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# PREDICATE RAISING AND THETA RELATIONS

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## 1. Introduction

In Saito and Hoshi (1998, 2000), where we discussed the light verb construction and the stative complex predicate construction in Japanese, we argued for the following conclusions:

- (1)a. The need for theta-role assignment can be the trigger for predicate raising. That is, a head can adjoin to another head in order to discharge its theta-roles.
- b. Two heads can assign theta-roles to a single NP in an appropriate configuration.

The purpose of this paper is to develop this theory by applying it to other phenomena. I will show that with slight modification, the theory captures some properties of the Edo serial verb construction (Baker and Stewart 1999), Chinese resultative V-V compounds (Li 1990, Huang 1992), and Japanese lexical V-V compounds (Kageyama 1993, Nishiyama 1998).

In the following section, I will present a slightly revised version of the analysis proposed in Saito and Hoshi (1998, 2000). Then, in Section 3, I will discuss the Edo serial verb construction and the Chinese V-V compound construction. I will show that some differences between these two constructions automatically follow from our theory. In Section 4, I will argue that the theory can be extended to the Japanese lexical V-V compounds. There, I will suggest that contrary to the prevailing view, those lexical compounds are formed in the syntax. Section 5 concludes the paper.

## 2. Head Movement for Theta-Role Assignment

### 2.1. Japanese Light Verb Construction

The Japanese light verb construction is exemplified in (3b) and (4). In this construction, the verb *su* is void of meaning and theta-role assignment is done by the nominal head of the

object NP.

- (2) Mary-ga [NP (suugaku-no) syukudai]-o sita (= su + ta (past))  
 -NOM math -GEN homework -ACC did

'Mary did the (math) homework' (heavy *su*)

- (3)a. Mary-ga (kyonen) John-to kekkon -sita  
 -NOM last year -with marriage-did (married)

- b. Mary-ga (kyonen) John-to [NP kekkon] -o sita  
 -NOM last year -with marriage-ACC did

'Mary married John (last year)'

- (4) Mary-ga John-ni/-e [NP toti-no zyooto]-o sita  
 -NOM -to/-to land-GEN giving -ACC did

'Mary gave a piece of land to John'

Important generalizations on this construction are presented in Grimshaw and Mester

(1988). They are shown in (5).

- (5)a. At least one internal theta-role of the noun must be assigned to an argument outside the NP.  
 b. If a theta-role T is assigned outside the NP, then all theta-roles that are higher than T in the thematic hierarchy must also be assigned outside the NP.

(6a-b) illustrate the generalization in (5a).

- (6)a. ?Mary-ga [NP John-to -no kekkon] -o sita (cf. (2))  
 -NOM -with-GEN marriage-ACC did

'Mary married John' (heavy *su*)

- b. ?Mary-ga [NP John-e -no toti-no zyooto]-o sita  
 -NOM -to-GEN land-GEN giving -ACC did

'Mary gave a piece of land to John' (heavy *su*)

These examples are marginally allowed, but only with the interpretation where *su* is a theta-role assigner like the English main verb *do*. (6a) means "there is a specific act of getting married with John, and Mary did it." The sentence is out as an example of the light verb construction.

The examples in (7) clearly show that (5b) is valid with the thematic hierarchy 'agent >

goal > theme'.

- (7)a. ??Mary-ga John-ni/-e toti-o [NP zyooto]-o sita  
 -NOM -to/-to land-ACC giving -ACC did

- b. \*Mary-ga toti-o [NP John-e -no zyooto]-o sita  
 -NOM land-ACC -to-ACC giving -ACC did

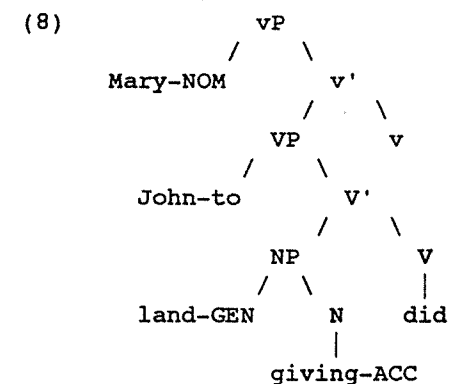
- c. \*John-ni/-e toti-o [NP Mary-no zyooto]-o sita  
 -to/-to land-ACC -GEN giving -ACC did

- d. \*Toti-o [NP Mary-no John-e -no zyooto]-o sita  
 land-ACC -GEN -to-GEN giving -ACC did

'Mary gave a piece of land to John'

(7a) is marginal because the sentence contains two accusative NPs. But (7b-d) are hopeless.

In Saito and Hoshi (2000), we proposed a covert predicate raising analysis for the construction. Let us consider the structure of (4) shown in (8).



According to this analysis, the nominal head 'giving' first assigns the theme role to 'land' within the NP. Then, it raises covertly to V and discharges its goal role to 'John'. Finally, the N-V complex raises to v and at this point, the N assigns the agent role to 'Mary'. The generalization in (5b) follows if the thematic hierarchy specifies the order in which theta-roles are discharged.

The following contrast constitutes independent evidence for the covert head movement analysis:

(9)a. [CP Op<sub>i</sub> [IP Mary-ga John-ni/-e t<sub>i</sub> zyooto-o sita] no] -wa  
 -NOM -to/-to giving-ACC did COMP-TOP

toti-o<sub>i</sub> da (cf. (7a))  
 land-ACC is

'It is a piece of land that Mary gave to John'

(Lit. It is a piece of land that Mary did giving to John.)

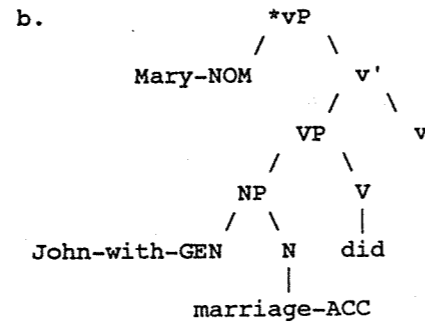
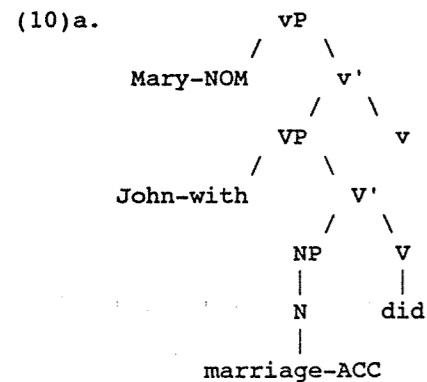
b. \*[CP Op<sub>i</sub> [IP Mary-ga John-ni/-e toti-o t<sub>i</sub> sita] no] -wa  
 -NOM -to/-to land-ACC did COMP-TOP

zyooto-o<sub>i</sub> da  
 giving-ACC is

(Lit. It is giving that Mary did a piece of land to John.)

(9a) shows that we can cleft the real object 'land' in (7a). On the other hand, the NP headed by the theta-role assigning noun cannot be clefted as (9b) shows. This contrast is expected. In (9b), the noun *zyooto* 'giving' must move to the position of *su* to discharge its theta-roles, but this movement is impossible.

Finally, the generalization (5a) can also be accommodated. Let us consider the structures of (2) and (6a) given in (10a) and (10b) respectively.



In (10a), the N 'marriage' needs to assign a theta-role to 'John-with'. Hence, the N raises to V, and the N-V complex moves to v. In (10b), on the other hand, the N has no reason to raise to V, but must move to v to discharge its external theta-role. If head movement requires a "reason" and is constrained by the head movement constraint illustrated in (11), then the movement of N that is necessary for theta-role assignment fails in the case of (10b).

(11)a. John has t<sub>v</sub> been here

b. \*John been has t<sub>v</sub> here

c. \*John is have t<sub>v</sub> here (Travis 1984)

The analysis of the light verb construction presented above supports the proposition in (1a), that is, that a head can adjoin to another head in order to assign theta-roles.

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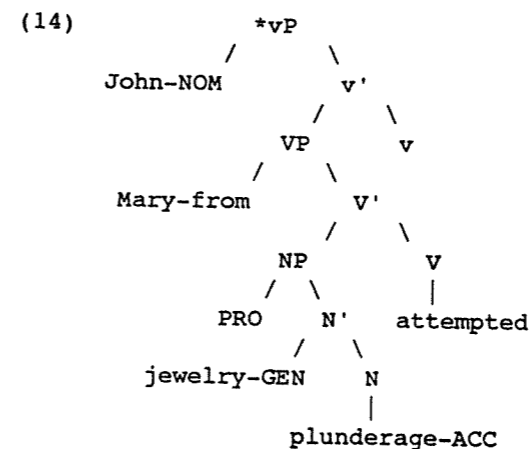
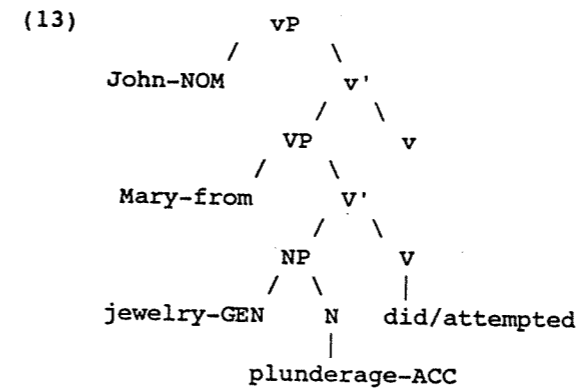
(12) a similar construction with obligatory control predicate  
 (Grimshaw and Mester 1988, Matsumoto 1996)

a. John-ga Mary-kara [NP hooseki-no ryakudatu]-o sita  
 -NOM -from jewelry-GEN plunderage-ACC did

'John stole jewelry from Mary'

b. John-ga Mary-kara [NP hooseki-no ryakudatu]-o kokoromita  
 -NOM -from jewelry-GEN plunderage-ACC attempted

'John attempted to steal jewelry from Mary'



(15) Both *ryakudatu* 'plunderage' and *kokoromita* 'attempted' assign their external theta-roles to *John-NOM* in (12b).

(*hazimeta* 'started', *oeta* 'finished', *tuduketa* 'continued')

## 2.2. Japanese Stative Complex Predicates

In Japanese, stative predicates assign nominative Case to their objects.

(16)a. *John-ga rosiago-o /\*-ga yomu*  
 -NOM Russian-ACC/ -NOM read

'John reads Russian'

b. *John-ga rosiago-ga /\*-o wakaru*  
 -NOM Russian-NOM/ -ACC understand

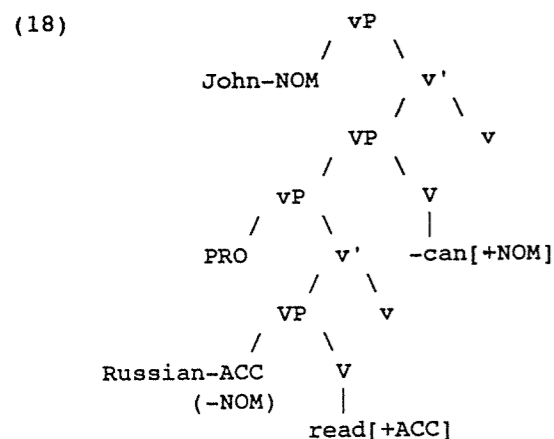
'John understands Russian'

When the predicate is complex, consisting of a non-stative verb and a stative predicate, the object can be either in accusative or nominative.

(17) *John-ga rosiago-o /-ga yom-eru*  
 -NOM Russian-ACC/-NOM read-can

'John can read Russian'

The account for the accusative object in (17) is rather straightforward. The following structure is standardly assumed.



However, the account for the nominative object in examples like (17) has been controversial.

Tada (1993) and Koizumi (1995) propose that the nominative object in (18) raises out of

the embedded vP so that its Case can be checked by the higher V or its associate v. They present Sano's (1985) observation in (19) as evidence for this analysis.

(19)a. *John-ga migime -dake-o tumur-eru*  
 -NOM right eye-only-ACC close-can

'John can close only his right eye'

(A) can > only (John can wink his right eye)

(B)?\*only > can (It is only his right eye that John can close)

b. *John-ga migime -dake-ga tumur-eru*  
 -NOM right eye-only-NOM close-can

(A) \*can > only (John can wink his right eye)

(B) only > can (It is only his right eye that John can close)

(19a) shows that when a quantificational object is accusative, it takes narrow scope with respect to 'can'. This is expected with the structure in (18). ((19a) is ambiguous for many. This can be attributed to the optional scrambling of the object out of the embedded vP.) On the other hand, when the object is nominative, it takes scope over 'can', as shown in (19b). Tada and Koizumi argue that this follows if nominative objects must move out of the embedded vP to have their Case checked.

There are some problems with the Tada-Koizumi analysis, however. The most serious is the fact that the Sano phenomenon is more general. When the object is nominative, not only the object itself but also other constituents take scope over 'can'. (20a-b) illustrate this point.

(20)a. *Taroo-wa me -o 0.001-byoo -dake ake-rareru*  
 -TOP eye-ACC -second-only open-can

(can > only, only > can)

b. *Taroo-wa me -ga 0.001-byoo -dake ake-rareru*  
 -TOP eye-NOM -second-only open-can

(?\*can > only, only > can)

'Taroo can open his eyes only for 0.001 seconds'

(20a) is ambiguous for me. One interpretation is that Taroo has a special ability to move his eyelids very quickly. (can > only) The other is that he cannot open his eyes for long (e.g. because his eyes are very sensitive to ultraviolet rays). (only > can) (20b), on the other hand,

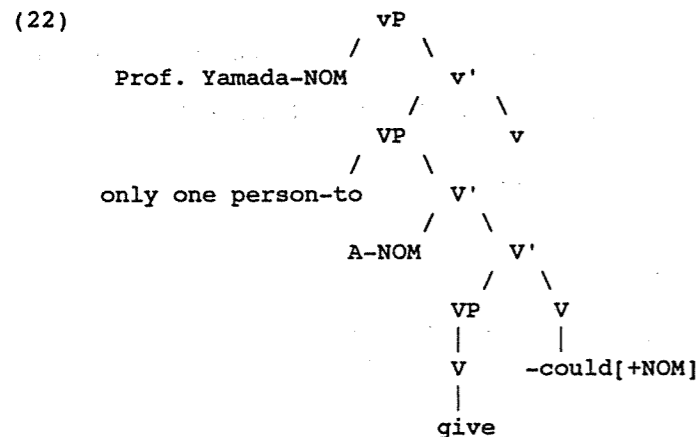
only has the latter interpretation. This shows that even adverbials take scope over 'can' when the object is nominative.

The pair in (21) points to the same conclusion.

- (21)a. Yamada-sensei -wa A-o hitori -dake-ni age -rareta  
 teacher-TOP -ACC one person-only-to give-could  
 (can > only, only > can)
- b. Yamada-sensei -wa A-ga hitori -dake-ni age -rareta  
 teacher-TOP -NOM one person-only-to give-could  
 (\*can > only, only > can)
- 'Prof. Yamada could give an A to only one student'

(21a) could imply that Prof. Yamada is an extremely tough grader (can > only), or that the students did not do well (only > can). (21b) only has the latter reading. Given examples like (20)-(21), the proponents of the Tada-Koizumi analysis would have to say that when the object is nominative, even the goal argument and adverbials must move out of the embedded vP in the structure in (18). This does not sound very plausible.

Considering the scope contrasts above, Saito and Hoshi (1998) propose the structure in (22) for (21b).



The idea is that when the object is nominative, it appears in the projection of 'can' to begin with. This automatically accounts for the nominative Case on the object. The verb 'give' adjoins to 'can' overtly so that a complex predicate is formed, and from this position discharges its theme and goal roles. We have seen that theta-roles can be assigned in this way in the

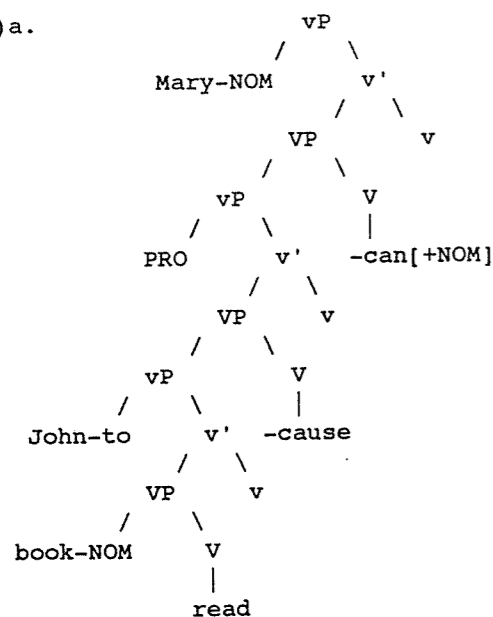
discussion of the light verb construction. The V-V complex raises to v covertly, and both Vs (with the aid of v) assign their external roles to 'Prof. Yamada'. Note that if the theme argument appears in the projection of the higher V, so should the goal argument because of the thematic hierarchy. If there is an analogue of thematic hierarchy for adverbials which forces them to appear in a position higher than the object, they too will have to appear in the projection of the higher verb.

This analysis implies that two verbs can discharge theta-roles to a single NP. If a verb with an external role assigns it together with v, as we assumed above, then both 'give' and 'can' assign theta-roles to the subject NP 'Prof. Yamada' in (22). Thus, this analysis motivates the proposition (1b).

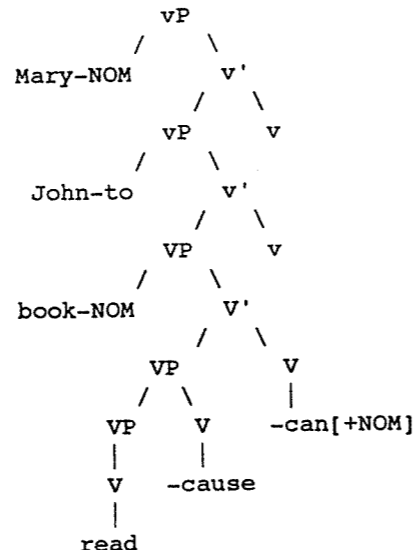
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- (23)a. Mary-ga John-ni hon -ga yom -ase -rareru  
 -NOM -to book-NOM read-cause-can  
 'Mary can make John read a book'
- b. Mary-ga John-ni Bill-ni hon -ga yom -ase -sase -rareru  
 -NOM -to -to book-NOM read-cause-cause-can  
 'Mary can make John make Bill read a book'
- (24)a. Mary-ga John-ni sono hon -o yom -asetu  
 -NOM -to that book-ACC read-caused  
 'Mary made John read the book'
- b. John-ga<sub>i</sub> Mary-niyotte t<sub>i</sub> sono hon -o yom -ase -rareta  
 -NOM -by that book-ACC read-cause-passive(past)  
 'John was made to read the book by Mary'
- c. \*Sono hon -ga<sub>i</sub> Mary-niyotte John-ni t<sub>i</sub> yom -ase -rareta  
 that book-NOM -by -to read-cause-passive(past)  
 (Lit. The book was made for John to read by Mary.)

(25)a.



b.



### 3. Resultative Constructions in Edo and Chinese

#### 3.1. The Edo Serial Verb Constructions

The Edo serial verb constructions are discussed in detail by Baker and Stewart (1999).

They argue that there are three kinds of serial verb constructions in this language.

(26)a. Òzó ghá gbè èwé khièn ùhùnmwùn érèn (covert coordination)  
Ozo FUT hit goat sell head its

'Ozo will kill the goat and sell its head'

b. Òzó ghá gbè èwé khièn (consequential SVC)  
Ozo FUT hit goat sell

'Ozo will kill the goat and sell it'

c. Òzó ghá gbè èwé wù (resultative SVC)  
Ozo FUT hit goat die

'Ozo will strike the goat dead'

(26a), which represents the first kind, contains two transitive verbs with their objects overtly expressed. The second kind, exemplified in (26b), also contains two transitive verbs but the object of the second verb is missing. (26c) is an example of the third kind, and the second verb is unaccusative. We are interested here in the third kind, which Baker and Stewart call the

resultative SVC. But before we get into the main discussion, let us briefly go over how the three kinds of serial verb constructions are distinguished.

According to Baker and Stewart, covert coordination and consequential SVC pattern differently with respect to the scope of the adverbials that appear right before the first verb. In the covert coordination (27a), the adverb 'quickly' modifies only the first verb-object pair. So, Ozo may noy have peeled the corn quickly.

(27)a. Òzó gié!gié gbó!ó ívin bòlò ókà  
Ozo quickly plant coconut peel corn

'Ozo quickly planted the coconut and [he] peeled the corn'

b. Òzó gié!gié dún!mwún èmà khièn!-né  
Ozo quickly pound yam sell -PL

'Ozo quickly pounded the yams and sold them'

In the consequential SVC (27b), on the other hand, 'quickly' modifies both of the verb-object pairs. This indicates that covert coordination involves coordination of larger constituents than consequential SVC. Adverbs also distinguish between consequential SVC and resultative SVC.

(28)a. Òzó lé èvbàré rhé!rhé ré  
Ozo cook food quickly eat

'Ozo cooked the food and quickly ate it'

b. \*Úyì gbé Òzó rhé!rhé wú  
Uyi hit Ozo quickly die

'Uyi beat Ozo so that he died quickly'

As shown in (28a), 'quickly' can be placed after the second verb in consequential SVC. (28b) indicates that this is impossible in the case of resultative SVC.

Baker and Stewart point out an even more striking difference between consequential SVC and resultative SVC: Only the latter involves true argument sharing. That is, in (26b) there is an empty object for the verb 'sell', but in (26c) the NP 'goat' serves as an argument for both 'hit' and 'die'. The evidence comes from the distribution of *tòbòrè* 'by self'. This element is associated with the NP that immediately precedes it. So, we have examples like those in (29a-c).

- (29)a. Òzọ tòbòrè ghá gié!gié lé èvbàré  
Ozo by self FUT quickly cook food  
'Ozo by himself will quickly cook the food'
- b. Òzọ ghá (gié!gié) tòbòrè lé èvbàré  
Ozo FUT quickly by self cook food
- c. Òzọ miànmián yá tòbòrè lé èvbàré  
Ozo forgot to by self cook food  
'Ozo forgot to cook the food by himself'

In (29b) the element is associated with the vP-internal trace of 'Ozo', and in (29c) with the vP-internal trace of the PRO controlled by 'Ozo'.

Let us now consider the examples in (30) in light of the distribution of 'by self'.

- (30)a. Òtàsówié dé éwù yó \_ tòbòrè  
Otasowie buy dress wear by self  
'Otasowie bought the dress and wore it by itself'
- b. \*Òzọ suá ògò dé \_ tòbòrè  
Ozo push bottle fall by self  
'Ozo pushed the bottle down by itself'

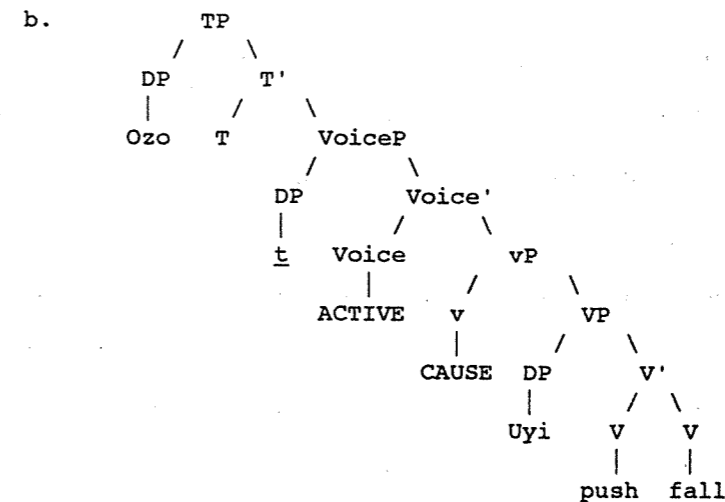
The consequential SVC in (30a) is fine, which indicates that the verb 'wear' is followed by an empty object that refers to the dress. On the other hand, there is no such empty object in the case of the resultative SVC in (30b), for otherwise the example should be fine. Note that an unaccusative verb can be followed by 'by self' when there is a trace in the object position.

- (31) Úyì dé \_ tòbòrè  
Uyi fall by self  
'Uyi fell by himself'

Thus, (30b) indicates that there is not even a trace following 'die' in (26c), and that 'die' assigns its theme role directly to the NP 'goat' in this example.

Then, how does 'goat' receive theta-roles from both 'hit' and 'die' in (26c)? Baker and Stewart propose "double-headed structures" for all of the serial verb constructions in (26). In particular, they assign the structure in (32b) to the resultative SVC in (32a).

- (32)a. Òzọ suá Úyì dé  
Ozo push Uyi fall  
'Ozo pushed Uyi, causing him to fall'



In this structure, the VP is double-headed, which allows both 'push' and 'fall' to assign theta-roles to 'Uyi'.

Although (32b) successfully accounts for the object sharing between 'push' and 'fall', it does not quite capture all of Baker and Stewart's insights on the resultative SVC. They write,

- (33) "..., the second verb of an RSVC [resultative SVC] has a somewhat paradoxical behavior: it acts as the complement of the first verb in some respects and as its cohead in other respects." (p.44)

That is, the second verb 'fall' in (32) not only assigns a theta-role to 'Uyi' but also serves as the complement of the first verb 'push'. To substantiate this claim, Baker and Stewart point out that the second verb shares the distribution of a delimiting goal expression, which "must be generated in the (unique) complement position of V" (p.41). Thus, a sentence cannot have two delimiting goal expressions as shown in (34a).

- (34)a. \*Òzọ fí àkhé yè òtíkù fuá  
Ozo throw pot in trash away



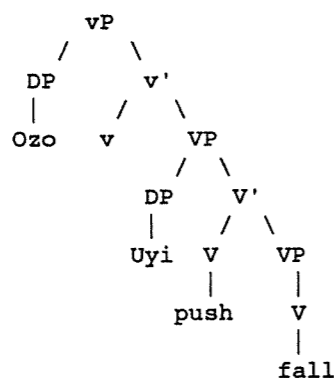
b. \*Òzò fí àkhé fuá guòghó  
 Ozo throw pot away break

'Ozo threw the pot away so that it broke'

(34b) shows that the second verb cannot cooccur with even one, which suggests that the second verb in resultative SVC occupies the (unique) complement position of the first verb. The structure in (32) does not at least directly represent this structural relation.

Given the discussion in the preceding sections, however, an alternative analysis of resultative SVC suggests itself. In the discussion of the Japanese light verb construction, we have seen that a head can adjoin to another head in order to discharge its theta-roles. Further, we have seen evidence from the stative complex predicate construction that two heads can assign theta-roles to a single NP. These proposals make it possible to assume the structure in (35) for (32a).

(35) an alternative:



Here, 'push' first discharges its theme role to 'Uyi'. It then overtly moves to v, which accounts for the surface word order. At this point, it assigns the agent role to 'Ozo' together with v. The second verb 'fall' covertly adjoins to the initial position of the first V, and assigns its theme role to 'Uyi'. Thus, (35), like (32b), successfully accounts for the object sharing. Further, in (35), the second verb is literally the complement of the first. It then seems to be an improvement over (32b).

The proposal above also enables us to explain another interesting property of resultative SVC. Baker and Stewart report that only transitive-unaccusative and unaccusative-unaccusative patterns are attested in this construction. An example of the unaccusative-unaccusative

combination is shown in (36).

(36) Òmó dé (\*gié!gié) wú  
 child fall quickly die

'The child fell and (\*quickly) died'

Examples of this kind can be given basically the same structure as (35), but without the v-projection. More interesting are the missing cases, especially the fact that the second verb can never be unergative.

- (37)a. \*unaccusative-transitive, \*unaccusative-unergative  
 (the absence of v in the structure)
- b. \*unergative-transitive, \*unergative-unaccusative  
 (the absence of Case checker for the object)
- c. The transitive-transitive case is factually unclear.
- d. \*transitive-unergative, \*unergative-unergative

The examples in (38) and (39) show that the transitive-unergative and the unergative-unergative combinations are impossible.

(38)a. \*Òzò suá Úyi só  
 Ozo push Uyi shout

'Ozo pushed Uyi, causing him to shout'

b. \*Ékítà khú áhiánmwèn tìn  
 dog chase bird fly

'The dog chased a bird, causing it to fly'

(39)a. ... \*Òzò gié!gié rhú!lé sá!án  
 Ozo quickly run jump

'(To win the athletic contest), Ozo quickly ran and jumped'

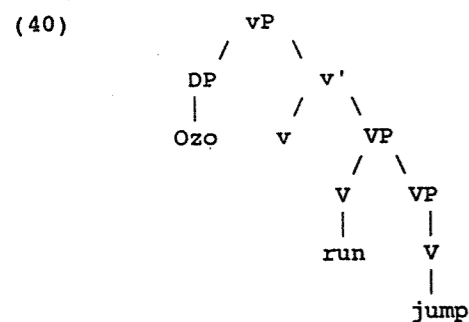
b. ... \*áhiánmwèn gié!gié tìn só  
 bird quickly fly shout

'(To protect her babies), the bird quickly flew and shouted'

The ungrammaticality of (38) follows from the Baker-Stewart analysis in (32b). In (38a), for example, 'Uyi' will be in an internal argument position for both 'push' and 'shout'. But

'shout' is unergative and must assign an external role. If a verb can assign an external role only with the aid of *v* (or Voice), then 'shout' fails assign a theta-role to 'Uyi'. Virtually the same analysis is possible with the analysis in (35). The second verb 'shout' cannot assign its theta-role to 'Uyi' by adjoining to the first verb because the NP is in an internal argument position.

The structure in (35) makes it possible to provide a unique account for (39), however. The structure of (39a), for example, will be as in (40).



Here, 'run' moves overtly to *v*, and jointly assigns the external role to 'Ozo'. What about 'jump'? It has no reason to move to the initial position of 'run', but must move to *v* to assign its external role to 'Ozo'. This means that if head movement requires a "reason," 'jump' must move directly to *v* skipping the head *V* of the higher VP. Then, the required movement of 'jump' in (40) necessarily violates the head movement constraint, and the verb fails to discharge its external theta-role.

Note that the account proposed above for (39) is identical in form to our account for the Grimshaw-Mester generalization (5a) on the Japanese light verb construction. In both cases, a head needs to move to *v* to properly assign its external role, but the movement is blocked by an intervening *V*. We thus have a unified explanation for two apparently unrelated phenomena.

### 3.2. Chinese Resultative V-V Compounds

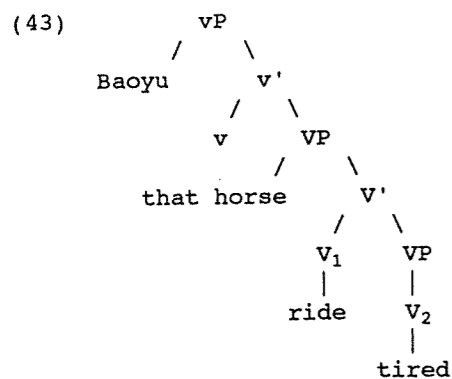
I proposed above that (40) is out because 'jump' has no reason to move to the position of the first verb, and hence, must skip this position. This implies that if in some language the second verb has an independent reason to move to the position of the first verb, the counterpart of (40) should be allowed in that language. This prediction in fact seems to be borne out by

Chinese, although it is difficult to construct exact minimal pairs with Edo and Chinese.

Chinese has a productive resultative V-V compound construction as discussed in detail in Li (1990, 1993) and Huang (1992). The examples in (41) are from Li (1990), and those in (42) are from Huang (1992).

- (41)a. Baoyu xia -shu -le qi  
 play-lose-asp chess  
 'Baoyu played chess (and as a result he) lost it'
- b. Baoyu qi -lei -le neipi ma  
 ride-tired-asp that horse  
 'Baoyu rode the horse (and as a result the horse got) tired'  
 'Baoyu rode the horse (and as a result he got) tired'
- c. Daiyu ku -zou -le henduo keren  
 cry-leave-asp many guest  
 'Daiyu cried (so much that) many guests left'
- (42)a. Ta chi-bao (fan) le  
 he eat-full rice asp  
 'He ate (rice) and got full'
- b. Ta he -zui (jiu) le  
 he drink-drunk wine asp  
 'He drank (wine) and got drunk'

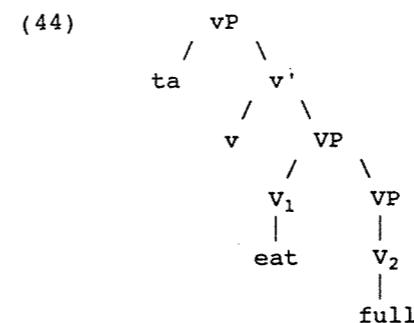
As these examples indicate, the Chinese construction is very productive. It allows the transitive-transitive combination as in (41a), and also examples like 'run the pavement thin' in English as (41c) shows. I do not have much to say about these facts, except that they seem to indicate that Chinese is more "generous" in its Case system than languages like Edo. But I would like to take up the fact that (41b) is ambiguous, and also the fact that (42a-b) are grammatical. Let us first consider (41b), whose structure is shown in (43).



This structure is exactly like the Edo (35). Hence, we predict that 'tired' can raise to the position of V<sub>1</sub> and theta-mark 'that horse'. This results in the reading where it is the horse that became tired. But the example allows another reading, which is that Baoyu rode the horse and as the result Baoyu became tired. This requires 'tired' to raise to v, and assign its theta-role to 'Baoyu'. And this looks similar to what was impossible in the Japanese light verb construction and the Edo resultative SVC, that is, head movement across another head. Then how is this interpretation possible?

There is one crucial difference between the Chinese V-V resultative construction on the one hand, and the Japanese light verb construction and the Edo resultative SVC on the other. The Chinese construction involves V-V compounds. This means that the second verb adjoins to the first overtly due to a morphological reason. So, independently of the theta requirements, 'tired' in (43) adjoins to 'ride', and then the V-V complex moves to v in overt syntax. If 'tired' discharges its theta-role to 'that horse' at the point it adjoined to 'ride', we obtain the interpretation where the horse gets tired. On the other hand, if 'tired' assigns its theta-role to 'Baoyu' after the 'ride-tired' complex adjoins to v, then 'Baoyu' will be the one that becomes tired. Hence, in (43), 'tired' can assign its theta-role to 'Baoyu' without moving across another head. The ambiguity of (41b), thus, follows from the fact that morphology requires the second verb to adjoin to the first, independently of theta-role assignment.

Huang's examples in (42) can be analyzed in the same way. Let us take (42a) without the object 'rice'.



The second verb 'full' overtly adjoins to 'eat' so that the compound 'eat-full' is formed. The compound then raises to v. The two verbs at this point assign their theta-roles to 'he'. Hence, the example can be derived without a violation of the head movement constraint. The apparently problematic examples, then, actually provide supporting evidence for the analysis proposed in the preceding sections.

#### 4. Japanese V-V Compounds

##### 4.1. The Initial Hypothesis

Japanese V-V compounds, which are discussed in detail in Kageyama (1993) and Li (1993), also provide a good testing ground for the analysis proposed so far. They are similar to the Chinese resultative V-V compounds, but as we will see later in this section, require a different analysis. I will argue in this section that they too provide supporting evidence for the proposals made in Section 2, but in a different way.

Some examples of Japanese V-V compounds from Kageyama (1993) are listed below.

(45)a. transitive-transitive:

kai-toru (buy-take), nigiri-tubusu (grasp-crash)

b. unergative-unergative:

take-yoru (run-go close to), tobi-oriru (jump-go down)

c. unaccusative-unaccusative:

suberi-otiru (slip-fall), umare-kawaru (be born-change)

d. unergative-transitive:

naki-harasu (cry-make swollen), warai-tobasu (laugh-fly)

(e. transitive-unergative:)

moti-aruku (carry-walk), nomi-aruku (drink-walk)

As the list shows, the possible patterns of the combination of verbs are quite extensive as in Chinese. We expect this because we are dealing with V-V compounds again as in the case of Chinese.

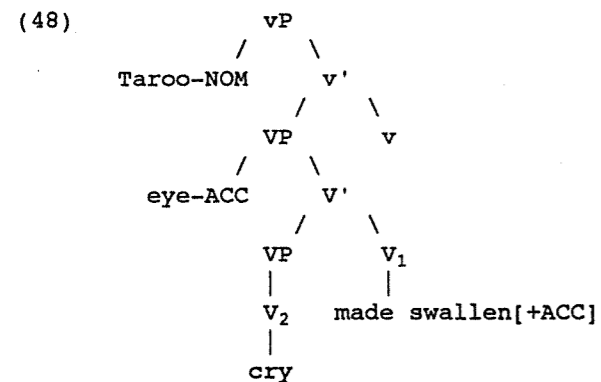
At first sight, it appears that the analysis of Chinese resultative V-V compounds can be applied directly to Japanese. Let us take *naki-haras* 'cry-make swollen'. As shown in (46), *nak* is unergative and *haras* is transitive.

- (46)a. Taroo-ga naku  
 -NOM cry  
 'Taroo cries'
- b. Taroo-ga me -o harasita  
 -NOM eye-ACC made-swollen  
 'Taroo made his eyes swollen'

The compound appears in examples like (47).

- (47) Taroo-ga me -o naki-harasita  
 -NOM eye-ACC cry -made swollen  
 'Taroo cried, and as a result, made his eyes swollen'

A possible structure for (47) is shown in (48).



Here, 'cry' must assign a theta-role to 'Taroo'. This is possible because it raises overtly to the position of 'make swollen' to form a compound. If the V-to-v movement is covert in Japanese

as I have been assuming, the V-V complex raises to v in the covert component and each verb assigns its external role to 'Taroo'. As in the case of the Chinese examples in (41b) and (42a-b), no head movement across another head is required.

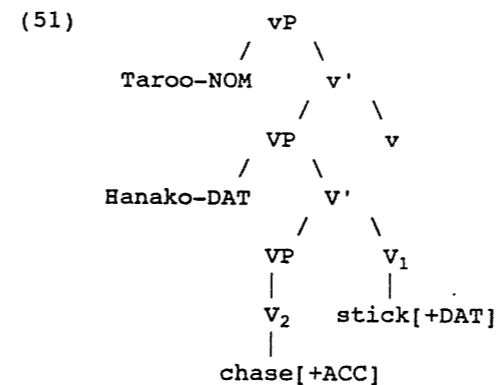
The behavior of *oi-tuk* 'chase-stick (catch up)' is very illuminating. The two component verbs take an accusative object and a dative object respectively.

- (49)a. Taroo-ga Hanako-o ou  
 -NOM -ACC chase  
 'Taroo chases Hanako'
- b. Goei -ga Hanako-ni tuku  
 guard-NOM -DAT stick  
 'A guard keeps close to Hanako'

The compound takes a dative object, and never an accusative object.

- (50) Taroo-ga Hanako-ni oi -tuku  
 -NOM -DAT chase-stick  
 'Taroo catches up with Hanako'

This fact in fact follows from our analysis. The structure of (50) would be as in (51).

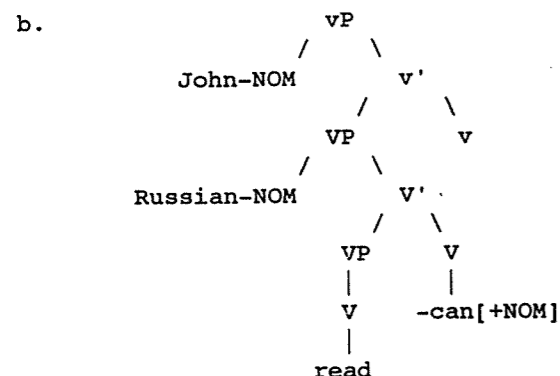


The verb 'chase' adjoins overtly to 'stick'. Both verbs assign their internal theta-roles to 'Hanako'. Then, in the covert component, the V-V compound raises to v, and at this point, both verbs assign their external theta-roles to 'Taroo'. So, the theta-role assignment is straightforward. Then, why is it that 'Hanako' in (51) is in dative and not accusative? Recall the analysis of stative complex predicates with nominative objects. According to Saito and

Hoshi (1998), the structure of (52a) is as in (52b).

(52)a. John-ga rosiago-ga yom-eru  
 -NOM Russian-NOM read-can

'John can read Russian'



Here, 'read' adjoins to 'can' to form a complex predicate, and discharges its internal theta-role from the adjoined position. Hence, 'Russian-NOM' is an argument of 'read'. But it is in nominative because it is in the projection headed by the stative verb 'can'. So, by hypothesis, the higher verb determines the Case of the object. We then should expect 'Hanako' in (50) to be in dative.

#### 4.2. What are Lexical Compounds?

We have seen that the analysis of Chinese resultative V-V compounds seems to extend successfully to Japanese V-V compounds. However, there is one problem. Kageyama (1993) argues persuasively that Japanese V-V compounds are not formed by incorporation (head raising) in syntax but instead are lexical compounds. (Hence, they are called V-V compounds as opposed to complex predicates.)

One of his arguments is based on the distribution of the phrase *soo su* 'do so'. He hypothesizes that complex predicates of the forms *V-sase* 'V-cause', *V-(rar)e* 'V-can', *V-ta* 'V-want' are generated from a complex syntactic structure through incorporation. This accounts for the fact that *soo su* can combine with the causative *sase*, the potential *(rar)e*, and the desiderative *ta*.

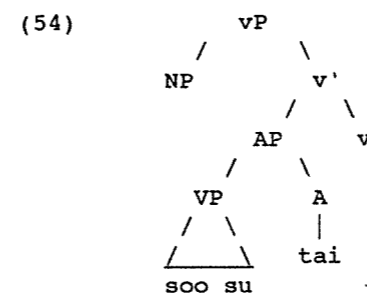
(53)a. *soo s -aseru*  
*so do-cause(pres)*

'cause to do so'

b. *soo si-tai*  
*so do-want(pres)*

'want to do so'

(53b), for example, can be generated with the the following structure.



Here, *soo su* is the VP, and the complex predicate *si-tai* is formed by the incorporation of the verb *su* to the adjective *tai*.

On the other hand, V-V compounds are incompatible with the *soo su* form.

(55)a. \**soo si-harasu*  
 \**so do-make swollen(pres)*

'make swollen by doing so'

b. \**soo si-oriru*  
 \**so do-go down(pres)*

'go down by doing so'

c. \**soo si-otiru*  
 \**so do-fall(pres)*

'fall by doing so'

This is mysterious if V-V compounds are formed by incorporation exactly like complex predicates. Kageyama, then, concludes that V-V compounds are formed in the lexicon. If the second verbs in (55) never take a phrasal complement, there would be no way for them to combine with *soo su*.

Kageyama further offers an explanation for why the resultative V-V compounds in Japanese cannot be formed by incorporation. (See also Li 1993.) Let us compare the Chinese

(56a) and the Japanese (56b).

(56)a. Baoyu qi -lei -le neipi ma  
ride-tired-asp that horse

'Baoyu rode the horse (and as a result the horse got) tired'

'Baoyu rode the horse (and as a result he got) tired'

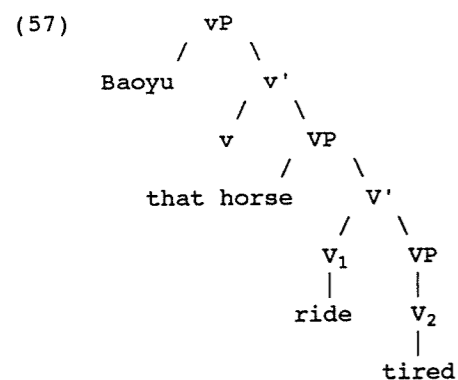
cause-result -> head-complement -> incorporation possible -> syntactic

b. Taroo-ga me -o naki-harasita  
-NOM eye-ACC cry -make swollen

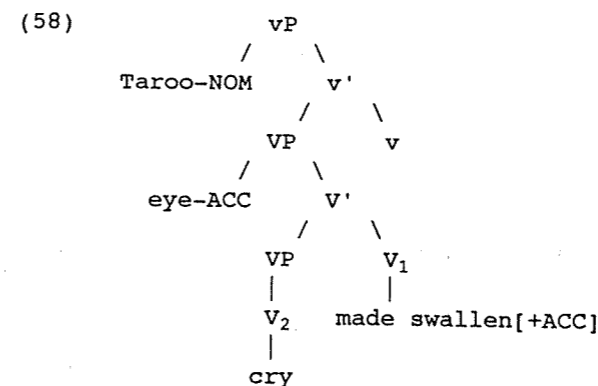
'Taroo cried (and as a result he) made his eyes swollen'

cause-result -> modifier-head -> incorporation impossible -> lexical

In both cases, the first member of the compound expresses the cause and the second the result. It is argued persuasively by Carrier and Randall (1992) and others that in a resultative construction the result phrase can be the complement of the verb expressing the cause. Since Chinese is head-initial in the verb-complement structure, (43), repeated below in (57), is in fact a possible structure for (56a).

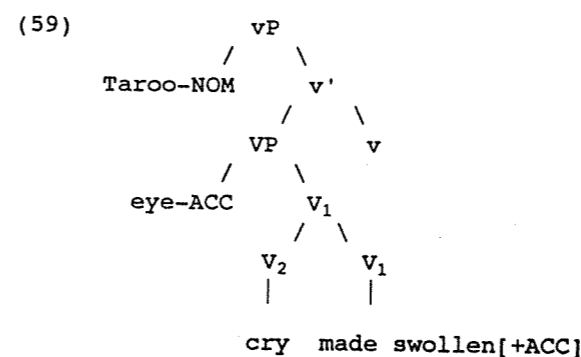


On the other hand, Japanese is uniformly head-final. So, in (48), repeated as (58), the verb expressing the result takes the cause phrase as the complement.



But this, Kageyama argues, should be impossible. The embedded VP in (48) is after all a reason phrase, and hence, should be an adjunct rather than a complement. If the embedded VP is an adjunct, the derivation of (56b) by incorporation should be impossible: it is shown in Baker (1986) that incorporation takes place only from complements. Thus, Kageyama concludes that Japanese resultative V-V compounds are formed in the lexicon for a principled reason.

The arguments of Kageyama (1993) summarized above are quite convincing. This means that we cannot maintain the structure in (58) for (56b). But does this necessitate a radically different analysis? The answer seems negative. In (57), the embedded VP is there only to express the head-complement relation of V<sub>1</sub> and V<sub>2</sub>. The second verb discharges its theta-role after it moves to a higher head. Then, for the Japanese (56b), the following alternative structure should be possible because the first verb is not a complement of the second.



Here, V<sub>2</sub> is directly adjoined to V<sub>1</sub> in the syntactic derivation, which expresses the adjunct-head relation between the two verbs. The theta-role assignment proceeds as before. The V-V

complex raises to v, and at this point, both verbs assign their external theta-roles to 'Taroo'.

If the above analysis is correct, then the Japanese resultative V-V compounds provides yet another piece of supporting evidence for the hypothesis that a head can discharge its theta-roles from a position adjoined to another head. Further, the compound in (59) is formed in the syntax by direct merger (adjunction) of the two heads. Thus, we can say that the difference between the complex predicates and lexical V-V compounds is not in whether they are formed in the syntax or in the lexicon. They are both formed in syntax. The difference is instead in how they are formed. Complex predicates are formed by head movement, and V-V compounds are formed by direct merger.

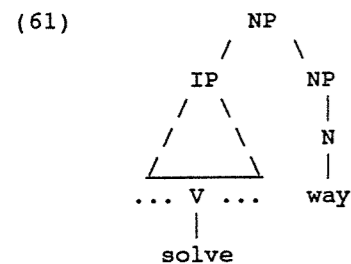
"Word formation" by direct merger was in fact suggested in Saito and Hoshi (1998). The idea is pursued further in Hoshi (1999), who discusses the following examples among others.

(60)a. John-ga [suugaku-no mondai]-o toku houhou  
 -NOM math -GEN problem-ACC solve way

b. John-no [suugaku-no mondai]-no toki -kata  
 -GEN math -GEN problem-GEN solve way

'the way John solves math problems'

(60a-b) express the same "meaning." (60a) is a complex NP containing a prenominal sentential modifier. Its rough structure is shown in (61).

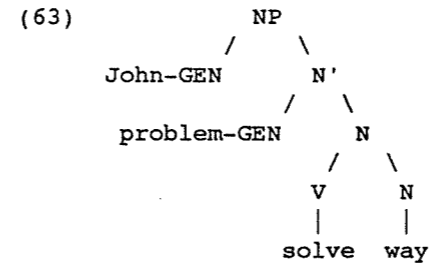


As expected, the subject and the object of the modifying clause appear in nominative and accusative respectively.

In (60b), on the other hand, 'solve' and 'way' form a word. If this word can be created by head movement, we should predict that the Case pattern of (60b) can be the same as in (60a). However, this is impossible: both the subject and the object must be in genitive Case.

(62) \*John-ga [suugaku-no mondai]-o toki -kata  
 -NOM math -GEN problem-ACC solve way

This is not surprising, Hoshi argues, because the modifying clause in (61) is an adjunct and head movement out of an adjunct is generally prohibited. He then proposes the following structure for (60b).



In (63), 'solve' is directly adjoined to 'way'. This represents the modification relation. The verb 'solve' assigns its theme role and agent role to 'problem' and 'John' respectively from the adjoined position. Because the head of the complex noun 'solve-way' is the noun 'way', the arguments 'problem' and 'John' both appear in genitive Case. Thus, Hoshi's analysis of (60b) is virtually identical to the analysis of Japanese resultative compounds proposed above. It shows that "word-formation by direct adjunction" is quite productive in Japanese.

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(64) Kageyama's transitivity harmony principle

a. \*unaccusative - transitive/unergative

(b. \*transitive/unergative - unaccusative) - excluded universally.

(65) The selectional properties of v must be satisfied when it is merged.

## 5. Conclusion

In this paper, I have discussed and provided further supporting evidence for the following proposals in Saito and Hoshi (1998, 2000):

(66)a. The need for theta-role assignment can be the trigger for predicate raising. That is, a head can adjoin to another head in order to discharge its theta-roles.

- b. Two heads can assign theta-roles to a single NP in an appropriate configuration.

I argued that the theory successfully captures some properties of the Edo resultative serial verb construction. Then I showed that it correctly explains the fact that the Chinese resultative V-V compound construction allows the combination of verbs that are impossible in Edo. Finally, I discussed V-V compounds in Japanese in some detail, and showed that they too receive a simple analysis under this theory. In particular, I argued that Japanese complex predicates and V-V compounds are both formed in the syntax by adjunction. Their differences are attributed to the way the adjunction structure is formed: complex predicates are formed by head-movement, and V-V compounds by direct merger of two heads.

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