Resultatives and What They Describe

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1. Introduction

A sentence with a resultative phrase must describe an event in which some participant of the event undergoes a change of state: otherwise, there would be no argument for the resultative phrase to describe. At the same time, there seem to be syntactic or semantic constraints on what can be the argument of a resultative phrase, and it is hardly the case that any participant can be described by a resultative phrase only if it conceivably undergoes a change. The question is, then, what are those constraints that determine which argument a resultative phrase can or cannot be predicated of, and what makes it possible for the speaker to interpret the predication relation between resultative phrases and arguments of verbs.

Resultative phrases in Japanese are generally believed to conform to the Direct Object Restriction just like English: that is, they describe the direct object if verbs are transitive. However, some exceptions have occasionally been pointed out, and this paper investigates those exceptions by focusing on resultative phrases that appear in sentences headed by a locative alternation verb. Locative alternation verbs involve two arguments both of which undergo a change of state. Each variant of the alternative syntactic structures takes one of the arguments as the direct object. It will be shown that resultative phrases can be predicated of not only the argument expressed as direct object, but also of the other argument that appears as an oblique complement regardless of which alternative syntactic structure they appear in. Thus, it is claimed that in Japanese, the predication relation of resultative phrases is not determined by the grammatical function of arguments as generally believed, but rather by the lexical semantics of the verbs.

2. The resultative construction in Japanese

It has been long understood (e.g., Tsujimura 1990; Koizumi 1994; Kageyama 1996, 2001; Washio 1997) that resultative phrases in Japanese come in two types: object-oriented resultative phrases with a transitive verb, e.g., *Taro-ga kabin-o konagona-ni kowasi-ta* 'Taro broke a vase into pieces,' which describe the referent of direct object, and subject-oriented resultative phrases with an unaccusative intransitive verb, e.g., *Taro-ga aka-ku hiyakesi-ta* '(lit.) Taro sunburnt red,' which describe the subject. These two types of resultative phrases conform to the general constraint on the predicate relation expressed by resultative phrases in English, originally observed and analyzed by Simpson (1983), later dubbed Direct Object Restriction (Levin and Rappaport Hovav 1995; the DOR henceforth).

Since resultative phrases describe a resultant state of an argument following the event denoted by the

verb, verbs which allow a resultative phrase must generally express an event involving a change of state. Various authors have attempted to identify the exact class of such verbs, and conclude that the Japanese resultative construction requires the class of verbs whose lexical semantics obligatorily express, rather than just imply, a change of state of an argument. Koizumi (1994) calls those verbs "affected-theme transitives." Kageyama (1996, 2001), in the framework of Lexical Conceptual Structure (e.g., Jackendoff 1990), identifies a class of "change-of-state verbs," which crosscuts both aspectually telic and atelic verbs, and both transitive and intransitive verbs.

Both in English and Japanese, the resultant state described by a resultative phrase is often predictable, or "canonical" or "generic" (Wechsler 1997: 309), and Green (1972), for example, proposes that the lexical representation of the verbs contains a reference to a specific result. Such resultative phrases, which describe a predictable result, are called "weak resultatives" by Washio (1997) and "Type B resultatives" by Iwata (2006) as opposed to "strong resultatives" or "Type A resultatives," which express unpredictable result. According to Washio, Japanese resultative construction is more limited than English in that it allows only weak resultatives. Wechsler (1997) analyzes that, in English, resultative phrases that express an unpredictable result are allowed only with verbs followed by a non-subcategorized NP such as *I laughed myself sick* and *I ate him out of house and home*, i.e. the third type in Simpson's analysis of English resultative phrases (Simpson 1983: 146-147). If Wechsler's analysis has a cross-linguistic implication, it is consistent with Washio's observation that Japanese lacks strong resultatives since Japanese lacks this type of resultative construction with a non-subcategorized NP. Thus, in the resultative construction in Japanese, verbs entail a state change of an argument, and resultative phrases describe a predictable result of such a change.

3. Locative alternation verbs

Levin (1993: 118) characterizes the locative alternation verbs as describing events of "covering surfaces and putting things into containers." Those verbs involve two internal arguments: one refers to what undergoes motion and the other to the goal of motion. They are called locatum and location arguments as coined by Clark and Clark (1979), and are used here simply to identify the participants involved in the event described by the verb. No theoretical claim is intended that they are thematic role labels, or associated with specific grammatical functions. As many authors argue (e.g., Pinker 1989), verbs' ability to participate in the locative alternation is lexically determined: they describe the events where both arguments are perceived to concurrently undergo a change of state or position. It is the simultaneous changes that give rise to alternative syntactic structures that map a distinct argument to the direct object.

The DOR predicts that the resultative phrase is predicated of the direct object. Consequently, if a resultative phrase appears with locative alternation verbs, it is predicted to describe the locatum argument in the locatum-object variant, and of the location argument in the location-object variant. Various authors have confirmed that it is in fact the case in English as shown in (1). (In the following examples, resultative phrases are underlined while the NPs whose referents are described by resultative phrases are in bold.)

(1) a. *John loaded the hay into **the wagon** _full_. (locatum-object variant) (Williams 1980: 204)

     b. John loaded **the wagon** _full_ with hay. (location-object variant)

The resultative phrase _full_ is location-oriented, i.e. describing the location argument _the wagon_, and as expected, it is acceptable when the location argument is expressed as the direct object as in (1b), but not in the locatum-object variant in (1a). Locatum-oriented resultatives exhibit a complementary distribution and are acceptable only in the locatum-object variant as in (2).

(2) a. John sprayed **paint** _thick_ on the wall. (locatum-object variant)

     b. *John sprayed the wall with **paint** _thick_. (location-object variant)

It is argued that Japanese also has locative alternation verbs similar to English (Kageyama 1980; Fukui et al. 1985; Kishimoto 2001a, 2001b; Iwata 2008). The corpus data, however, show that the resultative phrases exhibit different patterns from English: with locative alternation verbs, resultative phrases can be predicated of either the locatum or the location argument regardless of which syntactic variant they appear in. As discussed before, what makes the alternation possible is the fact that the locative alternation verbs describe the events that are perceived to involve concurrent changes of the locatum and location arguments. Consequently, it is not surprising if a resultative phrase describes a result of change of either argument as far as semantics is concerned. The following sections confirm that some instances of the resultative construction in Japanese defy the DOR as pointed out by some authors, and furthermore show that their occurrences are more systematic and regular than those authors assume.

4. Resultatives with locative alternation verbs

Nitta (2002) and Miyakoshi (2006) have pointed out some resultative phrases are predicated of an oblique NP suffixed by -_ni_ 'on, in, to,' rather than the direct object, as shown in Nitta's example in (3).

(3) _otoko-wa_   **_kabe_-_ni_**   _penki-o_   <u>_aka-ku_</u>   _nut-ta_. (Nitta 2002: 52)

     man-TOP   wall-LOC   paint-ACC   red-KU   smear-PAST

     '(lit.) The man smeared paint on the wall (so that it became) red.'

The resultative phrase _aka-ku_ 'red' describes the oblique NP _kabe_ 'wall' rather than the direct object _penki_ 'paint,' and the acceptability contrasts with the pair of examples in English in (1).

     Nitta (2002) characterizes (3) as _ni_-marked NP resultative and Miyakoshi (2006) characterizes a similar example as a goal-oriented resultative, both focusing on the NP which the resultative phrase is predicated of. However, a larger picture emerges when attention is turned to the verb. The Japanese verb _nut-ta_ 'smeared, painted' is a locative alternation verb like the English verbs _spray_ and _smear_. Instead of _penki_ 'paint,' the location argument _kabe_ 'wall' can be expressed as direct object as shown in (4), in which case the locatum argument appears as _de_-marked oblique NP.

(4)　location-oriented resultative in location-object variant

otoko-wa	**_kabe-o_**	*penki-de*	<u>*aka-ku*</u>	*nut-ta.*
man-TOP	wall-ACC	paint-with	red-KU	smear-PAST

'The man smeared the wall red with paint.'

The resultative phrase is still predicated of *kabe* 'wall' in (4), as predicted by the DOR. Syntactically, there is no clue that indicates that the resultative phrase is predicated of the oblique NP in (3) and the direct object in (4). As discussed in Section 2, resultative phrases in Japanese only allow a description of a predictable result of the change that an argument undergoes, i.e. "weak resultatives," and if the wall is painted, it is naturally predictable what becomes red is the wall. No ambiguity arises in either of the syntactic variants in (3) and (4).

　　While these examples demonstrate that the resultative phrase *aka-ku* 'red' describes the location argument, the corpus data show that resultative phrases can also be predicated of the locatum argument. The verb *mak-* 'wind, bandage' in examples (5) and (6) is a locative alternation verb in Japanese, unlike English counterpart *wind*, which is a non-alternating verb with the locatum argument as direct object (*He wound the chain around the pole* vs. **He wound the pole with the chain*).

(5)　locatum-oriented resultative in locatum-object variant

koros-are-nai-youni	*kaziya-ni*	*tanon-de*		
kill-PASS-not-in.order.to	blacksmith-to	ask-and		

kubittama-ni	<u>*atu-ku*</u>	**_kin-demo_**	*mai-te-oke.* [Nagai 1978]	
neck-to	thick-KU	gold-or.something	wind-and-leave	

'(lit.) In order not to be killed, ask a blacksmith to wind gold-or-something thick around your neck.'

The resultative phrase *atu-ku* 'thick' in (5) describes the thickness of gold put around the neck. Although the suffix *-demo* 'or something' suppresses the accusative marker *-o*, *kin-demo* 'gold or something' is the direct object of the verb, and the example conforms to the DOR. In (6), on the other hand, the locatum argument appears as a *de*-marked oblique NP of the same verb *mak-* 'wind' while the resultative phrase *atu-ku* 'tick' is still predicated of the locatum argument.

(6)　locatum-oriented resultative in location-object variant

ryoume-mo [...]	*sono*	*ue-o*	**_houtai-de_**	<u>*atu-ku*</u>	*mak-are-te* ... [Nijo 2000]
both.eyes-also	of.that	top-ACC	bandage-with	thick-KU	wind-PASS-and

'(lit.) As for both eyes, (I had) the top of them bound with a bandage thick and ...'

In so-called indirect or 'adversity' passive sentence in (6), the direct object is the *o*-marked NP *sono ue* 'the top of them [both eyes].' The resultative phrase *atu-ku* 'thick' describes not the direct object but the oblique NP *houtai* 'bandage.' If the verb is replaced by a non-alternating verb such as *kakus-* 'hide' and *husag-*

'close,' the same resultative phrase is unacceptable as shown in (7).

(7) *ryoume-mo [...]   sono   ue-o   **houtai-de**   <u>atu-ku</u>   kakus-/husag-are-te ...
     both.eyes-also   of.that   top-ACC   bandage-with   thick-KU   hide-/block-PASS-and
     '(lit.) As for both eyes, (I had) the top of them hidden/blocked with a bandage thick and ...'

Thus, the corpus data show that resultative phrases can also be predicated of the locatum argument whether it is realized as the direct object or a *de*-marked oblique NP in Japanese, while they are allowed only when the locatum argument is expressed as direct object in English as shown in (2). These examples clearly show that the oblique NPs described by resultative phrases are not limited to *ni*-marked NP or a goal argument as Nitta (2002) and Miyakoshi (2006) analyze. At the same time, however, they are not totally unrestricted as Iwata (2006) might be suggesting: "nothing prevents the result state from being predicated of an entity which emerges only in the course of an event" (Iwata 2006: 466). The predication relation of resultative phrases is clearly restricted by the lexical semantics of verbs as shown in the contrast between (6) and (7) although locative alternation verbs may not be the only verbs that allow resultatives to be predicated of oblique complements.

5. Resultatives with locative alternation verbs of removal

Locative alternation verbs of removal, e.g., *clear*, *clean* and *empty*, generally express an event in which the referent of locatum argument is removed from the referent of location argument. The direct object of the verbs alternates between the locatum and the location arguments as in (8).

(8) a. *John cleared dishes from the table*. (locatum-object variant)
     b. *John cleared the table of dishes.* (location-object variant)

In the locatum-object variant (8a), the location argument is expressed by a prepositional phrase headed by *from*, i.e. ablative PP, while in the location-object variant (8b), the locatum argument is expressed by a prepositional phrase headed by *of*, or "abstrument PP" coined by Hook (1983), for an oblique argument denoting a removed substance. Other verbs of removal, e.g., *wipe* and *rub*, also allow the alternation of the direct object, but unlike *clear*, they do not allow the locatum argument to be expressed overtly in the location-object variant: e.g., *John wiped the dishes* (**of dirt*).

Japanese locative alternation verbs are similar to English *wipe*-type verbs rather than to the *clear*-type in that the location-object variant does not overtly express the locatum argument. The verb *sibor*- 'squeeze,' for example, takes the locatum argument as direct object in (9a), and the location argument as direct object in (9b).

(9)　a.　locatum-object variant

    tane-kara　　abura-o　　sibor-u-to　　　　　himasiyu-gator-e-masu. [Yabiku 2005]

    seed-from　　oil-ACC　　squeeze-NONPAST-if　castor.oil-NOM　be.obtained-can- NONPAST

    'If (one) squeezes oil from seeds (of a castor-oil plant), castor oil can be obtained.'

  b.　location-object variant

    tane-o　　(*abura-de/ni/kara)　sibor-u-to　　　　　himasiyu-ga　　tor-e-masu.

    seed-ACC　(*oil-with/on/from)　squeeze-NONPAST-if　castor.oil-NOM　be.obtained-can-NONPAST

    'If (one) squeezes seeds (*of oil), castor oil can be obtained.'

In the locatum-object variant (9a), the location argument is expressed as an oblique NP *tane-kara* 'from seeds,' while as in (9b), the location-object variant does not allow incorporation of the locatum argument into a sentence.

The locatum argument undergoes a change of position or spatial configuration while the location argument undergoes a change of state as a result of removal of locatum argument. Consequently, resultative phrases can be predicated of either argument in either locatum-object or location object variant, giving rise to four possibilities as was the case with other locative alternation verbs in Section 4. The following examples (10) and (11) from the corpus show that *sibor-* 'squeeze, wring' allows a location-oriented resultative phrase in both variants. Example (10), an instance of the locatum-object variant, is a cooking instruction to squeeze water out of salted green perilla and cabbage.

(10)　location-oriented resultative in locatum-object variant

    aoziso-to　　　　kyabetu-wa ...　sio-de　　mon-de,　<u>kata-ku</u>　mizuke-o　　sibor-u. [Shiba 2001]

    green.perilla-and　cabbage-TOP ...　salt-with　knead-and　stiff-KU　water-ACC　squeeze-PRES

    '(lit.) As for green perilla and cabbage, knead them with salt and squeeze out water (so that they become) stiff.'

The resultative phrase *kata-ku* 'stiff' does not describe the state of the direct object *mizuke* 'water,' but rather it describes the state of *aoziso-to kyabetu* 'green perilla and cabbage,' the implied location argument, after water is squeezed out of them. The example does not conform to the DOR.

The same location-oriented resultative phrase appears in the location-object variant in (11), a cleaning instruction. It describes the direct object *zoukin* 'cloth, rag' as predicted by the DOR. The variant does not generally allow the locatum argument, water, to be expressed although it is apparent from the context.

(11)　location-oriented resultative in location-object variant

    ***zoukin**-o　　<u>kata-ku</u>　　sibot-te　　　　tatami-o　　　　　huk-imasu.* [TV Asahi 2001]

    cloth-ACC　　stiff-KU　　squeeze-and　　tatami.mat-ACC　　wipe-NONPAST

    'Squeeze a cloth out stiff, and wipe the tatami mats (with it).'

Thus, a location-oriented resultative can appear with the removal verb *sibor-* 'squeeze, wring' whether the location argument is an elided oblique NP in the locatum-object variant as in (10), or expressed as direct object in (11).

Locative alternation verbs of removal also allow a locatum-oriented resultative phrase to appear in both variants as shown in corpus examples (12) and (13) with the removal verb *kezur-* 'scrape, shave, plane.' Example (12), an instance of the locatum-object variant, is an instruction to ingest powder or slices made out of a ball called 'power stone' for 'healing.' The locatum argument *seppen* 'slice' appears as the noun modified by a relative clause (indicated by brackets [ ]) headed by the (second occurrence of) verb *kezur-* 'scrape,' and is functionally the direct object of the verb within the relative clause. The resultative phrase *usu-ku* 'thin' is predicated of the slices, i.e. is an object-oriented resultative.

(12)   locatum-oriented resultative in locatum-object variant

    tama-o   *kezut-te*   *kona-ni*   *si-ta*   *mono-o*   *non-dari,*

    ball-ACC   scrape-and   powder-into   make-PAST   thing-ACC   swallow-and

    [*usu-ku*   *kezu-tta*]   **seppen**-*o*   *mizu-de*   *senzi-te*   *hukuyousi-tari, ...* [Ishida 1997]

    thin-KU   scrape-PAST **slice**-ACC   water-with   infuse-and   ingest-and ...

    '(lit.) Swallow the powder made by scraping the ball, and ingest the infusion of the slices [which (you) scrape thin (from the ball)] and …'

The following example (13) is an instance of the location-object variant of the same verb. The example describes a technique to plane a board, which produces very thin, almost transparent, wood shavings. The resultative phrase *simon-ga suketemieru-gurai-no ususa-ni* '(lit.) to the thinness which allows one to see fingerprints through (the shavings)' appears in a prenominal adjunct phrase (indicated by brackets [ ]) that modifies *kannasiage-gizyutu* 'planing-technique.' Within the adjunct phrase, the resultative phrase is predicated of the locatum argument, wood shavings, although the variant does not allow it to be overtly expressed as discussed above.

(13)   locatum-oriented resultative in location-object variant

    [*simon-ga*   *suketemieru-gurai-no*   *ususa-ni*   *ki-o*   *kezur-u*]

    fingerprint-NOM   visible-about-GEN   thinness-NI   board-ACC   plane-NONPAST

    kannasiage-gizyutu-o   *mot-teimas-u.* [Fukui 2008]

    planing-technique-ACC   have-STATIVE-NONPAST

    'One has a planing technique [to plane a board (and the shavings are so) thin that fingerprints can be seen through them].'

It is also possible (though not intended) to interpret the resultative phrase as describing the direct object *ki* 'board': after all, planing a board makes the board thinner, except that measuring the thickness of the remaining board is not a usual way to measure a skillfulness of planing. As argued before, it is not the

syntactic structure but the lexical meaning of verbs that determines the plausibility of interpretation of resultative phrases, which only express a predictable, or "generic" or "canonical," result in Japanese.

As is the case with locative alternation verbs of covering and putting in Section 4, locative alternation verbs of removal describe an event that is perceived to involve changes of both locatum and location arguments. This section has shown that, like the verbs in Section 4, the removal verbs also allow a resultative phrase to be predicated of either argument regardless of which variant it appears in.

6. Thematic accounts: Two previous analyses

Since the syntactic notion of direct object is closely tied to the semantic notion of THEME/PATIENT (e.g., Dowty 1991), it is not surprising that there have been attempts to reanalyze the DOR in terms of the thematic roles, trying to single out an argument describable by a resultative phrase: e.g., THEME in Kageyama (1980), PATIENT in Goldberg (1995) and FORCE RECIPIENT in Rappaport Hovav and Levin (2001).

In Goldberg's (1995, 2006) Construction Grammar, the location-object and locatum-object variants of locative alternation are considered to be instances of a single lexical meaning of each locative alternation verb that appears in two distinct constructions, the causative-plus-*with*-adjunct construction and the caused-motion construction respectively. For example, a location-object variant with a resultative, e.g., *John sprayed the wall red with paint,* would be analyzed as an instance of the resultative construction derived from the causative-plus-*with*-adjunct construction (Goldberg 1995: 176, 2006: 35)[1].

(14)　resultative construction derived from the causative-plus-*with*-adjunct construction

　　　John sprayed the wall red with paint.

Sem	CAUSE-BECOME	< cause	patient	result-goal	theme >
	SPRAY	< sprayer	target	–	liquid >
Syn	V	SUBJ	OBJ	OBL$_{AP}$	OBL$_{PP}$

In this theory, there are two sets of semantic roles: argument roles and participant roles. Argument roles such as CAUSE and PATIENT in (14) represent the constructional meanings, which are independent of the semantics of individual verbs. Those argument roles are "fused" with participant roles such as SPRAYER and TARGET, which represent the verb meaning provided by a particular verb, *spray* in this case. Note that in (14), the RESULT-GOAL role is added by the resultative construction, not by the verb. As Iwata (2006) correctly points out, it can be problematic because the resultant state is often encoded in the lexical semantics of the verb (Green 1972; Wechsler 1997). Furthermore, in Japanese, it is always

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[1] In Construction Grammar, as well as in the Lexical Conceptual Structure approach reviewed next, analyses of interaction of the locative alternation and resultatives are not comprehensively formulated. This section attempts to evaluate those theories by filling in some details that have been left unexplored in order to apply them to the resultative construction with locative alternation verbs.

specified by the verbs, giving rise to weak resultatives, according to Washio (1997) as discussed in Section 2.

The fused arguments are mapped to the syntactic structure: in particular, the PATIENT argument is linked with the direct object by canonical linking conventions. Goldberg claims that resultative phrases can only be predicated of PATIENT because it is the argument which is designated to potentially undergo a change of state.

In another semantic approach, the lexical meaning of verbs is decomposed into a few primitive predicates such as CAUSE and BECOME (e.g., Pinker 1989; Levin and Rapoport 1988; Rappaport and Levin 1988), and the notion of thematic roles such as THEME and PATIENT is represented in terms of argument positions (or variables) of the primitive predicates, rather than thematic role labels. Those argument positions represent the lexical semantic relation which the arguments bear to the predicates.

In the predicate decomposition, Pinker (1989: 79) characterizes the locative alternation in terms of two distinct lexical meanings, called thematic cores, of each locative alternation verb: "x causes y to move into/onto z" and "x causes z to change state by means of moving y into/onto z." Syntactically, the first semantic core is realized as locatum-object variant, and the second, derived from the first through a lexical rule, is realized as location-object variant. These thematic cores correspond to the semantic representations called Lexical Conceptual Structure (e.g., Jackendoff 1983, 1990; LCS henceforth) in an obvious way, as (15) shows the lexical meaning of *spray* in the location-object variant.

(15)　the lexical meaning of *spray* in *John sprayed the wall with paint* (location-object variant)
　　　[x CAUSE [z BECOME (AT) *STATE*] BY [x CAUSE [y BECOME (AT) z]]

In (15), BECOME (AT) expresses a change of state as well as a change of position viewed as a spatial state, and its left argument, e.g., z to the left of the first BECOME (AT) in (15), corresponds to the THEME argument, and is syntactically realized as the postverbal NP, i.e. direct object, in the syntactic frame [NP V NP XP]. The argument *STATE* is a shorthand for a constant that represents a state which each verb expresses as part of its lexical meaning: e.g., the verb *spray* may lexically specify *STATE* to be COLORED. An addition of the resultative phrase *red* to the clause will further instantiate it to RED. Clearly, the semantic structure [z BECOME (AT) *STATE*] indicates that the resultant state *STATE* is predicated of the locatum argument z, which is syntactically realized as direct object.

Although the constructional approach and the predicate decomposition approach differ in assumptions and derivations, both accounts face a significant limitation in an attempt to analyze Japanese, given a widely shared assumption that each argument in a single clause is assigned a unique thematic role label (e.g., case relations in Fillmore 1968; the θ-criterion in Chomsky 1981), i.e. only one argument can have a particular semantic relation to a verb. Consequently, singling out a thematic role such as PATIENT in (14), or an argument position such as z to the left of BECOME in (15) would imply that there is at most one argument in a clause that a resultative phrase could be predicated of, while, as has been shown in Sections 4 and 5, the predication relation of a resultative phrase is not limited to a single argument in sentences
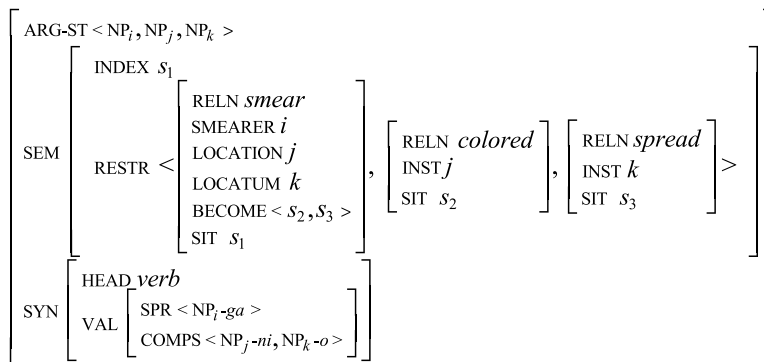
headed by a locative alternation verb in Japanese.

7. Proposed analysis

In this section, the predication relation of resultatives is proposed to be defined in terms of the verb's meaning which signals the two possible arguments, without recourse to the variant-specific thematic role labels such as THEME/PATIENT or grammatical functions such as the direct object. The proposed analysis shares the crucial assumption with Markantonatou and Sadler (1997), based upon Lexical Functional Grammar, and Beavers (2005), based upon Head-Driven Phrase Structure Grammar: locative alternation verbs are associated with a single semantic representation which is mapped to alternative syntactic structures rather than associating each syntactic variant with a distinct semantic representation. The assumption of a single lexical meaning is also shared by the Construction Grammar reviewed above, but unlike the constructional approach, and like the predicate decomposition approach, the predictable result of change is encoded as part of the lexical semantic representation of verbs.

　　The lexical semantics of locative alternation verbs is analyzed in the framework of Head-Driven Phrase Structure Grammar (Sag et al. 2003). The feature structure formalism is chosen because it allows the underspecified mapping between lexical semantics and its syntactic realization. A (partial) lexical entry for the locative alternation verb *nur-* 'smear, paint' which licenses an instance of the locatum-object variant such as *otoko-wa kabe-ni penki-o nut-ta* 'The man smeared paint on the wall,' is given in (16).

(16)　*nur-* 'smear, paint'

$$
\begin{bmatrix}
\text{ARG-ST} < \text{NP}_i, \text{NP}_j, \text{NP}_k > \\[4pt]
\text{SEM}
\begin{bmatrix}
\text{INDEX } s_1 \\[4pt]
\text{RESTR} <
\begin{bmatrix}
\text{RELN } smear \\
\text{SMEARER } i \\
\text{LOCATION } j \\
\text{LOCATUM } k \\
\text{BECOME} < s_2, s_3 > \\
\text{SIT } s_1
\end{bmatrix},
\begin{bmatrix}
\text{RELN } colored \\
\text{INST } j \\
\text{SIT } s_2
\end{bmatrix},
\begin{bmatrix}
\text{RELN } spread \\
\text{INST } k \\
\text{SIT } s_3
\end{bmatrix} >
\end{bmatrix} \\[4pt]
\text{SYN}
\begin{bmatrix}
\text{HEAD } verb \\[4pt]
\text{VAL}
\begin{bmatrix}
\text{SPR} < \text{NP}_i\text{-}ga > \\
\text{COMPS} < \text{NP}_j\text{-}ni, \text{NP}_k\text{-}o >
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}
$$

　　The lexical entry (16) roughly states: the verb takes three arguments, NPi, NPj and NPk, as specified in the value of ARG-ST (for argument-structure). As specified in the value of SEM (for semantics), the verb's main semantic content is a smearing relation among the individuals indexed as i for the agent (SMEARER), the location j (LOCATION), and the locatum k (LOCATUM). It also encodes as part of the lexical semantics the state change of two arguments j and k: j becomes colored and k becomes spread. Syntactically (SYN), as specified in the value of VAL (for valence), the agent is realized as the subject NPi marked by the nominative suffix -ga, i.e. the value of SPR (for specifier). The location is realized as

oblique complement NP*j* marked by *-ni*, and the locatum as direct object NP*k* marked by *-o* as specified by the value of COMPS (for complements).

The SEM value in (16) captures two characteristics shared by all locative alternation verbs. First, the events described by locative alternation verbs involve a location argument and a locatum argument, and both arguments undergo a change of state, position or spatial configuration as necessary part of the event. Second, predictable results of such changes are encoded as part of the lexical meaning of the verb although they may be underspecified. As discussed in Section 2, a predictable change of an argument is encoded as part of the lexical semantics of the verbs that license a resultative phrase. The results encoded in the verb's meaning, e.g., *colored* and *spread* in (16), are further specified when the verb combines with a resultative phrase in a sentence.

Following Markantonatou and Saddler (1997) and Beavers (2005, 2010), the present paper assumes that either locatum or location argument can be mapped onto the direct object, and the other to an oblique NP, giving rise to alternative syntactic realizations. Thus, another lexical entry of *nur-* (not shown here) for the location-object variant will be almost identical to (16) except that the value of COMPS is <NP*j-o*, NP*k-de*>, indicating that the location argument *j* is mapped to the direct object NP*-o*, and the locatum argument *k* is mapped to oblique complement NP*-de*.

When a resultative phrase is added by means of a lexical rule following the idea of e.g., Wechsler and Noh (2001), its predication relation is determined on the semantic grounds: as long as its semantic content is compatible with the predictable result lexically specified by the verb, the resultative phrase is interpreted as further specification of either argument's state regardless of its syntactic realization.

8. Conclusion

This paper analyzes the resultative phrases that occur with locative alternation verbs in Japanese, and shows that, unlike commonly believed, the restrictions on the predicate relation in the resultative construction are basically semantic rather than syntactic: resultative phrases can describe the result of a state or position change of a participant in the event described by the main verb regardless of whether such a participant is expressed as direct object or not. The data involving locative alternation verbs are used because they denote an event in which both locatum and location arguments are lexically specified to undergo changes concurrently. This semantic property gives rise to alternative syntactic structures in which either the locatum or the location argument appears as direct object while the predication relation of resultative phrases remains the same regardless of which syntactic variant they appear in, providing evidence that their predication relation is constrained not by the grammatical function but the semantic property of arguments. Syntactically, there is no clue that indicates the predication relation between resultative phrases and their arguments, and it is the lexical meaning of verbs that determines the plausibility of interpretation of resultative phrases, which only express a predictable result in Japanese.

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