

On interpretation of resultatives with locative alternation verbs

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Resultative phrases in Japanese are generally believed to be predicated of the object of transitive verbs just like English counterparts (e.g., *I painted the car yellow*). However, some exceptions are also known in which resultatives describe an oblique argument (e.g., *otoko-wa kabe-ni penki-o akaku nutta* ‘the man smeared paint on the wall (so that the wall became) red’). Using BCCWJ-NT corpus data, this paper shows that resultatives with locative alternation verbs in Japanese are generally interpreted as description of the argument that is lexically specified to undergo a change of state, rather than of the direct object.

Keywords. resultative construction; the Direct Object Restriction; locative alternation; argument realization; Japanese

1. Introduction. The resultative construction is a sentence with a resultative phrase, which describes a resultant state of a participant following the event described by the verb. Formally, resultative phrases are predicates of individuals, and the individuals correspond to arguments of the verbs that denote an event involving a state change of individuals denoted by arguments.

Consequently, any theory of the resultative construction must identify the predication relation between resultative phrases and what they describe. 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 reported, and this paper investigates the problem by focusing on resultative phrases that co-occur with locative alternation verbs in Japanese.

The locative alternation verbs take either the locatum or the location argument as direct object while denoting an event in which both arguments concurrently undergo a change. 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 the predication relation is not determined by the grammatical function of arguments as generally believed, but rather by the lexical semantics of verbs.

2. Resultative construction in Japanese. In her seminal work, Simpson (1983) claims that the resultative phrases are predicated of the direct object of transitive verbs as *I painted the car yellow*; the subject of unaccusative intransitive verbs as *He flushed red*; and unsubcategory post-verbal NP of unergative intransitive and transitive verbs as *I laughed myself sick* and *I ate myself sick*. The analysis is later dubbed Direct Object Restriction (Levin & Rappaport Hovav 1995; the DOR henceforth), and it is clearly a syntactic account of the predication relation between resultative phrases and arguments of verbs.

It is generally claimed (e.g., Tsujimura 1990; Kageyama 1996) that resultative phrases in Japanese are similar to those in English in that they obey the Direct Object Restriction as shown in (1) and (2), except that Japanese lacks the third type of resultative phrases that are predicated of post-verbal NPs not subcategorized for by the verb. (In the following examples, resultative

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phrases are underlined while the NPs described by resultative phrases are in bold.)

- (1) object-oriented resultative with a transitive verb
Taro-ga **kabin**-o konagona-ni kowasi-ta.
Taro-NOM vase-ACC pieces-NI break-PAST
'Taro broke a vase into pieces.'
- (2) subject-oriented resultative with an unaccusative intransitive verb
Taro-ga aka-ku hiyakesi-ta.
Taro-NOM red-KU sunburn-PAST
'(lit.) Taro sunburnt red.'

In (1), the resultative phrase *konagona-ni* 'into pieces' describes the direct object *kabin* 'vase' while *aka-ku* 'red' describes the subject *Taro* 'Taro' in (2) as expected. However, some authors have pointed out the examples that do not follow the generalization.

- (3) (Nitta 2002: 52)
otoko-wa **kabe**-ni penki-o aka-ku nut-ta.
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 well-known pair of examples, which shows that the predication relation between resultative phrases and argument NPs is syntactically constrained in English.

- (4) (Williams 1980: 204)
a. *John loaded the hay into **the wagon** full.
b. John loaded **the wagon** full with hay.

Examples in (4) show that resultative phrases in English must be predicated of the direct object while (3) demonstrates that the same syntactic constraint does not apply to Japanese.

Nitta (2002) analyzes the resultative phrase in (3) as an exception and argues that some "verbs of attachment" allow resultative phrases to be predicated of the oblique NP marked with the suffix *-ni* 'on, in, to,' which denotes the goal of attachment. According to him, the exception arises because verbs of attachment describe the events where not only what is attached, but sometimes also what it is attached to can undergo a change of state. While this paper shares his analysis based upon the lexical semantics of verbs, it will show that such resultative phrases are not isolated exceptions, but rather found systematically, and their occurrences are not limited either to the verbs of attachment or to *ni*-marked oblique NPs.

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, position or spatial configuration of some participant. Various authors have attempted to identify the exact class of such verbs, and propose to distinguish the verbs expressing the events that necessarily involve a state change from those expressing the events that are only likely to cause a state change. They conclude that the Japanese resultative construction requires the former class of verbs, which express a change of state as part of their lexical semantics, variously called "affected-theme transitives" (Koizumi 1994) and "change-of-state verbs" (Kageyama 1996, 2001). For example, Kageyama (1996) and Washio (1997) argue that, unlike the English counterpart, the Japanese verb of applying force *tatak-* 'hit, beat, pound' does not allow a resultative phrase because, while a state change of the theme argument is likely,

it is not entailed by the verb. Thus, *usu-ku tatak-u* ‘(lit.) pound thin’ is not acceptable while *usu-ku nobas-u* ‘roll out thin’ is (Washio 1997: 9).

Furthermore, both in English and Japanese, the resultant state described by a resultative phrase is often predictable, or “canonical” or “generic” (Wechsler 1997:309). This fact has led some authors to analyze resultative phrases as a syntactic realization of part of the lexical semantics of the verbs: e.g., Green (1972) proposes that the semantic representation of the verbs lexically contains a reference to a specific result. As a consequence, it is often (but not always) the case that only one of the members of antonym pairs is acceptable as a resultative phrase.

The resultative phrases which describe a predictable result are called “weak resultatives” by Washio (1997) or “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. As an example of strong resultatives, the sentence *The horses dragged the logs smooth* has no well-formed Japanese equivalent because, it is claimed, logs’ being smooth is not a result predictable from horses’ dragging them. Wechsler (1997) analyzes that, in English, resultative phrases that express an unpredictable result are allowed only with verbs followed by a non-subcategorized NP. If Wechsler’s analysis has cross-linguistic implications, it is consistent with Washio’s observation that Japanese lacks strong resultatives since, as discussed above, Japanese lacks the type of resultative construction with a non-subcategorized post-verbal 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. Locative alternation verbs, or *spray/load* verbs, describe events of “covering surfaces and putting things into containers” (Levin 1993: 118). Locative alternation verbs involve two arguments (in addition to the agent if the verb is transitive), the locatum argument and the location argument (the terms are coined by Clark & Clark 1979). The locatum argument refers to what moves, and the location argument refers to the goal of motion. As many authors argue (e.g., Fukui et al. 1985; Pinker 1989; Dowty 1991), the verbs’ ability to participate in the locative alternation is lexically constrained: they describe the events where both arguments are perceived to concurrently undergo a change of state, position, or spatial configuration. The simultaneous changes give rise to alternative syntactic structures that map one of the arguments to the direct object: e.g., *John sprayed paint on the wall* with the locatum *paint* as direct object, and *John sprayed the wall with paint* with the location *the wall* as direct object.

It is argued that Japanese also has locative alternation verbs similar to English (Kageyama 1980; Fukui et al. 1985; Kishimoto 2001a, 2001b; Iwata 2008) although the sets of locative alternation verbs are language-specific. For example, the verb *kazar-* ‘decorate’ in (5) exemplifies the alternation in Japanese while the English counterpart *decorate* is a non-alternating verb which allows only the location argument as direct object.

- (5) a. locatum-object variant
Taro-ga heya-ni hana-o kazat-ta.
Taro-NOM room-in flower-ACC decorate-PAST
‘(lit.) Taro decorated the flowers into the room.’
- b. location-object variant
Taro-ga heya-o hana-de kazat-ta.
Taro-NOM room-ACC flower-with decorate-PAST
‘Taro decorated the room with the flowers.’

In the locatum-object variant in (5a), the location argument *heya* ‘room’ appears with a locative suffix *-ni* ‘on, in, to’ while in the location-object variant in (5b), the locatum argument *hana* ‘flower’ appears with a suffix *-de* ‘with.’ Just like the English preposition *with* in the locative alternation, which marks “displaced theme” (Rappaport & Levin 1988) or “state changer” (Pinker 1989), the suffix *-de* can also mark a true instrument.

The DOR being a syntactic account of the predication relation of resultative phrases, it predicts that the resultative phrase cannot be predicated of the locatum or the location argument when it constitutes an oblique complement even though it is semantically as plausible as the other variant. Consequently, if a location-oriented resultative phrase such as *full* in (4) in the previous section appears with the locative alternation verb *load*, it correctly predicts that the location argument *the wagon* expressed as an oblique complement cannot be described by the resultative phrase as demonstrated in (4a). Locatum-oriented resultatives, on the other hand, exhibit a complementary distribution and are acceptable only in the locatum-object variant of the locative alternation verb *spray* as shown in (6).

- (6) a. John sprayed **paint thick** on the wall. (locatum-object variant)
 b. *John sprayed the wall with **paint thick**. (location-object variant)

Although most authors (e.g., Koizumi 1994; Kageyama 1996, 2001; Washio 1997) argue that the resultative construction in Japanese also conforms to the DOR, the corpus data involving locative alternation verbs in Japanese 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 variant of alternative syntactic structures they appear in. As discussed in this section, what makes the alternation possible is 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 as exceptions by a few authors (Nitta 2002; Miyakoshi 2006), and furthermore show that their occurrences are more systematic and regular than those authors assume.

4. Resultatives with locative alternation verbs. This section discusses resultative phrases in Japanese that appear with locative alternation verbs. The resultative phrases that are predicated of the location argument and those predicated of the locatum argument are discussed in 4.1 and 4.2 respectively. It is shown that locative alternation verbs allow resultative phrases to be predicated of an entity affected in the event they denote, not necessarily an entity expressed as direct object.

4.1. LOCATION-ORIENTED RESULTATIVES. Although the resultative construction in Japanese is understood to generally obey the DOR, 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 in (3) repeated here as (7).

- (7) (Nitta 2002: 52)
 otoko-wa **kabe-ni** penki-o aka-ku nut-ta.
 man-TOP wall-LOC paint-ACC red-KU smear-PAST
 ‘(lit.) The man smeared paint on the wall (so that it became) red.’

Nitta (2002) characterizes this example 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 as shown below. 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 (8), in which case the locatum argument appears as a *de*-marked oblique NP.

- (8) location-object variant
 otoko-wa **kabe**-o penki-de aka-ku 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 (8), as predicted by the DOR. Syntactically, there is no clue that indicates that the resultative phrase is predicated of the oblique NP in (7) and the direct object in (8). 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 (7) and (8).

It is further confirmed by the corpus data that a location-oriented resultative phrase appears in either variant of the locative alternation as shown in (9) and (10) (the sources of data are indicated in the square brackets []). The verb *mitas-* ‘fill’ is another locative alternation verb in Japanese unlike the English counterpart *fill*, which is a non-alternating verb with the location argument as direct object.

- (9) locatum-object variant
tekikatounai-ni yakueki-o
 dropping.funnel-into medical.fluid-ACC
yaku sanbun-no-iti-kara nibun-no-iti-ni mitas-u.
 about third-GEN-one-from half-GEN-one-NI fill-NONPAST
 ‘(lit.) Fill medical fluid into a dropping funnel (so that it becomes) about a third to a half full.’ [Oshikawa 2005]
- (10) location-object variant
 kare-wa sutekina utau-youna koe-de [...] **atasi**-o ippai-ni mitasite-kure-ru.
 he-TOP wonderful singing-like voice-with me-ACC full-NI fill-give-NONPAST
 ‘He fills me full with his wonderful singing-like voice.’ [Joyce 2003]

The resultative phrases are predicated of the location argument just like examples in (7) and (8). In (9), the location argument *tekikatounai* ‘dropping funnel’ is expressed as a *ni*-marked oblique NP and described by the resultative phrase *yaku sanbun-no-iti-kara nibun-no-iti-ni* ‘about a third to a half full.’ In (10), the location argument *atasi* ‘me’ is expressed as the direct object and described by the resultative phrase *ippai-ni* ‘full.’ As is the case with (7), the resultative phrase in (9) does not obey the DOR while causing no interpretation difficulties.

Note that, although it is possible to alter (9) to a location-object variant with or without a resultative phrase, i.e. *tekikatounai-o yakueki-de mitas-u* ‘fill a dropping funnel with medical fluid,’ the alternative to (10) with the locatum argument as direct object is not acceptable, **koe-o atasi-ni mitasite-kureru* ‘(lit.) fill voice into me.’ As Kishimoto (2001a) argues, the verb *mitas-* ‘fill’ does not invoke an alternation when it expresses motion of an abstract entity like *koe* ‘voice.’ The restriction is probably a lexically specified idiosyncrasy of the verb, but irrelevant to the fact that a resultative phrase can be predicated of the location argument in either variant.

The resultative phrase in (9) may be considered as another instance of resultative phrases describing *ni*-marked NP which Nitta (2002) and Miyakoshi (2006) point out. However, not every *ni*-marked NP expressing a goal can be described by a resultative phrase. Example (11) is identical to (9) except that the verb *mitas*- ‘fill’ is replaced by non-alternating verbs such as *ire*- ‘put (in)’ and *sosog*- ‘pour,’ which makes the resultative phrase unacceptable.

- (11) ***tekikatounai**-ni yakueki-o
 dropping.funnel-to medical.fluid-ACC
yaku sanbun-no-iti-kara nibun-no-iti-ni ire-ru/soso-gu.
 about third-GEN-one-from half-GEN-one-NI put-NONPAST/pour-NONPAST
 ‘(lit.) Put medical fluid into a dropping funnel (so that it becomes) about a third to a half full.’

These verbs take the locatum argument as direct object like their English counterparts *put* and *pour*. Unlike the locative alternation verb *mitas*-, they do not allow a resultative phrase to be predicated of the oblique location argument, suggesting that what is crucial is not the *ni*-marked, or goal, NP, but the locative alternation verb, which lexically encodes an event with a state change of the location argument even though the argument is not expressed as direct object. In fact, all other examples Miyakoshi (2006) gives as goal-oriented are also accompanied by locative alternation verbs *tume*- ‘pack, stuff’ and *hukitor*- ‘wipe.’

4.2. LOCATUM-ORIENTED RESULTATIVES. Oblique NPs whose referents are describable by a resultative phrase is not limited to *ni*-marked NPs: the locatum argument, realized as *de*-marked NP, can also be described by a resultative phrase with locative alternation verbs. More generally, the corpus data show that locatum-oriented resultative phrases appear whether the locatum argument is realized as the direct object or a *de*-marked oblique NP in Japanese, while in English, they are allowed only when the locatum argument is expressed as direct object as shown in (6).

The verb *mak*- ‘wind, bandage’ in examples (12) and (13) 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*). Its locatum argument refers to an item that is passed around something, and the location argument refers to something surrounded by the locatum argument.

- (12) locatum-object variant
 koros-are-nai-youni kaziya-ni tanon-de
 kill-PASS-not-in.order.to blacksmith-to ask-and
 kubittama-ni atu-ku **kin**-demo mai-te-oke.
 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.’ [Nagai 1978]

The resultative phrase *atu-ku* ‘thick’ in (12) 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 (13), 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* ‘thick’ is still predicated of the locatum argument.

- (13) location-object variant
 ryoume-mo [...] sono ue-o **houtai-de** atu-ku mak-are-te ...
 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 ...’
 [Nijo 2000]

The indirect or ‘adversity’ passive suffix *-are* on the verb does not trigger alternation of grammatical functions of argument NPs (e.g., Kuno 1973) as direct passivization does, and 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’ with the location argument as direct object, the same resultative phrase is unacceptable as shown in (14).

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

The examples of locatum-oriented resultatives clearly show that the oblique complements 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 (13) and (14) although locative alternation verbs may not be the only verbs that allow resultatives to be predicated of oblique compliments.¹

Note that, while (13) can be rephrased with the locatum argument as direct object with or without the resultative phrase, i.e. *sono ue-ni houtai-o mak-* ‘wind a bandage around the top of them,’ the location-object variant of (12), i.e. *kubittama-o kin-de mai-* ‘(lit.) wind the neck with gold,’ may not be acceptable to some speakers. The oddness is probably because the location-object variant induces the holistic interpretation (Anderson 1971) that the neck is completely covered by gold. Kageyama (1980), Fukui et al. (1985), and Kishimoto (2001b) claim that the holistic effect is also present in the location-object variant in Japanese. However, a number of authors point out that the effect is not always present, or is “readily neutralized” (Jeffries & Willis 1984: 717). Furthermore, the holistic interpretation is not unique to the locative alternation but rather is generally associated with the (definite and specific) direct object, or the incremental theme, of the verbs of state change (Hopper & Thomson 1980; Pinker 1989; Dowty 1991; Beavers 2010, 2017). The location-object variant of (12) may be odd not because of a restriction on the predication relation of resultative phrases, but because some speakers find it odd that a neck is totally covered by gold.

Thus, although syntactic structures of different variants of the locative alternation are not always interchangeable for various reasons ((10) is another example which cannot be rephrased), it still holds that a resultative phrase is predicated of the locatum argument whether it is expressed as direct object as in (12), or *de*-marked oblique NP as in (13). Together with Section

¹ The present paper discusses the crucial role of locative alternation verbs and their lexical semantics for non-object oriented resultatives, but does not attempt to claim that they are the only source of non-object oriented resultatives. For example, Nitta (2002) and Miyakoshi (2006) also give examples of subject-oriented resultatives with transitive verbs, another kind of deviation from the DOR. However, they are beyond the scope of the present paper.

4.1, it has been shown that either location or locatum argument can be described by a resultative phrase regardless of whether they are expressed as direct object or an oblique NP.

5. Ambiguity of resultative phrases. While it is possible for resultative phrases to be predicated of either the locatum argument or the location argument, there is no syntactic clue that indicates which argument they actually describe. Consequently, it is predicted that some resultative phrases are ambiguous when they are plausible descriptions of either argument. The corpus data show that in fact it is the case.

Locative alternation verbs of removal, e.g., *clear*, *clean* and *wipe* in English; *huk-* ‘wipe’ and *kezur-* ‘scrape, shave, plane’ in Japanese, express an event in which something is removed from surfaces or out of containers rather than attached or inserted. That is, the referent of locatum argument is removed from the referent of location argument. As is the case with previous examples of the locative alternation, they allow both locatum-object as in *John cleared dishes from the table*, and location-object as in *John cleared the table of dishes*. In the location-object variant, the locatum argument appears as a prepositional phrase headed by *of*, e.g., *of dishes* above. Some verbs, however, do not allow the locatum argument to be overtly expressed at all: e.g., *John cleaned the dishes* (**of dirt*). Japanese verbs of removal are similar to English *clean*-type verbs rather than to the *clear*-type in that the locatum argument is not syntactically expressed in the location-object variant.

Example (15) shows an example headed by the locative alternation verb of removal *kezur-* ‘scrape, shave, plane,’ and 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 the prenominal modifier (indicated by brackets []) adjoined to *kannasiage-gizyutu* ‘planing-technique.’ Within the adjunct phrase, the resultative phrase describes the locatum argument, wood shavings, although the variant does not allow it to be overtly expressed as discussed above.

(15) 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.
 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].’ [Fukui 2008]

Since the direct object of the verb is the location argument *ki* ‘board,’ it is also possible (though not intended) to interpret the resultative phrase as describing the board: after all, planing a board makes it thinner while producing thin wood shavings, 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.

6. Thematic accounts. Since the syntactic notion of direct object is closely tied to the semantic notion of THEME/PATIENT role (e.g., Dowty 1991), it is not surprising that there have been attempts to recast the DOR in terms of thematic roles. Given a widely shared assumption that each argument in a single clause is assigned a unique thematic role label (e.g., Fillmore 1968; Chomsky 1982), however, those thematic accounts face a significant limitation: they predict that

a resultative phrase can be predicated of only one argument in a single clause. In the various thematic accounts reviewed in this section, analyses of interaction of the locative alternation and the resultative construction are not comprehensively formulated. This section attempts to apply those theories by filling in some details that have been left unexplored.

In Goldberg's (1995) construction grammar, the location-object and locatum-object variants of locative alternation are considered to be instances of the causative-plus-*with*-adjunct construction and the caused-motion construction respectively. An example of 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 based on the causative-plus-*with*-adjunct construction (p. 176): a possible lexical representation is given in (16).

- (16) resultative construction based on the causative-plus-*with*-adjunct construction
John sprayed the wall red with paint.

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

Constructions specify the argument roles such as AGENT and PATIENT. Those argument roles are fused with participant roles, SPRAYER and TARGET, provided by a particular verb, *spray* in this case. Note that in this analysis, the RESULT-GOAL role is added by the 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 even in English, and always encoded in Japanese according to Washio (1997) as discussed in Section 2. Then 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 potentially undergoes a change of state.

The locatum-object variant *John sprayed paint on the wall* is an instance of a caused-motion construction, built on the predicate CAUSE-MOVE. An addition of a resultative phrase such as *thick* creates “a metaphorical extension” of the caused-motion construction, i.e. assimilates resultatives to goal phrases of caused motion. Furthermore, the THEME argument *paint* of caused motion becomes a PATIENT argument of the CAUSE-BECOME predicate. A potential lexical representation is given in (17):²

- (17) resultative construction as an extension of caused-motion construction
John sprayed paint thick on the wall.

Sem	CAUSE-BECOME	< agt	pat	result-goal	goal-path >
	spray	< sprayer	liquid	–	target >
Syn	V	SUBJ	OBJ	OBL _{AP}	OBL _{PP}

As is the previous lexical representation in (16), the PATIENT argument, which is linked with the direct object, is predicted to be the only possible argument of the resultative phrase.

In approaches to decompose the lexical semantics of verbs into a few primitive predicates

² Actually, the RESULT-GOAL argument is intended to replace the GOAL-PATH argument, and Goldberg's Unique Path Constraint (p. 81) prohibits their co-occurrence, rendering the locatum-object variant with a resultative phrase *John sprayed paint thick on the wall* in (17) ungrammatical. I will leave open the acceptability of the example, which my informants find acceptable, since the inadequacy of the construction account remains valid for the analysis of the resultative construction in Japanese.

(e.g., Pinker 1989, Levin & Rapoport 1988), the notion of THEME/PATIENT role is represented as an argument of a predicate such as BECOME, rather than thematic role labels. Pinker (1989) characterizes the locative alternation as a “gestalt shift” in interpretation of the same event from “moving a theme to a location” to “changing the state of a theme” (p.79). It is a rule that takes the verb’s semantic structure “X causes Y to move into/onto Z” in (18a), which is syntactically realized as locatum-object variant, and converts it to “X causes Z to change state by means of moving Y into/onto it” in (18b), realized as location-object variant.

- (18) a. John sprayed paint on the wall. (locatum-object variant)
 [x CAUSE [y BECOME (AT) z]]
- b. John sprayed the wall with paint. (location-object variant)
 [x CAUSE [z BECOME (AT) STATE] BY [x CAUSE [y BECOME (AT) z]]]

In the lexical structures in (18), called Lexical Conceptual Structure (Jackendoff 1983, 1990; LCS henceforth), CAUSE, BECOME (AT) and BY are taken from a small inventory of primitive lexical predicates. The BECOME (AT) predicate expresses a change of state as well as a change of location viewed as a spatial state, and its left argument corresponds to the THEME argument. The BY predicate marks the following subordinate clause of means (‘by means of’). STATE in (18b) 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 lexical structure indicates that the resultant state STATE is predicated of the locatum argument z, which is syntactically realized as direct object.

The LCS in (18a) primarily represents a change of position of the locatum argument y as the basic sense of the verb. With a resultative phrase, the LCS goes through a meaning shift, called “lexical subordination” (Levin & Rapoport 1988), which takes the original LCS in (18a), subordinates it under a new main clause, representing a change of state as “the extended use of the verb” (Levin & Rapoport 1988: 282).

- (19) John sprayed paint thick on the wall. (locatum-object variant with a resultative phrase)
 [x CAUSE [y BECOME (AT) STATE] BY [x CAUSE [y BECOME (AT) z]]]

This derived LCS indicates that the resultative phrase is predicated of the location argument y, i.e. the left argument of BECOME, which is linked with the direct object.

What is crucial in these analyses is that they propose different semantic structures for each variant of locative alternation, and identify a single argument in each semantic structure as being described by a resultative phrase. As has been shown, Japanese resultatives are predicated of either argument that undergoes a change of state, regardless of which syntactic variant they appear in. In order to deal with the semantic nature of predication relation, it is proposed in the next section to postulate a single representation of lexical semantics in terms of which the predication relation of resultatives is defined, and map it to alternative syntactic structures of the locative alternation.

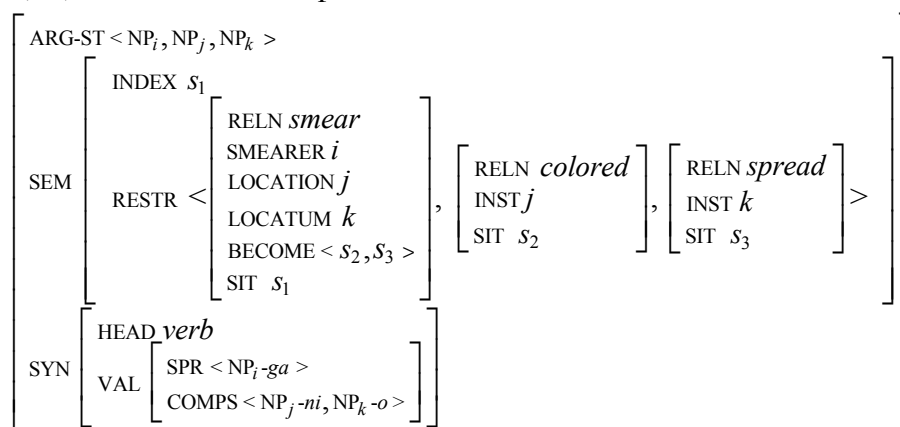
7. Analysis. In order to formally represent the predication relation between resultative phrases and arguments of locative alternation verbs, the lexical semantics of verbs is analyzed in the framework of Head-Driven Phrase Structure Grammar (Sag et al. 2003; HPSG henceforth). Although the choice of specific framework is not crucial, the feature structure formalism is chosen because it allows the underspecified mapping between lexical structure and its syntactic realization. The crucial assumption is that, following the view of such authors as Markantonatou & Sadler (1979)

based upon Lexical Functional Grammar, and Beavers (2005, 2010) based upon HPSG, 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 predication relation between resultative phrases and arguments of verbs is determined based upon the shared semantic representation, not alternative syntactic realizations. More specifically, resultative phrases are predicated of the arguments that are specified to undergo a change of state in the lexical semantics.

A (partial) lexical entry for the locatum-object variant of *nur*- ‘smear, paint’ is given in (20).

(20) otoko-wa **kabe**-ni penki-o nut-ta.

‘(lit.) The man smeared paint on the wall.’



The lexical entry (20) roughly states: the verb takes three arguments, NP_i , NP_j and NP_k , 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 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 SPR (for specifier) in VAL (for valence), the agent is realized as the subject NP_i marked by the nominative suffix *-ga*. 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).

More specifically, the semantic content is INDEXed as s_1 , i.e. the main situation index of the verb. The semantic feature RESTR (for restriction) takes as its value a list of predications: they describe semantically relevant properties of individuals and their relations encoded as the value of RELN (for relation), and each predication carries its own situation index encoded as the value of SIT (for situation). The first predication in (20) has a situation index s_1 , which is identical to the INDEX value of the verb, indicating that it is the main predication of the verb. It states that the verb denotes a smearing event which involves three participants, the smearer i , the location j , and the locatum k , as well as resultant situations s_2 and s_3 encoded as BECOME value. It roughly translates as “ s_1 is a situation wherein i smears j on k with resultant situations s_2 and s_3 .”

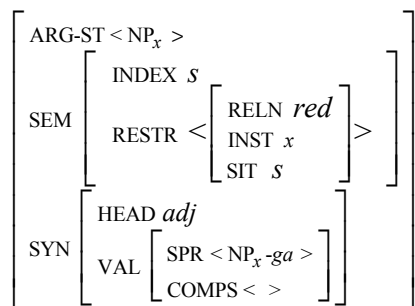
The second predication s_2 describes a resultant situation caused by the main situation s_1 . It states that the location j , the value of INST (for instance), stands in the *colored* relation, i.e. the location j is colored. Similarly, the third predication s_3 indicates that the locatum k is spread. Situations s_2 and s_3 are secondary to the main situation s_1 in that the state changes are co-extensive with the smearing event, rather than distinct events.

The SEM value in (20) 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 although they may be underspecified. As discussed in Section 2, a predictable change of an argument is required 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 (20), 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 (20) except that the value of COMPS is $\langle NP_j-o, NP_k-de \rangle$, 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 . Although it is beyond the scope of this paper, more fine-grained contrasts and characteristics associated with each variant should figure into the argument realization: for example, whichever argument is realized as direct object receives the holistic interpretation as discussed in Section 4.2.

The feature structure in (21) shows the (partial) lexical entry of adjective *aka-* ‘red.’

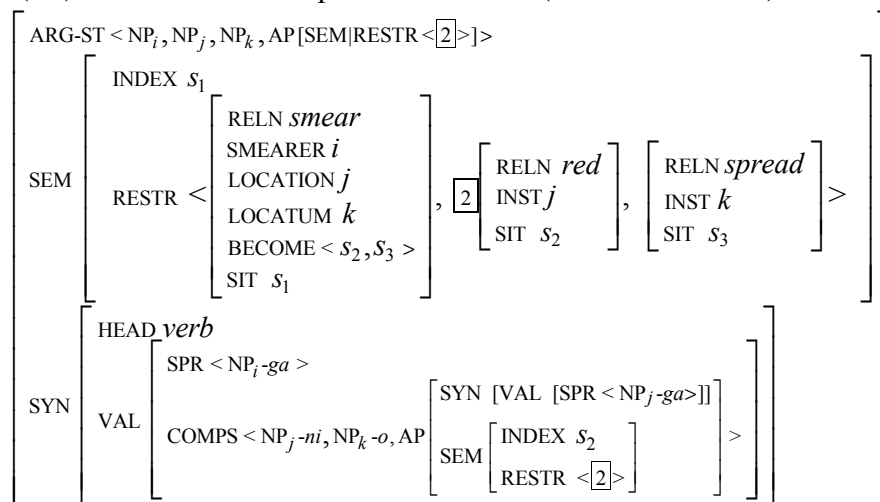
(21) *aka-* ‘red’



The adjective denotes the property *red*, which is predicated of an individual x , that is, “ x is red.” When the adjective, as well as an AP, is added to the ARG-ST list of *nur-* in (20) as a location-oriented resultative in the locatum-object variant, the individual index x in the predication of the adjective will be identified with the location index j of the verb. The property *red*, i.e. the RELN value in (21), further instantiates the property *colored* of the location j , assuming that *red* is a subtype, i.e. a more specific type, of *colored*. The individual x of the resultative phrase will not be identified with the locatum k since its property *spread* is not compatible with the property *red*. As discussed in Section 5, the predication relation of a resultative phrase is not syntactically conditioned, but rather left for pragmatic interpretation. Semantics of the resultative phrase will determine whether it can be properly predicated of a particular argument, and bad cases are excluded on semantic grounds.

When the resultative phrase *aka-ku* ‘red’ appears in a sentence as in (3), the category of the head verb *nut-* ‘smear, paint’ is further instantiated to be (22).

- (22) *otoko-wa kabe-ni penki-o aka-ku nut-ta.*
 ‘(lit.) The man smeared paint on the wall (so that it became) red.’



The feature structure in (22) shows the net effect of the “original” lexical specification of *nur*- ‘smear, paint’ in (20), adding a resultative phrase *aka*- ‘red’ in (21) into the ARG-ST list describing the location argument *j*, and instantiating the value *colored* of RELN to be its subtype *red*.

To recapitulate, locative alternation verbs share the semantic specifications that they express an event which involves a locatum and a location; both participants are lexically specified to undergo a change of state associated with a predictable (general) result. The semantics is mapped onto alternative syntactic variants, a process which also incorporates variant-specific contrasts. A resultative phrase is added to their ARG-ST list, and its predication relation is determined on the semantic grounds. Either the locatum or the location argument of locative alternation verbs can be described by a resultative phrase regardless of their 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 predication relation in the resultative construction are basically semantic rather than syntactic: resultative phrases can describe the result of a state 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. Resultative phrases are, however, predicated of either argument 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.

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