Japanese Resultative Construction

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Abstract

This paper investigates resultative phrases in Japanese and shows that their behaviors are more consistent with adjuncts than with obligatorily controlled complements as proposed by some authors. It is shown that, as expected of adjuncts, Japanese resultative phrases iterate, and do not always take a predetermined argument of the main verb as the semantic subject or as the antecedent of a reflexive contained in resultative phrases. A lexical rule account is given, which analyzes resultative phrases as adverbials and places them on the valence list of the main verb.

1 Introduction

The resultative phrase is most generally characterized as the second predicate to describe the state of an argument of the main verb, which results from the event denoted by the main verb. Since the ground-breaking analysis by Simpson (1983), numerous analyses have been advanced in various frameworks to account for various aspects of the construction, including the semantic properties of resultative phrases and the controller, i.e. the understood subject, of resultative phrases as predicates. The present paper focuses on the resultative construction in Japanese, and claims that the distribution of resultative phrases is more restricted than their counterparts in English in some aspects, e.g. neither fake objects nor expressions of unpredictable results are allowed. At the same time, it exhibits some properties that are not expected if resultative phrases are analyzed as controlled complements as some authors propose for other languages: e.g. they iterate, and do not always take a predetermined argument of the main verb as the semantic subject or as the antecedent of a reflexive contained in resultative phrases. Based upon those facts, a lexical rule account is proposed that analyzes resultative phrases in Japanese as adjuncts whose unrealized subjects are anaphorically determined.

2 Data: Resultatives in Japanese

2.1 Distribution and semantic subjects of resultative phrases

It is generally understood (e.g. Tsujimura 1990, Kageyama 1996) that resultative phrases in Japanese come

in two types: object-oriented resultative phrases with transitive verbs and subject-oriented resultative phrases with unaccusative intransitive verbs. Object-oriented resultative phrases appear in a sentence headed by a transitive verb, and describe the resultant state of the referent of object NP as in (1). (In the following examples, resultative phrases are underlined while the semantic subjects of resultative phrases are italicized.)

(1) Taro-ga *kabin-o* konagona-ni kowasi-ta.
Taro-NOM vase-ACC pieces-NI break-PAST
'Taro broke a vase into pieces.'

In (1), the resultative phrase *konagaona-ni* 'into pieces' describes the state of the object *kabin* 'vase' which results from Taro's breaking it. Subject-oriented resultative phrases, on the other hand, appear with an unaccusative intransitive verb, and describe the state of the referent of subject NP, which results from the event expressed by the verb, as in (2).

(2) *hune-ga* huka-ku sizun-da.
ship-NOM deep-KU sink-PAST
'A ship sank deep.'

The resultative phrase *huka-ku* 'deep' describes the resultant state of the subject *hune* 'ship' after its sinking. These two types of resultatives conform to the general characteristic of resultatives in English, originally observed and analyzed by Simpson (1983), later dubbed Direct Object Restriction (Levin and Rappaport Hovav 1995): '[t]he controller of a resultative attribute must be an OBJECT, whether that OBJECT is a surface OBJECT, as in transitive verbs, or an underlying OBJECT, as in passives and intransitive verbs of the Unaccusative class, or whether the OBJECT is a fake reflexive, as in intransitive verbs of the Unergative class' (Simpson 1983:146). Resultatives in Japanese, however, lack the third type in Simpson's analysis of English resultatives with 'a fake reflexive', or more generally a fake object, where the semantic subject of resultative phrases is not an argument subcategorized by the main verb as illustrated in (3).

(3) (taken from Simpson 1983:146-147)
a. I laughed *myself* sick.
b. I ate *myself* sick.
c. I cried *my eyes* blind.
d. I ate *him* out of house and home.

In (3a), the resultative phrase is predicated of the reflexive object *myself*, called 'fake reflexive' by Simpson (1983), which is not subcategorized by the intransitive verb *laughed*. Example (3b) is similar in that the reflexive object does not describe a thing eaten as a subcategorized object of *eat* usually does, and therefore is not subcategorized by the verb. Examples (3c) with the intransitive verb *cry* and (3d) with the transitive verb *eat* parallel (3a) and (3b) respectively, except that non-subcategorized object NPs are not reflexives. Whether a reflexive NP or a referential NP, these object NPs are 'non-subcategorized' in the sense that they are not assigned a semantic role by the main verb. In Simpson's analysis, these types also conform to the general characteristic that the controller of resultative phrases must be the object NP (either

surface or underlying) of verbs, but Japanese resultatives do not allow these types of fake object NPs.[1]

While the linear order of the nominative NP, the accusative NP, and the resultative phrase in Japanese examples (1) and (2) is the unmarked one, the other linear orders are also possible as long as the verb remains at the end of the sentence. Example (1), for example, has a total of six variations in phrase order.

(4) {Taro-ga, *kabin*-o, konagona-ni} kowasi-ta.
Taro-NOM vase-ACC pieces-NI break-PAST
'Taro broke a vase into pieces.'

In particular, the resultative phrase does not have to follow, or to be adjacent to, the NP that is understood as its semantic subject.[2]

2.2 Semantic restrictions on verbs and resultative phrases

As a direct consequence of the definition that resultative phrases express the state that results from the event denoted by the verb, the verbs which appear in the construction indicate some change of state either inherently or by virtue of an accompanying resultative phrase, as analyzed with English resultatives (Levin and Rappaport Hovav 1995:54). That is, either verbs in the resultative construction are accomplishment verbs which express a causative change of state, as is the case of *kowasu* 'break' in (1), or the whole sentence including a resultative phrase expresses an accomplishment while the main verb may be classified as activity verb in isolation, as is the case of *migaku* 'polish' in (5).[3]

(5) Taro-ga *kabin*-o pikapika-ni migai-ta.
Taro-NOM vase-ACC shiny-NI polish-PAST
'Taro polished the vase shiny.'

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[1] Examples headed by verbs of sound emission, e.g. *The garage door rumbles open*, are also included as instances of resultatives by Rappaport Hovav and Levin 2001:768, among others. They consider the uses of those verbs as unergative, and if so, those examples may constitute another type in English resultatives not covered by Simpson (1983). Japanese, however, seems to lack the equivalents of resultatives with sound-emission verbs. Yet another type discussed by some authors (e.g. Wechsler 1997a, Levin and Rappaport Hovav 1995, Rappaport Hovav and Levin 2001, Wechsler and Noh 2001, Müller 2002, Goldberg and Jackendoff 2004) are those that involve verbs which describe a change of location, rather than a change of state: e.g. *John ran into the room* and *John danced mazurkas across the room*. Generally, Japanese verbs which describe a manner of motion do not allow the coocurrence of locative phrases which express a path of motion (Talmy 2000), and resultatives which express the result of a change of location are not considered in the following discussion.

[2] Furthermore, the linear order restriction is not applicable to Japanese in that a resultative phrase must be 'closer' to the main verb than a depictive phrase as observed in English (e.g. *The clay won't set stiff cold.* (Goldberg1991:86)), German (e.g. *Gustav hat das Fleisch roh klein geschnitten.* 'Gustav chopped the raw meat into little pieces.' (Müller 2002:235)), and Italian (e.g. *Dario ha servito la carne troppo cotta arrabbiato.* 'Dario served the meat overcooked angry.' (Merlo 1988:341)):

{Taro-ga *sakana*-o nama-de sanmai-ni} orosi-ta.
Taro-NOM fish-ACC raw-DE three slices-NI cut-PAST
'Taro cut a raw fish into three slices.'

While the verbs are restricted to those that denote a change of state either inherently or potentially, the resultative phrases are subject to the semantic restriction imposed by the lexical meaning of the main verb, as Green (1972) convincingly argues. Generally, resultative phrases must describe a result which is predictable, or 'canonical or generic' in Wechsler's (1997a) terms, from the event denoted by the main verb. As a consequence, it is often (but not always) the case that only one of the members of antonym pairs is acceptable as shown in (6).

(6) Taro-ga *huku*-o kirei-ni/*kitana-ku arat-ta.
Taro-NOM clothes-ACC clean-NI/dirty-KU wash-PAST
'Taro washed the clothes clean/*dirty.'

The resultative phrase *kitana-ku* 'dirty' in (6) is unacceptable because the dirty clothes are not a result generally predictable from someone washing them.

Washio (1997) calls these resultative phrases which describe a predictable result 'weak resultatives', and according to him, Japanese resultative construction is more limited than English in that it allows only 'weak resultatives'. As an example of 'strong resultatives', i.e. resultatives which express no predictable result, 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. Furthermore, Japanese lacks resultatives with non-subcategorized arguments, exemplified in (3), and those are the type of resultatives, as Wechsler (1997a) points out, which do not require the expressed result to be predictable. Thus, Japanese resultatives generally express predictable results, or more so than English resultatives. At the same time, either in English or Japanese, it seems undeniable that collocations of particular verbs and resultative phrases are to some extent conventionalized, or idiomatic, since expressions of imaginable results are not always acceptable: e.g. **hutatu-ni kowasi-ta* 'broke into two pieces' is not acceptable while *konagona-ni kowasi-ta* 'broke into pieces' in (1) and *mapputatu-ni kowasi-*

[3] Koizumi (1994), building upon Miyagawa's (1989) classification of Japanese verbs, claims that 'affected-theme transitive' verbs allow resultative phrases while 'non-affected-theme transitive' verbs do not, presumably because only the affected-theme 'refers to an entity that is affected by being moved or changed as a result of the action that is represented by the verb' (Miyagawa 1989:56). The affected-theme and non-affected theme arguments are claimed to appear in different syntactic configurations, and thus the distinction is syntactic as well as semantic. However, verbs *nagur-u* 'hit' and *tatak-u* 'hit', non-affected-theme transitive verbs in their analyses, for example, do appear in fairly common resultative expressions:

dorobo-ga *keikan*-o bokoboko-ni nagut-ta.
thief-NOM policeman-ACC bumpy-NI hit-PAST
'lit. The thief hit the policeman bumpy. (The thief knocked the policeman around.)'

niku-o menbo-de taira-ni tatai-ta.
meat-ACC rolling pin-with flat-NI hit-PAST
'(Someone) pounded the meat flat with a rolling pin.'

Clearly, the crucial property of verbs which appear in the resultative construction is that they express an event which can be terminated with a change of state, rather than that the lexical semantics of verbs in isolation entails a change of state.

ta 'broke into exact halves' are.

2.3 Morphological forms of resultative phrases

The head of resultative phrases in Japanese can be a noun such as *konagona-* 'pieces' in (1), an adjective such as *huka-* 'deep' in (2), or an 'adjectival noun' such as *kirei-* 'clean'. The syntactic and semantic functions of adjectival nouns are the same as those of adjectives, but their declension is more similar to that of nouns than to adjectives: hence, they are traditionally called adjectival nouns. As shown in examples above, nouns and adjectival nouns are suffixed by *-ni*, and adjectives are suffixed by *-ku* in resultative phrases. These morphological forms are, however, not unique to the resultative construction, and they mark coordinate and subordinate clauses, and adverbials as well as resultatives. In other words, Japanese does not have a morphological form specific to resultatives, and example (7) is ambiguous between the resultative reading and the adverbial reading.

(7) onna-no *ko*-wa yasasi-ku sodate-ru-bekida.
woman-GEN child-TOP gentle-KU raise-NONPAST-should
'One should raise a girl to be gentle./ One should gently raise a girl.'

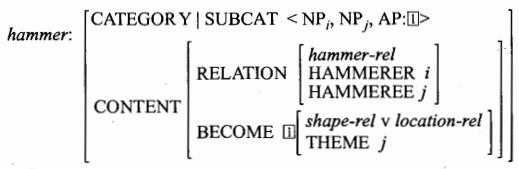
The *ku*-form of adjective *yasasi-ku* 'gentle' in (7) can be interpreted as the way a girl should turn out to be (the resultative meaning), or the manner in which a girl should be raised (the adverbial meaning).

3 Previous analyses

Since Simpson (1983), various analyses have been developed to formalize the notion of 'underlying object' under the unaccusative hypothesis (Perlmutter 1978), which assumes that the subject of unaccusative verbs is the underlying object, and to characterize the controller of the unrealized subject of resultative phrases as an object of the main verb at some level of representation (e.g. Hoekstra 1988, Bresnan and Zaenen 1990, Carrier and Randall 1992, Levin and Rappaport Hovav 1995; also more semantics-inclined Goldberg 1991, Rappaport Hovav and Levin 2001, Goldberg and Jackendoff 2004). However, Wechsler (1997a) convincingly argues and demonstrates that the analyses based upon unaccusativity are not only unnecessary but also incorrect (if locative phrases in fact constitute a resultative construction as he claims). Subsequently, Wechsler and Noh (2001) and Müller (2002) develop analyses for English/Korean and German, respectively, in the framework of Head-driven Phrase Structure Grammar without recourse to unaccusativity. Since the present paper builds on their analyses, a brief review is in order.

Wechsler and Noh (2001) analyze resultative phrases in English and Korean as optional complements whose unrealized subject is controlled by an argument of the main verb by structure-sharing. The controller argument is lexically encoded in the CONTENT value of the main verb: i.e. the semantic structure of the main verb determines the argument whose referent undergoes a change of state as a result of the event denoted by the main verb. As one of the four types of resultatives which they analyze, transitive verbs which give rise to object-oriented resultatives have lexical specifications as exemplified in (8). The lexical specification is similar to that of object-control verbs whose object index is shared by the (unrealized) subject of an infinitival VP complement.

(8) lexical entry for *hammer* with a resultative complement AP (Wechsler and Noh 2001)



The lexical entry for *hammer* in (8) licenses a resultative construction such as *John hammered the metal flat*. The resultative phrase *flat* is analyzed as an optional complement AP which appears as the last element of the SUBCAT list. The semantic contribution of the resultative phrase is specified by the tag [1], and appears as the value of BECOME in the CONTENT value. The THEME index *j* in the *shape-relation*, which is denoted by the resultative phrase, is shared by the value of HAMMEREE of the *hammer-relation* and accounts for the interpretation that the resultative phrase *flat* describes the resultant state of the referent of object, *the metal*. Subject-oriented resultatives in unaccusative intransitive sentences, e.g. *The puddle froze solid*, are accounted for in a similar lexical entry for *froze*, except that the unrealized subject of the resultative phrase *solid* is index-shared by the subject of *froze*.

Müller (2002) analyzes resultatives in German in terms of a raising construction. He argues that in object-oriented resultatives, e.g. *Er fuhr das Auto kaputt* 'He drove the car to a wreck,' the object NP *das Auto* 'the car' is not given a semantic role by the main verb *fuhr* 'drove', and the example can be interpreted that the car was wrecked as a result of his driving something else (Müller 2002:214). In other words, the object NP *das Auto* 'the car' expresses the semantic subject of the resultative phrase *kaputt* 'to a wreck', and not the theme argument of the main verb. Thus, in his raising analysis, the index for the object NP appears in the BECOME value, but not in the *drive-relation*.

Müller's (2002) analysis is similar to Wechsler and Noh's (2001) raising analysis of English resultatives which involve non-subcategorized objects, exemplified in (3), but Müller (2002) goes so far as to claim that only intransitive (forms of) verbs can be used in resultative constructions. A lexical rule 'transitivizes' intransitive verbs by raising the subject of resultative phrases to the object of the verbs, and gives rise to the object-oriented resultative construction. Subject-oriented resultatives are also analyzed as a raising construction in Müller (2002): the subject of resultative phrases is raised to the subject of unaccusative intransitive verbs.

In both Wechsler and Noh (2001) and Müller (2002), the driving force for the resultative construction is the valence list of the main verb. As a result of application of the lexical rules, the main verb takes a resultative phrase as an unsaturated complement, and its semantic subject is obligatorily interpreted as the referent of one of the NPs which appear in the valence list of the main verb. The NP interpreted as the semantic subject of resultative phrases is lexically determined by the semantic structure of the main verb.

4 Resultative phrases in Japanese as adjuncts

The present paper shares with Wechsler and Noh (2001) and Müller (2002) the view that the distribution of resultative phrases should be accounted for without recourse to the unaccusative hypothesis, and the

resultative construction in Japanese is analyzed in terms of lexical specifications of the main verbs. The present paper, however, parts from those authors who consider resultative phrases as unsaturated complements whose semantic subject is predetermined. Rather, it is shown that Japanese resultative phrases exhibit the syntactic characteristics of adjuncts, rather than those of complements, and the unrealized subject of the resultative phrase is contextually interpreted as one of the arguments of the main verb, or even a participant of the event not mentioned in the sentence.

4.1 Optionality of resultative phrases

Japanese resultatives exhibit behaviors similar to adjuncts rather than to unsaturated complements whose semantic subject is lexically specified. As stated before, Japanese allows no fake objects of the types exemplified in (3) for English, or the German example of object-oriented resultatives, *Er fuhr das Auto kaputt* 'He drove the car to a wreck,' cited in the previous section, where *das Auto* 'the car' is not the theme argument of the verb. The object NP, which plays the role of semantic subject of object-oriented resultatives, also plays some semantic role in the event expressed by the main verb, and consequently, sentences containing resultative phrases are always grammatical without the resultative phrases: i.e. resultative phrases are syntactically optional, as expected of adjuncts.

4.2 Coordination with adverbs

Wechsler and Noh (2001) argue that coordination data demonstrate that resultatives in Korean are controlled complements, and not adverbs. Coordination data in Japanese, however, show the opposite. Japanese resultatives can be freely coordinated with adverbs, as shown in (9), suggesting the similarity of their syntactic functions.

(9) a. Taro-ga *kabe*-o [aka-ku sosite zyozu-ni] nut-ta.
Taro-NOM wall-ACC red-KU and skillful-NI paint-PAST
'lit. Taro painted the wall red and skillfully. (Taro skillfully painted the wall red.)'

b. *Hune*-ga [huka-ku sosite sizuka-ni] sizun-da.
ship-NOM deep-KU and quite-NI sink-PAST
'lit. The ship sank deep and quietly. (The ship quietly sank deep.)'

In the object-oriented example in (9a), while the *ku*-form of adjective *aka-ku* 'red' describes the resultant state of the wall, and thus is a resultative phrase, the *ni*-form of adjectival noun *zyozu-ni* 'skillfully' cannot be predicated of the object *kabe* 'wall'. Rather, it describes the manner of Taro's painting the wall, and is used as adverb. In the subject-oriented example in (9b), the *ku*-form of adjective *huka-ku* 'deep' describes the resultant state of the ship and the *ni*-form of adjectival noun *sizuka-ni* describes the manner of sinking.

It is possible that (9a) and (9b) are examples of coordination of unlike conjuncts, and the range of possible conjuncts in Japanese coordinate structure is an independent topic of research. However, the examples still sharply contrast with the data in Korean, cited in (10), where the coordination of a resultative phrase and an adverb constitutes a highly questionable sentence due to the 'two incompatible syntactic functions' (Wechsler and Noh 2001:410).

(10) ??Kim-un cip-ul ppalkah-key kuliko wanchenhi chilha-yess-ta.
Kim-TOP house-ACC red-COMP and completely paint-PAST-DEC
'Kim painted the house red and completely.'
(Wechsler and Noh 2001:410)

4.3 Iteration of resultative phrases

While resultative phrases do not iterate in English (e.g. **He wiped the table dry clean* (Goldberg 1991:86)), in Japanese, resultative phrases iterate as expected of adjuncts, but not of controlled complements subcategorized by the main verb, as shown in (11).

(11) a. Taro-ga konagona-ni *koori*-o komaka-ku kudai-ta.
Taro-NOM pieces-NI ice-ACC small-KU crush-PAST
'lit. Taro crushed ice into pieces, small. (Taro crushed ice into small pieces.)'

b. oisi-sou-ni *pan*-ga kituneiro-ni yake-ta.
tasty-looking-NI bread-NOM brown-NI be.toasted-PAST
'lit. Bread was toasted tasty-looking, to a golden brown. (Tasty-looking toast was done to a golden brown.)'

In (11a), the *ni*-forms of noun *konagona-ni* 'pieces' and the *ku*-form of adjective *komaka-ku* 'small' are both predicated of the object *koori* 'ice', and in (11b), the *ni*-forms of adjectival noun *oisi-sou-ni* 'tasty-looking' and the *ni*-form of noun *kituneiro-ni* 'a golden brown' are both predicated of the subject *pan* 'bread', thus indicating that the iteration of resultative phrases is possible. Although those resultative phrases can occupy adjacent positions as an unmarked linear order, they may be scrambled as in (11) without affecting their acceptability: since coordination in Japanese does not require a conjunction (the conjunction *sosite* 'and' in (9) is optional), the two resultative phrases are split by the object in (11a), and by the subject in (11b), to eliminate the possibility that a sequence of two resultative phrases may form a coordinate structure.

Müller (2002) points out that iteration of resultative phrases is not possible in German (e.g. **Er wusch die Sachen sauber weiß.* 'lit. He washed the clothes clean white.' (Müller 2002:239)), and argues that it is an expected result of the analysis of resultative phrases as an unsaturated complement of the main verb: that is, once a lexical rule 'transitivizes' intransitive verbs to subcategorize for a resultative phrase and its semantic subject, another application of the lexical rule to the already transitivized verbs is not possible. He also argues, following Winkler (1997), that iteration of resultative phrases is unacceptable on semantic grounds as well because an event denoted by the main verb is delimited by a resultative phrase, and the event cannot be delimited twice. Example (11) clearly shows that the semantic explanation does not universally hold, and furthermore, the syntactic explanation that resultative phrases are unsaturated complements is not applicable to Japanese.

4.4 Binding of the reflexive in resultative phrases

A binding fact provides another piece of evidence that resultative phrases are not controlled complements.

In Japanese, binders of the reflexive *zibun* 'self' must be a subject, but the anaphora relation between a binder and the reflexive is not clause-bound. Thus, in the causative construction, a typical example involving controlled complements, the reflexive *zibun* in the embedded VP (indicated by brackets) is bound either by the matrix subject or the embedded (unrealized) subject, as exemplified in (12).

(12) Taro$_i$-ga yoso-no ko$_j$-ni [zibun$_{i,j}$-no ie-de gohan-o tabe-] sase-ta.
Taro-NOM other-GEN child-DAT self-GEN house-at meal-ACC eat- cause-PAST
'Taro had someone else's child eat a meal at Taro's/the child's house.'

The antecedent of *zibun* is ambiguous between *Taro*, the matrix subject, and the causee *ko* 'child', which is the controller of the embedded VP, as predicted by the binding principles for Japanese.

The reflexive *zibun* which appears in the resultative phrase, however, does not behave in the same way as that in the controlled complement in (12): it can only be bound by the matrix subject as shown in (13a).

(13) a. Taro$_i$-ga yoso-no *ko*$_j$-o zibun$_{i,*j}$-no oya-yori zyoubu-ni sodate-ta.
Taro-NOM other-GEN child-ACC self-GEN parent-than strong-NI raise-PAST
'Taro raised someone else's child stronger than Taro's parent.'

b. yoso-no ko$_j$-ga zibun$_j$-no oya-yori zyoubu-da.
other-GEN child-NOM self-GEN parent-than strong-be
'Someone else's child is stronger than his parent.'

The resultative phrase *zyoubu-ni* 'strong, healthy' in (13a) describes the state where somebody else's child has become stronger than Taro's parent but cannot mean stronger than the child's parent, a reading that would be expected if the resultative phrase were a complement controlled by the object *ko* 'child' in the same way as VP complements in the causative construction are. Example (13b) shows that if the adjectival noun *zyoubu* appears as the primary predicate, the overt subject *ko* binds the reflexive *zibun* as predicted by the binding principles.

Another example of the reflexive *zibun* with the *ni*-form of noun *zyun-ni* 'in order' is given in (14). The reflexive is bound by the matrix subject *sensei* 'teacher', but not by the semantic subject *gakusei* 'students' of the resultative phrase.

(14) sensei$_i$-ga *gakusei*$_j$-o zibun$_{i,*j}$-no suki-na zyun-ni narabe-ta.
teacher-NOM students-ACC self-GEN like-NA order-NI arrange-PAST
'The teacher arranged the students in the order of his preference.'

The *ni*-form of noun *zyun-ni* 'in order' can be interpreted in two ways: as an adverbial phrase, it describes the sequence of the students who were given the command to line up by the teacher. It indicates the sequence of the students moving into their positions in a line, but not necessarily the sequence of the positions occupied by them. As a resultative phrase, on the other hand, it describes the resultant sequence of the lined up students. Whether as an adverbial phrase or as a resultative phrase, the reflexive it contains can only be bound by the matrix subject *sensei* 'teacher', not by the semantic subject *gakusei* 'students' of the resultative phrase. The example thus indicates that the reflexive binding in resultative phrases operates in the same way as that in adverbial phrases, and not in the same way as that in controlled complements

exemplified by the causative sentence in (12).

4.5 The arguments of the verb as the controller of resultative phrases

It seems to be a cross-linguistic pattern that resultative phrases accompanying transitive verbs can induce the object-oriented interpretation, and those with unaccusative intransitive verbs can induce the subject-oriented interpretation. However, languages and authors differ as to the extent of other types of interpretations which are (claimed to be) allowed by the resultative phrases. Japanese resultatives clearly exhibit examples which deviate from those two typical types in the choice of the semantic subject.

The resultative phrases in (15) are predicated of the matrix subject, rather than of the object, of the transitive verbs.

(15) a. *Taro*-ga sakana-o hara-ippai-ni tabe-ta.
Taro-NOM fish-ACC stomach-full-NI eat-PAST
'lit. Taro ate fish to full stomach. (Taro gorged himself on fish.)'

b. *Taro*-ga zeiniku-o garigari-ni sogiotosi-ta.
Taro-NOM surplus.fat-ACC slender-NI trim-PAST
'lit. Taro trimmed surplus fat slender. (Taro became reduced to skin and bones.)'

The resultative phrase *hara-ippai-ni* 'to full stomach' in (15a) unmistakably describes a resultant state of the eater, *Taro*, not of the eaten, *sakana* 'fish', and the resultative phrase *garigari-ni* 'slender' describes a resultant state of Taro after surplus fat was trimmed. The deviation of the semantic subject of the resultative phrases cannot be attributed to an idiosyncratic semantic structure of the verbs as shown in (16) where the same verb as (15a) equally allows an object-oriented resultative phrase.[4]

(16) Taro-ga *sakana*-o kirei-ni tabe-ta.
Taro-NOM fish-ACC clean-NI eat-PAST
'lit. Taro ate fish clean. (Taro completely ate fish.)'

The resultative phrase *kirei-ni* 'clean' describes the state of *sakana* 'fish', the object of the transitive verb.

[4] Various authors argue that a semantic classification of theme arguments is necessary in order to account for the distribution of the resultative phrases. For example, in order to explain the limited admissibility of resultative phrases with transitive verbs, Koizumi (1994:55), following Miyagawa (1989:56), employs the notion of 'affected theme': i.e. a theme argument whose referent undergoes a change of state as a result of action described by the verb (See footnote 3). In order to explain subject-oriented resultatives with a transitive verb (e.g. *The wise men followed the star out of Bethlehem.* (Wechsler 1997a:313)), Rappaport Hovav and Levin (2001:786), following Croft (1991:186) and Tsunoda (1985:388-389), propose a further refined notion of 'force recipient', i.e. a recipient of the transmitted force which is described by the verb. According to them, if the object NP does not carry the semantic role of force recipient, though the object of transitive verbs usually does, then resultatives are free to be predicated of the subject NP. However, the object *sakana* 'fish' in examples (15a) and (16) is clearly the argument expressing the 'affected theme' which undergoes a change of state as a result of the eating event, or the 'recipient of the force' transmitted by the eating action. Thus, neither the notion of 'affected theme' nor 'force recipient' is sufficient to account for the subject-oriented resultative in (15a).

The two resultative phrases in (15a) and (16), one that describes a state of the referent of the subject and the other that describes a state of the referent of the object, can even cooccur in a single sentence though it would require a context in which both referents are foci of the discourse: e.g. Taro gorged himself on fish while Hanako only took a bite though still hungry.

The apparent generalization of these subject-oriented resultatives with transitive verbs in (15) is that the referent of subject, as well as the referent of object, undergoes a change of state as a result of the event described by the verb. The subject is not formally a theme argument in syntactic or semantic sense, but nevertheless understood as expressing an entity that experiences a change of state, e.g. becoming full or slender as a result of the events in the real world. While the syntactic and semantic structures of the sentence *Taro-ga sakana-o tabe-ta* 'Taro ate fish' is identical in (15a) and (16), the resultative phrases *haraippai-ni* 'to full stomach' and *kirei-ni* 'clean' are interpreted without difficulty as predicated of the referent of subject and object, respectively. This flexibility of interpretation seems to suggest that the semantic subject of resultative phrases is anaphorically determined, i.e. determined contextually on semantic and pragmatic grounds, rather than being obligatorily controlled as is the case of unsaturated complements subcategorized by the main verb.

To further illustrate the control patterns that do not follow the typical types of resultatives, the examples in (17) show that resultative phrases can be predicated of the indirect object, in spite of the claim that they cannot (Koizumi 1994).

(17) a. Taro-ga *kabin*-ni penki-o aka-ku nut-ta.
Taro-NOM vase-DAT paint-ACC red-KU brush-PAST
'lit. Taro brushed paint on the vase red. (Taro painted the vase red.)'

b. Taro-ga *sentakumono*-ni airon-o kirei-ni kake-ta.
Taro-NOM laundry-DAT iron-ACC neat-NI apply-PAST
'lit. Taro applied an iron to the laundry neat. (Taro neatly ironed the laundry.)'

In (17a), the resultative phrase *aka-ku* 'red' is predicated of *kabin* 'vase', the indirect object of the verb, and not the direct object *penki* 'paint' (the paint must be red to start with), and in (17b), the resultative phrase *kirei-ni* 'neat' is predicated of *sentakumono* 'laundry', again the indirect object of the verb.

The argument structure of the verb *nut-ta* 'brushed' alternates in a similar way to that of the English verbs *brush* and *spray*: the goal argument *kabin* 'vase', i.e. the indirect object in (17a), can also be expressed as the direct object as in (18), in which case the theme argument *penki* 'paint' is expressed as an oblique NP.

(18) Taro-ga *kabin*-o penki-de aka-ku nut-ta.
Taro-NOM vase-ACC paint-INSTRUMENTAL red-KU brush-PAST
'lit. Taro brushed the vase with paint red. (Taro painted the vase red.)'

Whether the verb *nut-ta* 'brushed' is used with the valence pattern of ditransitive verbs as in (17a), or with the valence pattern of transitive verbs as in (18), the resultative phrase *aka-ku* 'red' equally describes the resultant state of the goal argument *kabin* 'vase'. This sharply contrasts with English resultative constructions in which resultative phrases can only be predicated of the direct object, as repeatedly pointed

out by various authors.

(19) a. John loaded *the wagon* full with hay.

b. *John loaded the hay into *the wagon* full.

(Williams 1980:204; underlines are added by the present author)

The examples of Japanese resultatives in (17) and (18), in comparison with English resultatives in (19), clearly show that, unlike English (and Korean (Wechsler and Noh 2001:416)), the interpretation of resultative phrases in Japanese is sensitive to which entities undergo a change of state as a result of the event regardless of the formal grammatical functions given to the linguistic expressions of those entities. As may be expected, in (17a) and (18), a resultative phrase can describe a resultant state of paint, which is another affected entity, instead of (or in addition to) the resultative phrase *aka-ku* 'red' which describes the state of the vase.

(20) a. Taro-ga kabin-ni *penki*-o madara-ni nut-ta.
Taro-NOM vase-DAT paint-ACC uneven-NI brush-PAST
'lit. Taro brushed paint on the vase uneven. (Taro unevenly painted the vase.)'

b. Taro-ga kabin-o *penki*-de madara-ni nut-ta.
Taro-NOM vase-ACC paint-INSTRUMENTAL uneven-NI brush-PAST
'lit. Taro brushed the vase with paint uneven. (Taro unevenly painted the vase.)'

Since it must be the paint, and not the vase, that is uneven as a result of Taro's painting, the resultative phrase *madara-ni* 'uneven' is predicated of *penki* 'paint', expressed as the direct object in (20a) and as the oblique NP in (20b).

The data show that resultative phrases can be predicated of the subject of transitive verbs (as in (15)), the indirect object of ditransitive verbs (as in (17)), and oblique NPs (as in (20b)), as well as the direct object of transitive verbs and the subject of unaccusative intransitive verbs. The only generalization that encompasses all types is that resultative phrases can describe the entity that undergoes a change of state regardless of their syntactic functions.

4.6 Non-arguments of the verb as the controller of resultative phrases

As discussed in the previous section, Japanese resultative phrases can be predicated of the indirect object and oblique NPs, and hence the unaccusative hypothesis cannot account for their distribution. Furthermore, they can express a resultant state induced by the event denoted by the main verb, not necessarily of the entities expressed as arguments of the verb. That is, resultative phrases in Japanese do not require their controllers to be an element of the sentence at all. The resultative phrase in (21), taken from Washio (1997), describes a state of an entity which is not expressed in the sentence.

(21) kare-wa kutu-no himo-o kata-ku musun-da.
he-TOP shoe-GEN lace-ACC tight-KU tie-PAST
'He tied his shoelaces tight.' (Washio 1997:18)

In (21), the *ku*-form of adjective *kata-ku* 'tight, stiff' describes the tightness of a knot of shoe laces, but not of shoe laces: being stiff is not a usual attribute of shoe laces, and if it is, *kutu-no himo-ga kata-i* 'The shoe

laces are stiff' can only mean that the shoe laces are stiffened by e.g. starch or being frozen. Washio (1997) analyzes *kata-ku* in (21) as an example of 'the spurious resultative' which describes the manner of action. It is claimed that spurious resultatives are not instances of the resultative construction while their syntactic nature is left unspecified.

The *ku*-form of adjective in the following example also describes a state which results from the event expressed by the verb but concerns an entity not expressed as an argument of the verb. The example is adopted from the Korean example *kang-i twukkep-key el-ess-ta* 'lit. The river froze thickly' (Wechsler and Noh 2001:409), and its Japanese counterpart in (22), as well as the Korean example, is perfectly acceptable.

(22) kawa-ga atu-ku koot-ta.
river-NOM thick-KU freeze-PAST
'lit. The river froze thick.'

The *ku*-form of adjective *atu-ku* 'thick' is naturally interpreted as describing a state of ice as a result of the river's freezing, but the sentence lacks the controller. If resultative phrases are analyzed as a complement subcategorized by the main verb, it follows that *atu-ku* 'thick' in (22) is not a resultative phrase since it is a generally accepted assumption that the unrealized subject of unsaturated complements must be controlled by an argument of the verb (e.g. Halliday 1967, Williams 1980, Bresnan 1982, Wechsler 1997b). Not surprisingly, Wechsler and Noh (2001), under their analysis of resultative phrases as controlled complement, claim that *twukkep-key* 'thick' is an adverbial use of the adjective which describes 'a thick manner' of the freezing event. Aside from the fact that the phrases lack the controller among the arguments of the verb, however, there does not seem to be any independent evidence to consider the examples in (21) and (22) as distinct constructions from the resultative. In other words, there is no independent reason not to consider uncontroversial examples of resultatives in Japanese (and possibly Korean), as well as the examples in (21) and (22), as adjuncts.

Furthermore, quite a few examples can be found that are readily interpreted as describing a resultant state induced by the event denoted by the verb, but that lack the controller argument.

(23) a. Taro-ga (*sakazuki-no*) sake-o karappo-ni nomihosi-ta.
Taro-NOM cup-GEN sake-ACC empty-NI drink up-PAST
'lit. Taro drank sake (in a cup) empty. (Taro emptied a cup of sake.)'

b. (*miki-kara*) eda-o taira-ni sogioto-su
(trunk-FROM) branch-ACC flat-NI cut off-NONPAST
'lit. to cut branches (off the trunk) flat (to cut branches off, leaving the trunk smooth)'
(taken from an advertisement for gardening scissors)

c. Hanako-ga kao-o atu-ku nut-ta.
Hanako-NOM face-ACC thick-KU paint-PAST
'lit. Hanako painted her face thick. (Hanako put on heavy makeup.)'

d. ha-ga marubouzu-ni kare-ta.
leave-NOM bald-NI dry up-PAST
'lit. Leaves dried up bald. (Leaves dried up, leaving the tree bald.)'

e. (*mati*-ni) yuki-ga siro-ku tumot-ta.
town-in snow-NOM white-KU pile.up-PAST
'lit. Snow piled up (in town) white. (It snowed, covering the town with a white sheet.)'

In (23a), the *ni*-form of adjectival noun *karappo-ni* 'empty' describes the container, not *sake* 'sake (Japanese rice wine)', after the drinking event, but *sakazuki* 'cup' is neither an argument of the verb nor an element of the sentence required by the presence of the adjectival noun. In (23b), the *ni*-form of adjectival noun *taira-ni* 'flat, smooth' describes the trunk after the cutting event, but *miki* 'trunk' is not a direct argument (i.e. the subject or in/direct object) of the verb, though it may be analyzed as an oblique argument. In (23c), the *ku*-form of adjective *atu-ku* 'thick' describes the makeup materials after the making-up event, but there is no natural way to incorporate the controller into the sentence. In (23d), the *ni*-form of noun *marubouzu-ni* 'bald' describes the tree after losing all leaves, but what becomes bald does not constitute an element of the sentence. In (23e), the *ku*-form of adjective *siro-ku* 'white' describes the color of whatever snow fell on, but *yuki* 'snow,' the only argument in the sentence, is white to start with and therefore the resultative phrase cannot be predicated of the subject.[5]

Lexically specified unsaturated complements, as resultatives are analyzed in Wechsler and Noh (2001) and Müller (2002), are generally understood to be obligatorily predicated of an argument of the verb. On the contrary, the data of Japanese resultatives in Section 4.5 and 4.6 indicate that they are non-obligatorily controlled adjuncts, i.e. their unrealized subject is determined on semantic and pragmatic grounds. The analysis of resultative phrases as adjuncts is further supported by the data in Section 4.3 which show that resultative phrases iterate (with possibly distinct controllers) and the data in Section 4.4 which show that the binding of the reflexive in resultative phrases operates in the same way as that in adverbial phrases rather than in controlled complements.

5 Formal analysis

In the following analysis, Japanese resultative phrases are formally treated as adverbial phrases. They are adverbial in the sense that they modify a VP and take the semantic value of the VP as argument; they can iterate or be absent altogether from the sentence as adjuncts can in general. However, they are analyzed as members of the valence lists, following the treatment of adjuncts in van Noord and Bouma (1994), Manning, Sag, and Iida (1999), and Bouma, Malouf, and Sag (2001). The analysis of adjuncts as valence-list members is originally motivated to account for the multiple scopes of adjuncts, and can be encoded in a simple lexical rule as in (24). In (24) and the following analysis, the representation of feature structures and lexical rules is cast in the framework of Sag, Wasow, and Bender (2003).

[5] The expression *yuki-ga siro-ku tumo-ru* 'lit. Snow piles up white' in example (23e) is a common expression in Japanese and I owe the observation that it cannot be a subject-oriented resultative to Stefan Muller (p.c., 2008).

(24) the adjunct lexical rule

$$\begin{bmatrix} \textit{derivational-rule} \\ \text{INPUT} \quad \left[\text{SYN}\begin{bmatrix}\text{HEAD}\ \textit{verb} \\ \text{VAL}\,|\,\text{COMPS}\ \boxed{1}\end{bmatrix}\right] \\ \text{OUTPUT}\ [\text{SYN}\,|\,\text{VAL}\,|\,\text{COMPS}\ \boxed{1}+[\text{SYN}\,|\,\text{HEAD}\ \textit{adv}]\,] \end{bmatrix}$$

The adjunct lexical rule adds an adverbial phrase to the COMPS list of a verb in the OUTPUT. If applied more than once, the rule adds more adverbs, accounting for the iteration of adverbs.

In the present analysis, the members of the valence lists are assumed to be realized in the constituent structure tree in any order and any number, following the assumption of Manning, Sag, and Iida (1999). This treatment accounts for the scrambling of complements and adjuncts in Japanese: i.e. as stated in 2.1, complement NPs and resultative phrases, or adverbial phrases in general, appear in any linear order before the head verb.

Various derivational (and inflectional) forms of adjectives, adjectival nouns, and nouns[6] are analyzed as the output of lexical rules, which produce distinct morphological forms with appropriate syntactic and semantic information. The derivational lexical rule in (25) gives rise to the adverbial head of resultative phrases.

(25) the resultative lexical rule

$$\begin{bmatrix} \textit{derivational-rule} \\ \text{INPUT} \begin{bmatrix}\text{PHON}\ \boxed{1} \\ \text{SYN}\begin{bmatrix}\text{HEAD}\ \textit{adj} \\ \text{VAL}\begin{bmatrix}\text{SPR}\ \langle\,\rangle \\ \text{MOD}\left\langle\begin{bmatrix}\text{SYN}\,|\,\text{HEAD}\ \textit{noun} \\ \text{SEM}\,|\,\text{INDEX}\ i\end{bmatrix}\right\rangle\end{bmatrix}\end{bmatrix} \\ \text{SEM}\left[\text{RESTR}\left\langle\boxed{2}\begin{bmatrix}\text{RELN}\ \textit{adj-rel} \\ \text{INST}\ i\end{bmatrix}\right\rangle\right]\end{bmatrix} \\ \text{OUTPUT} \begin{bmatrix}\text{PHON}\ F_{ku}(\boxed{1}) \\ \text{SYN}\begin{bmatrix}\text{HEAD}\ \textit{adv} \\ \text{VAL}\begin{bmatrix}\text{SPR}\ \langle\,\rangle \\ \text{MOD}\left\langle\begin{bmatrix}\text{SYN}\,|\,\text{HEAD}\ \textit{verb} \\ \text{SEM}\,|\,\text{INDEX}\ s\end{bmatrix}\right\rangle\end{bmatrix}\end{bmatrix} \\ \text{SEM}\left[\text{RESTR}\left\langle\begin{bmatrix}\text{RELN}\ \textit{change-of-state} \\ \text{CAUSE}\ s \\ \text{RESULT}\ \boxed{2}\end{bmatrix}\right\rangle\right]\end{bmatrix} \end{bmatrix}$$

The INPUT of the resultative lexical rule is taken to be an attributive adjective stem though other forms of adjective, e.g. a predicative adjective, are equally conceivable as the basic lexeme which serves as the input. The lexical rule converts the PHON value [1] of the adjective stem to the *ku*-form, $F_{\text{-ku}}([1])$; similar rules for adjectival nouns and nouns are necessary to convert their PHON values to those of the *ni*-form. The syntactic information is altered from that of a noun-modifier in the INPUT to that of a verb-modifier in the OUTPUT as the MOD values indicate. In the semantic value of the OUTPUT, the CAUSE role in the *change-of-state* RELATION takes the event index *s* as its value, which is the INDEX value of the modified

[6] Case-marked and tensed forms of nouns are assumed to be inflectional forms of noun stems as well as tensed forms of adjectives and adjectival nouns. The treatment is based upon the view that bound morphemes which indicate the case and the tense in Japanese do not constitute independent syntactic units (i.e. leafs of constituent structure trees), but rather they are merely inflectional endings (e.g. Manning, Sag, and Iida 1999).

verb. The RESULT in the *change-of-state* RELATION is the *adj-relation* coindexed as [2], which is taken to be a supertype of all semantic relations specified in the lexical entries of adjectives. In other words, the OUTPUT is an adverb that heads a resultative phrase, takes the event index of the modified verb, interprets it as the cause of a change of state, and specifies the result to be the semantic content of the input adjective.

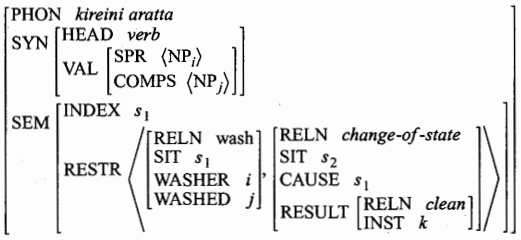
Index *i* indicates the referent of the modified noun in the INPUT, and in the OUTPUT, it indicates the entity that the resultative is predicated of. However, the index is not shared by any argument of the modified verb in the OUTPUT. As discussed in Sections 4.5 and 4.6, the controller of the unrealized subject of resultative phrases is not lexically specified, but rather it is determined on semantic and pragmatic grounds: e.g. the examples in (15a) and (16) show that it is inferred to be the eater that becomes full, and the eaten that is reduced to bare bones after the eating event. Note also that Washio's (1997) analysis that Japanese only allows predictable results to be encoded as resultative phrases, supports the view that resultative phrases are admitted only when the affected entity is inferable from the rest of the sentence. Consequently, it is not possible nor desirable to lexically specify the subject index of resultative phrases, as is done for controlled complements. It is likely that the possible range of controllers of adjuncts is predetermined for each language (as claimed by Bresnan 1982), and that there is some sort of accessibility hierarchy among the possible controllers (as claimed by Wechsler and Noh 2001). However, the exact mechanism determining the controller for resultative phrases, or non-obligatorily controlled adjuncts in general, is left open for further research.

As the output adverb, i.e. resultative, in (25) is formulated, index *i* of the unrealized subject of the resultative phrase does not stand in the obliqueness relation: i.e. the subject index does not appear in the ARG-STR list of the adverb simply because adverbs do not take the subject and their SPR list is specified as empty. This treatment is intended to account for the binding fact described in Section 4.4, that the reflexive appearing in resultative phrases is not bound by the semantic subject of the resultatives. Instead, the reflexive in resultative phrases is bound by the matrix subject as examples (13) and (14) show. The binding by the matrix subject is achieved in the ARG-STR list of the main verb since resultative phrases are included in the COMPS list as specified by the adjunct lexical rule in (24), and consequently in the ARG-ST list, of the main verb.[7]

The feature structure in (26) shows the partial VP *kirei-ni arat-ta* 'washed clean' in (6).

[7] As stated in Section 4.4, the binding relation between the reflexive and its antecedent is not clause-bound in Japanese. That is, the antecedent and the reflexive may not be coarguments within a single ARG-ST list in general, and consequently, the binding principle for Japanese will have to look into the argument structure of an argument of the head. It is also true of the reflexive that appears in the resultative phrase since it is not the resultative phrase itself but the reflexive appearing within the resultative phrase that is bound by the matrix subject. See e.g. a proposal for a nested ARG-ST list to account for the binding of the Japanese reflexive in Manning, Sag, and Iida (1999).

(26) a partial VP *kirei-ni arat-ta* 'washed clean'



The head verb is the output of the adjunct lexical rule, but the adjunct added to the COMPS list by the lexical rule is already realized as the resultative phrase *kirei-ni* 'clean' and so has already been cancelled from the list. In the SEM value, the first *predication* in the RESTR(iction) list originates from the head verb and indicates the washing event. The second *predication* in the list comes from the resultative phrase, indicating that the CAUSE of the change of state is the washing event, s_1, and the result is that some entity represented by the individual index k is clean. The interpretation that identifies the index k with the index j of the WASHED is assumed to be pragmatically achieved. While (26) is an example of a resultative phrase cooccurring with a transitive verb, nothing in the lexical rules in (24) and (25) is specifically for transitive verbs, and those lexical rules will equally be applicable to the resultative construction with unaccusative intransitive verbs.

6 Conclusion

This paper provides an analysis of Japanese resultatives as adverbs based upon the data that indicate that they share the properties of adjuncts rather than those expected of obligatorily controlled complements: they iterate, they do not participate in the binding relation with the semantic subject, and their semantic subjects are not the referent of a lexically predetermined argument of the main verb, but rather an entity which is understood as affected by the event described by the verb. Resultative phrases are formally analyzed as projections of an adverb which is derived from an adjective, an adjectival noun, or a noun, and that their semantic content encodes a change of state whose cause is the event denoted by the verb and whose result is the state denoted by the stem of an adjective, an adjectival noun, or a noun.

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