On the Argument Structure of *Zi*-Verbs in Japanese:

Description and Explanation

1. Introduction

In this paper, we discuss the nature of morphologically complex verbs known as *zi*-verbs in Japanese, such as *zi-satu-suru* 'kill oneself', *zi-kai-suru* 'collapse' and *zi-sui-suru* 'cook for oneself.' *Zi*-verbs consist of three parts: (a) the *zi*-morpheme, (b) Sino-Japanese verbal nouns, for example, *satu* 'killing' and *kai* 'collapsing' in the examples above, and (c) the light verb *suru* 'do.' The descriptive investigation of the syntax and semantics of this verbal class has been undertaken for the first time in Japanese linguistics by Tsujimura and Aikawa (1996, 1999), but the fuller examination of the true nature of *zi*-verbs within the wider context of the syntax-lexical semantics interface and the theory of argument structure is yet to be conducted. Against this backdrop, the present paper attempts to develop a comprehensive theoretical account of *zi*-verbs within the framework of generative grammar. As noted in Tsujimura and Aikawa (1996, 1999), there are two types of *zi*-verbs: *zi*-verbs that cannot occur with object arguments (this paper calls them 'objectless *zi*-verbs') and those that can occur with objects ('object-taking *zi*-verbs'). Tsujimura and Aikawa treat the first type of *zi*-verbs uniformly as reflexive verbs that have an unaccusative structure. Contrary to their analysis, we claim that not all objectless *zi*-verbs have an unaccusative structure and that objectless *zi*-verbs cannot be classified into a single type as reflexive verbs. We show that

objectless *zi*-verbs are categorized into three subtypes in terms of argument structure and that the *zi*-morpheme that arises in each type of verb has a different function /meaning.

The present paper is organized in the following way. In section 2, we introduce *zi*-verbs. In section 3, we review the seminal work on *zi*-verbs by Tsujimura and Aikawa (1999) that categorizes objectless *zi*-verbs uniformly as reflexive verbs with unaccusative argument structure. In section 4, we show that some objectless *zi*-verbs such as *zi-satu-suru* 'kill oneself' have an external argument, contrary to Tsujimura and Aikawa's uniform unaccusative analysis, by applying four diagnostics from the Japanese literature for external argumenthood of a verb: (a) Verb-Verb compounds, (b) accusative case marking in light verb constructions, (c) passivized causativization, and (d) *de*-marked instrumental subject constructions. Further, we introduce two diagnostics for internal argumenthood: (a) the resultative interpretation of the –*teiru* morpheme and (b) the –*kake* suffixation, and show that some objectless *zi*-verbs have both external and internal arguments, some have only an external one, and some other have only an internal one. Also, we show that not all objectless *zi*-verbs are reflexive verbs: they occur in non-reflexive constrictions as well. In section 5, we provide our alternative analysis of objectless *zi*-verbs in terms of Lexical Conceptual Structure and its mapping to Argument Structure (Levin and Rappaport-Hovav 1995, Kageyama 1996, among others). We claim that objectless *zi*-verbs are classified into three subtypes: (a) transitive reflexive verbs such as *zi-satu-suru* 'kill oneself', (b) unaccusative (decausative) verbs such as *zi-kai-suru* 'collapse' and (c)

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unergative verbs such as *zi-sui-suru* 'cook for oneself' and that the *zi*-morpheme used in the

(a) type of verb functions as an argument, while it functions as an adjunct in the (b) and (c) types.

Section 6 is the conclusion.

2. What are *Zi*-Verbs?

The list in (1) contains some examples of *zi*-verbs. The *zi*-morpheme (自 in Chinese

character) 'self' combines with a wide variety of Sino-Japanese verbal nouns (Japanese

verbal nouns that originated in Chinese, such as *satu* 'killing' in (1a) or *man* 'boast' in

(1b)) that are supported by the light verb *suru* 'do' (Grimshaw and Mester 1988).[1]

(1) a. *zi-satu-suru* 'kill oneself'   *zi-ritu-suru* 'establish oneself'

   zi-kai-suru 'collapse by itself'   *zi-ten-suru* 'revolve by itself'

 b. *zi-man-suru* 'boast about oneself'   *zi-kyoo-suru* 'confess oneself'

   zi-san-suru 'praise oneself'   *zi-nin-suru* 'admit oneself'

A *zi*-verb consists of three parts: the *zi*-morpheme, a verbal noun, and the light verb as

shown in bold in (2a). If the three parts are not together, the expressions are ill-formed, as

exemplified in (2b-d). The *zi*-morpheme cannot be used independently by taking the

accusative case marker *-o* as in (2b), even with a Japanese-origin verb *korosu* 'kill.' As

(2c) shows, a Sino-Japanese verbal noun used in *zi*-verbs cannot stand by itself even if it

is supported by the light verb. The morphological incorporation of the *zi*-morpheme is

required. Also, the *zi*-morpheme and verbal noun complex cannot be inflected for tense by itself as in (2d).[2]

(2) a. John-ga   **zi-satu-si**-ta.

John-Nom self-killing-do-Past

'John killed himself.'

b.* John-ga   **zi**-o   satu-si-ta.   (Cf. *John-ga   **zi**-o   korosi-ta.)

John-Nom self-Acc killing-do-Past   John-Nom self-Acc kill-Past

'John killed himself.'   'John killed himself.'

c.* John-ga   zibun-o   **satu-si**-ta.   (Cf. John-ga   zibun-o   korosi-ta.)

John-Nom self-Acc   killing-do-Past   John-Nom self-Acc   kill-Past

'John killed himself.'   'John killed himself (lit.)'[3]

d. * John-ga   **zi-satu**-ta.

John-Nom self-killing-Past

'John killed himself.'

Tsujimura and Aikawa (1999) observe that there are two types of *zi*-verbs in Japanese: 'unaccusative *zi*-verbs' and 'inalienable *zi*-verbs.' Unaccusative *zi*-verbs cannot occur with object arguments, as illustrated in (3a). This paper calls this type of *zi*-verb 'objectless *zi*-verbs.' The verbs listed in (1a) belong to this class. By contrast, as (3b) illustrates, inalienable *zi*-

verbs can occur with object arguments that stand in the inalienable relation with the subject argument. We call these 'object-taking zi-verbs.' The verbs in (1b) belong to this class.

(3) a.* John-ga   musuko-o   zi-satu-si-ta.   (Objectless zi-verb)

       John-Nom   son-Acc   self-killing-do-Past

       'John killed his son.'

   b. John-ga   musuko-o   zi-man-si-ta.   (Object-taking zi-verb)

       John-Nom   son-Acc   self-boast-do-Past

       'John boasted about his own son.'

In this paper, we focus on the objectless type of zi-verb. The object-taking type will be left for future studies.

3. Tsujimura and Aikawa's (1999) Uniform Unaccusative Reflexive Verb Analysis

    Tsujimura and Aikawa (1999) propose that all objectless zi-verbs are reflexive verbs with unaccusative argument structure in the sense of Perlmutter (1978) and Burzio (1986). Specifically, this verb lacks an external argument in the subject position. The derivation for the sentence in (2a) is analyzed as in (4).

(4)   [$_{TP}$ John$_i$-ga [$_{VP}$ t_i zi-satu si] ta]

The surface subject *John* is generated in the complement of the verbal noun *zi-satu* 'self-killing,' and undergoes syntactic movement into [Spec, TP] for nominative case.

This analysis directly explains the observation noted above: *zi*-verbs such as *zi-satu-suru* 'kill oneself' cannot occur with direct objects, as in (3a), because unaccusative verbs in general cannot do so due to Burzio's Generalization, given in (5).

(5)   Burzio's Generalization (Burzio 1986: 178-179)

$-\theta_s \rightarrow -A$: All and only the verbs that can assign θ-role to the subject can assign (accusative) Case to an object.

Tsujimura and Aikawa provide two pieces of evidence from the literature on unaccusativity in Japanese to show that objectless *zi*-verbs are unaccusative verbs. The first piece of evidence comes from the Direct Object Restriction. This restriction first noted by Simpson (1983) and so named by Levin and Rappaport-Hovav (1995) states that secondary resultative predicates can be predicated of only (underlying) direct objects. Consider (6).[4] The secondary predicate and the object it is predicated of are in bold and underlined, respectively.

(6) a. John-ga   [_{VP} <u>pan</u>-o   **makkuroni**   yai-ta].   (Transitive Verb)

John-Nom   bread-Acc black   toast(Tr)-Past

'John toasted the bread black.'

   b.* <u>John</u>-ga   [_{VP}**kutakutani**   hasi-tta].   (Unergative Verb)

John-Nom   exhausted   run-Past

'John ran exhausted.'

c. Pan$_i$-ga [$_{VP}$ **makkuroni** t_i yake-ta]. (Unaccusative Verb)

bread-Nom black toast(Intr)-Past

'The bread burned black.'

d. John$_i$-ga [$_{VP}$ **rippani** t_i zi-ritu-si-ta]. (*Zi*-Verb)

John-Nom finely self-establishing-do-Past

'John established himself well.'

In (6a) with the transitive verb *yaku* 'toast', the secondary predicate *makkuroni* 'black' can be predicated of the NP *pan* 'bread' in compliance with the Direct Object Restriction because the NP is in direct object position. (6b) with the unergative verb *hasiru* 'run' is ill-formed because *John* is the external argument and the secondary predicate *kutakutani* 'exhausted' cannot be predicated of the NP. The well-formedness of (6c) naturally falls out under the unaccusative hypothesis of Perlmutter (1978) and Burzio (1986) if intransitive verbs such as *yakeru* 'toast' are unaccusative and hence have underlying direct objects as indicated by the VP-internal trace. Tsujimura and Aikawa apply this restriction to *zi-ritu-suru* 'establish oneself' in (6d). Their claim is that the well-formedness of the example indicates that this *zi*-verb is an unaccusative verb.

The second argument for Tsujimura and Aikawa's (1999) uniform unaccusative analysis concerns numeral quantifier floating. Miyagawa (1989a) observes that the floating numeral quantifier must stand in the mutual c-command relation with its host. Consider (7)-(10).[5] A floating numeral quantifier and its host are in bold.

(7) a. **Gakusei-**ga   **yo-nin**   [_{VP} ie-o   ka-tta].   (Transitive Verb)

student-Nom   four-Cl   house-Acc   buy-Past

'Four students bought a house.'

b.*?**Gakusei-**ga   [_{VP} ie-o   **yo-nin**   ka-tta].

student-Nom   house-Acc   four-Cl   buy-Past

'Four students bought a house.'

(8) a. **Gakusei-**ga   **yo-nin**   [_{VP} ofisu-ni   hasi-tta].   (Unergative Verb)

student-Nom   four-Cl   office-to   run-Past

'Four students ran toward the office.'

b.* **Gakusei-**ga   [_{VP}   ofisu-ni   **yo-nin**   hasi-tta].

student-Nom   office-to   four-Cl   run-Past

'Four students ran toward the office.'

(9) a. **Gakusei_i-**ga   **yo-nin** [_{VP} ofisu-ni t_i ki-ta].   (Unaccusative Verb)

student-Nom   four-Cl   office-to   come-Past

'Four students came to the office.'

b. **Gakusei_i-**ga   [_{VP} ofisu-ni t_i **yo-nin**   ki-ta].

student-Nom   office-to   four-Cl   come-Past

'Four students came to the office.'

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(10) a. **Gakusei_i-ga yo-nin** [$_{VP}$ abekku-de t_i zi-satu-si-ta].   (*Zi*-Verb)

   student-Nom four-Cl   in pairs   self-killing-do-Past

   'Four students killed themselves in pairs.'

   b. **Gakusei_i-ga** [$_{VP}$ abekku-de t_i **yo-nin**   zi-satu-si-ta].

   student-Nom   in pairs   four-Cl   self-killing-do-Past

   'Four students killed themselves in pairs.'

The (a) examples of (7)-(10) are all acceptable. The quantifier *yo-nin* '4-classifier (for person)'

is in a mutual c-command relation with its host *gakusei* 'student' in each example. On the other

hand, the (b) examples differ in their acceptability. (7b) with the transitive verb *kau* 'buy' is

unacceptable since the floating numeral quantifier and its host *gakusei* 'student' are separated

by the VP boundary and the mutual c-command relation does not obtain. (8b) with the

unergative verb *hasiru* 'run' is unacceptable for the same reason. By contrast, (9b) with the

unaccusative verb *kuru* 'come' is acceptable because the relevant requirement is met between

the floating numeral quantifier and the VP-internal trace of the surface subject. With this in

mind, Tsujimura and Aikawa (1999) note, the fact that (10b) with *zi-satu-suru* 'kill oneself'

patterns with the unaccusative example (9b) shows that this *zi*-verb is also unaccusative.

   To summarize, this section has reviewed Tsujimura and Aikawa (1999). They provide

two arguments that all objectless *zi*-verbs are unaccusative verbs. It is important to note,

however, that many other diagnostics for the argument structure of verbs have been

proposed in the Japanese literature in addition to the ones mentioned here. In the next section, we see that their uniform unaccusative analysis makes incorrect predictions when the other diagnostics are applied to objectless zi-verbs.

4. Against the Uniform Unaccusative Reflexive Verb Analysis

In this section, we demonstrate that not all objectless zi-verbs are reflexive verbs with an unaccusative argument structure, arguing against Tsujimura and Aikawa (1999). In making our case, in section 4.1, we introduce diagnostics for external argumenthood and show that some objectless zi-verbs underlyingly have an external argument. In section 4.2, we further apply diagnostics for internal argumenthood. The results of the diagnostics in the two subsections show that some objectless zi-verbs have both external and internal arguments and cannot be unaccusative verbs. In section 4.3, we show that not all objectless zi-verbs are reflexive verbs: objectless zi-verbs arise not only in reflexive constructions but also in non-reflexive constructions. In section 4.4, we apply the two sets of argumenthood diagnostics to some other objectless zi-verbs and show that objectless zi-verbs should be further categorized into three subclasses in terms of their argument structure.

4.1. Objectless *Zi*-verb with an External Argument

We introduce four diagnostics for external argumenthood from the Japanese literature, listed in (11), and show that some objectless zi-verbs underlyingly have an external argument.

(11) a. Verb - Verb compounds headed by *naosu* 'redo'

    b. accusative case-marking in light verb constructions

    c. passivized causativization

    d. *de*-marked instrumental subject constructions

These tests distinguish verbs with an external argument from ones without it. We assume that this distinction is correlated with the *agentivity* of surface subject, following the commonly held assumption in the literature (Perlmutter 1978, Burzio 1986, Levin and Rappaport-Hovav 1995) that unergative verbs are more likely associated with agentive subjects, whereas unaccusative ones are with non-agentive subjects. [6] Our assumption is independently supported by Kishimoto (1996, 2005), who claims that in Japanese, it is the *volitionality* of subject that distinguishes unergative verbs (=verbs with an external argument) from unaccusative verbs (=verbs without it). So, we regard external arguments as agentive subjects and underlying internal arguments as non-agentive. In this section, for reasons of space, we apply the diagnostics only to the *zi*-verb *zi-satu-suru* 'kill oneself' that Tsujimura and Aikawa (1999) use in their discussion. However, other verbs such as *zi-ritu-suru* 'establish oneself' and *zi-sou-suru* 'admire oneself' pattern with this *zi*-verb. We argue that these verbs have an external argument in their argument structure, though they are claimed to have unaccusative structure in Tsujimura and Aikawa (1999).

The first diagnostic concerns Verb-Verb (V-V) compounds headed by a transitive verb *naosu* 'redo, do again.' Japanese V-V compounds have a restriction on combination called the Principle of Subject Sharing (Yumoto, 1996, Matsumoto, 1998).[7] It requires that the most salient participants in the semantic structure (usually subjects with agentivity or animacy) of the two members of a compound be identical: transitive and unergative verbs (or two transitive or two unergative verbs) that both have an agentive external argument can be combined, two unaccusative verbs that both lack an agentive argument also can be combined, but the transitive-unaccusative and unergative-unaccusative combinations (and vice versa) are not allowed. Consider (12a-c). The second verb is a transitive verb *naosu* 'redo,' and only transitive and unergative verbs can be the first member of the compound.

(12) a. kitae-**naosu** 'train again' tukuri-**naosu** 'make again' (V1 = Transitive Verb)

  b. suwari-**naosu** 'sit again' odori-**naosu** 'dance again' (V1=Unergative Verb)

  c.*korobi-**naosu** 'tumble again' *taore-**naosu** 'fall again' (V1 = Unaccusative Verb)

As (13) indicates, the *zi*-verb *zi-satu-suru* 'kill oneself' can be the first member of the V-V compound headed by *naosu* 'redo.' That this *zi*-verb behaves similarly with transitive and unergative verbs suggests that this verb has an agentive external argument.

(13) Tasuke-rare-ta noni   John-ga   zi-satu-si-***naosi***-te   minna-o   kanasimase-ta.

save-Pass-Past despite John-Nom ZI-killing-do-again-Past everyone-Acc vex-Past

'That John killed himself again after he was saved made everyone feel sad.'(V1=*Zi*-verb)

The second diagnostic comes from the observation due to Kageyama (1993: 52), based on

Dubinsky (1985, 1989), Miyagawa (1989b) and Tsujimura (1990), that the accusative case

marker -*o* can be attached to transitive and unergative verbal nouns, not unaccusative verbal

nouns. This is illustrated by the contrast between (14a, b) and (14c).

(14) a. Daigaku-de   kenkyu (***-o***)   suru hito-ga   hue-ta.   (Transitive Verbal Noun)

university-in   research(-Acc) do   person-Nom increase-Past

'The number of people who study in universities increased.' (Based on Kageyama 1993)

b. Roo huuhu-ga   rikon (***-o***)   si-ta.   (Unergative Verbal Noun)

old couple-Nom   divorce(-Acc) do-Past

'The old couple got divorced.'   (Kageyama 1993: 52)

c. Kaityoo-ga kinoo   sikyo (****-o***)   si-ta.   (Unaccusative Verbal Noun)

CEO-Nom yesterday death(-Acc) do-Past

'The CEO died yesterday.'   (Kageyama 1993: 53)

Under the theory of Argument Transfer proposed by Grimshaw and Mester (1988), this

contrast follows as a natural result of Burzio's Generalization, given in (5). Grimshaw and

Mester argue that the argument-taking property of the verbal noun is transferred into the

empty θ-grid of the light verb *suru* 'do.' Under this analysis, the verbal nouns can be marked

with the accusative marker *-o* by the light verbs in (14a, b), which become transitive and

unergative verbs, respectively, as the result of Argument Transfer. The impossibility of the

accusative case marking on the verbal noun in (14c) directly falls out, because the light verb

does not get an external argument via Argument Transfer and hence lacks the ability to

assign accusative case to the verbal noun. Now, when this diagnostic is applied to the *zi*-verbal

noun *zi-satu* 'self-killing' in (15), the verbal noun can be marked with the accusative case. This

suggests that the light verb has an external argument.[8]

(15)   John-wa   tuini   zi-satu (*-o*)   si-ta.   (*Zi*-Verbal Noun)

        John-Top   finally   ZI-killing(-Acc)   do-Past

        'John finally killed himself.'

   The third test involves passivized causativization. Following the observation first made by

Inoue (1976), Kageyama (1993: 60-62) points out that the embedded external argument, not the

embedded internal argument, of a causative construction can be promoted to the grammatical

subject of its passive counterpart. This observation is illustrated in (16)-(18).

(16) a. Kantoku-ga   ***kooti-ni***   sensyu-o   kitae-sase-ta.   (Transitive Verb)

        manager-Nom coach-Dat players-Acc train-Caus-Past

        'The manager made the coach train the players.'

b. ***Kooti-ga***   kantoku-niyotte   sensyu-o   kitae-sase-rare-ta.

coach-Nom manager-Dat   players-Acc train-Caus-Pass-Past

'The coach was made to train the players by the manager.'

c. ****Sensyu-ga***   kantoku-niyotte kooti-ni   kitae-sase-rare-ta.

players-Nom   manager-by   coach-Dat   train-Caus-Pass-Past

'The players were made to be trained by the coach by the manager.'

(17) a. Hahaoya-ga   ***kodomo-o*** suwar-ase-ta.   (Unergative Verb)

mother -Nom child-Acc sit-Caus-Past

'The mother made her child sit.'

b. ***Kodomo-ga***   hahaoya-niyotte   suwar-ase-rare-ta.

child-Nom   mother-by   sit-Caus-Pass-Past

'The child was made to sit by his mother.'

(18) a. Hahaoya-ga ***kodomo -o***   korob-ase-ta.   (Unaccusative Verb)

mother-Nom child-Acc   tumble-Caus-Past

'The mother made her child tumble.'

b. ****Kodomo-ga*** hahaoya-niyotte korob-ase-rare-ta.

child-Nom   mother-by   tumble-Caus-Pass-Past

'The child was made to tumble by his mother.'

In the causative construction in (16a) with the transitive verb *kitaeru* 'train,' *kooti* 'coach' is the external argument of the embedded transitive verb. As shown in (16b), this argument can be promoted to the matrix subject, in conformity with Inoue's observation. By contrast, *sensyu* 'players', the internal argument of the embedded verb, cannot be so promoted in (16c). Inoue's observation is further illustrated by (17) with the unergative verb *suwaru* 'sit.' The subject of the embedded clause in (17a), *kodomo* 'child,' is promoted to the matrix subject in its passive counterpart in (17b). The ill-formedness of (18b) with the unaccusative verb *korobu* 'tumble' shows that this promotion is not possible because this verb lacks an external argument. Now, consider (19). The subject of the embedded *zi*-verb in (19a), *John*, can be promoted to the matrix subject in (19b). This example, thus, shows that *John* is the external argument of the *zi*-verb.

(19) a. Tomodati-ga   ***John-o***   zi-satu-s-ase-ta.   (*Zi*-Verb)

      friends-Nom   John-Acc   ZI-killing-do-Caus-Past

      'His friends made John kill himself.'

  b. ***John-ga***   tomodati-niyotte   zi-satu-s-ase-rare-ta.

      John-Nom   friends-by   ZI-killing-do-Caus-Pass-Past

      'John was made to kill himself by his friends.'

The final test concerns the *de*-marked instrumental subject construction first discussed in Takubo (1985) and investigated by Kishimoto (2005). Kishimoto observes that, if certain

semantic conditions are met, agentive/volitional external arguments can be optionally marked with the instrumental case marker *-de*. The contrast between (20a, b) and (20c) illustrates this.

(20) a. Gakusei-tati-***ga/-de***   sensyu-o   kitae-ta.   (Transitive Verb)

        student-Pl-Nom/Instr players-Acc   train-Past

        'The students trained the players.'

   b. Gakusei-tati-***ga/-de***   isu-ni   suwat-ta.   (Unergative Verb)

        student-PL-Nom/Instr   chair-on sit-Past

        'The students sit on chairs.'

   c. Gakusei-tati-***ga/-*de*** yama-de   koron-da.   (Unaccusative Verb)

        student-Pl-Nom/Instr mountain-in   tumble-Past

        'The students tumbled in a mountain.'

(20a) and (20b) show that the subject argument *gakusei-tati* 'the students' can be optionally marked with the instrumental case *-de*. This alternative case marking is impossible in (20c) with the unaccusative verb *korobu* 'tumble.' Now, (21) shows that the subject of the verb *zi-satu-suru* 'kill oneself' can be marked with the instrumental marker. This means that *gakusei-tati* 'the students' is the external argument of this *zi*-verb.

(21) Sekinin-o   kanzi-te gakusei-tati-***ga/-de***   zi-satu-si-ta.   (*Zi*-verb)

    responsibility-Acc feel-and student-Pl-Nom/Instr   ZI-killing-do-Past

    'The students killed themselves as they felt responsible.'

Summarizing thus far, the results of the four diagnostics strongly indicate that certain *zi*-verbs, such as *zi-satu-suru* 'kill oneself,' utilized in the above examples, have an external argument in their argument structure. Thus, Tsujimura and Aikawa's analysis of all the objectless *zi*-verbs as uniformly unaccusative predicates is not tenable.

4.2. Objectless *Zi*-verb With an Internal Argument

Next, we apply two new diagnostics for internal argumenthood that concern the *-teiru* morpheme and and the *-kake* modification, in addition to the two already reviewed in section 3 as evidence for Tsujimura and Aikawa (1999)'s unaccusative analysis. We apply these tests to the same *zi*-verb *zi-satu-suru* 'kill oneself' used in the last subsection. The results of these diagnostics show that this verb has an internal argument as well.

First, recall the two arguments on unaccusativity reviewed in section 3 that are based on the Direct Object Restriction and on numeral quantifier floating. As shown in (22), secondary resultative predicates, such as *rippani* 'finely,' can be predicated of only (underlying) direct objects. The well-formedness of (22) shows that the verb *zi-satu-suru* 'kill oneself' has an internal argument which the resultative predicate is predicated of.

(22)   <u>John</u>-ga [$_{VP}$ **rippani**   zi-satu-si-ta].

    John-Nom   finely   ZI-killing-do-Past

    'John killed himself well.'   (The verb is replaced from (6d))

The second argument is that floating numeral quantifiers must stand in a mutual c-command relation with their hosts. The acceptability of (10b) shows that the *zi*-verb has an internal argument with which the numeral quantifier can be in a mutual c-command relation.

Now, we introduce two additional diagnostics for internal argumenthood. The first diagnostic comes from the availability of the resultative reading of the *teiru* morpheme in Japanese. This morpheme has a wide variety of meanings such as continuation of an action (progressive), continuation of the resultant state of an action, experience, repetition, and simple state (resultative). Focusing on the resultative interpretation of the morpheme and syntactic environments under which this interpretation is possible, Takezawa (1991: 70) proposes the generalization given in (23).

(23)   The resultative interpretation of *-teiru* obtains when there is a binding relation between the (grammatical) subject and internal argument of an affective verb, where the 'internal argument' is an element subcategorized by the verb.

The generalization in (23) says that the resultative interpretation is available only if the binding relation between the subject and the object holds. The progressive interpretation is available without such a relation. This generalization is illustrated in (24).

(24) a. Yamada-san-ga   omotya-o kowasi-***teiru***.   (Transitive Verb)

   Yamada-Mr.-Nom toy-Acc   break-TEIRU

   'Mr. Yamada is breaking a toy. [progressive] /*The toy is broken. [*resultative] '

   b. Omotya-ga kowas-are-***teiru.***   (Passive Verb)

   toy-Nom   break(Tr.)-Pass-TEIRU

   'The toy is being broken. [prog] /The toy is broken. [result]'

   c. Omotya-ga koware-***teiru.***   (Unaccusative Verb)

   toy-Nom   break(Intr.)-TEIRU

   'The toy is breaking.[prog] / Thetoyisbroken.[result]' (Takezawa,1991:(3)/(5))

In (24a) with the transitive verb *kowasu* 'break,' only the progressive interpretation is available. As

the subject *Yamada-san* 'Mr. Yamada' does not bind the object *omotya* 'toy,' the resultative

interpretation is not possible. By contrast, this interpretation is possible in the passive example (24b)

and the unaccusative example (24c). The surface subject of each sentence *omotya* 'toy' binds its

trace in the underlying position, as shown in (25).

(25)   [$_S$ [omotya]$_1$ –ga [$_{VP}$ {t_1 kowa-sare-teiru / t_1 koware-teiru }]]   (Takezawa 1991: (7))

Now, we have a sentence in which *-teiru* follows the *zi*-verb *zi-satu-suru* 'kill oneself' in (26).

(26)   (Ano katei-wa)   musuko-ga   zi-satu-si-***teiru***.

   That family-Top   son-Nom   ZI-killing-do-TEIRU

   'That family lost their son by his suicide [resultative / *progressive]'

The availability of the resultative reading in (26) shows that this *zi*-verb has an internal argument.

The second diagnostic is based on the deverbal nominal construction headed by the aspectual affix *-kake* 'be about to, do halfway' discussed by Kishimoto (1996, 2005). In this construction, the morpheme *-kake* is suffixed productively to a variety of verbal stems, followed by the genitive marker *no-*, to create the prenominal modification pattern. Kishimoto establishes the generalization that the target of the modification by this affix is restricted to the (underlying) internal argument. This is illustrated in examples (27)-(29).

(27) a. Masao-ga   zassi-o   yon-da.   (Transitive Verb)

     Masao-Nom   magazine-Acc   read-Past

     'Masao read a magazine.'

  b. yomi-**kake**-no   zassi

     read-KAKE-Gen   magazine

     'the magazine, read halfway'

  c.* yomi-**kake**-no   Masao

     read-KAKE-Gen   Masao

     'Masao, read halfway'   ((27b, c) from Kishimoto 1996: 254)

(28) a. Rannaa-ga   hasi-tta.   (Unergative Verb)

runner-Nom   run-Past

'the runner ran.'

b.* hasiri-***kake***-no   rannaa.

run-KAKE-Gen runner

'the runner, almost running'   ((28b) from Kishimoto 1996: 255)

(29) a. Doa-ga   ai-ta.   (Unaccusative Verb)

door-Nom open(Intr)-Past

'the door opened.

b. aki-***kake***-no   doa

open(Intr)-KAKE-Gen   door

'the door, slightly ajar'   ((29a) from Kishimoto 1996: 256)

The contrast between (27b) and (27c) shows that only the internal argument of the transitive verb *yomu* 'read' can be felicitously predicated of by the corresponding preverbal noun derived by *kake*-suffixation. The *-kake* suffixation with the unergative verb *hasiru* 'run' is bad, as shown in (28b). The surface subject *rannaa* 'runner' is the external argument of the verb. In (29b), by contrast, the surface subject of the unaccusative verb *aku* 'open (Intr)' can be the target of the *kake*-modification. This NP is the underlying internal argument of the verb. Now we apply this diagnostic to the *zi*-verb *zi-satu-suru* 'kill oneself' in (30).

(30) a. Musuko-ga   zi-satu-suru.

          son-Nom   ZI-killing-do

          'The son kills himself.'

      b. Zi-satu-si-**kake**-no   musuko-ga watasi-no sinpai.no.tane-da.

          ZI-killing-do-KAKE-Gen   son-Nom   I-Gen   concern-Cop

          'The son, half kills himself, is my concern.'

The availability of the *kake*-modification in (30b) suggests that this *zi*-verb has an internal

argument.

    The results of the four diagnostics for internal argumenthood show that the objectless *zi*-

verb *zi-satu-suru* 'kill oneself' has an internal argument. Note that this verb has an external

argument as well, as we have seen in section 4.1. So, this *zi*-verb is not unaccusative, contrary

to Tsujimura and Aikawa (1999)'s claim.

4.3. Not All Objectless *Zi*-verbs are Reflexive Verbs

    We further argue that not all objectless *zi*-verbs are reflexive verbs, though Tsujimura

and Aikawa (1999) treat all of them as reflexive verbs. Consider the verbs *zi-kai-suru*

'collapse' in (31) and *zi-sui-suru* 'cook for oneself' in (32).

(31) Tatemono-ga   (*kabe-o)   zi-kai-si-ta.

      building-Nom   wall-Acc   ZI-collapse-do-Past

      'The building collapsed.' / *'The building collapsed its wall.'

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(32) John-ga   (*yuusyoku-o)   zi-sui-si-ta.

      John-Nom   supper-Acc   ZI-cooking-do-Past

      'John cooked for himself.' / *'John cooked supper for himself.'

Like the *zi*-verb *zi-satu-suru* 'kill oneself,' which we used in the examples in the previous

subsections, these verbs do not occur with an object argument. So, we categorize these

verbs as 'objectless *zi*-verbs' on a par with *zi-satu-suru*. The two verbs, however, differ

from this verb in other respects. (33) illustrates that the verb *zi-satu-suru* can be

paraphrased using the reflexive anaphor *zibun* 'self' and the transitive verb *korosu* 'kill.'

(33) John-ga   zibun-o   korosi-ta.   =   John-ga zi-satu-si-ta. (=(2a))

     John-Nom   self-Acc   kill-Past

     'John$_i$ killed self$_i$.'

In the sentence, the subject *John* and the object *zibun* are coreferential and the reflexive

reading is obligatory. We propose that the *zi*-verb *zi-satu-suru* is a reflexive verb in

which the subject and the object are coreferential (we will discuss that the *zi*-morpheme is

the object argument of the verbal noun *satu* 'killing' in section 5).

    On the other hand, the two verbs in (31) and (32) are not reflexive verbs. (34) shows

that the verb *zi-kai-suru* in (31) cannot be paraphrased using the anaphor *sore-zitai* 'it-self'

for an inanimate element and the transitive verb *kowasu* 'destroy.' Rather, it is felicitous to

paraphrase the verb using the intransitive verb *kowareru* 'collapse.' Also, as shown in (35),

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the verb *zi-sui-suru* in (32) cannot be paraphrased using the anaphor *zibun* 'self,' unlike (33). Although the *zi*-verb does not occur with an overt object, the sentence (32) is interpreted with an implicit object: 'John cooked *a meal, food or something edible* for himself.' It never means 'John cooked himself (and ate himself!).' These verbs do not induce reflexive interpretations at all.

(34)   Tatemono-ga   {*sore-zitai-o kowasi-ta   /   koware-ta.}

         building-Nom   it-self-Acc destroy-Past   /   collapse-Past

         *'The building destructed itself. (Lit.)' / 'The building collapsed.'

(35)   *John-wa   zibun-o   suizi-si-ta.

         John-Top self-Acc   cooking-do-Past

         'John cooked himself.'

So, we claim that not all objectless *zi*-verbs are reflexive verbs, contrary to Tsujimura and Aikawa (1999). We agree with them in that some objectless *zi*-verbs such as *zi-satu-suru* 'kill oneself' and *zi-ritu-suru* 'establish oneself' are reflexive verbs. However, there are objectless *zi*-verbs such as *zi-kai-suru* 'collapse' and *zi-sui-suru* 'cook for oneself' that occur in a non-reflexive construction. Our proposal, therefore, is that objectless *zi*-verbs are further categorized into subtypes. It is cross-linguistically observed that the morpheme used to mark reflexivity can occur in non-reflexive constructions as well. For example, in

Italian, the morpheme *si* (glossed as SI in the examples) is used in reflexive, decausative, middle and impersonal constructions as in (36) - (39), respectively.[9]

(36) Maria **si** guarda.

Maria **SI** watches

'Maria watches herself.'   (Lidz, 1996, (157a))

(37) Il   vetro **si** rompe.

the glass   **SI** breaks

'The glass breaks.'   (Lidz, 1996, (75b))

(38) La pellice **si** vendono bene   d'autunno

The furs **SI** sell   well   in-autunno

'The furs sell well in the autumn.'   (Lidz, 1996, (157b))

(39) Domani   **si** discutera   le due proposte di legge

tomorrow **SI** discuss.FUT.3SG the two bills   of law

 'Tomorrow they will discuss two bills.'   (Lidz, 1996, (161b))

We claim that objectless *zi*-verbs, like '*si*-verbs' in Italian, arise in non-reflexive as well as reflexive constructions. That is, there are several types of objectless *zi*-verbs.

Not all languages use the same verbal morpheme in the same variety of constructions, though. Some languages such as English do not have a verbal morpheme to mark reflexivity or decausativity and some languages such as Kalkatungu use different verbal

morphemes in different constructions. There is, however, a typological generalization that if a language has a verbal morpheme for both reflexive and decausative constructions, it uses the same morpheme for the constructions (Geniušiene 1987). We will show in section 5 that Geniušiene's generalization holds for Japanese as well.

4.4. Types of Objectless *Zi*-verb

We have already observed in the previous subsections that objectless *zi*-verbs like *zi-satu-suru* 'kill oneself' have both external and internal arguments and that they occur only in reflexive sentences. Now, we consider other objectless *zi*-verbs that we have not focused on such as *zi-kai-suru* 'collapse' in (31) and *zi-sui-suru* 'cook for oneself' in (32). We apply the two sets of diagnostics for external and internal argumenthood to these verbs and show that the two verbs should be categorized into two different types in terms of argument structure.

We first consider verbs such as *zi-kai-suru* 'collapse,' *zi-baku-suru* 'explode,' and *zi-ten-suru* 'rotate.' Here, we apply the diagnostics to the first verb *zi-kai-suru*. The external argumenthood diagnostics are applied in (40) and the internal argumenthood ones in (41).

(40)a.*(Hankai-zyootai   dat-ta   node) tatemono-ga   zi-kai-si-***naosi***-ta.

   Half-collapse-state Cop-Past since   building-Nom ZI-collapse-do-again-Past

   'The building got collapsed again (since it has been half-destroyed).'

b. *(Tuyoi zisin-notame)   tatemono-ga   zi-kai (*-**o**)   si-ta.

    strong earthquake-for   building-Nom   ZI-collapse-Acc   do-Past

  'The building got collapsed due to a strong earthquake.'

c. ***Ie-ga***   John-niyotte   zi-kai-s-ase-rare-ta.

  house-Nom John-by   ZI-collapse-do-Caus-Pass-Past

  'The house was made to get collapsed by John.'

d. Ano hoteru-de-wa   honkan-to-bekkan-***ga/*de***   zi-kai-si-ta.

  That hotel-Loc-Top main.building-and-annex-Nom/Instr ZI-collapse-do-Past

  'In that hotel, the main building and the annex got collapsed.'

(41) a. Tatemono-ga   [_{VP} **konagonani**   zi-kai-si-ta].

  building-Nom   into-pieces   ZI-collapse-do-Past

  'The building collapsed into pieces.'

b. **Tatemono-ga**   [_{VP} sono sikitinai-de **san-mune** zi-kai-si-ta].

  building-Nom   that on.premise   three-CL   ZI-collapse-do-Past

  'Three buildings collapsed on that premise.'

c. Tatemono-ga   [_{VP} zi-kai-si-***teiru***].

  building-Nom   ZI-collapse-do-TEIRU

  'That building is collapsing.' [resultative / progressive]

d.   zi-kai-si-***kake***-no   tatemono

   ZI-collapse-do-KAKE-Gen   building

   'the building, half collapsed'

The ill-formedness of the sentences in (40) suggests that the verb *zi-kai-suru* 'collapse' lacks

an external argument in its argument structure. The well-formedness of (41a) with the

resultative phrase *rippani* 'finely' and that of (41b) with the floating numeral quantifier show

that this verb has an internal argument so the resultative phrase can be predicated of it and

the quantifier can be in a mutual c-command relation with it. The availability of a resultative

reading in (41c) shows that this verb has an internal argument so the binding relation defined

in (23) holds. That the *kake*-modification is available in (41d) can be explained if this verb

has an internal argument that can be the target of the modification.

   Now, we consider verbs such as *zi-sui-suru* 'cook for oneself,' *zi-doku-suru* 'read for

oneself' and *zi-kyuu-suru* 'supply for oneself.' The first verb *zi-sui-suru* 'cook for oneself' is

used in the diagnostics below. The diagnostics for external argumenthood are applied in (42)

and the ones for internal argumenthood in (43).

(42) a.? Izen sippai-si-ta   ga   John-ga   zi-sui-si-***naosi***-ta.

   Once mistake-do-Past but   John-Nom   ZI-cooking-do-again-Past

   'John was again in the habit of cooking for himself (though he has once failed).'

b.   John-ga   zi-sui (*-o*)   suru.

   John-Nom   ZI-cooking-Acc   do

   'John cooks for himself.'

c.   *Musuko-ga*   John-niyotte   zi-sui-s-ase-rare-ta.

   son-Nom   John-by   ZI-cooking-do-Caus-Pass-Past

   'His son was made to cook for himself by John.'

d.   Setuyaku-notame watasi-tati-*ga/de*   zi-sui-suru.

   saving-for   I-Pl-Nom/Instr   ZI-cooking-do

   'We cook for ourselves to save money.'

(43) a. ??John-wa [VP **rippani**   zi-sui-si-ta].

   John-Nom   finely   ZI-cooking-do-Past

   'John finely cooked for himself.'

b. ??Gakusei-ga   apaato-de   **san-nin**   zi-sui-suru.

   student-Nom apartment-at   three-Cl   ZI-cooking-do

   'Three students cook for themselves.'

c. John-wa   zi-sui-si-*teiru*.

   John-Top ZI-cooking-do-TEIRU

   'John is cooking his own food. [progressive/*resultative] (Takezawa 1991: 71-72)

d. *zi-sui-si-**kake**-no   John

    ZI-cooking-do-KAKE-Gen   John

    'John, half doing his cooking'

The well-formedness of the sentences in (42) shows that the *zi*-verb *zi-sui-suru* 'cook for oneself' has an external argument. The low acceptability of (43a,b) and the ill-formedness of the *kake*-modification in (43d) illustrate that this verb lacks an internal argument. That the *-teiru* morpheme that follows the *zi*-verb induces only the progressive reading in (43c) also shows that this verb lacks an internal argument.

The results of these diagnostics show that *zi-kai-suru* 'collapse' has only an internal argument, while *zi-sui-suru* 'cook for oneself' has only an external argument. Thus, in terms of argument structure, these verbs have to be categorized into different types. Note that the *zi*-verb *zi-satu-suru* 'kill oneself' also has to be in a separate type as we have already seen. So, in conclusion, three types of objectless *zi*-verbs need to be acknowledged.

4.5. Section summary

To summarize, in this section, we have shown that not all objectless *zi*-verbs are reflexive verbs with an unaccusative structure and thus Tsujimura and Aikawa's (1999) uniform unaccusative reflexive verb analysis is not tenable. Objectless *zi*-verbs have to be further categorized into three types in terms of argument structure. The chart below has some

examples of each type of objectless *zi*-verb. In the chart, the '*zi*- +verbal noun' parts are given in Chinese characters as well for convenience, as some words are homonyms.

Objectless *Zi*-verbs		
w/ ext.& int. arguments	w/ only int. argument	w/ only ext. argument
zi-satu-suru 自殺	*zi-kai-suru* 自壊	*zi-sui-suru* 自炊
'kill oneself'	''collapse'	'cook for oneself'
zi-ritu-suru 自立	*zi-baku-suru* 自爆	*zi-doku-suru* 自読
'establish oneself'	'explode'	'read for oneself'
zi-gai-suru 自害	*zi-ten-suru* 自転	*zi-kyuu-suru* 自給
'kill oneself'	'roll'	'supply for oneself'
zi-sou-suru 自惚	*zi-mei-suru* 自鳴	*zi-katu-suru* 自活
'admire oneself'	'sound'	'maintain for oneself'
zi-sui-suru 自水	*zi-sei-suru* 自生	*zi-syuu-suru* 自習
'drown oneself'	'grow'	'study for oneself'

Chart 1: Three Types of Objectless *Zi*-verbs in Japanese

5. Alternative Analysis of Objectless *Zi*-verb

In this section, taking our results from the previous sections as background, we propose an alternative analysis of the three types of objectless *zi*-verbs in Japanese that draws on a fine-grained mapping between Lexical Conceptual Structure (LCS) and Argument Structure (AS) (Carter 1976, Hale and Keyser 1986, 1987, Jackendoff 1990, Levin and Rappaport-Hovav 1995, among others). We show that our analysis not only derives the various properties of the three types of *zi*-verbs discovered in the earlier

sections but also correctly derives the different argument-structural function and meaning that the *zi*-morpheme is associated with in each type.

5.1. Objectless *Zi*-verb with a Transitive Argument Structure

We have observed in the last section that objectless *zi*-verbs such as *zi-satu-suru* 'kill oneself' in (44) are associated with a transitive argument structure with both the external and internal arguments, which are mapped onto the subject and direct object in the syntactic representation, respectively. Other verbs like *zi-ritu-suru* 'establish oneself' and *zi-sou-suru* 'admire oneself' pattern with this verb.

(44) John-ga   zi-satu-suru.

John-Nom   ZI-killing-do.

'John$_i$ kills himself$_i$.'

Following this observation and the standard analysis of accomplishment verbs like *kill* in English and *korosu* 'kill' Japanese, we postulate that the AS and the LCS for this type of verb are as shown in (45a,b).

(45) a. AS: (x, (y))

   b. LCS: [X CAUSE [Y BECOME DEAD]

It is commonly assumed in the literature on the lexical semantics-syntax interface (see Levin and Rappaport-Hovav 1995, Kageyama 1996, among others) that the Causer variable of the embedding (causing) sub-event in the LCS is mapped to the external

argument in the AS whereas the variable of the embedded (caused) sub-event in the LCS

is mapped to the internal argument in the AS. For the *zi-satu-suru* type of *zi*-verb, there is

a straightforward one-to-one mapping between the variable positions of the LCS and the

argument slots of the AS, as shown in (45a,b). Once the AS is mapped to the syntactic

representation, the internal argument is obligatorily incorporated into the verbal complex

due to its affixal nature. This mapping thus correctly derives the result that this type of

verb has fully transitive argument structure with external and internal arguments.

Recall that we have seen in section 4.3. that this type of *zi*-verb is a reflexive verb. In the

proposed analysis, the obligatory reflexive nature of this class of verb can be derived as

follows. We assume that the *zi*-morpheme used in verbs like *zi-satu-suru* has exactly the

same AS function and meaning as the anaphor *zibun* in regular transitive verbs: compare

(44) with the *zi*-verb and (46) with *zibun* and the accomplishment verb *korosu* 'kill.' In

both sentences, the reflexive (coreferential) interpretation is induced.

(46)   John-ga   zibun-o   korosi-ta.   (= (33))

        John-Nom self-Acc   kill-Past

         'John$_i$ killed self$_i$.'

The *zi*-mopheme and *zibun* have one difference: *zi-* is a bound morpheme, while *zibun* is

not. [10] Except for that, they share many properties. Both occupy the y position in the AS

and the Y position in the LCS. Both contain *zi-*: the morpheme itself and the first part of

zibun. We suppose that the underspecified part of the meaning of the *zi*-morpheme that is originated from Chinese is 'self.' One conceivable way to reflect these properties is coindexing the *zi*-morpheme or *zibun* with the external argument (x/X in the AS and LCS structures). Then, this operation induces the obligatory coreferential reading between the external and internal arguments in cases like (44) and (46).

5.2. Objecltess *Zi*-verbs with an Unaccusative Structure

Next, consider the second type of objectless *zi*-verbs such as *zi-kai-suru* 'collapse' in (47), *zi-baku-suru* 'explode' and *zi-ten-suru* 'rotate.' We have already seen that this class of verb is associated with the unaccusative AS and only has an internal argument.

(47)   Tatemono-ga   zi-kai-si-ta.

        building-Nom   ZI-collapsing-do-Past

        'The building collapsed.'

The AS and the LCS for this intransitive verb then would be as in (48).

(48) a. AS: (y) (y=Theme/Causee)

    b. LCS: [X CAUSE [Y BECOME BROKEN]]   (where X=Y)

We follow Kageyama (1996) and assume that intransitive verbs of change of state such as *break* in English and *kowareru* 'break (Intr)' in Japanese are derived from their transitive variants *break* and *kowasu*, respectively, by decausativization through the coidentification of the Causer and Causee/Theme participants (X = Y). As a result of this process, the

participant of the embedding (causing) sub-event (namely, X) becomes inaccessible for linking to a position in the AS (though it remains in the LCS). This process, thus, links the only visible element in the LCS (namely, Y) to the sole argument position (y) in the AS. This mapping thus gives the unaccusative syntactic profile to the *zi-kai-suru* type of *zi*-verbs. It should also be noticed that there is no variable position for the *zi*-morpheme to occupy in the AS in (48a). This mapping thus also correctly predicts that the morpheme has an adjunct status in the *zi-kai-suru* type of verbs. Since the coidentification of the Causer and Causee means that a single non-animate entity behaves as if it broke due to its own internal properties (see Chapin 1967, Smith 1970, Levin and Rappaport-Hovav 1995 and Kageyama 1996) and the LCS involves the non-agentive causative structure for inanimate objects, the only possible reading for the *zi*-morpheme in question that meets these two conditions is 'by itself.' Note that English change of state verbs show the parallel behavior in this regard, as shown by the grammaticality of (49a,b).

(49) a. The vase broke *by itself*.

   b. Can the screen rotate *by itself*?

   Furthermore, the verb *zi-kai-suru* in (47) can be paraphrased using the decausative verb *kowareru* 'break' and the adjunct *sizen-to* or *hitoride-ni*, both meaning 'by itself,' as in (50). The paraphrasability here is a natural consequence if our proposal that the *zi-*

morpheme attaches to intransitive verbs and functions as an adjunct that marks internal causation is on the right track.

(50)   Tatemono-ga   {sizen-to/ hitoride-ni}   koware-ta.

building-Nom   by itself   collapse-Past

'That building collapsed by itself.'

Our proposed analysis is also consistent with the typological generalization made by Geniušiene (1987) that if a language has a verbal morpheme for both reflexive and decausative constructions, it uses the same morpheme for both constructions. In our present cases, the *zi-satu-suru* type (reflexive) verbs and the *zi-kai-suru* type (decausative) verbs both use the same *zi*-morpheme.

5.3. Objecltess *Zi*-verbs with an Unergative Structure

Finally, let us consider the AS and LCS of the third type of objectless *zi*-verbs such as *zi-sui-suru* 'cook for oneself' in (51), *zi-doku-suru* 'read for oneself,' and *zi-kyuu-suru* 'supply for oneself.'

(51)   John-ga   zi-sui-suru.

John-Nom   ZI-cooking-do

'John cooked for himself.'

As we have seen above, this type of *zi*-verb is associated with the unergative AS, which does not project its direct object for the purposes of syntax. For example, the sentence

(51) implies that John cooked something but the object denoted by the verb remains as an implicit argument. These properties are captured by the AS and LCS shown in (52a,b).

(52) a.   AS: (x)   (x=Agent)
                   |
    b.   LCS: [X DO Y]

In this mapping, the initiating participant of the activity event in the LCS (namely, X) is mapped to the sole agent slot in the AS. This mapping accounts for our observation that the *zi-sui-suru* type of verbs has only the external argument mapped to the subject position in the syntax. The other argument involved in the activity (namely, Y) in the LCS remains unlinked to any argument slot since there is no other slot available. This one-place analysis of the *zi-sui-suru* type verbs has been independently proposed by Grimshaw (2005) with evidence from English activity verbs. Grimshaw argues that several arguments that English activity verbs such as *study, read* and *cook* have actually only one grammatical (Agent) argument in the AS, contrary to the commonly assumed two-place treatment of these verbs; the Theme-like object as in *John studies English* is merely a semantic argument that only exists in the LCS and is never linked to the syntactic structure through the AS. This one-place treatment is evidenced by the fact that these activity verbs have been commonly analyzed as verbs with omissible objects as shown in *John often studies at night* or *Mary cooks for her husband*. Thus, our proposed LCS and the mapping to the AS shown in (52) have independent support.

Now, since the sole argument slot in the AS is taken by the Agent of the DO component, there is no place for the *zi*-morpheme to occupy as an argument. This brings us the favorable consequence that the morpheme in question serves as an adjunct in the *zi-sui-suru* type of verbs. Note, however, that the function of the *zi-* morpheme in this class of verb cannot be analyzed on a par with that of the *zi-* morpheme used in the *zi-kai-suru* type discussed in section 5.2. Though the morpheme in both cases serves as an adjunct due to the lack of any argument slot in the AS, its meanings are different. The meaning of the *zi*-morpheme in the latter case ('by itself') arises from the coindexation of the Causer and the Causee/Theme participants in the LCS together with the non-agentive LCS. The former, however, lacks such coindexation, as shown in (52a, b). Thus, the *zi*-morpheme in the *zi-sui-suru* type cannot have the 'by itself' reading, by definition. However, notice that the LCS in (52b) involves the agentive operator DO, which was absent in the LCS in (48b). Thus, the only possible interpretation for the morpheme in the *zi-sui-suru* type of verbs is one that is compatible with the agentive orientation of the action. Thus, for the *zi-sui-suru* type, the morpheme ends up having the agentive 'for oneself, by oneself' reading.

Takezawa (1991: 71-72) also observes that the *zi*-morpheme used in *zi*-verbs such as *zi-sui-suru* is an adjunct that means 'by oneself,' while the *zi*-morpheme used in *zi*-verbs such as *zi-ritu-suru* 'establish oneself' ('transitive reflexive verbs' under our proposal) is

an argument. Recall the diagnostic for internal argumenthood that concerns the availability of the resultative reading of the *-teiru* morpheme introduced in section 4.2. By comparing (53) and (54), he argues that the resultative reading of the *–teiru* morpheme is available in (53) because the *zi*-morpheme used in the verb *zi-ritu-suru* is an argument and the subject can bind it, while that reading is not allowed in (54) since the morpheme used in the verb *zi-sui-suru* is not an argument and such a binding relation does not hold. Rather, he claims that the morpheme in the latter case is an adjunct and that (54) is paraphrased as (55).

(53)   Yamada-san   no   musuko-ga   zi-ritu-si-teiru.

     Mr.Yamada   Gen   son-Nom   ZI-establishing-do-TEIRU

     'Mr. Yamada's son has established himself.' [resultative / *progressive]

(54)   Yamada-san   no   musuko-ga   zi-sui-si-teiru.

     Mr.Yamada   Gen   son-Nom   ZI-cooking-do-TEIRU

     'Mr. Yamada's ' son is cooking for himself.' [*resultative / progressive]

(55)   Yamada-san   no   musuko-ga   zibun-de   syokuzi-o tukut-teiru.

     Mr.Yamada   Gen   son-Nom   self-by   meal-Acc   cook-TEIRU

     'Mr. Yamada's son cooks a meal by himself.'   (Takezawa 1991:(44)(46)(47))

Takezawa's argument that the verb *zi-sui-suru* can be paraphrased as in (55) thus further supports our analysis that the *zi*-morpheme in the verb *zi-sui-suru* is an adjunct.

5.4. Section summary

In summary, in this section, we have proposed that objectless zi-verbs are classified into three subtypes in terms of argument structure: (a) reflexive verbs with a transitive argument structure in which the zi-morpheme functions as an internal argument such as zi-$satu$-$suru$ 'kill oneself,' (b) unaccusative (decausative) verbs in which the zi-morpheme functions as an adjunct that means 'by itself' such as zi-kai-$suru$ 'collapse' and (c) unergative verbs with the adjunct zi-morpheme that means 'by oneself, for oneself,' such as zi-sui-$suru$ 'cook for oneself.'

6. Concluding Remarks

In this paper, we have proposed an analysis of objectless zi-verbs, morphologically complex Sino-Japanese origin verbs that take the affixal zi-morpheme, in perspective of Lexical Conceptual Structure (LCS) and its mapping to Argument Structure (AS). By applying several diagnostics for external/ internal argumenthood of the verb, we have shown that not all objectless zi-verbs are reflexive verbs with an unaccusative argument structure, contrary to the seminal work on zi-verbs by Tsujimura and Aikawa (1999), and that objectless zi-verbs are rather classified into three subtypes in terms of argument structure as transitive, unaccusative and unergative. We have also observed that the zi-morpheme used in the three types of zi-verb has different function/meaning: in the transitive type of zi-verb, the morpheme is an internal argument of the verb with the reflexive anaphor function, while it functions as an adjunct that means 'by itself'

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and 'by oneself' in the unaccusative and unergative types, respectively. Our analysis in terms of the interface between LCS and AS naturally derives (a) the argument structure difference among the three types of objectless zi-verb and (b) the argument vs. adjunct status and the function/meaning variety of the zi-morpheme.

Notes

[1] In sections 2 and 3, we tentatively gloss the *zi*-morpheme as 'self' following Tsujimura and Aikawa (1999). In later sections, we gloss it as 'ZI,' because the morpheme does not always occur in a reflexive sentence nor mean 'self.'

[2] The following abbreviations are used in the data in this paper: Nom=nominative, Acc=accusative, Gen=genitive, Dat=dative, Top=topic, Past=past tense, Tr=transitive, Intr=intransitive, Cl=classifier, Loc=locative, Caus=causative, Pass=passive, Instr=instrumental, Cop=copular, ABS=abstract, ERG=ergative, AP=antipassive, PRES =present.

[3] The phrase *zibun-o korosu* 'kill oneself' is most likely interpreted with the idiomatic meaning 'sacrifice oneself' and seldom with the literal meaning 'commit suicide' if *zibun* has a local binder.

[4] The examples in (6a, c, d) are based on (13b), (14a) and (15a) of Tsujimura and Aikawa (1999), respectively. The traces *t* of surface subjects and the indices in the examples used in this section are added by the present authors.

[5] The examples in (7), (9b) and (10b) are based on (17), (18) and (19) of Tsujimura and Aikawa (1999), respectively.

[6] We thank an anonymous reviewer for pointing out the correlation between the diagnostics introduced in section 4 and the notion of *agentivity*.

[7] Kageyama (1993) observes that, in Japanese lexical V-V compounds, the argument structure of the first member is restricted by that of the second member, and proposes the Transitivity Harmony Principle: if the second member is transitive, the first member must

be transitive or unergative, not unaccusative. However, Yumoto (1996), Matsumoto (1998), Nishiyama (1998a,b) and Fukushima (2005) argue that this principle is too strict. We thank an anonymous reviewer for pointing this out.

[8] Following Grimshaw and Mester (1988), Terada (1990), Hasegawa (1991, 1999) and Saito and Hoshi (2000), we assume that the verb *suru* 'do' in this construction is a light verb, not a heavy verb. We believe, however, that whether the verb *suru* is light or heavy does not affect the main point of the diagnostic, which is simply to show whether a verbal noun has an external argument as a consequence of Burzio's Generalization and Argument Transfer.

[9] We use the term 'decausative' for verbs like *break* in (37), following Lidz (1996), though Kageyama (1996) calls this type of verb 'anticausative' and claims languages like English do not have decausative verbs.

[10] The *zi*-morpheme and *zibun* show another difference in addition to the bound vs. free morpheme difference. *Zi-* allows only local antecedents, while *zibun* allows non-local antecedents as well as in (i) and (ii).

(i) John-ga   Mary-ga   zi-ritu-si-ta   to   it-ta.

John-Nom   Mary-Nom   ZI-establishing-do-Past   that   say-Past

'John$_i$ said that Mary$_j$ established self$_{*i/j}$.'

(ii) John-ga   Mary-ga   zibun-o   seme-ta   to   it-ta.

John-Nom   Mary-Nom   self-Acc   blame-Past   that   say-Past

'John$_i$ said that Mary$_j$ blamed self$_{i/j}$.'

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