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Inanimate antecedents of the Japanese reflexive *zibun*: experimental and corpus evidence

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Abstract: This research sets out to challenge a conventional wisdom in Japanese linguistics, that the reflexive pronoun *zibun* is unable to take an inanimate antecedent. Through careful presentation of the data, including corpus sources, it is unequivocally demonstrated that the reflexive use of *zibun* can indeed overcome the animacy constraint and be anteceded by an inanimate antecedent, without any personification present. This has specific theoretical consequences in the sense of providing a theoretical simplification behind reflexivity modeling in Japanese. This is followed by a psycholinguistic experiment investigating how native Japanese speakers judge and process sentences with inanimate *zibun*. The key factors tested are the animacy of the antecedent, and also if the type of sentence, episodic versus generic, will affect the acceptability of inanimate *zibun*. Results from the experiment show that native speakers indeed do find inanimate *zibun* acceptable, and appear to process it slightly slower than the animate counterpart. The episodic versus generic distinction does not play a role in either the judgment or processing. Combining the corpus and experimental data anchors the phenomenon firmly. Finally, our attention turns to how to account for inanimate *zibun* theoretically, where we draw information from how *zibun* can already take inanimate antecedents if they are construed as agentive, or if *zibun* is used as an adverbial reflexive, showing that in fact, inanimate *zibun* does not require additional theoretical treatment – leading to a reformulation of Kuno's animacy constraint.

Keywords: Japanese; reflexive pronoun; animacy

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1 Introduction

The study of the Japanese reflexive pronoun, *zibun* 'self', has generated copious analyses in the syntactic (Aikawa 1999; Iida 1996; Katada 1991; Nishigauchi 2014), semantic (Oshima 2006; Tenny 2006), pragmatic (Sakakibara 1995), cognitive (Hirose 2014, 2018; Uehara 2003), and functional (Kuno and Kaburaki 1977) realms. Its theoretical importance for anaphoric binding has been underscored by considerable experimental work in first-language acquisition (Fujiwara 2013; Ito 2012), second-language acquisition (White et al. 1997; Yoshimura et al. 2012), psycholinguistics (Aoshima et al. 2009; Nagata 1995), and neurolinguistics (Okabe et al. 2011). This wealth of research has captured many different aspects of *zibun*, however, there is an important feature that has escaped detection. This new development relates to the well-known animacy constraint of *zibun*, whereby *zibun* is unable to be anteceded by an inanimate antecedent as discussed by Kuno (1973), (1) being a typical example:[1]

(1) **Rekisi-wa zibun-o kurikaesu.*
history-TOP self-ACC repeat.PRS
'History repeats itself.'
(Kuno 1973: 291)

The animacy requirement was formalized by Kuno (1973: 291) stating, "The antecedent of *zibun* 'self' in Japanese must be something that is animate and has willpower", which naturally excludes objects such as trees or stones. In the literature on Japanese reflexive pronouns, this has been typically repeated or noted that *zibun* requires an animate antecedent, as usually the focus has been understanding *zibun*'s binding behavior using typical human antecedents. However, our data (in Section 2) provides evidence contrary to the animacy constraint. In what follows, there are examples of inanimate *zibun* that have a verb designating an action that must or can be performed by non-human entities.

We quickly note that the data excludes cases of objects that have been personified, acquiring human-like qualities (cf. Dorst 2011), as exemplified by (2) below.

1 The list of abbreviations used in this paper are as follows: ACC = Accusative, COMP = Complementizer, COP = Copula, DAT = Dative, FOC = Focus, GEN = Genitive, GER = Gerund, INS = Instrumental, LOC = Locative, NEG = Negative, NOM = Nominative, NMLZ = Nominalizer, PASS = Passive, PL = Plural, PRS = Present, PROG = Progressive, PRT = Particle, PST = Past, Q = Question Particle, TOP = Topic.

(2)

Tuki-ga	*zibun-o*	*kataru*	*kotoba-wa*	*kodomo-tati-ni*
Moon-NOM	self-ACC	talk.about	language-TOP	child-PL-DAT
mizikade,	*sore-mo*	*miryoku*	*da.*	
familiar	that-PRT	beauty	COP	

'The language of the moon talking about itself is familiar to kids, which is also fascinating.'
(http://www.kodomo.gr.jp/kodomonohon_article/14207/)

Personification has an effect of describing non-human entities as taking on human nature. For example, the ability to talk is an essential attribute that pertains only to human beings, not to the moon, hence personification at work in (2). As this example illustrates, a personification effect is typically discernible if the predicate taking the inanimate subject describes a human action (cf. Bloomfield 1963: 165–166). Consequently, no example of a personified inanimate *zibun* forms part of our dataset.

The type of *zibun* investigated here is the reflexive use of *zibun*, and not the viewpoint (empathic) or logophoric use of *zibun*.[2] The data that we deal with sits firmly with the reflexive use of *zibun*, due to the fact that an inanimate object is unable to adopt a perspective (logophoricity), and it is difficult to adopt an empathic perspective for the same object (empathy). This naturally leaves reflexive *zibun* as our target of discussion, given that it simply reflexive-marks its predicate. Note that when the term *zibun* is used henceforth, we refer to it in its reflexive usage, unless otherwise stated.

In the next section, we first demonstrate the three uses of *zibun* as mentioned above to orientate the reader, and then present new data that demonstrate that reflexive *zibun* can indeed take a genuine inanimate antecedent (without the presence of personification),[3] contrary to the predictions of Kuno's animacy constraint. This, however, should not be interpreted as a complete falsification of the animacy constraint as there are innumerable cases where the animacy distinction is clearly corrected. Rather, instead of taking the constraint as inviolable, we present the case further on that a revised animacy constraint plays a key role in restricting *zibun*'s potential antecedents, as it is possible to overcome it given the right context.

2 We should note, however, that we do not consider the usage of reflexive *zibun* as the common, default usage; rather, viewpoint and logophoric *zibun* usage are much more common (cf. Hirose 2018).

3 We follow Lakoff and Johnson's (1980: 34) interpretation of personification, "…they are extensions of ontological metaphors and that they allow us to make sense of phenomena in the world in human terms – terms that we can understand on the basis of our own motivations, goals, actions, and characteristics."

2 The data

2.1 Reflexive, viewpoint, and logophoric *zibun* usage

We first illustrate the three uses of *zibun* with typical animate antecedents in (3a)–(3c):

(3) a. Reflexive *zibun*
John-wa ***zibun****-o* *seme-ta.*
John-TOP self-ACC blame-PST
'John blamed himself.'

b. Viewpoint (Empathic) *zibun*
Bill-wa ***zibun****-no* *tikakuni at-ta* *kuruma-ni* *butukat-ta.*
Bill-TOP self-GEN close.by be-PST car-DAT hit-PST
'Bill hit a car that was close to himself.'

c. Logophoric *zibun*
Taro-wa *John-ga* ***zibun****-o* *mi-ta* *to* *omot-ta.*
Taro-TOP John-NOM self-ACC look-PST COMP think-PST
'Taro thought John looked at him.'

The above examples represent common usage; (3a) shows a simple reflexive relation where the action is performed by the subject, (3b) shows a long-distance (LD) binding example where the speaker presents the event from the point-of-view of the matrix subject (cf. Oshima 2007 for discussion on empathy, who sees it as a primitive psychological construct), and (3c), another LD example, whereby the speaker internal perspective is adopted (here the matrix subject), rather than the sentence utterer perspective (cf. Huang 2000). It should also be noted in the case of (3b)–(3c), in order to obtain a local reading, the reflexive use of *zibun* is utilized.

Now, revising the above sentences to include only inanimate antecedents (4a)–(4c), we quickly find that all are ungrammatical, as predicted by Kuno's Animacy constraint:

(4) a. Reflexive ***zibun***
Ki-wa* ***zibun**-o* *seme-ta.*
Tree-TOP self-ACC blame-PST
'The tree$_1$ blamed itself$_1$.'

b. Viewpoint ***zibun***
Ki-wa* ***zibun**-no* *tikakuni* *at-ta* *kuruma-ni* *butukat-ta.*
Bill-TOP self-GEN close.by be-PST car-DAT hit-PST
'The tree$_1$ hit a car that was close to self$_1$.'

c. Logophoric ***zibun***
*Ki-wa John-ga **zibun**-o mi-ta to omot-ta.*
Tree-TOP John-NOM self-ACC look-PST COMP think-PST
'The tree$_1$ thought John looked at self$_1$.'

This is where the challenge begins, as now we present data to the contrary for reflexive *zibun*, with no examples found for viewpoint and logophoric *zibun* (to be discussed in detail in Section 5).

2.2 The new data

The data gathered here are a combination of sentences found in corpus and website materials. They show that *zibun* can in fact be anteceded by an inanimate antecedent, as demonstrated in (5a)–(5d).

(5) a. *Kihontekini ki-wa zibun-o mamore-ba yoi wake desu kara,*
basically tree-TOP self-ACC protect-if okay why COP because
boutyuusei-wa mot-teimasu-ga, sattyuusei-wa
insect.repellent-TOP have-PROG-but insecticidal.property-TOP
mottei-nai toiukoto desu.
have.be-NEG COMP COP
'Basically, the tree only has to protect itself, so it is insect-repellent but not insecticidal.'
(https://wood.co.jp/10-chishiki/qa/12-poison.html)

b. *Purisettos-are-ta siyouzikan ya sonota-no zyoken-ni*
preset-PASS-PFT operating.hour or other-GEN condition-on
tassuru to, apurikeisyon-ga zibun-zisin-o sakuzyosuru-koto-wa
achieve if application-NOM self-self-ACC delete-COMP-TOP
kanou-desyou ka?
possible-COP Q
'Can the application delete itself at a preset operating hour or under other conditions?'
(https://www.366service.com/jp/qa/0a31fb2919be720d1911b4e63cf72c7f)

c. *Taihou-wa zibun-o tyuusin-ni guruguru mawatte nerai-o*
canon-TOP self-ACC center-DAT around turn aim-ACC
sadameru mono dakara.
take.PRS thing because
'Because the cannon turns itself around and takes aim.'
(http://funnysteps.jp/konpon-htmls/konpon-h-10.html)

d. *Kono sekyuritii sisutemu-wa izyo-o kentisi,*
this security system-TOP anomaly-ACC detect.GER
zidoutekini zibun-zisin-ni patti-o tekiyousuru.
automatically self-self-DAT patch-ACC apply.PRS
'The security system detects an anomaly and the database automatically patches itself.'
(https://japan.zdnet.com/article/35108295/)

These items are drawn from Japanese-language websites whose context clearly does not give rise to any personified reading of the inanimate antecedent of *zibun*. In (5a), the article discusses chemicals produced by trees in the sense of producing toxins to protect themselves from nature. The example from (5b) is taken from a railway company discussing a computer application they had developed. Example (5c) discusses how to understand coordinates in simple terms by using a cannon to demonstrate direction.[4] The final example, (5d), demonstrates the inanimate use of the complex reflexive *zibun-zisin* in the dative case, being locally bound.[5] It should be noted that the register of these examples is of daily language intended for widespread understanding, not being a part of any specialist language registers.

Given the discovery of inanimate antecedents of *zibun* through these examples, the next step is to investigate if tokens can be found within a formal corpus database. The corpus data investigated here is collected from the *Balanced Corpus of Contemporary Written Japanese* (BCCWJ), which also confirm the existence of *zibun* being anteceded by inanimate antecedents. The examples in (6a)–(6b) from the corpus demonstrate the different case forms are allowed for the inanimate *zibun* the instrumental and the accusative in (6a) and the ablative in (6b):

(6) a. *Nou-wa zibun-de zibun-o tukut-teiku.*
brain-TOP self-INS self-ACC create-go.PRS
'The brain creates itself on its own.'
(BCCWJ, LBn5_00017)[6]

4 Example (5c) is especially interesting as it represents a long-distance binding configuration whereby *zibun* is embedded in a circumstantial adjunct clause 'X-o Y-ni' (Miyake 2011). A reviewer suggests a possible alternative interpretation, whereby a human operator sits on the cannon (such as older style anti-aircraft gun) aiming – rather than the cannon itself. The context of the example can support either interpretation.

5 Scholars such as Aikawa (1999) note that this intensified form must be locally bound.

6 For reference, we show the sample number of each example cited from the BCCWJ hereafter.

b. *Zibun-kara hakkoo-suru nodewanaku hoka-kara-no hikari ya*
self-from light-do not other-from-GEN light and
ryusi-no syoosya niyotte hakko-suru hikari-o keikou
particle-GEN irradiate by light-do light-ACC fluorescent
to iu.
COMP say.PRS
'Light that is not emitted without an external cause, but that is emitted by light and particles irradiated from others, is called fluorescent light.'
(BCCWJ, OT23_00018, with slight modification)

Moreover, replacing the verbs in (5) with the simple past forms of the verbs renders the sentences anomalous; for example, compare (5a) with its counterpart in the past tense, **Ki-wa zibun-o mamot-ta* 'The tree protected itself'. This may be related to an observation by Kageyama and Shen (2012: 40), where constructions of property-predication, including generic sentences, allow for inanimate subjects as in (7):

(7) *Syureddaa-(toiu-no)-wa, kami-o saidan-suru (mono-da).*
shredder-(COMP-NMLZ)-TOP paper-ACC cut.up-do.PRS (thing-COP)
'A shredder cuts paper.'

Importantly, one will note that the sentences in (5) and (6) are of the generic type, which describes a general state of the subject. This contrasts with episodic sentences, where the subject is actually performing an action. Our search for inanimate *zibun* through the BCCWJ has not unearthed an episodic sentence with an inanimate antecedent. A null result should not entail that an inanimate antecedent cannot be used in an episodic sentence (with *zibun*), but its absence is thus far noteworthy. However, there may be more than meets the eye as these two episodic sentences (8a)–(8b) are natural:[7]

(8) a. *Ki-wa taihuu-kara zibun-o mamot-ta.*
tree-TOP typhoon-from self-ACC protect-PST
'The tree protected itself from the typhoon.'
b. *Apuri-wa zidoutekini zibun-o sakuzyosi-ta.*
application-TOP automatically self-ACC delete-PST
'The app automatically deleted itself.'

7 We thank a reviewer for providing these two examples. In (8a), the subject 'tree' sounds like it acted as a human being to protect itself. Also, it conveys that the speaker of the sentence made an inference to evaluate the eventuality subjectively. Example (8b) does not seem to be the same as (8a), though it strikes the hearer that the speaker explains the situation figuratively. For the authors, these examples would be judged as more acceptable in generic contexts.

If this judgment is shared generally, consequently, it would seem that the generic versus episodic distinction is not a factor in licensing inanimate antecedents for *zibun*. In other words, we have a distinction between what can be found empirically against what is thought to be acceptable. For instance, we may not be able to find inanimate episodic sentences for *zibun* because this is already a very uncommon event – but nonetheless, the Japanese language can express it.

In summary, the implications of this new data indicate that against the traditional purview, the reflexive use of *zibun* is indeed able to take an inanimate antecedent. Thus, while the animacy constraint is largely correct in its predictions, the data shows that it is possible to overcome it, given the right conditions. We note here a particularly important point, that none of the examples were found to have the viewpoint or logophoric use of *zibun*, which is commonly found in long-distance binding cases with a salient antecedent. In Section 5, we will propose that while the animacy constraint is not feasible for the reflexive use, the other uses of *zibun* adhere to it, which can be straightforwardly drawn from the nature of the speaker that is relevant to the uses of *zibun*, rather than from the grammatical status of *zibun* as a reflexive pronoun. Our focus now shifts to understanding how native Japanese speakers interpret and process this, leading us to the experimental part of our study.

3 Judgments and processing of *zibun*

As discussed in the introduction, while there is a breadth of research on *zibun*, the idea that *zibun* cannot be anteceded by an inanimate antecedent has gone thus far unchallenged. As the evidence presented above represents the real use of *zibun* taking an inanimate antecedent, it is now important to investigate how native Japanese speakers interpret and process such sentences. That is, do native speakers find these types of examples acceptable? Will processing inanimate *zibun* be an effortful undertaking?

Given the discussion of the data above, there appear to be two factors at play. The first evident one is that of animacy (given the animacy condition), as it is unmistakable that the status of the antecedent's animacy will affect the binding probability. The second issue is that of episodic versus generic sentences, for as discussed, the type of sentence *zibun* occurs in with an inanimate antecedent may affect its acceptance. As there are no experimental studies to draw upon,[8] and working with the information that we have on hand, we initiate a self-paced reading (SPR) experiment combined with judgment ratings (along with reaction timing)

8 As far as we are aware of, there are no experiments of this kind for Japanese. For experimentation on animacy and references therein, see Bonin et al. (2019).

to better understand inanimate *zibun*, which is detailed in the next section. The three hypotheses assessed by the experiment undertaken are presented thus:

H1: Inanimate antecedents are judged less acceptable than animate antecedents, but they are still considered acceptable.

H2: Episodic sentences are processed slower than generic sentences in the processing of inanimate *zibun* in the critical and post-critical regions, and in judgment timing.

H3: Inanimate antecedents are processed slower than animate antecedents in the critical and post-critical regions, and in judgment timing.

3.1 Methodology

The experiment pursued here focuses on collecting three data points on inanimate *zibun*, objective judgments from Japanese native speakers, their reaction timing, and how the sentence is processed. This is approached by comparing *zibun* with animate antecedents in both generic and episodic sentences against *zibun* with inanimate antecedents in the same sentence types. The experiment collects three kinds of data; one, reading reaction time data on each segment of the sentence read; two, judgment data on the sentence by answering a question about it; three, judgment reaction time data of how long it took to make the judgment. Next, the materials used are detailed.

3.2 Materials

The experiment is a 2 × 2 design of Generic/Episodic sentences and Animate/Inanimate antecedents of *zibun*. The test script contained ten tokens of each combined type, Generic In/Animate and Episodic In/Animate, which equals 40 test items with an equal number of distracters (40 items), for a total of 80 items. Items were pseudorandomized so that no two test items occurred one after another. Below in (9)–(10) are examples of each sentence type with antecedents differing in animacy:[9]

9 Experimental test sentences (and data) are found in the supplementary file. Test sentences are designed to be read as naturally as possible while retaining the highest degree of acceptability (done in consultation with other native Japanese speakers) as found in the examples presented in Section 2. In order to restrict sentence variability, the syntax of the sentences is matched as closely as possible, and context of the sentences are limited. The experiment is created with the program Paradigm Player 2.5.

(9) Episodic, animate
この忍者はなんと忍術で自分を治癒したという、実に驚くべきものだった。
Kono ninzya-wa nanto ninzyutu-de zibun-o
this ninja-TOP lo.and.behold ninja.technique-INS self-ACC
tiyusi-ta toiu, zituni odorokubeki monodat-ta.
cure-PST COMP really surprising COP-PST
'This ninja, lo-and-behold, cured himself with a ninja technique, which was really surprising.'

(10) Generic, inanimate
この新種の木はなんと自然に自分を治癒するという、実に驚くべきものだった。
Kono sinsyu-no ki-wa nanto sizenni zibun-o
this new.type-GEN tree-TOP lo.and.behold naturally self-ACC
tiyusuru toiu, zituni odorokubeki monodat-ta.
cure.PRS COMP really surprising COP-PST
'This new type of tree, lo-and-behold, naturally cured itself, which was really surprising.'

Before the presentation of the actual SPR sentence, participants first read an orientating context (11) which contained the in/animate antecedent appearing in the SPR sentence following it.[10]

(11) ジャングルで発見された新種の木について、新しい事実が明らかになった。
Zyanguru-de hakkens-are-ta sinsyu-no ki-nituite, atarasii
jungle-LOC discover-PASS-PST new.kind-GEN tree-about new
zizitu-ga akirakani nat-ta.
fact-NOM apparent become-PST
'Regarding a new kind of tree found in the jungle, a new fact has been revealed.'

A brief note on the reasoning behind the context being first presented is that we wished to avoid possible personification effects. That is, as it was mentioned previously, inanimate antecedents are acceptable within a personification context. Here, this problem is avoided as the context provides a clear indication that the following sentence is to be taken as a real-world fact. Secondly, the context further serves to lock down the antecedent of *zibun* to a sentence internal one, given the

10 Note that the Romaji, glossing, and English translation are not present in the experimental materials, only Japanese characters are used.

inanimate antecedent has been mentioned within the previous context giving it high prominence, thus reducing the possibility that participants consider other (non-mentioned) antecedents (which is possible to do with *zibun*). After reading the context, the matched SPR sentence is then read (12).

(12) この新種の木はなんと自然に自分を治癒するという、実に驚くべきものだった。

Kono *sinsyu-no* *ki-wa* *nanto* *sizenni* *zibun-o*
this new.type-GEN tree-TOP lo.and.behold naturally self-ACC
tiyusuru *toiu,* *zituni* *odorokubeki* *mondat-ta.*
cure.PRS COMP really surprising COP-PST
'This new type of tree, lo-and-behold, naturally cures itself, which is really surprising.'

The SPR is a 'moving window' type experiment, where the sentence is first covered by a series of dashes. The participant presses the spacebar which causes the first word to appear, and then by pressing the spacebar again the word disappears and then the next word appears – until the end of the sentence is read. The sentence then disappears, replaced by the question (13) that assesses if the participant finds this interpretation acceptable or not.

(13) 「自分」が「この新種の木」を指す解釈はできますか?
'Does the interpretation of '*zibun*' refer to this 'new kind of tree'?

Note the underlined component (done for convenience here) changes according to the subject of the SPR item. Instead of using a binary accept/reject paradigm, the participant assesses the question based on the acceptability, as shown via the Likert scale below (14). This was done because we assume there might be conflicts between the animacy constraint and the contexts designed to allow antecedenthood. It follows that if the participant accepts the interpretation, he/she has used the context to overcome the animacy constraint. However, if the participant rejects the interpretation, this means that he/she is following the animacy constraint.

(14)

1 – 自然な解釈	'It is a natural interpretation'
2 – 解釈できるが、やや不自然	'Acceptable but slightly unnatural interpretation'
3 – かなり不自然な解釈	'It is a quite unnatural interpretation'
4 – 全く不自然な解釈	'It is a completely unnatural interpretation'

With the test construct discussed, we now move on to the participants and data treatment.

3.3 Participants and data

The participants of this experiment consist of 46 native Japanese speakers studying at a university in Japan (male = 26, female = 20, mean age = 20.1 years). All participants gave informed consent and received a small gift upon completion of the experiment. The experiment was completed in a private room on a computer, which took about 30 min. The computer monitor size is 17″, with a resolution set at 1024 × 768. The font style used is Mincho, size 18. The participant read the instructions, did three trials, and then completed the experiment. It was emphasized that intuitive responses were to be given.[11]

Preparation of the data for statistical analysis observed the following procedures. First, in regard to the SPR data, outliers that fell below 100 ms and above 4,000 ms are replaced with these values. Then, per segment, any values that fell outside of 2SDs are replaced by the 2SD value. This was done to reduce the effects of outliers on the statistical analysis (cf. Jegerski (2014) for discussion on data smoothing). The same procedures are followed for the judgment reaction timing data, but with a minimum of 300 ms and a maximum of 10,000 ms for the first pass, as it is reasoned that participants may take a longer time assessing the overall sentence's meaning per context. In total, this affected 3.9 % of the SPR data and 6.7 % of the judgment reaction time data. Finally, all timing data are logarithmically transformed for analysis (due to the right-skewed nature of reaction timing data).

4 Results

The first analysis presented is on the acceptability judgments of the sentences tested to certain how acceptable inanimate *zibun* is, as structured here. This is then followed by observing *zibun*'s processing profile. Analyses are completed using SPSS 25.

4.1 Judgment ratings and reaction timing

Table 1 shows the ratings for Sentence Type and Animacy, recall that rating 1–2 are considered acceptable while rating 3–4 is considered to be unacceptable:

An ordinal logistic regression (with factors of Sentence Type and Animacy) testing main and interaction effects model is significant, $\chi^2(3) = 98.736$, $p < 0.001$, Nagelkerke $R^2 = 0.076$, but only the main factor Animacy is significant $\chi^2(1) = 38.866$,

11 For one participant, the computer crashed while completing the experiment resulting in a script that was two thirds complete.

Table 1: Judgment ratings for Sentence Type by Animacy.

Rating		1		2		3		4	
Episodic	Animate	414	90.6 %	34	7.4 %	5	1.1 %	4	0.9 %
	Inanimate	338	74.1 %	92	20.2 %	19	4.2 %	7	1.5 %
Generic	Animate	416	91 %	33	7.2 %	7	1.5 %	1	0.2 %
	Inanimate	332	72.8 %	85	18.6 %	27	5.9 %	12	2.6 %

$p < 0.001$. Consequently, the Animate condition overall is found to be slightly more acceptable than the Inanimate condition, and Sentence Type does not have an effect.

Shifting to the reaction timing of the judgments, Table 2 presents the logarithmic (LG) mean times:

A by-subject repeat measures ANOVA run with the main effects of Animacy and Sentence Type shows no interaction effects, with only Animacy being significant [$F(1,45) = 15.03$, $p < 0.001$, $p\eta^2 = 0.250$].[12] Thus, we can conclude overall that the Inanimate condition is judged slower than the Animate condition regardless of sentence type.

In sum, an inanimate antecedent is found to be acceptable for *zibun*, although it takes slightly longer to judge the inanimate antecedent than an animate one.

4.2 Self-paced reading processing

The SPR segmentation is presented in Table 3 using (12) above as a guiding example. Note that the antecedent of *zibun* occurs in segment S1, the reflexive *zibun* occurs in the precritical region (PRE), preceded by the verb (CRT) and then the complementizer (PST). This is followed by the spillover regions (SO)1–4.[13] Only PRE, CRT and PST are

Table 2: Judgment reaction timing (LG) for Sentence Type by Animacy.

	Episodic			Generic		
	Mean	**SD**	**95 % CI**	**Mean**	**SD**	**95 % CI**
Animate	3.073	0.168	3.02, 3.12	3.061	0.165	3.01, 3.11
Inanimate	3.123	0.182	3.07, 3.18	3.128	0.153	3.08, 3.17
Animacy EMM	Animate $M = 3.067$, $SE = 0.024$, 95 % CI [3.019, 3.115]					
	Inanimate $M = 3.125$, $SE = 0.023$, 95 % CI [3.078, 3.173]					

12 Multiple comparisons are Bonferroni adjusted.

13 Note that the words per sentence were presented on a single line and not over two lines as shown here in the table.

Table 3: SPR segment names and content.

S1	S2	S3	PRE	CRT	PST	SO1	SO2	SO3	SO4
この新種の木は	なんと	自然に	自分を	治癒する	という、	実に	驚くべき	もの	だった。

analyzed to target for effects found when reading *zibun* (PRE), once the verb is read (CRT) and when the sentence is completed (PST), the latter two are likely to capture any effects generated once *zibun* has been read, and when the sentence has been parsed.

A by-subject repeat measures ANOVA shows that only the CRT and PST regions are significant, CRT [$F_1(1,45) = 17.326$, $p < 0.001$, $p\eta^2 = 0.278$], PST [$F_1(1,45) = 23.358$, $p < 0.001$, $p\eta^2 = 0.342$],[14] where a by-item independent ANOVA shows that these two regions are also significant, CRT [$F_2(1,2) = 6.89$, $p = 0.013$, $p\eta^2 = 0.161$], PST [$F_2(1,2) = 5.651$, $p = 0.023$, $p\eta^2 = 0.136$]. However, the *minF′* analysis is not significant for these two regions, CRT [*minF′*(1,4) = 4.93, $p = 0.091$], PST [*minF′*(1,3) = 4.55, $p = 0.123$]. Descriptive statistics are seen both in Table 4 (by subject) and Table 5 (by item) below.

4.3 Summary

Triangulating judgment, judgment reaction timing, and processing data unambiguously show that the Episodic and Generic sentence types are not important factors. First, regarding the judgments, inanimate antecedents of *zibun* are found to be

Table 4: CRT and PST region timing (LG) by subject.

		Episodic			Generic		
		Mean	SD	95 % CI	Mean	SD	95 % CI
CRT	Animate	2.578	0.139	2.54, 2.62	2.565	0.128	2.53, 2.60
	Inanimate	2.601	0.154	2.56, 2.65	2.607	0.153	2.56, 2.65
	Animacy EMM	Animate *M* = 2.571, *SE* = 0.019, 95 % CI [2.532, 2.610]					
		Inanimate *M* = 2.604, *SE* = 0.022, 95 % CI [2.559, 2.658]					
PST	Animate	2.506	0.143	2.46, 2.55	2.495	0.125	2.46, 2.53
	Inanimate	2.537	0.135	2.50, 2.58	2.517	0.124	2.48, 2.55
	Animacy EMM	Animate *M* = 2.500, *SE* = 0.019, 95 % CI [2.462, 2.539]					
		Inanimate *M* = 2.527, *SE* = 0.019, 95 % CI [2.489, 2.565]					

14 Note the Sentence Type for the PST region is significant in the by-subject analysis, [$F_1(1,45) = 6.079$, $p = 0.018$, $p\eta^2 = 0.119$], but is not for the by-item analysis, nor does it interact with Animacy.

Table 5: CRT and PST region timing (LG) by item.

		Episodic			Generic		
		Mean	**SD**	**95 % CI**	**Mean**	**SD**	**95 % CI**
CRT	Animate	2.578	0.068	2.54, 2.62	2.499	0.084	2.45, 2.55
	Inanimate	2.599	0.081	2.55, 2.65	2.606	0.077	2.56, 2.65
	Animacy EMM	Animate *M* = 2.538, *SE* = 0.017, 95 % CI [2.503, 2.573]					
		Inanimate *M* = 2.603, *SE* = 0.017, 95 % CI [2.567, 2.638]					
PST	Animate	2.505	0.049	2.47, 2.54	2.421	0.086	2.37, 2.47
	Inanimate	2.535	0.096	2.48, 2.59	2.515	0.091	2.46, 2.57
	Animacy EMM	Animate *M* = 2.463, *SE* = 0.019, 95 % CI [2.425, 2.500]					
		Inanimate *M* = 2.525, *SE* = 0.019, 95 % CI [2.488, 2.563]					

acceptable. We find that inanimate judgments take longer to answer than animate ones. Finally, it appears that the Inanimate condition has a dissimilar processing profile to the Animate condition, by taking slightly longer to process in the CRT and PST regions.

5 Discussion

This article began with the introduction of the unexpected allowance of an inanimate antecedent for *zibun*, theorized not to be possible yet found in corpus materials. We then explored the acceptability of inanimate *zibun* and investigated its processing profile. We now revisit the experimental hypotheses, discuss the experimental results together with the corpus data in more general terms, and finally shift to the theoretical side of the problem.

Beginning with the hypothesis assessment, H1, inanimate antecedents are judged slightly less acceptable than their animate counterparts but are still found to be acceptable, in line with the hypothesis. Regarding H2, it is clear that the Episodic and General sentence types do not contribute to a different processing profile of inanimate *zibun*, nor in the judgment reaction timing, falsifying the hypothesis. Finally, assessing H3, while the hypothesis holds at the by-subject and by-item levels for the CRT and PST regions (inanimate *zibun* takes longer to process), this was unable to be finally generalized across both levels.[15]

15 As it stands, while the effect could not be generalized at the highest level, it may be the case that future experimentation finds an effect with a stronger dataset, which appears positive with the current results.

A reviewer notes that it is impossible to rule out that a metaphorical interpretation was not assessed, i.e., the antecedent was personified by the participant, and not assessed as an inanimate antecedent. While it is not possible to fully understand what the participant is thinking at the time, on the balance of probabilities we believe that indeed the participants were consistently assessing the antecedent as inanimate without personification for the following reasons: (i) the lead-in contexts for inanimate interpretations were of factual nature, as found in our corpus data, where we have specifically avoided contexts that support a metaphoric reading (such as fables);[16] (ii) some of our examples involve verbs that cannot take an animate object, e.g., *sakuzyosuru* 'erase, delete' in (5b) or *kesu* 'delete' due to the nature of the designated actions (e.g., **The man deletes himself*); therefore, such sentences would not make any sense if the antecedent and its self were interpreted as animate; (iii) the antecedents given in our examples can be followed by the existential verb *aru*, which is generally used with inanimate subjects, whereas it cannot be by the verb *iru*, which only take animate subjects in (15).

(15)

Koko-ni	*aru/*iru*	*sinsyu-no*	*ki-wa*	*nanto*	*sizenni*
here-LOC	exist	new.type-GEN	tree-TOP	lo.and.behold	naturally
zibun-o	*tiyusuru*	*toiu,*	*zituni*	*odorokubeki*	*monodat-ta.*
self-ACC	cure.PRS	COMP	really	surprising	COP-PST

'The new type of tree here, lo-and-behold, naturally cured itself, which was really surprising.'

The distinction between *aru* and *iru* in Japanese is related to a more general cross-linguistic pattern of classification by verb on animacy (Croft 1994), and can be utilized as a diagnostic for evidencing the speaker's conceptualization of objects; (iv) as metaphorical interpretations are commonly found in everyday discourse, that then the inanimate antecedent has degraded acceptability is odd – unless there is something causing the hesitation – the consideration of the inanimate antecedent non-metaphorically; (v) the SPR effect found started at the CRT region (before sentence end), suggesting that the participants are engaged with antecedence assignment, extending to the following region PST (sentence end); if the participants are dealing with a metaphorical interpretation, we would expect the effect to start at PST and extend across the spillover regions, as the literal interpretation of the sentence would be processed and compared against a metaphorical interpretation – this process should start once the sentence is finished, but it did not; (vi) regarding

16 Furthermore, we should point out that the context preceding the SPR primed the participants for a clear expectation that the SPR would comment on the topic introduced by the context. We might predict that the acceptance would drop if the SPR sentence were uttered out of the blue, but this falls out of line with the pragmatic/semantic driven nature of Japanese reflexive interpretation (cf. Sperlich 2020), thus holding its ecological validity.

judgment reaction timing, although it is possible that the participants are now dealing with a metaphorical interpretation (the sentence is now fully parsed), considering the context provided that has steered them towards an inanimate antecedent judgment, an inanimate antecedent assessment fits better with our understanding of the antecedent judgment and prior parsing.

Put together, these results suggest that inanimate *zibun* appears to be processed slightly slower than animate *zibun*,[17] with timing differences in the judgments showing (inanimacy judged slightly slower), but these judgments are nonetheless found to be acceptable (but at a slightly lower level than the animate counterparts).[18] Thus, the experimental results reinforce what the corpus data shows, that an inanimate antecedent of *zibun* is acceptable within the right context (without personification), contrary to what has been presented in the previous literature. We hasten to add that this does not disprove Kuno's animacy constraint, as sentences such as (1), among others, do not suddenly become acceptable. Rather, this constraint is clearly active in Japanese, but its strength of application is found gradable rather than binary, as it is possible to override it. In fact, animacy has often been perceived as a gradient notion in the linguistic literature and often represented as a category along a hierarchy or continuum (Aissen 2003; Bossong 1984; Yamamoto 1999; see also de Swart and de Hoop 2018). A reviewer also points to the following examples (16a) and (16b) as problematic if one does not assume the animacy constraint (which we do not in its current form).

(16) a. *Dono gakusei$_1$/syoosetsu$_2$ mo, zibun$_{1/*2}$-o kirat-teiru*
every student$_1$/novel$_2$ also self-ACC hate-PROG
kyoozyu-ni hihans-are-ta.
professor-DAT criticize-PASS-PST
'Each student$_1$/novel$_2$ was criticized by a professor who dislikes self$_{1/*2}$.'

b. *Sono doroboo$_1$/taihoo$_2$-wa, zibun$_{1/*2}$ yori hitomawari {se-ga takai*
that thief$_1$/cannon$_2$-TOP self than a.size height-NOM tall
otoko/ookii taihoo} to issyo-ni, 101-goo-situ-ni
man/big cannon with together-DAT 101-number-room-LOC
{syuuyoos/syuunoos}-are-teiru.
detain/store-PASS-PROG
'That thief$_1$/cannon$_2$ is detained/stored in Room 101, along with a man/cannon that is somewhat taller/bigger than self$_{1/*2}$.'

17 Another factor is that inanimate antecedents in Japanese are not so commonly found in the subject position of transitive sentences, which would increase the cognitive footprint here.

18 From this, there is a practical experimental implication; one now cannot rely on the animate/inanimate distinction as a 'pure' variable when interpreting data with *zibun*, e.g., by having an animate LD subject and an inanimate local subject assuming minimal inanimate 'interference' in establishing a LD-dependency.

The reviewer points out that, without the animacy constraint, one might think it would be hard to account for the clear difference in grammaticality. While we propose a revision to the animacy constraint further below in (20), these examples suggest the particular importance of the interaction between animacy and the speaker. As we have discussed in Section 1, according to Hirose (2000, 2002, 2014, 2018) and Oshima (2004, 2006), in addition to the reflexive use, there are two other uses of *zibun*, which serve as non-clause-bounded reflexive pronouns: viewpoint (empathic) and logophoric. Viewpoint *zibun* is used to signal the speaker's perspective being placed or projected onto that of its referent and typically appears in an adverbial subordinate clause or a relative clause. Logophoric *zibun*, on the other hand, "occurs in the indirect-discourse complement of a saying or thinking verb and refers to the original speaker of indirect discourse" (Hirose 2018: 379).

In both uses, the speaker plays a pivotal role. In the viewpoint use, the speaker projects his/her viewpoint onto the referent of *zibun*. His/her viewpoint is therefore projected onto an animate participant only, as illustrated in (17), where we find it difficult to empathize with *John*:

(17) **John$_1$-wa, zibun$_1$-ga sin-da toki, issen mo mot-tei-nakat-ta.*
John-TOP self-NOM die-PST when penny even have-PROG-NEG-PST
'John$_1$, when self$_1$ died, didn't have a penny.'
(Kuno 1973: 310)

Likewise, in a logophoric context, the antecedent must be conscious as the subject of thinking or communicating, and inevitably animate, just as the narrator of a story must be more or less regarded as animate.[19] For instance, (18) does not make any sense because the corpse, as an inanimate entity, cannot be understood as conscious:

(18) **Sitai$_1$-wa zibun$_1$-ga ie-ni aru to omot-teiru.*
corpse-TOP self-NOM home-LOC exist COMP think-PROG
'The corpse$_1$ thinks self$_1$ exists at home.'

In (16a) and (16b), we see that *zibun* appears in relative clauses, i.e., contexts for the viewpoint *zibun*, where the speaker's viewpoint is cast onto its inanimate antecedent. It is unlikely to place one's perspective on and empathize with inanimate entities, hence the unacceptability with *zibun*.

A reviewer, however, does present an interesting counter example showing the speaker being able to empathize with an inanimate object, as (19) below:

19 It is of course possible to imagine that inanimate entities narrate a story, but even in such cases, they can be perceived substantially as human beings with consciousness and agency, depending on physical and psychological properties that they possess, as well as linguistic clues (Bernaerts et al. 2014; Trompenaars et al. 2018).

(19) *Koko-ni aru syokubutu-wa, mawari-ni zibun-yori se-ga*
Here-LOC be plant-TOP around-LOC self-than height-NOM
takai ki-ga aru to seiiku dekinai node, …
tall tree-NOM be if grow cannot because
'[The plant you see over there]$_1$ cannot grow when it is surrounded by trees that are taller than self$_1$, so… (e.g. it is essential for it to have its seeds carried by birds to distant places/you should be careful when you pick a place to plant it).'

The animacy constraints on the viewpoint and logophoric uses of *zibun* is thus naturally drawn from the fact that the speaker in general is supposed to be animate; however, as the above example shows, even this can be overruled under special circumstances.[20] By contrast, in our earlier examples, e.g., (6a)–(6c), *zibun* is the co-argument of the antecedent and expresses reflexivity of the action, without any viewpoint or logophoric aspect being present. We can then generalize that the reflexive use productively allows for inanimate antecedents. We now discuss the significance of this observation in relation to the corpus data and corresponding theoretical issues.

Beginning with the empirical data, it is curious that generic sentences are found with inanimate *zibun* but not episodic sentences in the corpus data assessed. The absence of episodic sentences, however, does not predict difficulty in the processing or interpretation of these types of sentences: the distinction between the generic and episodic sentences, exemplified by (9) and (10), is not an important factor for inanimate *zibun*. The question then becomes, why haven't episodic inanimate *zibun* sentences been found in the wild?

We simply might consider that a generic sentence is more likely to be found because it is simply reporting on the state of the inanimate antecedent – which is not something uncommon. However, it is uncommon for an inanimate to perform an action on itself – it must have some type of agency. The examples used in the experiment here focused on a new species of tree and a computer program that could act

20 *Zibun* in (19) may be suspected, to some extent, as personified, as *se* 'height' is mainly used for the height of human beings:

(i) {*John / ?Kono-yama*}*-no se-no takasa.*
{John this-moutain}-GEN height tallness
'The height of {John / this mountain}.'

When it refers to the height of an object, *se* conveys "a certain part of an object that looks like the back of a human from head to toe" (*Nihon Kokugo Daijiten* [Complete Japanese-Language Dictionary]). Oshima (2007: fn. 5) observes that the acceptability of empathy with an animate, nonhuman antecedent can be affected by pragmatic factors as well, so that, to exclude the possibility of personification, much attention should be paid to pragmatic aspects of co-occurring words.

upon themselves, supported by a context that suggested some agency.[21] This shows that part of the puzzle is that if one offers a context for agency for an inanimate object, an inanimate *zibun* can be acceptable (whereas example (1) does not meet these criteria).[22] In this relation, it is a well-known fact that Japanese has a tendency to disallow inanimate referents to occur as transitive agents as in (20) (e.g., Kuno 1973):

(20) **Taihuu-ga mado-o kowasi-ta.*
typhoon-NOM window-ACC break-PST
'The typhoon broke the window.'
(Kuno 1973: 30)

As we have seen in Section 2, however, the corpus data suggest that generic sentences and other generalizing constructions more easily allow for inanimate subjects in a transitive sentence (Kageyama and Shen 2012: 40). If agency is the key to allowing inanimate antecedents of the reflexive *zibun*, it then follows that attested examples of inanimate *zibun* are more commonly found in generic contexts, as inanimate referents with agency in general tend to be allowed only in those linguistic environments. In this sense, the perceived inanimate *zibun* problem is less syntactic and more semantic/pragmatic.[23] We now turn to the theoretical issues surrounding the allowance of inanimate *zibun*.

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21 An important note is that we used physical, not abstract verbs, as abstract verbs are incompatible with inanimate objects. This links with another restriction on *zibun*, that is, it is limited in its occurrence with physical verbs. In this sense, this adds to the difficulty in finding reported inanimate antecedents of *zibun*.

22 A reviewer wonders whether agency instead of animacy determines what can act as an antecedent for *zibun* – this is on the right track if we consider Kuno's animacy condition (1973: 1), 'willpower' is one of the factors, which is very similar to agency. In the experimental items we used, the inanimates did possess a degree of 'insentient agency', stemming from ecological adaptation, which we believe helps overcome the animacy constraint to a certain degree.

23 Another possible perspective is a cognitive one. Hirose (2014) uses Lakoff's "subject-self" metaphor to capture *zibun*'s binding patterns, where reflexivity is expressed as dividing a person into a subject (where consciousness is located) and self (everything else that the person is). Hirose proposes four different Subject-self models, and the model best fitting inanimate *zibun* is 'subject-in-self' (Hirose 2014: 103–105). In this model, the actor acts upon himself, but is not conceptualized that the subject and self are separate.

However, it is difficult to apply this to the inanimate situation, because the subject is the locus of consciousness, here absent from the inanimate. When participants read the episodic readings of inanimate *zibun* we could hypothesize they apply this frame, which would cognitively take longer as the consciousness requirement of the subject needs to be foregone in order to fit a new frame, 'subject without consciousness'. However, it was found that the generic/episodic distinction does not affect either the interpretation or processing of inanimate *zibun*, nor was it shown that the inanimate/animate *zibun* processing times have much of a timing difference, which a shift in frame would presumably produce.

A positive step taken concerns theoretical clarity: inanimate *zibun* should not be accounted for as an inviolable phenomenon in the syntactic or semantic interfaces. Specific syntactic/semantic proposals accounting for inanimate *zibun* from early (e.g., Aikawa 1993) to more recent ones (e.g., Tenny 2006), in this light, are too strong as they cannot capture the new data presented here. Consequently, by adopting the hypothesis that inanimate antecedents with a high degree of agency can bind *zibun*, and incorporating Oshima's (2007) empathy considerations, Kuno's (1973) animacy constraint (while covering the general data well) is reformulated as thus (21):

(21) The Revised Animacy Condition
The antecedent of *zibun* in Japanese is characteristically animate but it may also be inanimate (excluding personification), if it has a high degree of agency supported by context for reflexive use, or to be empathized with under special circumstances.

Moreover, we are in agreement with a reviewer that rather than a lexically specified restriction, the binding of *zibun* in relation to animacy is due to an amalgamation of factors, which the above condition tries to capture. This thus shifts the research direction to specifying the general type of context and circumstances, and what the threshold of agency is for inanimates. Based on the sentences we have found and tested, it appears that this insentient agency is attributable to, for example, evolutionary pressures (involving plants) or programmed behavior (involving computers); in a sense, agency related to preprogrammed behavior which occurs automatically when a particular set of conditions are met. In fact, entities with insentient agency are construed as 'independent instigators' (Fauconnier 2011: 539) who autonomously act upon themselves without being manipulated by an implied controller. Inanimate entities endowed or equipped with any preprogrammed behaviors, for example, trees or computer applications, are regarded as agents in this sense. By contrast, it would be highly unlikely for concrete objects such as 'rock' or 'book' to ever serve as an inanimate antecedent for *zibun* whatever the context, or abstract nouns such as 'honesty' or 'history', as they cannot be adapted in the same manner above. Under this approach, the fluid nature of animacy surrounding *zibun* stems from how we conceptualize inanimate entities in terms of their agency depending on the context that it is used within.

Incidentally, the reader will notice that in Kuno's example in (1), repeated here as (22), the reflexive is used as a maker of a middle situation, i.e., occurs in a context of derived intransitivity (unlike (3a)–(3b)).

(22) **Rekisi-wa* *zibun-o* *kurikaesu.*
history-TOP self-ACC repeat.PRS
'History repeats itself.'
(Kuno 1973: 291)

Itself in the English translation marks the intransitivity of the verb; more accurately, the verb *repeat* has been detransitivized. In fact, it is omissible with no change to the sentential interpretation. As discussed by Siemund (2010: 814–815), such an optional occurrence of *itself* has important commonalities with intensifying *self*-forms of the adverbial type, as with *The budgie opened the cage door itself*. However, *zibun* does not have such intensifying functions; it is another reflexive pronoun, *mizukara*, that takes on an intensifying function in Japanese and therefore more suitably functions as a maker of a middle situation, as evidenced by the acceptability of *Rekisi-wa mizukara kurikaesu* 'History repeats itself [without any help].' The main point is that *zibun* has a reflexive use where it acts as an argument of the verb and refers to an event participant involved in a transitive eventuality; that *zibun* lacks a middle marker usage does not however, implicate that it disallows inanimate antecedence.

It is then predicted that if *zibun* takes on such an intensifying function, it can more readily be used with an inanimate antecedent. In fact, as seen in Section 2, there are intensifying adverbial instances where *zibun* can occur with an inanimate subject, *zibun-kara* 'from self' (23) and *zibun-de* 'by self' (24) (cf. Kogusuri 2018, 2019):

(23) [At the time when my boyfriend started to go out with a French student]
Koibito-kankei-wa zibun-kara totuzenni maku-o orosi-ta-noda.
lover-relationship-TOP self-from suddenly curtain-ACC lower-PST-COP
'All of a sudden, our romantic relationship has ended naturally.'
(BCCWJ PB39_00301)

(24)

Wakusei-nado-wa	*zibun-de-wa*	*hikarazu,*	*taiyou-no*	*hikari-o*
planet-etc.-TOP	self-INS-FOC	shine.not	sun-GEN	light-ACC
hansyasi-teiru	*dake*	*daga …*		
reflect-PROG	only	though		

'Although planets do not shine by themselves but only reflect sunlight …'
(BCCWJ OT23_00032)

Notice here that the sentence in (23) has only an episodic reading, as the verb is used in the simple past form. This adverbial use of *zibun* is much more commonly found than accusative *zibun* with inanimates, as the intensification function focuses on actors and their corresponding actions (the agency of itself, without others, see Hirose (2014: 107)), rather than the action's effect on an antecedent (even though the reflexive and subject are one of the same).[24] Here, we see another path of allowing inanimate *zibun*, not by extending the categorical boundary of 'animate' with a high degree of agency, but by shifting its function from anaphoric reference to intensifying an actor role in the event.

24 We do not advocate that the properties of *zibun-kara*/*-de* have been transferred to *zibun*, rather it is a matter of domain transfer as discussed. We thank the reviewer for asking us to clarify our points.

6 Conclusions

This study has presented data on reflexive *zibun* being able to take an inanimate antecedent, something that was said to be impossible since Kuno (1973). This was further verified through an experimental paradigm which explored the processing and interpretation of inanimate *zibun*, showing that while it is processed slower and has lower acceptability than animate *zibun*, it appears that this is allowed as part of the grammar given the proper context. Based on Hirose's (2014) trichotomy of uses of *zibun*, we have argued that, only the reflexive use, but no viewpoint or logophoric ones, can allow for inanimate antecedents if they are conceptualized as entities with a high degree of agency, or if *zibun* is used as an adverbial intensifier emphasizing the antecedent's actorhood. We then offered a reformulation of the animacy condition to reflect the inanimate binding possibilities (considering Oshima 2007), and explored reasons why episodic sentences with inanimate *zibun* are difficult to find in corpora. Finally, we explored theoretically the base reasons why the animacy condition exists and how generalizing contexts, as attested in the corpus data, are related to inanimate *zibun*.

The important implication of our conclusion is that animacy, governing the use of *zibun*, is a conceptually flexible notion, dependent on the speaker's conceptualization as well as the context where it is used. In this sense, *zibun*'s binding is semantic and pragmatic in nature.

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References

Aikawa, Takako. 1993. *Reflexivity in Japanese and LF-analysis of zibun-binding*. Columbus, OH: The Ohio State University dissertation.

Aikawa, Takako. 1999. Reflexives. In Natsuko Tsujimura (ed.), *The handbook of Japanese linguistics*, 154–190. Oxford: Blackwell.

Aissen, Judith. 2003. Differential object marking: Iconicity vs. economy. *Natural Language and Linguistic Theory* 21. 435–483.

Aoshima, Sachiko, Masaya Yoshida & Colin Phillips. 2009. Incremental processing of coreference and binding in Japanese. *Syntax* 12(2). 93–134.

Bernaerts, Lars, Marco Caracciolo, Luc Herman & Bart Vervaeck. 2014. The storied lives of non-human narrators. *Narrative* 22. 68–93.

Bloomfield, Morton W. 1963. A grammatical approach to personification allegory. *Modern Philology* 60(3). 161–171.

Bonin, Patrick, Margaux Gelin, Vivien Dioux & Alain Méot. 2019. "It is alive!" Evidence for animacy effects in semantic categorization and lexical decision. *Applied Psycholinguistics* 40. 965–985.

Bossong, Georg. 1984. Animacy and markedness in Universal Grammar. *Glossologia* 2(3). 7–20.

Croft, William. 1994. Semantic universals in classifier systems. *Word* 45. 145–171.

Dorst, Aletta G. 2011. Personification in discourse: Linguistic forms, conceptual structures and communicative functions. *Language and Literature* 20(2). 113–135.

Fauconnier, Stefanie. 2011. Differential agent marking and animacy. *Lingua* 121. 533–547.

Fujiwara, Yoshiki. 2013. *Zibun*-anaphora in child Japanese and nominative objects in potential sentences. In Yukio Otsu (ed.), *The proceedings of the Fourteenth Tokyo Conference on Psycholinguistics*, 43–59. Tokyo: Hituzi.

Hirose, Yukio. 2000. Public and private self as two aspects of the speaker: A contrastive study of Japanese and English. *Journal of Pragmatics* 30. 1623–1656.

Hirose, Yukio. 2002. Viewpoint and the nature of the Japanese reflexive *zibun*. *Cognitive Linguistics* 13(4). 357–401.

Hirose, Yukio. 2014. The conceptual basis for reflexive constructions in Japanese. *Journal of Pragmatics* 68. 99–116.

Hirose, Yukio. 2018. Logophoricity, viewpoint, and reflexivity. In Yoko Hasegawa (ed.), *The Cambridge handbook of Japanese linguistics*, 379–403. Cambridge: Cambridge University Press.

Huang, Yan. 2000. *Anaphora: A cross-linguistic study*. Oxford: Oxford University Press.

Iida, Masayo. 1996. *Context and binding in Japanese*. Stanford, CA: CSLI.

Ito, Masuyo. 2012. The bound-variable interpretation in child Japanese: The implicit variable, the anaphor *zibun*, and stripping structures with case markers. *Syntax* 15(4). 315–353.

Jegerski, Jill. 2014. Self-paced reading. In Jill Jegerski & Bill VanPatten (eds.), *Research methods in second language psycholinguitsics*, 20–49. New York: Routledge.

Kageyama, Taro & Li Shen. 2012. Hukasi syugo koubun no zokusei zyozyutu kinoo [The property-predication function of adjunct-subject constructions]. In Taro Kageyama & Li Shen (eds.), *Nittyuu riron gengogaku-no sintembou* [*New perspectives in Japanese-Chinese theoretical linguistics*], vol. 2, 27–65. Tokyo: Kurosio.

Katada, Fusa. 1991. The LF representation of anaphors. *Linguistic Inquiry* 22(2). 287–313.

Kogusuri, Tetsuya. 2018. 'Zibun'-no hukasi-yoho-nikansuru itikousatu [A note on adjunct uses of *zibun*)]. *Gengo bunka kyodo kenkyu purojyeuto: Nintikinoo gengogaku [Language & culture joint research project: Cognitive-functional linguistic research]* 3. 1–10.

Kogusuri, Tetsuya. 2019. On the emphatic reflexive in Japanese: With special reference to *zibun-de*. *Gengo bunka kyodo kenkyu purojyekuto: Nintikinoo gengogaku [Language & culture joint research project: Cognitive-functional linguistic research]* 4. 31–40.

Kuno, Susumu. 1973. *The structure of the Japanese language*. Cambridge, MA: MIT Press.

Kuno, Susumu & Etsuko Kaburaki. 1977. Empathy and syntax. *Linguistic Inquiry* 8. 627–672.

Lakoff, George & Mark Johnson. 1980. *Metaphors we live by*. Chicago, IL: Chicago University Press.

Miyake, Tomohiro. 2011. *Nihongo kenkyu-no intaafeisu [The interface in the study of Japanese]*. Tokyo: Kurosio.

Nagata, Hiroshi. 1995. On-line and off-line reflexive resolution in Japanese logophoric sentences. *Journal of Psycholinguistic Research* 24(3). 205–229.

Nihon Kokugo Daijiten Dainihan Hensyu Iinkai. 2000–2002. *Nihon Kokugo Daijiten* [Complete Japanese-Language Dictionary], 2nd edn. Tokyo: Syogakukan.

Nishigauchi, Taisuke. 2014. Reflexive binding: Awareness and empathy from a syntactic point of view. *Journal of East Asian Linguistics* 23(2). 157–206.
Okabe, Reiko, Yuki Kobayashi & Takane Ito. 2011. Antecedent selection of a reflexive pronoun in bi-clausal structure: An ERP study in Japanese. In Yukio Otsu (ed.), *The proceedings of the Twelfth Tokyo Conference on Psycholinguistics*, 209–228. Tokyo: Hituzi.
Oshima, David. 2004. *Zibun* revisted: Emphathy, logophoricity, and binding. *University of Washington Working Papers in Linguistics* 23. 175–190.
Oshima, David. 2006. *Perspectives in reported discourse*. Stanford, CA: Stanford University dissertation.
Oshima, David Y. 2007. Syntactic direction and obviation as empathy-based phenomena: A typological approach. *Linguistics* 45(4). 727–763.
Sakakibara, Sonoko. 1995. *Pragmatics and distribution of the Japanese reflexive pronoun zibun*. Urbana-Champaign, IL: University of Illinois at Urbana-Champaign dissertation.
Siemund, Peter. 2010. Grammaticalization, lexicalization, and intensification: English *itself* as a marker of middle situation types. *Linguistics* 48(4). 797–836.
Sperlich, Darcy. 2020. *Reflexive pronouns: A theoretical and experimental synthesis*. Cham: Springer.
de Swart, Peter & Helen de Hoop. 2018. Shifting animacy. *Theoretical Linguistics* 44(1/2). 1–23.
Tenny, Carol L. 2006. Evidentiality, experiencers, and the syntax of sentience in Japanese. *Journal of East Asian Linguistics* 15(3). 245–288.
The Balanced Corpus of Contemporary Written Japanese. Toyko: National Institute for Japanese Language and Linguistics. Available at: https://clrd.ninjal.ac.jp/bccwj/en/.
Trompenaars, Thijs, Lotte Hogeweg, Wessel Stoop & Helen de Hoop. 2018. The language of an inanimate narrator. *Open Linguistics* 4. 707–721.
Uehara, Satoshi. 2003. *Zibun* reflexivization in Japanese: A cognitive grammar approach. In Eugene H. Casad & Gary B. Palmer (eds.), *Cognitive linguistics and non-Indo-European languages*, 389–404. Berlin & New York: Mouton de Gruyter.
White, Lydia, Bruhn-Garavito Joyce, Takako Kawasaki, Joe Pater & Philippe Prévost. 1997. The researcher gave the subject a test about himself: Problems of ambiguity and preference in the investigation of reflexive binding. *Language Learning* 47(1). 145–172.
Yamamoto, Mutsumi. 1999. *Animacy and reference: A cognitive approach to corpus linguistics*. Amsterdam & Philadelphia: John Benjamins.
Yoshimura, Noriko, Mineharu Nakayama, Koichi Sawasaki, Atsushi Fujimori & Hiroya Shimizu. 2012. L2 knowledge at the syntax-pragmatics interface: Interpretations of reflexives by Japanese, Korean, and Chinese ESL learners. In Yukio Otsu (ed.), *The proceedings of the 13th Tokyo Conference on Psycholinguistics*, 303–323. Tokyo: Hituzi Syobo.