Empathy Effects on Antecedent Salience and Anaphor Processing in Japanese

Вплив емпатії на виразність антецедента та обробку анафори в японській мові

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ABSTRACT

Purpose. The present study investigates whether antecedent saliency is affected by empathy status. That is, the possibility that when the speaker of a sentence empathizes with an entity, called the empathy locus, that entity is more salient than other entities. Accordingly, reduced forms of anaphors would be preferred to fuller forms when referring to an empathy locus.

Methods. Two self-paced reading experiments were conducted using two-sentence discourses. Sentence 1 contained empathy-locus and non-empathy-locus antecedents. These were then referred to by fuller and reduced forms of anaphors in Sentence 2. The empathy statuses of the antecedents were indicated by Japanese ‘giving’ verbs, which obligatorily express the empathy locus.

Results. Analyses of sentential reading-time results showed a significant interaction of antecedents and anaphors. Sentences 2 were read faster when the anaphors were reduced forms (i.e., null pronouns) than when they were fuller forms, but the reading-speed difference was significantly neutralized when the antecedents were non-empathy loci. Also, this significant neutralization appeared only when the anaphors were overt pronouns (not when they were repeated names) and when the anaphors were not marked by the topic morpheme.

Conclusions. The outcomes indicate that empathy-locus antecedents are more salient than non-empathy-locus ones, which affects the choices of fuller or reduced forms of anaphors. Also, the results imply that Japanese overt pronouns may carry anti-logophoricity, which would cause them to avoid referring to empathy loci. In addition, the results imply that the topic’s inherent function, which is to refer to an entity that has previously appeared, may nullify the difference which results from antecedent saliency.

Key words: antecedent, salience, anaphor, empathy, Japanese.

Introduction

Early psycholinguistic studies on referential expressions indicate that the salience of an antecedent affects the choice of its anaphor. There appears to be a consensus in existing studies that salient antecedents prefer being referred to by anaphors in reduced forms, such as pronouns, whereas non-salient antecedents allow the use of fuller forms of anaphors, such as full noun phrases (full NPs) (Ariel, 1990; Gundel et al., 1993; Gordon et al., 1993; Grosz et al., 1983, 1995; Gordon & Hendrick, 1998; Arnold, 1998; Almor, 1999)*. In general, salient antecedents are grammatical subjects or the first-mentioned

* This paper considers the term “salience” as roughly synonymous with the terms “accessibility” in Ariel (1990) and “prominence” in Gordon and Hendrick (1998).
entity in the sentence. Refer to the following examples with a salient antecedent (i.e., the grammatical subject ‘Bruno’) and with a non-salient antecedent (i.e., the non-subject ‘Debbie’). In (1a), the reduced anaphor ‘He’ is preferred to fuller anaphor ‘Bruno’, but both are accepted in (1b).

(1) a. Salient antecedent
Bruno was the bully of the neighborhood. He/#Bruno chased Tommy all the way home from school one day
(Gordon et al., 1993: 317); 
b. Non-salient antecedent
George jumped out from behind a tree and frightened Debbie. She/Debbie screamed loudly and ran away.
(Gordon et al., 1993: 333–334)

Why is the repetition of a full name antecedent generally avoided? In their Discourse Prominence Theory (DPT), Gordon and Hendrick (1998) explain the mechanism: a repeated full name leads the hearer to initially interpret it as a non-anaphor and to therefore establish a new representation of an entity. For example, in the sentence, ‘Jane thinks Jane is sick’ (Gordon & Hendrick, 1998: 404), the hearer tends to interpret the second ‘Jane’ as a new person, not as an anaphor. Only after that does the hearer modify their initial interpretation and begin searching for a possible matching antecedent. The search starts with the least salient entity and proceeds in increasing order of salience.

In contrast, a pronoun is immediately interpreted as an anaphor that needs an antecedent. For example, in the sentence, ‘Jane thinks she is sick’ (Gordon & Hendrick, 1998: 404), the hearer immediately interprets ‘she’ as an anaphor. Therefore, the hearer immediately begins a search for the antecedent (‘Jane’), starting with the most salient entity and proceeding in decreasing order of salience. Thus, for salient antecedents, pronouns are processed faster and are preferred to repeated-name anaphors.

The above interpretation is not universally accepted, however. Almor’s (1999) Informational Load Hypothesis (ILH) offers the explanation that the amount of information carried by an anaphor should be the minimum required for the hearer to identify its antecedent.
That is to say, a salient entity is the default antecedent, which is already at the center of attention in the discourse (e.g., the first ‘Jane’ in ‘Jane thinks Jane is sick’). A full-name anaphor presents an issue because its informational load is too high: it carries information in excess of what is necessary to interpret it as the antecedent. In contrast, the use of a repeated full-name anaphor is allowed with a non-salient antecedent, such as the grammatical object. This is because the rich information that the anaphor carries reasonably serves to identify the non-salient antecedent.

A noteworthy difference between the DPT and the ILH is their handling of salience with regard to null pronouns and overt pronouns. The ILH can account for the finding, in Romance languages, that a salient antecedent prefers being referred to by a null pronoun rather than by an overt pronoun (Alonso-Ovalle et al., 2002; Sorace & Filiaci, 2006). This phenomenon may indicate that a salient antecedent – the default antecedent – requires the minimum information that null pronouns carry in order for parsers to identify them as antecedents. Overt pronouns in Romance Languages are too informative because the information they carry, such as number, gender, and person, overlaps with the information indicated by verbal morphemes. The difference between null pronouns and overt pronouns is not explained by the DPT, as it does not differentiate between overt and null pronouns.

Although existing accounts of anaphors differ in their explanations, they largely agree that salient antecedents prefer reduced forms of anaphors, and non-salient antecedents allow fuller forms of anaphors. Empirical support for these preferences comes from a number of studies. One example is Gordon et al.’s (1993) self-paced sentence-by-sentence reading experiment with English speakers which indicated that when antecedents were salient (i.e., either grammatical subjects or first-mentioned), readers processed the sentences that included repeated names (fuller anaphors) slower than the sentences that included pronouns (reduced anaphors). This slower processing was significantly neutralized when antecedents were not salient. Gordon et al. referred to the relatively slower reading of sentences with repeated-name anaphors for salient antecedents as the Repeated Name Penalty (RNP).

Another example comes from a self-paced reading experiment with speakers of Spanish conducted by Gelormini-Lezama and Almor (2011). This study indicated that, when antecedents are salient, readers
processed the sentences with overt pronouns (relatively fuller anaphors) slower than those with null pronouns (relatively more reduced anaphors). The processing-time difference was significantly smaller when antecedents were non-salient, showing an interaction. Gelormini-Lezama and Almor called this slowed reading of overt pronouns for salient antecedents the Overt Pronoun Penalty (OPP).

The previous paragraphs mentioned that it is widely accepted that grammatical categories (subjects) and word order (first-mentioned) enhance the salience of antecedents, and that salience affects the choice of anaphor. However, other factors affecting salience have also been proposed. The current study examines one such factor, empathy, explained below.

**Antecedent Salience and Empathy in Japanese**

In order to understand the present study’s examination of whether an antecedent’s salience is connected with empathy, it is critical to first understand the concept of empathy in the context of referential expressions.

**Empathy and Antecedent Salience**

This notion of empathy was proposed by Kuno (1976) in order to present the speaker’s position in describing a situation. In general, empathy indicates the point of view or perspective of a person that the speaker empathizes with. Refer to the following sentences, both of which describe a situation in which a father named Taro has hugged his son Saburo.

(2) a. Taro hugged his son (= Saburo).
   b. Saburo’s father (= Taro) hugged him

(Walker et al., 1994: 208)

In (2a), the sentence foregrounds the father by using his name, ‘Taro’, and backgrounds the son by using the term ‘his son’. In other words, the speaker of this sentence is empathizing with Taro’s point of view, so Taro is the empathy locus. In contrast, (2b) foregrounds the son by using his name, ‘Saburo’, and backgrounds the father by using the term ‘father’, so Saburo is the empathy locus.

Walker et al. (1994) examined empathy in the Japanese language and proposed a connection to antecedent accessibility. In their study of
Japanese referential expressions, they argue that antecedents’ accessibility is enhanced by empathy. That is, an antecedent that is the speaker’s empathy locus is more salient than an antecedent that is a non-empathy locus. According to Walker et al., Taro should be more salient than Saburo in (2a), and Saburo should be more salient than Taro in (2b).

Walker et al. (1994) explain this empathy effect using the framework of Centering Theory (Grosz et al., 1983, 1995). Centering Theory ranks antecedents’ saliences based on their grammatical categories, with grammatical subjects being more salient than grammatical objects (i.e., SUBJECT > OBJECT). Walker et al. propose a non-grammatical category, empathy, as a factor that also affects antecedent saliency in addition to the grammatical categories. Furthermore, according to Walker et al., the empathy effect is stronger than that of grammatical subjects or objects (i.e., EMPATHY > SUBJECT > OBJECT). In other words, an empathy-locus grammatical object should be more salient than a non-empathy-locus grammatical subject, in the way that ‘him (Saburo)’ is more salient than ‘Saburo’s father in (2b).

Although the concept of empathy is based on a theoretical grounding, little empirical data currently exists to test its connection to antecedent saliences. The present study aims to fill in this gap by empirically testing this possibility.

**Empathy and Japanese Verbs**

This section explains how empathy is expressed in a Japanese sentence, a point with direct relevance to the experimental items of this study. Importantly, as Walker et al. (1994) note, empathy is reflected in certain Japanese words. That is, some verb phrases obligatorily indicate the empathy-locus NP, regardless of the grammatical status of the NPs. This expression of empathy is seen, for example, in the verbs describing an event involving giving and receiving (Kuno & Kaburaki, 1977; Kuno, 1987).

By selecting the verb in a giving and receiving scenario in Japanese, the speaker is obligatorily choosing whether to empathize with the giver or the receiver. Two different verbs for ‘give’ are utilized: ageru must be used when the speaker is empathizing with the giver’s perspective, and kureru must be used when the speaker is empathizing with the receiver. The examples below demonstrate the difference in viewpoint (i.e., empathy), with ageru and kureru used here in their past forms, ageta and kureta. Sentence (3a) with ageta indicates that the
giver, *Taro*, is the empathy locus, whereas (3b) with *kureta* indicates that the receiver, *Saburo*, is the empathy locus.*

(3) a.

\[
\begin{array}{cccc}
Taro & \text{Saburo} & \text{hon} & \text{ageta} \\
\text{NOM} & \text{DAT} & \text{ACC} & \\
\end{array}
\]

‘Taro gave Saburo a book’.

b.

\[
\begin{array}{cccc}
Taro & \text{Saburo} & \text{hon} & \text{kureta} \\
\text{NOM} & \text{DAT} & \text{ACC} & \\
\end{array}
\]

‘Taro gave Saburo a book’.

These verbs have additional constructions which, too, contain the mandatory adoption of a viewpoint for giving and receiving. These constructions express the concept of doing something for the sake of someone else. In such cases, the words *ageru* and *kureru* can be used as auxiliary verbs affixed to any other verbs in order to mean, ‘do for [someone]’ or ‘do [someone] the favor of -ing’. Examples are shown below.

(4) a.

\[
\begin{array}{cccc}
Taro & \text{Saburo} & \text{hon} & \text{katte-ageta} \\
\text{NOM} & \text{DAT} & \text{ACC} & \\
\end{array}
\]

‘Taro bought a book for Saburo (Taro did Saburo the favor of buying him a book)’

b.

\[
\begin{array}{cccc}
Taro & \text{Saburo} & \text{hon} & \text{katte-kureta} \\
\text{NOM} & \text{DAT} & \text{ACC} & \\
\end{array}
\]

‘Taro bought a book for Saburo (Taro did Saburo the favor of buying him a book)’

In the sentences above, the verbs *ageta* and *kureta* ‘gave’ affix another verb *kau* ‘buy’ (in the inflected form *katte*), so they together construct *katte-ageta/katte-kureta* ‘did [someone] the favor of buying’. These combinations of *ageru/kureru* ‘give’ and another verb in the

* As *kureta* expresses empathy with the receiver, it is typically used when the speaker or a person in their in-group, such as a family member or co-worker, is given a gift by someone.
Inflected form $V$-te show the same empathy hierarchy as $ageru/kureru$ (Kuno, 1987; Koga, 2014). That is, $V$-te $ageru$ indicates that the do-er of the favor is the empathy locus. In contrast, $V$-te $kureru$ indicates that the do-ee who is receiving the favor is the empathy locus. $Taro$ is the empathy locus in sentence (4a) with $katte$-$ageta$ and $Taro$ is the do-er; $Saburo$ is the empathy locus in (4b) with $katte-kureta$ and $Saburo$ is the do-ee. Indeed, such manipulation of the empathy locus appears to serve a specific function. In the case of storytelling, for example, Yanagimachi (2000) reports that Japanese speakers used these auxiliary verbs of giving and receiving in order to set their empathy on the protagonist of the story.

Different empathy loci may also be marked with the verbs $iku$ ‘go’ and $kuru$ ‘come’, and their past-tense forms $itta$ ‘went’ and $kita$ ‘came’ (Kuno, 1978; Kawakami, 1996; Koga, 2014). When a Japanese speaker says that someone “goes” somewhere, the speaker is empathizing with the person who is going, but if he/she says someone “comes” somewhere, the speaker is empathizing with the person at the destination. The verbs $iku$ ‘go’ and $kuru$ ‘come’ combine with $motu$ ‘hold’ and $kau$ ‘buy’, which form the verbs $motte$-$iku$ and $motte-kuru$, both of which mean ‘bring’ and the verbs $katte$-$iku$ and $katte-kuru$, both of which mean ‘buy [for someone]’. When a sentence describes that someone brings/buys something to/for someone, the use of $motte$-$iku$ and $katte$-$iku$ may express that the empathy locus is the person who brings/buys something, in accordance with $iku/kuru$’s empathy hierarchy. In contrast, the use of $motte$-$kuru$ and $katte$-$kuru$ should express that the empathy locus is the person who receives the thing. Refer to the example sentences below.

(5)  
\begin{align*}
a. & \quad Taro-ga & Saburo-ni & purezento-o & motte$-$itta/katte$-$itta \\
& \text{Taro-NOM} & \text{Saburo-DAT} & \text{present-ACC} & \text{brought/bought} \\
& \text{‘Taro brought a present to Saburo / Taro bought a present for Saburo’} \\

b. & \quad Taro-ga & Saburo-ni & purezento-o & motte$-$kita/katte$-$kita* \\
& \text{Taro-NOM} & \text{Saburo-DAT} & \text{present-ACC} & \text{brought/bought} \\
& \text{‘Taro brought a present to Saburo / Taro bought a present for Saburo’} \\
\end{align*}

* Motte$-$itta/katte$-$itta and motte$-$kita/katte$-$kita in (5) are the past tenses of motte$-$iku/katte$-$iku and motte$-$kuru/katte$-$kuru, respectively.
The speaker’s empathy is probably placed on *Taro* in (5a) with *motte-itta* and (5b) with *katte-itta*, whereas it is likely to be with *Saburo* in (5a) with *motte-kita* and (5b) with *katte-kita*.

**Empathy and the Present Study**

As explained above, Walker et al. (1994) argue that antecedents’ accessibility is enhanced by empathy. The main objective of the current study is to investigate whether this empathy effect is true. The previous section showed how certain verbs in Japanese express an empathy locus by requiring the speaker to adopt a viewpoint. The current study examines the interplay between such verbs and the salience of antecedents and forms of anaphors.

As mentioned previously, it is widely acknowledged that salient antecedents prefer being referred to by reduced forms of anaphors, and non-salient antecedents allow the use of fuller forms of anaphors. Regarding empathy’s connection to antecedents, Walker et al. (1994) argued that empathy-locus antecedents are more salient than non-empathy-locus antecedents. If true, it is implied that empathy-locus antecedents would prefer reduced forms of anaphors. Furthermore, non-empathy-locus antecedents would accept fuller forms of anaphors. Accordingly, the RNP and OPP would occur with empathy-locus antecedents and non-empathy-locus antecedents when they are processed with different types of anaphors.

In the current study, two self-paced reading experiments were conducted. The experiments were similar to those by Gordon et al. (1993) and Gelormini-Lezama and Almor (2011), and tested the RNP and the OPP effects respectively. The experimental items used the verbs listed in examples (3) ‘give’, (4) ‘do [someone] the favor of -ing’ and (5) ‘bring/buy [for someone]. Such verbs indicate whether or not the antecedent is the empathy locus. The experiments tested whether the RNP or OPP would be detected with empathy-locus and non-empathy-locus antecedents, with the possibility of finding empathy effects on antecedent salience. To the best knowledge of the authors, there have been no other experiments that test empathy effects on antecedent salience in the RNP or the OPP frameworks.

**Factors Belonging to Anaphors in Japanese**

**Pronouns in Japanese**

Before proceeding to the experiment section, related aspects of Japanese anaphors will be reviewed in this section. Recall that
Gordon et al.’s (1993) RNP study in English used repeated full-name anaphors and pronoun anaphors in the experiments, and found that salient antecedents affected the choice of pronoun anaphors, i.e., reduced forms of anaphors. Also, the OPP study by Gelormini-Lezama and Almor (2011) utilized repeated names, overt pronouns and null pronouns in Spanish as anaphors, and their experiment found that salient antecedents were preferred for null pronouns, i.e., the most reduced form of anaphors. Similar to Spanish, Japanese pronouns have overt and null forms. In general, null pronouns in Japanese are equivalent to overt pronouns in English and null pronouns in Spanish, which are the most reduced forms of pronouns in each language (Kuroda, 1979; Kameyama, 1985). However, an important difference between Japanese and Spanish is that Spanish utilizes verbal morphology to indicate gender, number, and person features of the subject entity. This use of morphology facilitates parsers to find a null-pronoun subject’s antecedent. In contrast, Japanese does not utilize verbal morphemes like the ones in Spanish, and thus, the parser of a Japanese sentence with a null pronoun retrieves its referent based on the discourse contents.

Of the various overt pronouns in Japanese, the following paragraphs focus on the 3rd person overt pronouns, kare ‘he’ and kanojo ‘she’, which are used in the experiments of the current study, as well as in earlier research including Gordon et al.’s (1993) RNP study and Gelormini-Lezama and Almor’s (2011) OPP study.

Japanese 3rd person overt pronouns differ from those in English and Spanish in that Japanese ones contain far more semantic or socio-cultural information (Hinds, 1975; Obana, 2003a, 2003b; Ishiguro, 2013). For example, the use of a Japanese 3rd person overt pronoun implies that the referent is younger or lower in social status than the speaker that utters the pronoun. In addition, the pronoun hints at the closeness of the interpersonal relationship: the referent of the 3rd person overt pronoun is usually neither a stranger to the speaker nor especially close. The rich semantic connotation of Japanese 3rd person overt pronouns implies that they are not mere pronouns like those in English or Spanish, which are semantically bleached in comparison to those of Japanese.

If Japanese 3rd person overt pronouns are not merely reduced anaphor forms and do indeed carry rich semantic information, the possibility emerges that they may incur an OPP. This would be similar to the effect exhibited by the Spanish overt pronouns in Gelormini-Lezama...
and Almor’s (1993) study. On the other hand, the opposite possibility still remains: Japanese 3rd person pronouns may not incur a processing penalty because Japanese does not utilize verbal morphology like that of Spanish. As described earlier, Gelormini-Lezama and Almor (2011) attributed the occurrence of the OPP in Spanish to that language’s verbal morphology. Information such as gender, number and person is shown by the verbal morphology, so that same information carried by Spanish overt pronouns becomes redundant, thus slowing down readers’ processing. The account by Gelormini-Lezama and Almor is consistent with the finding from Yang et al.’s (1999) experiment in Chinese. They found no OPP with overt pronouns in Chinese, a language that – similar to Japanese – does not have verbal morphology. However, some other studies in Chinese (Zhao et al., 2015; Zhang & Kwon, 2016) found OPP-like effects with overt pronouns, potentially contradicting Gelormini-Lezama and Almor’s explanation. Therefore, the present study aims to shed light on whether the use of an overt pronoun in reference to a salient antecedent would penalize readers’ processing in a language that does not have Spanish-like verbal morphology.

**Logophoricity, Anti-logophoricity, and Japanese Overt Pronouns**

Another possible property of Japanese overt pronouns is suggested by Kuno (1986), who argues that Japanese overt pronouns are anti-logophoric pronouns. Based on the sense of the term “logophoricity” as introduced by Hagège (1974), logophoric pronouns exclusively refer to antecedents ‘whose speech, thoughts, feelings, or general state of consciousness are reported’ (Clements, 1975: 141). Logophoricity thus entails a speaker’s situating himself in the place of (i.e., empathizing with) the referent. In turn, anti-logophoricity exhibits the opposite property: anti-logophoric pronouns avoid referring to antecedents when the sentence reports the antecedent’s speech, thought, or feeling (i.e., when the antecedent is the perspective-bearer). The example sentences below illustrate the possible anti-logophoricity in Japanese 3rd person overt pronouns.

(6) a.  

*Hanako-ga tensai da to kanozyo-ga omotte-iru*  

Hanako-NOM genius is COMP she-NOM thinking  

‘Hanako, thinks that she, is a genius’
Sentence (6a) is unacceptable because, according to Kuno, anti-logophoric Japanese 3rd person pronouns should avoid referring to the agent of the thought (i.e., Hanako). On the other hand, (6b) is acceptable because the sentence reports the thoughts of Hanako’s parents’, not Hanako’s own.

Kuno’s claim is supported by Shoji’s (2019) study. Shoji’s experimental items used ambiguous Japanese discourses in which 3rd person overt pronouns could refer to either of two different types of antecedents, those which were the agents of speech, thoughts, or feelings, and those which were not. Results indicated that the native Japanese speakers’ choices of an appropriate antecedent significantly more frequently avoided the agent of speech, thoughts and feelings.

According to Sells (1987), the notion of logophoricity roughly corresponds to empathy, that is, the agent of speech, thoughts, and feelings (i.e., perspective-bearer) is the empathy locus. Accordingly, the above arguments on the anti-logophoricity of Japanese overt pronouns imply that anti-logophoric Japanese 3rd person pronouns should be avoided when referring to empathy loci. This possibility is important for the current study because it indicates that the processing of sentences with overt pronouns is likely to be penalized (showing slower reading) when those overt pronouns refer to empathy-locus antecedents compared to when they refer to non-empathy-locus antecedents, which may result in an OPP.

**Topic in Japanese**

Another important note in considering Japanese anaphor processing is that different adnominal morphemes can be added to anaphor nouns. In general, the adnominal morphemes indicate grammatical categories such as the subject or the object, or discourse categories such as the topic. For grammatical indications, for instance, the nominative morpheme *ga* is added to the subject noun (e.g., *Maria-ga banana-o tabeta* ‘Maria ate banana’). For discourse functions, the topic morpheme...
wa is added to the topic noun (e.g., Maria-wa banana-o tabeta ‘Maria ate banana’). Also, when the grammatical subject noun overlaps with the topic noun of the discourse, the noun can be marked by wa without indicating it to be the grammatical subject.

Regarding the distributions of the topic-wa and subject-ga, it has been widely discussed that topic-wa denotes old information that has appeared earlier in the discourse (e.g., Maria-ga uchi-ni kaettekita. Maria-wa banana-o tabeta ‘Maria came back home. Maria ate banana’), whereas subject-ga usually introduces a new or unidentifiable entity into the discourse (e.g., Takusan kudamono-ga atta. Maria-ga banana-o tabeta ‘There were lots of fruits. Maria ate banana’) (Kusaga, 1918; Matsushima, 1928; Kuroda, 1972; Kuno, 1973; Iwasaki, 1987). This usage of the topic-wa implies that topic-wa is an anaphor by nature. Haviland and Clark (1974) state that, when a speaker marks an entity as a topic, the hearer immediately finds its referent in the preceding context, which is already activated in their short-term or long-term memories, i.e., an entity which is salient.

Of importance to the current study is that wa-marked anaphors may behave like reduced-form anaphors that do not incur a processing penalty (i.e., do not result in RNP or OPP) when wa marks a repeated name or an overt pronoun. This is because a wa-marked topic anaphor may be immediately interpreted as an anaphor, as Gordon and Hendrick’s (1998) DPT explains for English pronouns, and thus wa-marking may neutralize any processing penalty and thus incur no RNP or OPP.

**Current Study**

In the current study, two self-paced sentence-by-sentence reading experiments were conducted, following the experimental designs in the original RNP study by Gordon et al. (1993) and the original OPP study by Gelormini-Lezama and Almor (2011). The experiments used sentences that included different antecedents, namely empathy-locus antecedents and non-empathy-locus antecedents. The antecedents...
were referred to by three different forms of anaphors: null pronouns, repeated names and overt pronouns. Repeated names and overt pronouns were either *wa*-marked topic subjects or *ga*-marked non-topic subjects. Experiment 1 tested the RNP effects, and Experiment 2 tested the OPP effects.

As described earlier, the primary objective of the experiments was to examine the effects of empathy on antecedent salience. If empathy enhances antecedent salience, sentences with null pronoun anaphors should be read faster than those with repeated-name and/or overt-pronoun anaphors when they refer to empathy-locus antecedents. Moreover, when they refer to non-empathy-locus antecedents, the reading-time difference might be significantly neutralized. In these cases, we would observe an RNP and an OPP, which would confirm that empathy affects the antecedent salience.

Secondly, if we should find the aforementioned empathy effects on antecedent saliences, this study could further discuss the anaphoric quality of *wa*-marked topic anaphors. The topic anaphor might be an anaphor in nature, and thus it may neutralize the RNP or OPP effects with repeated-name and overt-pronoun anaphors, while non-topic *ga*-marked anaphors would incur penalties.

A third point examined in the current study was the pronominal quality of overt pronouns. Specifically, it tested whether Japanese 3rd person overt pronouns would incur an OPP possibly because, unlike English pronouns, Japanese 3rd person pronouns are too rich in semantic information, or because they carry anti-logophoricity that causes them to avoid referring to empathy-locus antecedents. If an OPP should be found, it would require a different explanation from that of the OPP in Spanish, a language which utilizes verbal morphology that carries information redundant for antecedent identifications.

**Experiment 1**

**Participants**

Sixty-six native speakers of Japanese participated in Experiment 1, forty-one undergraduate students from Nagoya University and twenty-five graduate or undergraduate students from Mie University in Japan. All participants were between 18 and 23 years of age (*M* = 19.354).
They were near-monolinguals residing in Japan and had never continuously stayed in a foreign country for more than one month, points which were considered to ensure that a second language did not influence their linguistic instincts.

**Materials**

Experiment 1 tested the RNP effect by using two-sentence discourses in which the antecedents and anaphors were manipulated. The first sentence included an antecedent which was either an empathy-locus antecedent or a non-empathy locus antecedent (i.e., possibly salient or possibly non-salient). The subsequent sentence included one of three types of anaphors: a null pronoun, a non-topic ga-marked repeated name, or a topic wa-marked repeated name. Each discourse was followed by a yes/no comprehension question in order to ensure that the participants correctly understood the discourse.

Empathy was manipulated in the antecedent through the use of verbs. The ‘do-er’, who gives, brings, and buys, was always the antecedent. It additionally acted as the empathy locus when the verbs were ageru (‘give’), -te ageru (‘do [someone] the favor of -ing’), motte-iku (‘bring’), and katte-iku (‘buy [for someone]’). This type of antecedent was possibly salient. In contrast, the ‘do-er’ was not the empathy locus when the verbs were kureru (‘give’), -te kureru (‘do [someone] the favor of -ing’), motte-kuru (‘bring’), and katte-kuru (‘buy [for someone]’). This type of antecedent was possibly less salient. The sentences including the antecedents were followed by sentences that included anaphors which always referred to the grammatical-subject do-er. Examples of the items are shown in Table 1 below.

**Table 1**

*Example Items for Experiment 1 (testing RNP)*

<table>
<thead>
<tr>
<th>First sentence with Antecedent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(i) Empathy-locus Subject</strong></td>
</tr>
<tr>
<td>Taku-ga</td>
</tr>
<tr>
<td>Taku-NOM</td>
</tr>
<tr>
<td>‘Taku brewed coffee for Kazuko.’ [Taku = Empathy locus]</td>
</tr>
<tr>
<td><strong>(ii) Non-empathy-locus Subject</strong></td>
</tr>
<tr>
<td>Taku-ga</td>
</tr>
<tr>
<td>Taku-NOM</td>
</tr>
<tr>
<td>‘Taku brewed coffee for Kazuko’ [Kazuko = Empathy locus]</td>
</tr>
</tbody>
</table>
Empathy Effects on Antecedent Salience and Anaphor Processing...

Second sentence with Anaphor

(i) Repeated name-Ga

Taku-ga Kazuko-no koppu-ni satoo-o ni-hai ireta
Taku-NOM Kazuko-GEN cup-DAT sugar-ACC two.spoons.of put
‘Taku put two spoons of sugar into Kazuko’s cup.’

(ii) Repeated name-Wa

Taku-wa Kazuko-no koppu-ni satoo-o ni-hai ireta
Taku-TOP Kazuko-GEN cup-DAT sugar-ACC two.spoons.of put
‘Taku put two spoons of sugar into Kazuko’s cup’

(iii) Null pronoun

Ø Kazuko-no koppu-ni satoo-o ni-hai ireta
Kazuko-GEN cup-DAT sugar-ACC two.spoons.of put
‘(he) put two spoons of sugar into Kazuko’s cup.’

Six conditions were created by combining two types of antecedents with three types of anaphors. Six items were used for each of the six conditions, resulting in 36 total experimental items. Each participant was shown a total of 120 items, 36 experimental items and 84 distractor items.

One concern was that the verbs in the first sentences such as *ageru* / *kureru* had to appear in more than one experimental item. In order to minimize repetitions of the verbs, two measures were taken. The first was to vary the word form between the more formal *masu*-form (e.g., *agemasu* / *kuremasu*) and the less formal “plain” form (e.g., *ageru* / *kureru*). The second was to vary the level of politeness by alternating *ageru* ‘give’ and *V-te ageru* ‘do [someone] the favor of V-ing’ with their synonymous but less polite forms *yaru* and *V-te yaru*.

Also, in order to minimize the potential for confounds due to orthographic script (Kashiwagi & Nakayama, 2008), each word in the experiment was written in its most commonly occurring orthographic form, either Japanese *kanji* or *kana*. The most common form was determined according to the number of instances in the Kotonoha Shonagon corpus (https://shonagon.ninjal.ac.jp/).

An attempt was made to control for sentence length. In the case of the second sentences, although those with null pronouns

* The variations of the verbs used in the experimental items are summarized in the Appendix.
were shorter than those with repeated names, the lengths were kept as close as possible by aligning the number of characters and morae. The number of letters and morae ranged from 14 to 16 and 17 to 20, respectively, for the sentences with null pronouns. For the sentences with repeated names, they ranged from 16 to 19 and from 21 to 24, respectively.

Each of the experimental discourses included two persons, one male and one female (e.g., Taku and Kazuko in Table 1). The number of sentences with male and female anaphors was balanced across the items and in the individual lists shown to each participant. The lengths of male and female persons’ names used in Experiment 1 were aligned with the lengths of the overt pronouns used in Experiment 2, in order to make those experiments as uniform as possible. The 3rd person overt pronouns ‘he’ and ‘she’, are kare (彼) and kanojo (彼女) in Japanese, written as one character and two characters respectively. The names used in Experiment 1 had the same number of characters: Taku (拓) as a male name and Kazuko (和子) as a female name, for example. To ensure the familiarity of the names, a survey of 12 native Japanese speakers was conducted (mean age 22.67) in which 120 names were rated using a Likert scale according to how common each name was. The 72 highest rated names – 36 male and 36 female – were used in the study.

**Data Analysis**

The data analysis in Experiment 1 examined the reading times of the second sentences – the sentences which included anaphors. Reading-time data from trials with the incorrect answers to the comprehension question were removed prior to the analyses. Also, all data were removed for participants with a comprehension accuracy rate below 80%. Finally, extreme reading times below 200 ms or greater than 6000 ms were removed as outliers.

Log-transformed reaction times were analyzed with the software package R, version 3.6.0, using mixed effects models with the R package lme4.* Different models were compared to estimate the significance of each term, starting with the maximal model containing the antecedent and anaphor and their interaction as fixed-effect conditions. An attempt

---

* Log transformation makes data more interpretable when the data is highly skewed (Lane, n.d. http://onlinestatbook.com/2/transformations/log.html).
was made first at eliminating the interaction term. In cases where this elimination did not result in a significant loss of model fit, each of the individual factors was subsequently removed (Baayen, 2008). This resulted in the inclusion of the maximal structure of by-participant and by-item random intercepts and slopes that allowed the models to converge (Barr et al., 2013). The coefficients in the final models are reported.

**Procedure**

As mentioned, the basic design of Experiment 1 followed that of Gordon et al. (1993). Each of the 36 experimental items was presented in one of the six conditions, in a Latin-Square manner. Thus, six of the discourses for each condition were provided to each participant. Prior to the start of the experiment, a practice block consisting of four discourse items was used to familiarize the participants with the task. The entire process lasted approximately 20 minutes.

In both the experimental and the practice sessions, participants read the two sentences of each discourse item sentence-by-sentence in a self-paced fashion. Each trial began with a “+” fixation mark, which was followed by the first sentence, the second sentence, and then the comprehension question. Participants hit the space key to proceed to the next screen and pressed the number keys (1 = “yes”; 2 = “no”) to answer the comprehension questions. The experimental and distractor items were mixed and presented in a different random order for each participant.

**Results**

Reading times of the second sentences (i.e., the ones with anaphors) were used in the analyses. Of the data from the 66 participants, the data from two participants were removed prior to the analysis due to accuracy rates below the 80% threshold. For the data from the remaining 64 participants, reading times from trials in which the participant answered the comprehension question incorrectly were removed, affecting 10.06% of the data. Extreme reading times below 200 ms or greater than 6000 ms were also removed, affecting 1.22% of the data. The reading times of sentences with anaphors are shown in Figure 1 below. Error bars in the figure represent the standard error of the mean.
Figure 1
Reading Times of the Sentences with Anaphors in Experiment 1

![Graph showing reading times for sentences with anaphors.](image)

There was no significant interaction between antecedent (empathy locus vs. non-empathy locus) and anaphor (repeated name-
*ga*, repeated name-*wa*, and null pronoun) ($\chi^2(2) = 1.81, p = .404$) detected in the analysis. Table 2 shows the coefficients of the fixed terms in the final model. The coefficients of the interaction terms in this analysis were not significant in all cases, as shown in the table below.

Table 2
Analyses for Experiment 1 (testing RNP)

<table>
<thead>
<tr>
<th>Units of study</th>
<th>$\beta$</th>
<th>SE</th>
<th>$T$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.351</td>
<td>0.039</td>
<td>189.512</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Antecedent: Non-empathy locus</td>
<td>0.018</td>
<td>0.024</td>
<td>0.725</td>
<td>= .469</td>
</tr>
<tr>
<td>Anaphor: Repeated name-Ga</td>
<td>0.199</td>
<td>0.024</td>
<td>8.166</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Anaphor: Repeated name-Wa</td>
<td>0.165</td>
<td>0.024</td>
<td>6.796</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Antecedent: Non-empathy × Anaphor: Repeated name-Ga</td>
<td>-0.045</td>
<td>0.034</td>
<td>-1.321</td>
<td>= .187</td>
</tr>
</tbody>
</table>
Antecedent: Non-empathy ×
Anaphor: Repeated name-Wa -0.015 0.034 -0.430 = .668

Note. Factors were coded with dummy coding. The null pronoun and empathy-locus antecedent were used as reference levels (value = 0) for the reference form and antecedent factors, respectively. Reading times were log transformed and the coefficients thus represent differences between conditions in log scale. Effects at a $p \leq .05$ level are marked with a *.

In addition, the reading times of sentences with each anaphor form were compared between the empathy-locus antecedent condition and the non-empathy-locus antecedent condition.

Table 3
Simple Empathy-locus vs. Non-empathy-locus Antecedent Effects for Each Anaphor Form in Experiment

<table>
<thead>
<tr>
<th>Units of study</th>
<th>$\beta$</th>
<th>SE</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null pronoun</td>
<td>0.018</td>
<td>0.025</td>
<td>0.735</td>
<td>= .462</td>
</tr>
<tr>
<td>Repeated name-Ga</td>
<td>-0.033</td>
<td>0.024</td>
<td>-1.375</td>
<td>= .170</td>
</tr>
<tr>
<td>Repeated name-Wa</td>
<td>0.010</td>
<td>0.025</td>
<td>0.392</td>
<td>= .695</td>
</tr>
</tbody>
</table>

Note. Factors were coded with dummy coding. The empathy-locus antecedent was always used as reference levels (value = 0) for antecedent factor. Reading times were log transformed and the coefficients thus represent differences between conditions in log scale.

The comparisons indicate that none of the anaphors were read differently when paired with the empathy-locus and non-empathy-locus antecedents. These results did not show any significance. The results showed only a trend in which the reading times of repeated name-ga were longer with the empathy-locus antecedents than with the non-empathy-locus antecedents, whereas the reading times of null pronouns were longer with the non-empathy-locus antecedents than with the empathy-locus antecedents.

Experiment 2

Participants
Sixty-two native speakers of Japanese, who were graduate or undergraduate students at Mie University in Japan, participated in Experiment 2. They were all between 18 and 30 years of age ($M = 20.258$). As with Experiment 1, all of the participants were residing in Japan, having never continuously stayed in a foreign country for more than one month.
Materials

Experiment 2 tested the OPP effect by using empathy-locus antecedents or non-empathy locus antecedents (i.e., possibly salient or possibly non-salient) followed by three forms of anaphors, namely null pronouns, non-topic *ga*-marked overt pronouns, and topic *wa*-marked overt pronouns. Similar to Experiment 1, items were two-sentence discourses; the first sentence included an antecedent, and the second sentence included an anaphor. Each discourse was followed by a yes/no comprehension question. Examples of the items are shown in Table 4 below. The items were identical with those in Table 1 (Experiment 1) except that in this experiment, their repeated names were overt pronouns.

Table 4
Example Items for Experiment 2 (testing OPP)

<table>
<thead>
<tr>
<th>First sentence with Antecedent</th>
<th>Second sentence with Anaphor</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Empathy-locus Subject</td>
<td></td>
</tr>
<tr>
<td><code>Taku-ga Kazuko-ni koohii-o irete-ageta</code></td>
<td><code>Kare-ga Kazuko-no koppu-ni satoo-o ni-hai ireta</code></td>
</tr>
<tr>
<td>Taku-NOM Kazuko-DAT coffee-ACC brewed</td>
<td>he-NOM Kazuko-GEN cup-DAT sugar-ACC two.spoons.of put</td>
</tr>
<tr>
<td>‘Taku brewed coffee for Kazuko.’ [Taku = Empathy locus]</td>
<td>‘He put two spoons of sugar into Kazuko’s cup.’</td>
</tr>
<tr>
<td>(ii) Non-empathy-locus Subject</td>
<td></td>
</tr>
<tr>
<td><code>Taku-ga Kazuko-ni koohii-o irete-kureta</code></td>
<td><code>Kare-wa Kazuko-no koppu-ni satoo-o ni-hai ireta</code></td>
</tr>
<tr>
<td>Taku-NOM Kazuko-DAT coffee-ACC brewed</td>
<td>he-TOP Kazuko-GEN cup-DAT sugar-ACC two.spoons.of put</td>
</tr>
<tr>
<td>‘Taku brewed coffee for Kazuko.’ [Kazuko = Empathy locus]</td>
<td>‘He put two spoons of sugar into Kazuko’s cup’</td>
</tr>
<tr>
<td>(iii) Null pronoun</td>
<td></td>
</tr>
<tr>
<td><code>Ø Kazuko-no koppu-ni satoo-o ni-hai ireta</code></td>
<td><code>Ø Kazuko-no koppu-ni satoo-o ni-hai ireta</code></td>
</tr>
<tr>
<td>Kazuko-GEN cup-DAT sugar-ACC two.spoons.of put</td>
<td>Kazuko-GEN cup-DAT sugar-ACC two.spoons.of put</td>
</tr>
<tr>
<td>‘(He) put two spoons of sugar into Kazuko’s cup’</td>
<td></td>
</tr>
</tbody>
</table>
The other aspects of the materials, as well as the data analysis and procedures, were the same as those in Experiment 1

Results

Of the data from the 62 participants, the data from six participants was removed prior to the analysis due to accuracy rates below the 80% threshold. For the data from the remaining 56 participants, reading times from trials in which the participant incorrectly answered the comprehension question were removed from the analysis, affecting 11.11% of the data. Extreme reading times below 200 ms or greater than 8000 ms were also removed, affecting 4.53% of the data. The reading times for each of the types of anaphors are shown in Figure 2 below. Error bars in the figure represent the standard error of the mean.

Figure 2
Reading Times of the Sentences with Anaphors in Experiment 2
The analysis found no interaction between antecedent (empathy locus and non-empathy locus) and anaphor (overt pronoun-ga, overt pronoun-wa, and null pronoun) ($\chi^2(2) = 0.98$, $p = .614$). Table 5 shows the coefficients of the fixed terms in the final model. The coefficients of the interaction terms were not significant in any of the cases, suggesting no OPP.

Table 5

*Analyses for Experiment 2 (testing OPP)*

<table>
<thead>
<tr>
<th>Units of study</th>
<th>$\beta$</th>
<th>SE</th>
<th>T</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.335</td>
<td>0.047</td>
<td>155.141</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Antecedent: Non-empathy locus</td>
<td>0.054</td>
<td>0.030</td>
<td>1.771</td>
<td>= .077</td>
</tr>
<tr>
<td>Anaphor: Overt pronoun-Ga</td>
<td>0.292</td>
<td>0.031</td>
<td>9.552</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Anaphor: Overt pronoun-Wa</td>
<td>0.270</td>
<td>0.030</td>
<td>8.889</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Antecedent: Non-empathy locus × Anaphor: Overt pronoun-Ga</td>
<td>-0.042</td>
<td>0.043</td>
<td>-0.975</td>
<td>= .330</td>
</tr>
<tr>
<td>Antecedent: Non-empathy locus × Anaphor: Overt pronoun-Wa</td>
<td>-0.015</td>
<td>0.043</td>
<td>-0.346</td>
<td>= .729</td>
</tr>
</tbody>
</table>

Note. Factors were coded with dummy coding. The null pronoun and empathy-locus antecedent were used as reference levels (value = 0) for the reference form and antecedent factors, respectively. Reading times were log transformed and the coefficients thus represent differences between conditions in log scale. Effects at a $p \leq .05$ level are marked with a *.

As with Experiment 1, simple comparisons contrasting the reading times of each anaphor form between empathy-locus and non-empathy-locus antecedent conditions were conducted. The results are shown below.

Table 6

*Simple Empathy-locus vs. Non-empathy-locus Antecedent Effects for Each Anaphor Form in Experiment 2*

<table>
<thead>
<tr>
<th>Units of study</th>
<th>$\beta$</th>
<th>SE</th>
<th>T</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null pronoun</td>
<td>0.054</td>
<td>0.029</td>
<td>1.875</td>
<td>= .006*</td>
</tr>
<tr>
<td>Overt pronoun-Ga</td>
<td>0.011</td>
<td>0.030</td>
<td>0.346</td>
<td>= .729</td>
</tr>
<tr>
<td>Overt pronoun-Wa</td>
<td>0.040</td>
<td>0.032</td>
<td>1.263</td>
<td>= .207</td>
</tr>
</tbody>
</table>

Note. Factors were coded with dummy coding. The empathy-locus antecedent was always used as reference levels (value = 0) for antecedent factor. Reading times were log transformed and the coefficients thus represent differences between conditions in log scale. Effects at a $p \leq .05$ level are marked with a *.
These comparisons indicate that null pronouns were read significantly faster when referring to the empathy-locus rather than the non-empathy-locus antecedent. On the other hand, neither type of overt pronoun showed significant reading-time differences. In spite of the difference between null pronouns and overt pronouns, there was no OPP detected.

**Additional Analyses**

Experiments 1 and 2 did not find an RNP or OPP in any cases, showing no empathy effects on the antecedent salience. Here, we conducted additional analyses for the experiments with the data reduced based on the type of verbs in the experimental items. Recall that in the discourses for Experiments 1 and 2, four different types of verbs were used to indicate the empathy loci: ‘give’ (ageru / kureru), ‘do [someone] the favor of V-ing’ (V-te ageru / V-te kureru), ‘bring’ (motte-iku / motte-kuru), and ‘buy’ (katte-iku / katte-kuru). The verbs were divided into two sets: Set (i) ageru and kureru (as in ‘give’ and ‘do [someone] the favor of V-ing’) and Set (ii) iku and kuru (as in ‘bring’ and ‘buy [for someone]’).

The additional analyses shown in this section were conducted with only the Set (i) verbs. The Set (ii) verbs were removed from the analyses because, although iku / kuru ‘come/go’ are acknowledged as empathy indicators (Kawakami, 1996; Kuno, 1978; Koga, 2014), no existing studies (to the authors’ knowledge) have argued that those verbs indicate empathy when they are used auxiliarily as motte-iku / motte-kuru (‘bring’) or katte-iku / katte-kuru (‘buy [for someone]’). After removing the Set (ii) verbs, the data from 28 discourse items remained for analysis.

**Experiment 1: Additional Analyses**

For trials using the Set (i) verbs described above, reading-time data were removed in cases where the participant incorrectly answered the comprehension question, affecting 8.82% of the data. Outliers from extreme reading times below 200 ms and greater than 6000 ms were also removed, affecting 1.25% of the data. The results of the reading times of the sentences including repeated-name anaphors and null pronouns preceded by ageru / kureru are shown in Figure 3.
As shown in the Figure above, similar to the prior analysis with all verb sets, repeated names with *ga* were read slower when antecedents were empathy loci. This was opposite to the pattern found for null pronouns and repeated names with *wa*. However, the additional analysis for Experiment 1 still showed no interaction between antecedents and anaphor forms in any case, indicating no RNP ($\chi^2(2) = 2.14, p = .343$). The coefficients of the fixed items in the final model (shown below) did not detect any significant interaction.

### Table 7
**Additional Analyses for Experiment 1 (testing RNP) with Ageru / Kureru & V-te Ageru / V-te Kureru**

<table>
<thead>
<tr>
<th>Units of study</th>
<th>B</th>
<th>SE</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.366</td>
<td>0.041</td>
<td>180.947</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Antecedent: Non-empathy locus</td>
<td>0.006</td>
<td>0.028</td>
<td>0.229</td>
<td>.819</td>
</tr>
<tr>
<td>Anaphor: Repeated name-Ga</td>
<td>0.190</td>
<td>0.028</td>
<td>6.864</td>
<td>&lt; .001*</td>
</tr>
</tbody>
</table>
Empathy Effects on Antecedent Salience and Anaphor Processing...

<table>
<thead>
<tr>
<th>Anaphor: Repeated name-Wa</th>
<th>0.144</th>
<th>0.028</th>
<th>5.197</th>
<th>&lt; .001*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedent: Non-empathy ×</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaphor: Repeated name-Ga</td>
<td>-0.044</td>
<td>0.039</td>
<td>-1.112</td>
<td>= .267</td>
</tr>
<tr>
<td>Antecedent: Non-empathy ×</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaphor: Repeated name-Wa</td>
<td>0.011</td>
<td>0.039</td>
<td>0.270</td>
<td>= .787</td>
</tr>
</tbody>
</table>

Note. Factors were coded with dummy coding. The null pronoun and empathy-locus antecedent were used as reference levels (value = 0) for the reference form and antecedent factors, respectively. Reading times were log transformed and the coefficients thus represent differences between conditions in log scale. Effects at a $p \leq .05$ level are marked with a *.

Simple comparisons contrasting the reading times of each anaphor form between empathy-locus and non-empathy-locus antecedent conditions were conducted. No significant reading-time differences were found, as shown below.

Table 8

Simple Empathy-locus vs. Non-empathy-locus Antecedent Effects for Each Anaphor Form in Experiment 1 with Ageru / Kureru & V-te ageru / V-te Kureru

<table>
<thead>
<tr>
<th>Units of study</th>
<th>β</th>
<th>SE</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null pronoun</td>
<td>0.005</td>
<td>0.028</td>
<td>0.183</td>
<td>= .855</td>
</tr>
<tr>
<td>Repeated name-Ga</td>
<td>-0.043</td>
<td>0.027</td>
<td>-1.595</td>
<td>= .111</td>
</tr>
<tr>
<td>Repeated name-Wa</td>
<td>0.025</td>
<td>0.029</td>
<td>0.858</td>
<td>= .391</td>
</tr>
</tbody>
</table>

Note. Factors were coded with dummy coding. The empathy-locus antecedent was always used as reference levels (value = 0) for antecedent factor. Reading times were log transformed and the coefficients thus represent differences between conditions in log scale.

Experiment 2: Additional Analyses

In the additional analyses for Experiment 2, again, the reading-time data from trials in which the participant incorrectly answered the comprehension question were removed, affecting 12.61% of the data. Also, removal of outliers from extreme reading times below 200 ms and greater than 8000 ms affected 0.40% of the data.

The results of the reading times of the sentences including overt-pronoun anaphors preceded by sentences with ageru/kureru are shown in Figure 4 below.

The additional analysis found a significant interaction between antecedent (empathy locus and non-empathy locus) and anaphor (overt pronoun-ga, overt pronoun-wa, and null pronoun) ($\chi^2(2) = 6.38$, $p = .041$). In addition, the coefficients of the fixed items in the final
model detected a significant interaction with overt pronoun-*ga*, but not with overt pronoun-*wa* (shown below).

**Figure 4**
*Reading Times of the Sentences with Anaphors in Experiment 2 with Items Including Ageru / Kureru & V-te Ageru / V-te Kureru*

![Graph showing reading times for pro and null conditions with Ga and Wa postpositions.]

**Table 9**
*Additional Analyses for Experiment 2 (testing OPP) with Ageru / Kureru & V-te Ageru / V-te Kureru*

<table>
<thead>
<tr>
<th>Units of study</th>
<th>B</th>
<th>SE</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.306</td>
<td>0.050</td>
<td>146.506</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Antecedent: Non-empathy locus</td>
<td>0.102</td>
<td>0.034</td>
<td>2.984</td>
<td>= .003*</td>
</tr>
<tr>
<td>Anaphor: Overt pronoun-Ga</td>
<td>0.326</td>
<td>0.034</td>
<td>9.500</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Anaphor: Overt pronoun-Wa</td>
<td>0.294</td>
<td>0.034</td>
<td>8.692</td>
<td>&lt; .001*</td>
</tr>
<tr>
<td>Antecedent: Non-empathy locus × Anaphor: Overt pronoun-Ga</td>
<td>-0.122</td>
<td>0.049</td>
<td>-2.516</td>
<td>= .012*</td>
</tr>
<tr>
<td>Antecedent: Non-empathy locus × Anaphor: Overt pronoun-Wa</td>
<td>-0.071</td>
<td>0.048</td>
<td>-1.478</td>
<td>= .140</td>
</tr>
</tbody>
</table>

*Note.* Factors were coded with dummy coding. The null pronoun and empathy-locus antecedent were used as reference levels (value = 0) for the reference form and antecedent factors, respectively. Reading times were log transformed and the coefficients thus represent differences between conditions in log scale. Effects at a $p \leq .05$ level are marked with a *. 
Again, simple comparisons contrasting the reading times of each anaphor form between empathy-locus and non-empathy-locus antecedent conditions were conducted. The results are shown below.

**Table 10**

*Simple Empathy-locus vs. Non-empathy-locus Antecedent Effects for Each Anaphor Form in Experiment 2 with Ageru / Kureru & V-te Ageru / V-te Kureru*

<table>
<thead>
<tr>
<th>Units of study</th>
<th>β</th>
<th>SE</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null pronoun</td>
<td>0.107</td>
<td>0.033</td>
<td>3.283</td>
<td>.001*</td>
</tr>
<tr>
<td>Overt pronoun-Ga</td>
<td>-0.020</td>
<td>0.034</td>
<td>-0.584</td>
<td>.559</td>
</tr>
<tr>
<td>Overt pronoun-Wa</td>
<td>-0.030</td>
<td>0.036</td>
<td>0.846</td>
<td>.398</td>
</tr>
</tbody>
</table>

Note. Factors were coded with dummy coding. The empathy-locus antecedent was always used as reference levels (value = 0) for antecedent factor. Reading times were log transformed and the coefficients thus represent differences between conditions in log scale. Effects at a \( p \leq .05 \) level are marked with a *.

Similar to the prior analysis with all verb sets, null pronouns were read significantly faster when the antecedent was the empathy locus than when it was the non-empathy locus. There was no difference in reading times of the overt pronoun-*ga* / *wa* between the two antecedent types.

**Discussion**

Experiments 1 and 2 initially failed to elicit the RNP or OPP\* when the entire dataset was analyzed. The results did not support our prediction that repeated names and overt pronouns would tend to prefer non-salient antecedents (i.e., non-empathy-locus antecedents), whereas null pronouns would prefer salient antecedents (i.e., empathy-locus antecedents). One possible interpretation of the results is that empathy does not affect antecedent saliences. However, a significant OPP effect was detected in Experiment 2 when the analyses were conducted only with the data from selected items that used *ageru* / *kureru*-types of verbs (i.e., ‘give’ and ‘do [someone] the favor of V-ing’)\**. A significant

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* Recall from the introduction that RNP (Repeated Name Penalty) refers to the relatively slower reading of sentences with repeated-name anaphors for salient antecedents. OPP (Overt Pronoun Penalty) refers to the slowed reading of overt pronouns for salient antecedents.

** The reader is reminded that Japanese verbs of giving and receiving are themselves said to obligatorily indicate empathy with an entity, i.e., the empathy locus.
interaction was detected in that null pronouns preferred empathy-locus antecedents, while overt pronouns with *ga* preferred non-empathy-locus antecedents. This finding indicates that empathy loci are more salient than non-empathy loci, a result consistent with the argument made by Walker et al. (1994).

The OPP effect cannot be explained by Gordon and Hendrick’s (1998) DPT or by Almor’s (1999) ILH. In the case of the DPT, the incongruency is due to the fact that the DPT does not differentiate between null and overt pronouns. For the ILH, the issue is that Gelormini-Lezama and Almor’s (2011) account for the OPP does not directly apply to the outcome of the current study. This is because the verbal morphology of Spanish, to which they attributed the OPP due to overlapping information carried by overt pronouns, is not used in Japanese. A modification or extension of Gelormini-Lezama and Almor’s account is necessary to explain the results of the present study. One proposal for this modification appears later in this section.

We claim that empathy does indeed affect antecedent saliency based on the facts that, first, the current study detected an OPP and that, second, null pronouns were read faster for empathy-locus antecedents than for non-empathy-locus ones in Experiment 2. However, in order for this claim to be convincing, an explanation is needed as to why the effect appeared only with the selected data set, only with overt pronouns but not with repeated names, and only with *ga*-marked overt pronouns but not with *wa*-marked overt pronouns.

**OPP with Selected Data Set**

A significant effect did not appear when the data set included *iku* / *kuru*-type verbs. This is possibly because *iku* ‘go’ and *kuru* ‘come’ may lose their empathetic hierarchy when compounded with *motu* ‘hold’ and *kau* ‘buy’ to become *motteiku* / *motte-kuru* ‘bring’ and *katteiku* / *katte-kuru* ‘buy [for someone]’. In other words, *iku* / *kuru* may no longer function as an auxiliary verb in these compounds; *iku* / *kuru* might be so strongly tied with *motu* and *kau* as to have become independent verbs, i.e., ‘motteiku’, ‘mottekuru’, ‘katteiku’ and ‘kattekuru’. Those verbs may have lost the empathy hierarchy that *iku* / *kuru* carry by themselves. As a result, *motte-iku* / *motte-kuru* and *katte-iku* / *katte-kuru* do not provide antecedents with any difference in empathy status, and thus in Experiments 1 and 2, the antecedents
did not differ in salience when used with motte-iku / motte-kuru and katte-iku / katte-kuru.

**OPP and Anti-logophoricity**

Significant interaction was found only with overt pronouns but not with repeated names, resulting in no RNP. The outcome may reflect the additive effects from different antecedent saliences as well as from overt pronouns’ anti-logophoricity. As early studies imply, Japanese 3rd person overt pronouns may carry anti-logophoricity, which deters them from referring to empathy loci. That we found no RNP may indicate that the difference of antecedent saliences between empathy loci and non-empathy loci by themselves was not sufficient to detect significant interaction with null pronouns and with fuller anaphors (repeated names and overt pronouns). The effect only appeared when overt pronouns’ anti-logophoricity played a role on top of the antecedent-salience difference given by different empathy statuses. In other words, null pronouns preferred salient empathy-locus antecedents. This is in contrast to overt pronouns, which preferred non-empathy locus antecedents due to their dis-preference for referring to empathy-loci, resulting in significant interactions. Recall that Gelormini-Lezama and Almor (2011) explained that the OPP appears because verbal morphology in Romance languages carries redundant information, i.e., number, gender, and person. A possible modification could be, the OPP should be observed in null-pronoun languages in which verbal morphology carries information such as number, gender and person, as well as in null-pronoun languages in which the overt pronouns carry anti-logophoricity.

However, if it is true that Japanese overt pronouns carry anti-logophoricity, sentences with those should have been read faster for non-empathy-locus antecedents than for empathy-locus antecedents. In reality, the effect of the anti-logophoricity was not strong enough to generate this outcome; there was no difference in the reading of overt pronouns for empathy-locus antecedents or those for non-empathy-locus antecedents in Experiment 2 (as shown in Tables 6 and 10). The apparent absence of anti-logophoricity may be due to the way in which empathy statuses were indicated. Earlier studies related to anti-logophoricity explicitly indicated empathy-loci by using phrases such as “According to [name of empathy locus] …” (Dubinsky & Hamilton, 1999) and “[name of empathy locus] is thinking that…” (Kuno, 1986).
In contrast, the present study attempted to indicate the empathy locus through the use of verbs, specifically *ageru / kureru* and *iku / kuru*. The empathy-loci of these verbs might have been too implicit to fully activate anti-logophoricity in readers’ processing.

**OPP and the Topic**

Regarding the outcome that a significant OPP effect was found only when the anaphor was a non-topic marked by *ga*, but not with a topic anaphor marked by *wa*, the results are compatible with the suggestion from early studies: an NP-*wa* is designed to refer to old information, which indicates that readers should immediately interpret an anaphor with *wa* as an anaphor and start searching for its antecedent. Recall that Gordon and Hendrick (1998) argued that a pronoun in English does not result in a processing penalty because it is immediately interpreted as an anaphor; the reader immediately begins a search for the antecedent, starting with the most salient entity. In the case of Japanese anaphors, readers may start searching for an overt pronoun’s antecedent not only because it is a pronoun but also because it is marked by *wa*. Although Japanese overt pronouns are not simply pronominal expressions (as described earlier in this paper), the topic morpheme *wa* could add a degree of pronominal quality to an NP marked by *wa*. An example of this is the case of the overt pronoun-*wa* in Experiment 2, which may have allowed participants to immediately interpret it as an anaphor, resulting in no reduction to processing speed.

One problematic discrepancy between Experiments 1 and 2 is the difference in the reading times of null pronouns despite the use of exactly the same items in conditions with null pronouns. Specifically, null pronouns did not show a significant reading-time difference between empathy-locus and non-empathy-locus antecedents in Experiment 1 (Tables 3 and 8), but a significant difference was detected in Experiment 2 favoring the empathy-locus antecedents (Tables 6 and 10). A possible explanation for this discrepancy is that the overt pronouns in Experiment 2, which carry anti-logophoricity, activated readers’ sensitivity to the empathy-status difference of antecedents, and this sensitivity remained activated even when reading null pronouns. On the other hand, repeated-name anaphors in Experiment 1, which do not carry anti-logophoricity, may not have activated participants’ sensitivity to different empathy statuses in this way, resulting in a lack
Empathy Effects on Antecedent Salience and Anaphor Processing...

of reading-time difference of null pronouns between the two types of antecedents.

In summary, the current study indicates that empathy status affects antecedent salience in that empathy loci are more salient than non-empathy loci. This effect was elicited in Experiment 2, in which reduced forms of anaphor, i.e., null pronouns, were read faster than overt pronouns for empathy-locus antecedents, but the reading-time difference was significantly neutralized for non-salient antecedents. Detection of the effects was confined to the condition with overt pronouns that carry anti-logophoricity, but not with repeated names. In addition, the OPP effect did not appear when the overt pronouns were marked by *wa* because the marking facilitated readers to interpret the NP-*wa* as an anaphor, thus neutralizing the expected processing penalty.

**Conclusion**

The present study investigated the ways in which the empathy status of an antecedent affects its salience in Japanese. The experiments conducted in this study indicated that empathy-locus antecedents are more salient than non-empathy-locus antecedents, as argued by Walker et al. (1994). However, because this is the first empirical investigation for this effect to the authors’ knowledge, more evidence is needed. Possible further research should use phrases containing antecedents that more obviously reflect the difference of empathy status (e.g., “according to [antecedent]…” or “[antecedent] thinks that…”) instead of confining the empathy status to the use of verbs (e.g., *ageru* / *kureru* ‘give’). A further possibility is to use *iku* ‘go’ and *kuru* ‘come’, both in isolation. That is because, in this study, *iku* and *kuru*, compounded through the *V-te* form with *motu* ‘hold’ and *kau* ‘buy’, failed to convey the salience differences of the antecedents. An explanation put forward was that the compounds *motte-iku* / *motte-kuru* ‘bring’ and *katte-iku* / *katte-kuru* ‘buy [for someone]’ may have lost the empathic hierarchy of *iku* / *kuru*.

To conclude, the current study provides supporting data for empathy effects on antecedent saliences. This research should fill a gap in our understanding of the processing of referential expressions.
ADHERENCE TO ETHICAL STANDARDS

**Ethics Declarations.** Prior to the experiments, informed consent was obtained from all the participants, following the instruction from Research Support Office of Mie University, Japan, and in accordance with the Declaration of Helsinki (1964).

**Data Availability.** The data underlying this article are available in Mendeley Data as: Shoji, Shinichi, & Sokolovsky, Jesse (2023), https://data.mendeley.com/datasets/w5rs63v98/1

**Funding.** This research received no financial assistance.

**Conflict of Interest.** The authors do not have any financial interests to disclose.

**Author Contributions.** Shinichi Shoji: The first author who contributed to the current study conception and design. He conducted data collection, data analyses, and writing of the manuscript draft. Jesse Sokolovsky: The second author who assisted updating, editing, and proofreading the manuscript.

**Consent for Publication.** The authors consent for the manuscript to be published by the journal.

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References


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Appendix

Verbs used in the Experimental Items

<table>
<thead>
<tr>
<th>Units of study</th>
<th>Empathy locus = do-er (e.g., giver)</th>
<th>Empathy locus = do-ee (e.g., receiver)</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘give’</td>
<td>ageru</td>
<td>kureru</td>
</tr>
<tr>
<td></td>
<td>agemasu</td>
<td>kuremasu</td>
</tr>
<tr>
<td></td>
<td>yaru</td>
<td>yarimasu</td>
</tr>
<tr>
<td></td>
<td>(plain)</td>
<td>(plain)</td>
</tr>
<tr>
<td></td>
<td>(formal)</td>
<td>(formal)</td>
</tr>
<tr>
<td></td>
<td>(plain, impolite)</td>
<td>(formal, impolite)</td>
</tr>
<tr>
<td>‘do the favor of V-ing’</td>
<td>V-te ageru</td>
<td>V-te kureru</td>
</tr>
<tr>
<td></td>
<td>V-te agemasu</td>
<td>V-te kuremasu</td>
</tr>
<tr>
<td></td>
<td>V-te yaru</td>
<td>V-te yarimasu</td>
</tr>
<tr>
<td></td>
<td>(plain)</td>
<td>(plain)</td>
</tr>
<tr>
<td></td>
<td>(formal)</td>
<td>(formal)</td>
</tr>
<tr>
<td></td>
<td>(plain, impolite)</td>
<td>(formal, impolite)</td>
</tr>
<tr>
<td>‘bring’</td>
<td>motte iku</td>
<td>motte kuru</td>
</tr>
<tr>
<td></td>
<td>motte ikimasu</td>
<td>motte kinamasu</td>
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<td></td>
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<td>(plain)</td>
</tr>
<tr>
<td></td>
<td>(formal)</td>
<td>(formal)</td>
</tr>
<tr>
<td>‘buy [for someone]’</td>
<td>katte iku</td>
<td>katte kuru</td>
</tr>
<tr>
<td></td>
<td>katte ikimasu</td>
<td>katte kinamasu</td>
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ANOTAЦІЯ

Мета. У цьому дослідженні вивчається, чи впливає статус емпатії на релевантність антецедента. Тобто, можливість того, що коли мовець речення співпереживає об’єкт, який називається локусом емпатії, цей об’єкт є більш релевантним, ніж інші об’єкти. Відповідно, скорочені форми анафор будуть кращими, ніж повні форми, коли йдеться про локус емпатії.

Процедура дослідження. Було проведено два експерименти з читання у власному темпі з використанням дискурсів із двох речень. Речення 1 містило антецеденти з локусом емпатії та антецеденти без локусу емпатії. Потім на них посилалися повні та скорочені форми анафор у речення 2. Емпатійні статуси антецедентів позначалися японськими дієсловами “давати”, які обов’язково вираховують локус емпатії.

Результати. Аналіз результатів часу читання речень показав значну взаємодію антецедентів та анафор. Речення 2 читалося швидше, коли анафори були скороченими формами (тобто нульовими займенниками), ніж коли вони були повними формами, але різниця у швидкості читання значно нейтралізувалася, коли антецеденти не були локусами емпатії. Крім того, ця значуща нейтралізація з’являлася лише тоді, коли анафори були відкритими займенниками (а не повторюваними іменами), і коли анафори не були марковані морфемою-темою.

Висновки. Результати свідчать про те, що антецеденти, орієнтовані на емпатію, є більш значущими, ніж антецеденти, не орієнтовані на емпатію, що впливає на вибір повної або скороченої форми анафори. Крім того,
Вплив емпатії на виразність антецедента та обробку анафори...

результати свідчать про те, що японські займенники можуть нести в собі антилогофоричність, що змушує їх уникати посилань на локуси емпатії. Крім того, результати свідчать про те, що властива темі функція посилатися на сутність, яка з’явилася раніше, може звести нанівець різницю, яка виникає в результаті антецедентної релевантності.

Ключові слова: антецедент, релевантність, анафора, емпатія, японська мова.