

# The Role of the Contrastive Topic *-wa* in the Felicity Judgment of Negation in Japanese\*

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## 1. Introduction

Comprehension of negative sentences is argued to be more difficult than affirmative sentences. Recent studies have focused on the pragmatic felicity in the use of negative sentences, and findings provide support for the argument that the comprehension of negative sentences is modulated by the pragmatic felicity. The current study extended this literature to Japanese. The

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study is based on Nordmeyer and Frank (2018), which examined the felicity judgment of negation in English by manipulating the informativeness of negative sentences. We crucially incorporated a Japanese-specific linguistic factor that was expected to affect the felicity of negative sentences, the contribution of contrastive topic particle *-wa* (Hara, 2006; McGloin, 1987). The goal of this study is two-fold: (i) whether, and in what way, the particle *-wa* in negative sentences modulates the felicity of negation; (ii) whether Japanese speakers show informativeness-based felicity judgment of negation.

## **2. Background and Research Questions**

### **2.1 Previous Studies in Comprehension of Negation**

There has been a debate on what constitutes difficulty in comprehending/processing negation. Earlier psycholinguistic studies revealed that participants took longer to process negative sentences than affirmative sentences (Clark & Chase, 1972; Just & Carpenter, 1971). These findings generated a hypothesis that, when processing a negative sentence, like ‘A robin is not a tree,’ one initially projects an affirmative statement (‘A robin is a tree’) and then negates it. The extra step of applying negation to the initial statement makes negation processing more taxing. This two-step model was further supported by neurolinguistic studies. For example, Fischler et al. (1983) revealed that the processing of a negative sentence, ‘A robin is not a tree,’ elicited an N400 (the negative neural voltage deflection indicating semantic processing costs). They claimed that the semantic mismatch between ‘robin’ and ‘tree’ triggered N400, where the semantic contribution of ‘not’ was ignored instead of incrementally incorporated. Findings supported the two-step model, suggesting that the projection of an affirmative proposition is to be negated later.

Afterwards, a cohort of researchers argued against the two-step model, claiming that difficulty in comprehending negation is yielded when negation is used without the support of pragmatics that would otherwise make it felicitous in a given context. In this vein, Nieuwland and Kuperberg (2008), in an ERP study, had participants read true negative sentences, with and without a preceding phrase which makes the sentences felicitous (e.g., in one condition, but not in the other, a negative sentence ‘scuba-diving isn’t very dangerous’ followed the phrase ‘with proper equipment’). Participants showed an N400 for a critical word (‘dangerous’) when reading the negative sentence without the preceding phrase, but they did not show an N400 when there was the preceding phrase. Contrary to the findings in Fischler et al. (1983), the findings of Nieuwland and Kuperberg suggested that ‘not’ was incrementally considered, rather than applied later, in support of the preceding phrase that makes the negation felicitous and easier to process.

Nordmeyer & Frank (N&F, henceforth) (2018) is one of the latest studies focusing on the pragmatic licensing of negation where they specifically examined informativeness proposed in pragmatic theories (e.g. Frank & Goodman, 2012; Grice, 1975; Horn, 1984; Levinson, 2000). According to these theories, an utterance is expected to be relevant and informative in a given context. N&F manipulated two factors in a visual context which might affect the informativeness of a true, simple negative sentence, e.g., ‘Abby doesn’t have an apple.’ The first factor is whether the mentioned subject character (e.g. Abby) has nothing or an alternative object like a cat. The other is about whether the other characters in the scene have nothing or the mentioned object (e.g. apple). Using a Likert-scale, participants rated how good a test sentence is as a description of a visual scene. They rated the negative sentence higher when Abby has nothing rather than an alternative object (e.g. cat). This was taken to indicate that when Abby has a cat, participants might have found it more felicitous to use an affirmative description about what she really has (i.e., ‘Abby has a cat’) rather than describing what she does not have by using the negative sentence. Participants also rated the negative sentence higher when everybody except Abby has an apple, i.e., where Abby is the only one without an apple, than when they have nothing. This was taken to suggest that the negative sentence is more felicitous to refer to Abby as the unique character who does not have an apple in the scene. Those findings are in line with the prediction based on the pragmatic theories regarding informativeness. From these results, N&F concluded that English speakers judge the felicity of negative sentences based on informativeness manipulated by visual contexts. Taken together, recent studies in English have suggested that the pragmatic support facilitates the comprehension of negation.

## 2.2 Negation in Japanese and the Role of Contrastive Topic *-wa*

Japanese is a head-final language and its negative morpheme *-nai* appears in the post-verbal position (Kato, 1985). In negative sentences, the scope of negation can be restricted by morphological elements, such as particles. The current study focused on the role of particle *-wa* in negation.

- (1) a. *Abby-wa ringo-wa<sup>1</sup> motte-i-nai.*  
 Abby-Thematic TOP apple-**Contrastive** TOP have-PROG-NEG  
 ‘Abby doesn’t have an apple (implicature: but she has some-thing else).’

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<sup>1</sup> As in (1a), thematic topic *-wa* and contrastive topic *-wa* can coexist in a clause. When there are multiple *-wa* in a sentence, only the first one is thematic topic (Kuno, 1973) and the second one is interpreted contrastively (Oshima, 2021).

- b. *Abby-wa ringo-o motte-i-nai.*  
 Abby-Thematic TOP apple-ACC have-PROG-NEG  
 ‘Abby doesn’t have an apple.’

Kuno (1973) proposed that topic particle *-wa* can be *thematic* or *contrastive* depending on contexts<sup>2</sup>. McGloin (1987) claimed that in negative sentences contrastive topic *-wa* marks the direct target of negation. In (1a), the object noun *ringo* ‘apple’ is marked with a contrastive topic particle *-wa*, where *ringo* ‘apple’ is the direct scope of negation, rendering the interpretation ‘it is not an apple that Abby has.’ Therefore, in addition to the base meaning ‘Abby doesn’t have an apple,’ (1a) yields the implied meaning ‘Abby has something other than an apple’ as a conventional implicature (Hara, 2006). The object noun in (1b), on the other hand, does not carry a contrastive *-wa* and is marked with an accusative particle *-o*. Thus, (1b) is interpreted as negation of Abby having an apple without implicature.

The phenomenon described above provides an ideal testing ground that allows the examination of the felicity of negative sentences in Japanese, and if the findings in English (N&F, 2018) can be applied to Japanese. Adopting the paradigm of N&F (2018), the current study investigated whether the implicature from contrastive topic *-wa* would affect the felicity judgment of negative sentences in Japanese, as well as whether Japanese speakers would also judge the felicity of negation based on informativeness. We addressed two research questions: (i) Do native speakers of Japanese generate the implicature driven by contrastive topic *-wa* and incorporate it when judging the felicity of negation? The role of contrastive topic *-wa* in negation was discussed in the theoretical literature, but empirical investigation remains sparse. Findings of the current study add new evidence regarding whether the contribution of *-wa* is indeed computed when comprehending negation. (ii) Does adopting the paradigm of N&F (2018) also reveal sensitivity in Japanese speakers to informativeness in negation comprehension? Addressing this question allows a cross-linguistic investigation of informativeness-based felicity judgment.

### 3. Experiment

#### 3.1 Participants

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<sup>2</sup> The precise nature of roles that *-wa* plays in (1a-b) is a matter of debate, particularly with respect to on what basis one can draw a line between two roles of *-wa*. Oshima (2020) and Tomioka (2016) claim that the role of *-wa* is determined depending on whether *-wa* attaches to a focus element or a non-focus element. In Oshima (2021), thematic *-wa* is argued to be a marker of the groundhood, but it can be interpreted as contrastive topic *-wa* in certain structures. This theoretical debate is left out of the scope of the current study.

A total of twenty-five native speakers of Japanese (age range = 19;9-32;11, mean = 24;3, female = 19, male = 5, gender unidentified = 1) participated in an online experiment which was administered on *Qualtrics* (Qualtrics, 2021). They were recruited through a social networking service and through linguistics courses at the International Christian University, Tokyo, Japan.

### 3.2 Design

The experiment was designed with one linguistic factor and two visual factors. Sentence Type (Contrastive *-wa* vs. Accusative *-o*) was the linguistic factor, while Subject Animal (None vs. Alternative Object) and Background Animals (None vs. Mentioned Object) were the visual factors. All these independent variables were within-subject variables.

### 3.3 Materials

#### 3.3.1 Linguistic Materials

There were two types of sentences used in the target stimuli: Contrastive *-wa* as in (2a) and Accusative *-o* as in (2b).

Contrastive *-wa*

- (2) a. *Inu-wa ringo-wa motte-i-nai.*  
 dog-Thematic TOP apple-**Contrastive** TOP have-PROG-NEG  
 ‘The dog doesn’t have an apple (but it has something else).’

Accusative *-o*

- b. *Inu-wa ringo-o motte-i-nai.*  
 dog-Thematic TOP apple-ACC have-PROG-NEG  
 ‘The dog doesn’t have an apple.’

Note that the only difference between the two sentences is that *ringo* ‘apple’ is marked by a contrastive topic marker *-wa* in (2a) while it is marked by an accusative marker *-o* in (2b). (2a) has the implied meaning ‘..., but the dog has something else’ because of the contrastive topic *-wa* on the object noun, marking *ringo* ‘apple’ as the target of negation (McGloin, 1987) and yielding a conventional implicature (Hara, 2006). On the other hand, (2b) is a simple sentential negation with no implied meaning. Both (2a) and (2b) are true in all the visual contexts (see Table 1 below), but the felicity of each sentence was predicted to vary across the contexts.

#### 3.3.2 Visual Materials

The design of the visual materials was adopted from N&F (2018). The visual context in each trial consisted of four animals with a table placed in front of each of them. When there was an object on the table, participants were instructed to regard the animal right behind the table as ‘having’ the object.

In the target items, there were four types of visual contexts, manipulated in terms of the two conditions: Subject Animal and Background Animals. Subject Animal condition is about whether the subject animal (e.g. ‘dog’ in (2)) has nothing (‘None’ context) or a non-mentioned alternative object such as a banana (‘Alternative Object’ context). Background Animals condition is about whether the other animals in the scene have nothing (‘None’ context) or the mentioned object (‘Mentioned Object’ context) such as an apple in (2). Each type is presented in Table 1.

		Background Animals							
		None				Mentioned Object (e.g. apple)			
Subject Animal	None								
	Alternative Object (e.g. banana)								

Table 1: Four types of visual stimuli (design adopted from N&F, 2018) used in test sentences like (2a-b)

A total of 128 items were created, of which 32 were targets and 96 were fillers. Filler items consisted of 32 false negatives, 32 true affirmatives, and 32 false affirmatives. Across all the 128 items including targets and fillers, the truth of the sentences (true vs. false), the polarity of the sentences (negative vs. affirmative), and the type of particles on subjects (nominative -*ga* vs. thematic topic -*wa* on the subject noun for affirmatives) or objects (contrastive topic -*wa* vs. accusative -*o* for negatives)<sup>3</sup> were counterbalanced.

### 3.4 Procedures

The task was the felicity judgment. In each trial, participants viewed the visual context and the test sentence presented on the screen. They were asked to read the sentence and judge how good the sentence is as a description of the visual context, using a seven-point Likert-scale (*totemo warui* ‘very bad’;

<sup>3</sup> The particle on object nouns was always accusative -*o* in affirmatives, and the particle on subject nouns was always thematic -*wa* in negatives.

*warui* ‘bad’; *yaya warui* ‘somewhat bad’; *futsu* ‘neutral’; *yaya yoi* ‘somewhat good’; *yoi* ‘good’; *totemo yoi* ‘very good’).

Predicted rating patterns are described in the following paragraph. First, if participants incorporate the implicature driven by contrastive topic *-wa* into the felicity judgment, they will rate Contrastive *-wa* negative sentences like (2a) higher when the dog has a banana rather than nothing, since the implicature (i.e., ‘... , but the dog has something else’) better matches the situation that the dog has a banana. On the other hand, they will rate Accusative *-o* negative sentences like (2b) (i.e. the negative sentences without implicature) higher when the dog has nothing than an alternative object. This is because, when the dog has a banana, it would be more felicitous to describe what it actually has by uttering a declarative affirmative sentence ‘The dog has a banana’; thus, the felicity of Accusative *-o* negative sentences could get lowered in the context. Participants will also rate both Contrastive *-wa* and Accusative *-o* sentences (2a-b) higher when the background animals have the mentioned object (e.g. apple) than when they have nothing, finding that the dog uniquely not having an apple makes use of the negative sentence more felicitous.

#### 4. Results

Each categorical rating was converted into a numerical score in data analysis, ranging 1 (*totemo warui* ‘very bad’) through 7 (*totemo yoi* ‘very good’). Figure 1 below shows the mean scores of Contrastive *-wa* sentences (Fig. 1a) and Accusative *-o* sentences (Fig. 1b) for each of the four visual contexts.

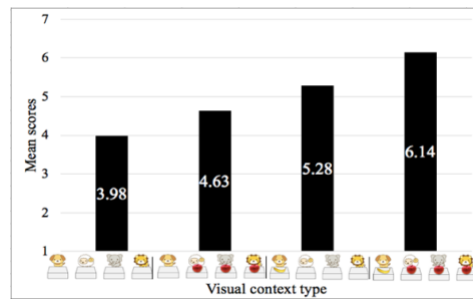


Figure 1a: Mean of the rating scores in Contrastive *-wa* condition

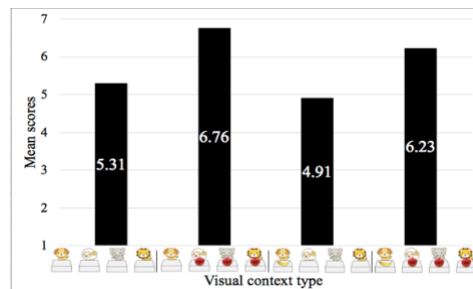


Figure 1b: Mean of the rating scores in Accusative *-o* condition

Overall, the two types of negative sentences were rated differently. In particular, rating pattern with respect to whether the subject animal (e.g. dog) has an alternate object (e.g. banana) or nothing revealed opposing patterns across conditions. Contrastive *-wa* sentences were rated higher when the dog has a banana than when it has nothing (Fig. 1a), while Accusative *-o* sentences were rated higher when the dog has nothing than a banana (Fig. 1b). As for Background Animals, both types of sentences were overall rated higher when the animals other than the dog have an apple than when they have nothing.

To examine whether the observed patterns would be statistically supported, a three-way Analysis of Variance (ANOVA) was conducted, having mean rating scores as the dependent variable and Sentence Type (Contrastive *-wa* vs. Accusative *-o*), Subject Animal (None vs. Alternative Object) and Background Animals (None vs. Mentioned Object) as within-subject variables. A significant main effect of Sentence Type was revealed, suggesting that Contrastive *-wa* condition (Fig. 1a) and Accusative *-o* condition (Fig. 1b) overall elicited a significantly different pattern in mean ratings ( $F(1,24) = 18.942, p < .001$ ). Based on this, a two-way ANOVA was conducted separately for each Sentence Type by having Subject Animal and Background Animals as within-subject variables. First, as for Contrastive *-wa* condition, there was a significant main effect of Subject Animal ( $F(1,24) = 19.464, p < .001$ ), suggesting that negative sentences were rated significantly higher when the dog has an alternative object (e.g. banana) rather than nothing. This finding aligned with our prediction, suggesting that participants incorporated the implied meaning which contrastive topic *-wa* generates ‘..., but the dog has something else,’ and this implicature influenced the felicity ranking of negative sentences. In Accusative *-o* condition, there was also a significant main effect of Subject Animal ( $F(1,24) = 12.485, p = .002$ ), confirming that the rating pattern was indeed opposing to Contrastive *-wa* condition. This also matches the prediction and is consistent with N&F (2018), suggesting that Japanese speakers, when the dog has an alternative object, might have found it more felicitous to use an



alternate declarative sentence (i.e., ‘The dog has a banana’), rather than using the negative sentence. Regarding Background Animals, there was a significant main effect for both Contrastive *-wa* condition ( $F(1,24) = 15.624$ ,  $p = .001$ ) and Accusative *-o* condition ( $F(1,24) = 69.632$ ,  $p < .001$ ), showing that participants rated negative sentences higher when everybody except the dog has an apple than when they have nothing. In line with N&F (2018) and our prediction, this finding suggests that participants found the negative sentence more informative and felicitous when the subject animal is the only one not having the mentioned object in the scene. For both Contrastive *-wa* and Accusative *-o* conditions, there was no interaction between Subject Animal and Background Animals ( $p = .499$  for the Contrastive *-wa*,  $p = .609$  for the Accusative *-o*).

## 5. Concluding Remarks

The findings of this study contribute to the literature on the role of particle *-wa* and on the comprehension and processing of negation. First, the results revealed the effect of contrastive topic particle *-wa* on the object noun and the influence of it on the felicity judgment of negation by Japanese speakers, where the findings suggest that they compute the implicature yielded by *-wa*. This finding provides a new piece of empirical evidence that Japanese speakers are aware of the role of contrastive topic *-wa* in simple negation, in which the element carrying *-wa* is the target of negation (McGloin, 1987), and that Japanese speakers can also generate the implicature (Hara, 2006). Second, when no implicature was involved, Japanese speakers rated negative sentences higher when they were expected to be more informative with respect to what the subject animal has and what the other animals have. Replicating N&F (2018), this finding provides cross-linguistic support for informativeness-based felicity judgment of negation. More broadly, the findings of the current study showed that the felicity judgement of true negative sentences varies across contexts. This further supports the argument that the challenge in comprehending/processing negation is not due to the representational complexity in negation, but rather is modulated by pragmatics.

A future extension of this study will investigate the felicity judgment of negation by Japanese-acquiring children by utilizing the paradigm of N&F (2018). The current data revealed the sensitivity of adults to the contribution of contrastive topic *-wa* in determining the felicity of negation. It raises a question as to how children come to know the contribution of *-wa*, which generates a significant effect on the felicity of negation. The extension to Japanese-acquiring children would allow investigation of this question, as well as cross-linguistically promote the literature of the comprehension of negation in children.

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