

Possessor Relations and the Interpretation of Nominative NPs in Japanese

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Abstract

Japanese speakers start interpreting sentences even before the clause-ending predicate is read or heard. We report two questionnaire studies that suggest that the possible semantic relations between NPs are critical in determining the interpretations pursued. Although the properties of individual NPs such as animacy are important, interpretation is modulated by the relations that may hold between NPs (e.g., possessor relations).

Keywords: language understanding; linguistics; psychology; human experimentation; Japanese.

Introduction

Because the predicate comes at the end of the clause in Japanese, NPs are often interpreted before the verb is read/heard as people attempt to comprehend what is being said. One crucial source of information in this process is case marking. For example, a dative NP can create the expectation that an accusative NP will follow (Kamide, Altmann & Haywood 2003). Moreover, nominative NPs tend to indicate the beginning of a new clause (Miyamoto 2002; Uehara & Bradley 2002). Recent work also indicates that in sentences with a dative NP followed by two nominative NPs, the animacy of the last NP is important for determining whether this NP is interpreted as a subject or an object and whether the NPs belong to the same clause (Muraoka & Sakamoto 2004).

However, it is not clear how much semantic interpretation is taking place between the NPs. It is conceivable that each NP is assigned a semantic role based on such individual properties as case marking and animacy. In an alternative model, NPs are interpreted considering the possible semantic relations that may hold between them. Although the properties of each individual NP are important, they have to be considered within the context provided by the other NPs. Thus, whether a nominative NP is interpreted as an object depends not only on such features as animacy but also on the kinds of semantic relations it can hold with previous NPs. The goal of this paper is to provide evidence for this second type of model.

Experiment 1

Animacy and possessor relations were manipulated to explore the interpretation of nominative NPs in detail.

Method

Participants Thirty-two native Japanese speakers, undergraduate students at Kobe Shoin Women's University, volunteered to participate in the experiment.

Materials Eight types of fragments followed a $2 \times 2 \times 2$ design. The first factor was whether the fragment contained a dative NP. The second nominative NP was manipulated according to two other factors: saturation (whether the noun requires an owner, e.g., *mother* is unsaturated as it requires determining whose mother is being referred to) and animacy as shown in the four *ga-ga* fragments in (1).

- (1) a. Unsaturated / Animate
Akira-kun-ga hahaoya-ga
Akira-title-nom mother-nom
- b. Unsaturated / Inanimate
Akira-kun-ga mokuhyoo-ga
Akira-title-nom goal-nom
- c. Saturated / Animate
Yooko-chan-ga ano pianisuto-ga
Yooko-title-nom that pianist-nom
- d. Saturated / Inanimate
Yooko-chan-ga konyano hoshizora-ga
Yooko-title-nom tonight starlit sky-nom

A dative marked NP (a proper name such as *Michiko-chan*) was added to the beginning of each *ga-ga* condition to obtain fragments with an initial dative NP (*ni-ga-ga* conditions).

Procedure Twelve sets of items with unsaturated nouns and 12 sets with saturated nouns were subdivided into four lists following a Latin Square design. A set of 28 filler fragments was added to each list and pseudo-randomly ordered avoiding as much as possible test items of the same type following in succession. Each participant saw one list and was instructed to complete each fragment into a sentence. Fragments were presented in Japanese fonts as shown below.

美智子ちゃんにあきら君が母親が _____

Analysis A total of 751 sentence completions were analyzed to examine their clause boundary placement, especially whether the two nominative NPs in (1) were interpreted as being part of the same clause (*same-clause interpretation*) or different clauses (*different-clause interpretation*). Note that when nominative NPs are in different clauses, each is likely to be assigned a subject role, which is not the case when they are in the same clause. Hence, clause boundary is a straightforward way of capturing differences in the roles of NPs.

Results

There were fewer completions (45 cases or 6.05%) in which the two nominative NPs belonged to the same clause than

to different clauses (706 cases, 93.95%; $F_1(1,31) = 595.35$, $P < 0.001$; $F_2(1,22) = 351.61$, $P < 0.001$). This replicates previous results indicating that readers prefer to interpret each nominative NP as part of a separate clause (Miyamoto 2002; Uehara & Bradley 2002).

The results for the *ni-ga-ga* fragments were similar although weaker than the *ga-ga* fragments because there were fewer same-clause interpretations for the *ni-ga-ga* fragments overall, as expected since the dative NP makes it harder for a single predicate to complete the fragment. Therefore, here we concentrate on the *ga-ga* fragments.

In the *ga-ga* fragments, there was a main effect of saturation since the unsaturated fragments led to more same-clause interpretations (14.58%) than the saturated fragments (5.47%; $P_s < 0.05$). The main effect of animacy (Animate: 5.21%; Inanimate 14.84%) was reliable in the participant analysis ($P < 0.01$) but marginal in the item analysis ($P = 0.06$). More crucially, there was an interaction between animacy and saturation ($F_1(1,31) = 9.67$, $P < 0.01$; $F_2(1,22) = 9.95$, $P < 0.005$) since there were more same-clause completions in the Unsaturated/Inanimate condition (26.04%) than in Unsaturated/Animate (3.13%; $P_s < 0.01$); the Saturated/Inanimate (3.65%) and the Saturated/Animate (7.29%) did not differ ($P_s < 0.3$). In other words, animacy only had a clear effect when the NP was unsaturated.

Discussion

Saturated nominative NPs led to fewer same-clause interpretations than unsaturated ones. Although animacy also had an effect, it was modulated by saturation so that its effects were most visible with unsaturated nouns.

Experiment 2

Because the saturated and unsaturated NPs in Experiment 1 differed in a number of ways, it is difficult to argue that factors other than possessor relations are not contributing to the effects reported. To address this concern, in this experiment the same nominative NPs were used across the conditions.

Method

Participants Twenty-four native Japanese speakers, undergraduate students at Kobe Shoin Women's University who had not taken part in the first experiment, volunteered to participate in the experiment.

Materials 20 sets of four fragments followed a 2×2 design. The first nominative NP was always a proper name. Animacy of the second nominative NP was one of the factors manipulated. Saturation was determined by the presence or absence of a genitive NP (either a proper name or *jibun* 'oneself') preceding the second NP-*ga* as its possessor. The following is a pair of Saturated items (the corresponding Unsaturated items can be obtained by removing the genitive NP *Yumi-chan-no*).

- (2) a. NP-*ga* NP-*no* NP-*ga* (Saturated / Animate)
Akira-kun-*ga* Yumi-chan-no hahaoya-*ga*
Akira-title-nom Yumi-title-gen mother-nom
- b. NP-*ga* NP-*no* NP-*ga* (Saturated / Inanimate)
Akira-kun-*ga* Yumi-chan-no mokuhyoo-*ga*
Akira-title-nom Yumi-title-gen goal-nom

Procedure The procedure was identical to Experiment 1.

Results

There was a reliable interaction between saturation and animacy ($F_1(1,23) = 19.14$, $P < 0.001$; $F_2(1,19) = 10.56$, $P < 0.005$) because the Unsaturated/Inanimate condition led to more completions with same-clause interpretation (30.42%) than the Unsaturated/Animate condition (13.19%; $F_1(1,23) = 10.89$, $P < 0.005$; $F_2(1,19) = 8.84$, $P < 0.01$); in the saturated conditions (Animate: 7.08%; Inanimate: 1.67%) there was no reliable difference ($F_1(1,23) = 1.94$, $P = 0.177$; $F_2(1,19) = 2.96$, $P = 0.102$).

Discussion

The results provide further evidence for the claim that saturation, and not some other property of the NPs used, is affecting clause-boundary interpretation. Because the nominative NPs remained constant across the conditions, the presence of the possessor NP (i.e., whether the second nominative NP is saturated) affects how the second NP is interpreted in relation to the previous NP.

General Discussion

Although the properties of each individual NP such as animacy are important, their interpretation is modulated by a relation that may hold between the NPs (e.g., possessor relations). This is compatible with the claim that semantic roles are not determined in isolation for each NP, but rather they are assigned taking the surrounding context (e.g., nearby NPs) into consideration. One concern with the present results is that some speakers find it unnatural to have two nominative NPs in the same clause, therefore in a third experiment the first nominative NP was replaced by a topic NP and the effects of saturation were still observed despite a substantial increase in same-clause interpretations.

Because of limitations in the adopted questionnaire methodology, we could not determine how soon possessor relations are considered by readers. Nevertheless, the results indicate that such internominal relations are an important factor during sentence interpretation. Future work will explore the temporal aspects of such information during the incremental processing of sentences.

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