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Japanese floating numeral quantifiers as generalized quantifiers

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ABSTRACT

The central concern of this paper is whether the Japanese FNQ is always a distributive operator, as Nakanishi (2004, 2007, 2008), and Kobuchi-Philip (2003, 2007) claim. Based on various interpretive facts, we instead argue that such an analysis is not necessarily correct, and that the interpretive ambiguity pertaining to FNQs (between distributive and non-distributive readings) can be resolved if the semantic ambiguity arises because of the existence of two different types of FNQs (as quantificational determiners and as quantificational adverbs). To validate this assumption, we will address interpretive aspects relevant to FNQ quantification from the viewpoint that natural languages may adopt two kinds of quantification, namely, D(eterminer)-quantification and A(dverbial)-quantification, as put forth in Partee (1995, 2008). This assumption might appear unattractive from the viewpoint of theoretical economy. However, the advantage of this hypothesis is that it is possible to maintain the generalized quantifier analysis and perfectly offer precise and uniform interpretation rules that derive the meaning of sentences involving Japanese FNQs that are attested.

1. Introduction

It has been proposed (e.g., Kobuchi-Philip, 2003, 2007; Nakanishi, 2004, 2007, 2008) that Japanese floating numeral quantifiers (FNQs) are adverbial rather than adnominal.[1] This predominant view leads to the claim that Japanese FNQs should be best analyzed as VP adverbs rather than generalized quantifiers. However, some recent studies have pointed out that there are some cases that the FNQ-as-adverb theory cannot properly handle (e.g., Takami, 1998; Miyagawa and Arikawa, 2007; Yokota, 2013). Hence, there is no consensus on exactly what the FNQ can properly deal with.

The central concern of this paper is whether the Japanese FNQ is necessarily a distributive operator as Nakanishi (2004, 2007, 2008) and Kobuchi-Philip (2003, 2007) claim. Based on the interpretive facts, we instead argue that Japanese FNQs do not necessarily produce distributive reading, and the interpretive ambiguity pertaining to the FNQs (between distributive and non-distributive readings) is resolved if the semantic ambiguity arises because of the existence of two different types of FNQs (as quantificational determiners and as quantificational adverbs).[2] We would like to address the interpretive aspects relevant to FNQ quantification from the viewpoint that natural languages may adopt two kinds of quantification, namely,

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[1] Steedman (2012: 250–251), for instance, notes that true universal generalized quantifiers or quantifier determiners in languages like Japanese are entirely lacking, unlike in English.

[2] It is worthwhile to note that Gunji and Hasida (1998) provide both the distributive and cumulative (non-distributive in our terms) interpretation based on their semantic representation, which is neutral and allows the dual interpretation. Our analysis is similar to theirs except that we assume that prosody affects the interpretation of FNQs, as discussed in what follows.

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D(eterminer)-quantification and A(dverbial)-quantification, as put forth in Partee (1995, 2008) and other papers in Bach et al. (1995). This assumption might appear unattractive from the viewpoint of theoretical economy. However, the advantage of this hypothesis is that it is possible to maintain the generalized quantifier analysis and perfectly offer precise and uniform interpretation rules that derive the meaning of sentences involving Japanese FNQs that are attested.

2. Generalized quantifiers (Barwise and Cooper, 1981)

Before starting the discussion, it is necessary to consider the fundamental assumptions. The study of quantification from the latter part of the twentieth century has tended to concentrate on generalized quantifiers (Barwise and Cooper, 1981), which are taken to be the denotation of quantified NPs (see, e.g., Partee et al., 1990; Cann et al., 2009 for details). The basic concept behind the theory of generalized quantifiers is that quantifiers themselves relate two sets of entities in terms of shared membership of various sorts:

(1)
a. the set denoted by the restrictor (→ the NP denotation)
b. the set denoted by the main predicate (→ the VP denotation)
(Cann et al., 2009: 176–177)

In generalized quantifier analysis, quantifiers denote families of subsets of domain E of discourse. Barwise and Cooper (1981) refer to the families as quantifiers, rather than as a quantifier of NP denotations, and use Q as a variable over such quantifiers.

(2)
In a model $M = <E, || ||>$, a quantifier Q lives on a set $A \subseteq E$ if Q is a set of subsets of E with the property that, for any $X \subseteq E$,
$X \in Q$ iff $(X \cap A) \in Q$.

English examples illustrating this notion are the following equivalences:

(3)
a. Many men run ⇔ Many men are men who run.
b. Few women sneeze ⇔ Few women are women who sneeze
c. John loves Mary ⇔ John is John and loves Mary

The quantifiers represented by the subjects of the sentences live on the set of *men*, *women*, and the singleton set containing *John*. The peculiarity of the sentences on the right-hand side of the biconditionals is presumably because of the fact that they are obviously redundant. Barwise and Cooper (1981) conclude that there are no counterexamples in the world's languages to the following requirement:

(4)
Determiner universal: Every natural language contains basic expressions (called determiners) whose semantic function is to assign to common count denotations (i.e., sets) A, a quantifier that lives on A.

3. D-quantification and A-quantification (Partee, 2008)

Considering the abovementioned basic principle, it can be shown how the interpretation of semantic relations is derived when the FNQ is construed within either the nominal or the verbal domain. Partee (1995, 2008), for example, discusses a hypothesis concerning quantifiers in natural language. According to her theory, A-quantification is the quantification expressed by NP-internal elements such as determiners, while D-quantification is the quantification expressed by NP-external elements such as adverbs. This concept has a clear point of contact with the generalized quantifier theory, and is useful in the following discussion, and easily extended to the analysis of Japanese FNQs. This indicates that languages like Japanese enjoy both D-quantification and A-quantification.

As Partee (2008: 1) says, every language appears to have ways of expressing quantification. Typically, quantificational notions are expressed in English both with NPs (broadly construed, covering current-day DPs and QPs) and adverbially, as in English example (5) (taken from Partee, 2008: 2–3).

(5)
a. *Every* student knows the answer. (*Most* students, *no* students, *three* students, *each* student, *many* students, *at least 10* students …)
b. A quadratic equation always has two solutions. (*Often, never, seldom, generally, typically, usually, almost always, in most cases* …)