Predicative and Quantificational Numerals in Japanese

1. Synopsis. It is well known that numerals in Japanese can appear either in pre-nominal position (Num+N+Case), as in (1a), or in post-nominal position (N+Case+Num), as in (1b).

(1) a. pre-N Num: Gakusei-ga [san-satu-no hon-o] kat-ta.
    'The students bought three books.'

    'The students bought three books.'

   In this paper, I discuss the semantics of these two types of numerals, and claim that the pre-N Num is a generalized quantifier of type \(<e,t,\>\), whereas the post-N Num is a property-denoting nominal expression of type \(<t,e,\>\). This claim leads to various consequences.

2. Data. I show that the pre-N Num in object position can take either wide or narrow scope, whereas the post-N Num has inherent narrow scope w.r.t. negation as in (2), disjunction as in (3), opaque verbs as in (4), and 'continue' as in (5).

(2) a. pre-N: John-wa [san-ko-no ringo-o] tabe-nakat-\(\digamma\). \(\gamma\)
    'John didn't eat three apples.'

   b. post-N: John-wa [ringo-o] tabe-nakat-\(\digamma\).

    'John or Mary has read five books.'


    'John is looking for three secretaries.'


(5) a. pre-N: John-wa [juk-ko-no ringo-o] tabezuku-\(\digamma\). \(\gamma\)
    'John continued to eat ten apples.'

   b. post-N: John-wa [ringo-o] tabezuku-\(\digamma\).

3. Property Analysis. Similarly, it is known that English bare plurals in object position take inherently narrow scope, whereas indefinites take either scope (Carlson 1977):

(6) a. Mary didn't eat an apple.
   'Van apple\(\gamma\)\(\digamma\) an apple.'
   b. Mary didn't eat apples.
   'Van apple\(\gamma\)\(\digamma\) apples.'

To account for inherent narrowness of English bare plurals (and also data from Spanish and West Greenlandic), van Geenhoven (1998) extends Zimmermann's (1993) analysis on verbs of absence/opacities to existential verbs, and proposes that expressions which take narrow scope are analyzed as property-denoting NPs of type \(<e,t,\>\). An existential verb combining with a predicative internal argument is type-shifted and interpreted as in (7):

(7) \([\text{Verb}] = \lambda P_{<e,t>} x_{<e,t>}. 3y \text{Verb}(x,y) \wedge P(y)\)
(9) post-N: \[[\text{apple-Acc three}]\] (of type \(<\text{e},t>\)) $= \lambda x_9 \text{THREE}(x_1) \land \text{APPLE}(x_9)$
(10) a. eat three apples (of type \(<\text{e},t>\))
\[\lambda x_9 \exists y \left( \text{EAT}(x_9, y) \land \text{THREE}(y) \land \text{APPLE}(y) \right)\]

b. not eat three apples (of type \(<\text{e},t>\))
\[\lambda x_9 \neg \exists y \left( \text{EAT}(x_9, y) \land \text{THREE}(y) \land \text{APPLE}(y) \right)\]

First, an extensional verb combines with the post-N Num, which is a predicative internal argument, as in (10a). Then it is combined with the negation operator yielding (10b). As in (8), the inherent narrowness of the post-N Num follows from the given semantics.

As for the pre-N Num, I claim that it is a generalized quantifier of type \(<<\text{e},t>,t>\), as shown in (11). Thus, it can freely take both wide and narrow scope by LF-movement such as quantifier raising (May 1985).

(11) pre-N: \[[\text{three apple-Acc}]\] (of type \(<<\text{e},t>,t>\)) $= \lambda Q_{e,t} \exists y \left( \text{APPLE}(y) \land Q(y) \right)$ \(\mid 3\)

This amounts to saying that these two numerals are semantically different: one is predicative and the other is quantificational.

Furthermore, I claim that Chierchia's (1998) kind-based account of the inherent narrowness, which treats all bare NPs as kind-denoting, is not applicable to Japanese. First, his account cannot deal with the whole array of data on inherent narrowness, as pointed out by van Geenhoven. Second, crucially, the post-N Num cannot be interpreted as a kind as in (12), which shows that the post-N Num is incompatible with a kind-predicate.

(12) post-N: \[[\text{Kyooryu-wa ni-tou} zetumetushi-ta}]\] [dinosaur-TOP two-CL] extinct-PAST
‘Two dinosaurs had been extinct.’

5. Consequences

The current claim that the post-N Num in argument position denotes property is compatible with various observations on Japanese numerals in previous literature. First, given that property-type expressions are ‘nonspecific’ (van Geenhoven 1998), the current proposal agrees with the traditional observation that post-N Num is ‘nonspecific’ (Nishigauchi and Uchibori 1991, among others). For example, (13) only means that ‘I read different two novels every day’, inducing ‘nonspecific’ reading of two novels (Ohki 1987). Under the current analysis, this is explained by interpreting ‘two’ as a property-denoting nominal expression.

‘I read two novels every day during the summer break.’ (cf. Ohki 1987)

Second, the current proposal agrees with Miyagawa’s (1989) claim that the post-N Num is related to the NP by the theory of predication (cf. Williams 1980).

Furthermore, we predict that, being a ‘nonspecific’ property, the post-N Num cannot be an antecedent of a reflexive, whereas the pre-N Num can, which is borne out as shown in (14):

(14) a. pre-N: John-wa [san-nin-no kodomo-o], jibun-no ie-ni ik-ase-ta.
John-TOP [three-CL GEN child-ACC] self-GEN home-to go-CAN-PAST
‘John made three children go to self’s home.’

b. post-N: John-wa [kodomo-o san-nin], jibun-no ie-ni ik-ase-ta.
[child-ACC three-CL]

6. Conclusion

It is widely accepted that NPs have three types, namely, e (referential), \(<\text{e},t>\) (predicative), and \(<<\text{e},t>,t>\) (quantificational) (Partee 1987). Less widely accepted is van Geenhoven’s view that property-denoting nominal expressions can occur in argument positions. This paper presents data from Japanese numerals which support van Geenhoven’s view. In particular, I claim that two types of numerals are semantically different in that the post-N Num is predicative and the pre-N Num is quantificational. Given that van Geenhoven’s analysis can account for various crosslinguistic data, the current claim implies that Japanese numerals are merely the manifestation of different types of NPs observed in the Universal Grammar.

Partial References


van Geenhoven, V. 1998. Semantic Incorporation and Indefinite Descriptions. CSLI.