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Prosody and Quantifier Float
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1. Introduction

Through the examination of floating numeral quantifier (FNQ) constructions in Japanese, this paper argues that much more serious attention needs to be paid to prosodic structure than usually exercised in conducting tests for judgements and interpretations (Fodor 2002; Kitagawa and Fodor 2006). We propose a prosodic account that explains in a straightforward way the FNQ constructions as instances of focal/informational structures. In recent studies working on syntax and semantics of Japanese quantifier float, Nakanishi (2007, 2008) reports prosodic effects as given in (1) (see also Kitagawa and Kuroda 1992; Fujita 1994; Kobuchi 2003). She notes (1) is ambiguous between distributive (1a) and non-disributive (or collective) (1b) readings without a boundary, whereas it only allows a distributive reading with a boundary (1a) (A quantifier is in italic and its host noun in boldface. The abbreviation CL stands for classifier. "//" indicates a (long) pause, corresponding to a prosodic boundary.)

(1) [**Gakusei ga**] (//) *go-nin* tsukue o mochiage-ta. (FNQ)
  student NOM   five-CL desk ACC lift-Past
  (a) 'Five (of the) students lifted a desk (individually).' **[Distributive]**
  (b) 'Five students lifted a desk (together).' **[Non-distributive]**
(2) [*Go-nin no* **gakusei** ga] tsukue o mochiageta. (Non-FNQ) (=(1))
  five-CL GEN student NOM desk ACC lifted **[Distributive] / [Non-distributive]**

Restricting our attention to the Subj-NQ pattern like (1), we claim that FNQ sentences are potentially ambiguous between (i) the event-related reading (VP-FNQ), and (ii) the object-related reading (NP-FNQ) where possible. With regard to the FNQ construal, a preferred reading is thus selected with the help of prosody (in accordance with the information structure) from a set of readings available in the discourse (e.g., ±distributive, ±partitive). Silent reading of (1) and other written sentences in this work may permit a different range of FNQ interpretations from actually pronounced examples, but that range is still controlled by prosody (cf. Kitagawa and Fodor 2006).

2. Some issues of the interpretation of Japanese FNQs

There have been two major contradictory views concerning Japanese FNQs. One is that the FNQs observe syntactic locality (mutual c-command) with its associated NP (Haig 1980; Kuroda 1980; Miyagawa 1981; Miyagawa and Arikawa 2007), the other is that FNQs are predicate modifiers and free from such locality (Kuno 1978; Fukushima 1991; Gunji and Hashida 1998; Takami 1998; Kobuchi 2003; Nakanishi 2007, 2008). The current study assumes that both insights are to be bonded to each other for the purpose of meeting the need for the adequate analysis of Japanese FNQs. What needs to be considered is the fact that in some contexts FNQs produce event-related readings, and in others they produce object-related readings. Assuming a tripartite structure for quantification; Quantifier(Restriction)(Scope) (cf. Heim 1982), semantic representations of (1a-b) would look like (3a-b).

$$\qquad\qquad\qquad R \qquad\qquad S \qquad\qquad\qquad\qquad\qquad R \qquad\qquad S$$
(3) a. [five x : student(x)] $\land$ lift.a.desk(x) =(1a) b. [five x : lift.a.desk(x)] $\land$ student(x) =(1b)

In our account, FNQ sentences, unlike the common assumption, do not necessarily force a distributive interpretation in terms of reference to objects (agenthood) or events (temporal relation). Under the latter definition, in Kitagawa and Kuroda's (1992) sense, the distributive property necessarily implies the occurrence of multiple events, while the non-distributive construal implies the occurrence of only a single event as in (4b) (see Nakanishi 2007, 2008 for a contrary view). Their observation seems correct and deserves careful attention.

(4) a. Kono isshuukan no aidani **shuujin ga** *san-nin* nigedashita. **[Distributive]**
    this one week GEN during prisoner NOM 3-CL escaped
    'There have been three jailbreaks this week.'
  b. Sonotoki totsuzen **shuujin ga** *san-nin* abaredashita. **[Non-distributive]**
    then suddenly prisoner NOM 3-CL started to act violently
    'Then, a group of three prisoners suddenly started to act violently.' (Kitagawa and Kuroda 1992)

The generation of non-distributive interpretations, as shown in (1b) and (4b), strongly indicates that the account assuming that the FNQ obligatorily functions as a verb modifier, yielding distributivity (as the default reading) needs to be modified before it is able to incorporate these facts (and other examples below).

3. Prosodic cues

The degree of unacceptability of non-distributive interpretations of FNQ sentences seems to vary (slightly) among speakers, presumably because the reading is probably (a bit) more marked in that it requires much more contextual framing to be felicitous and the NP-FNQ often appears to have an 'echoic' flavour. (It is then likely that Japanese FNQ is ambiguous between the definite/referential and the existential interpretations.) Even so, there is a natural reading of non-distributive FNQs in examples such as (5) (where the acceptability judgement is Nakanishi's based on the assumption that the distributive reading is not available).

(5) *Kodomo ga   kinoo   *san-nin*   sono inu o   koroshita.
     children NOM   yesterday   3-CL   that dog ACC   killed
     'Three children killed the dog.'   (Nakanishi 2007, 2008)

As Miyagawa and Arikawa (2007) note that the acceptability judgment of sentence (5) greatly improves, if a pause is put immediately after the NQ. This can translate to that a strategy to avoid infelicitous readings is to try forming a single (downtrend) intonational domain of the NQ and its associate NP (indicated by shade as in *Kodomo ga kinoo san-nin*), so that the NQ will not exhibit a pitch reset (but show a deaccenting), hence a contextually appropriate interpretation is available. Due to the lowering of the phrase, a non-distributive reading obtains in (5) where the denotation of the predicate is considered a singleton.

To see further a sensitivity of prosodic phrase to information structure, consider the discourses in (6) illustrating a VP-FNQ (6a) and a NP-FNQ (6b). For convenience, we adopt Steedman's (2000) informational dichotomy using *theme/rheme* sentence-structure assignment, accommodating a possible distribution of *focus* (marked by pitch accent)/*background* (unmarked by pitch accent or boundary) components along with possible prosodic events (e.g., downstep and pitch reset). We emphasize that the FNQ interpretation is largely determined by the context of use, and how this process works and its interpretation often relies on prosodic realization, which delineates its information status; for instance, focus and non-focus, as shown in (6a-b). The data also shows that the assumption that in the FNQ construction the host NP must be topic in the sentence (Takami 1998) is not correct. Note especially that in (6b) a (long) pause can intervene between the NQ and its host NP, where a new independent pitch range has not been chosen at the intermediate phrase boundary before the NQ; hence the two are phrased together, constituting a single intonational domain.

(6) (Single prosodic units are indicated by shade. "!" and "↓" indicate a pitch reset and downstep, respectively.)
   a.   Q: I heard that some men who happened to be there got involved in terrorism. And how many got
          involved in it?
        A: **Soko-ni iawáseta otokó ga**   //   !*rokú-nin*   téro ni   makikomáreta.
          men who happened to be there NOM   6-CL   in terrorism   got involved
                                                    PITCH RESET
          [*Theme* Focus   ]   [*Rheme* Focus   ...   ]
   'Six (of the) men who happened to be there got involved in terrorism.'

A pitch reset is observed on the NQ *roku-nin* 'six-CL'.
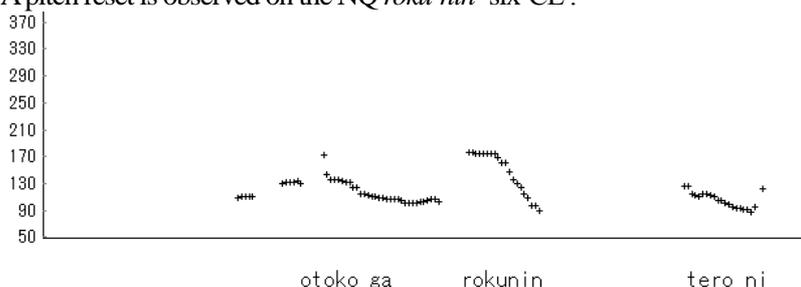
b.   Q: I heard that six people got involved in terrorism. And who was it that got involved in it?

A: **Soko-ni iawáseta otokó ga**   (//)   ↓*rokú-nin*   téro ni   makikomáreta.

    men who happened to be there NOM   6-CL   in terrorism   got involved

                                                  DOWNSTEP

[*Rheme* <u>Focus</u>   <u>Background</u>] [*Theme* <u>Focus</u> ...   ] or

[*Rheme* <u>Focus</u>   ]   [*Theme* <u>Focus</u> ...   ]

The F0 peak on the subject NP is raised (optionally), and the post-focal material is compressed (obligatorily).
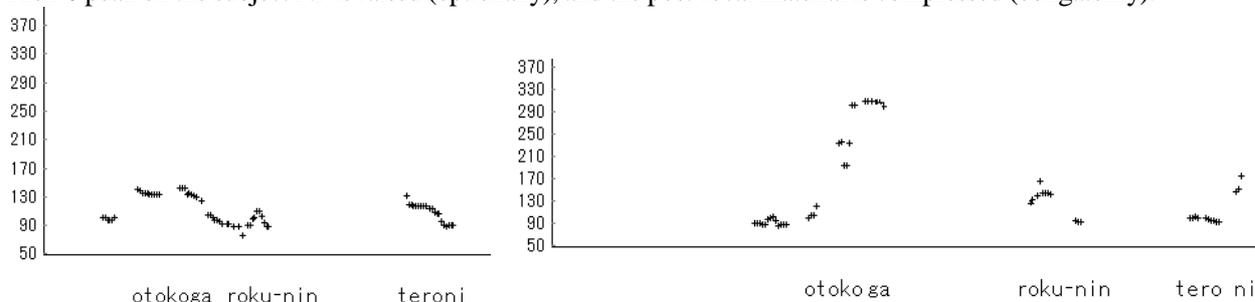
The generalization that follows would be that NP-FNQs can only get a contextually appropriate interpretation if they can have the F0 peak on the NQ lowered (compressed). Thus, we can say that, in actual speech, information structure is reflected in changes in pitch register scaling (e.g., downstep or pitch reset) of prosodic domains (cf. Féry and Ishihara 2009). Crucially, this is different from the claim that the presence of a prosodic boundary affects the focus interpretation: It is true that the different interpretations are often explained by ascribing to the insertion of a prosodic boundary (cf. Pierrehumbert and Beckman 1988, Kubozono 1993). However, it is not sufficient, as (6b with a (long) pause) exhibits a distinctive prosodic event involved in the construction: an initial F0 compression after the boundary (see the figure on the right). This might be analysed as grammaticalized 'continuation fall' contours, reflecting the speaker's intentions with regard to the theme-rheme articulation of his/her utterance. In this connection, the difference in phrasing here seems insensitive to the edges of major syntactic phrases, but rather to a (higher) level difference of whether or not the NQ belongs to the same prosodic unit as the subject NP it is modifying. It is not clear how a theory making reference to edges of syntactic maximal projections (Selkirk and Tateishi 1991), as it is, accounts for the above intonational (and interpretive) differences.

4. Summary

It seems reasonable to conclude that the difference in intonational phrasing crucially lies in the information structure. Hence, in terms of the information-based prosody, local NP-related FNQs and non-local NP-related ones may be substantially identical if a FNQ can form a single phrase (or prosodic constituent) with the host NP, despite the difference in the surface structure (or morphosyntactic constituent). This finding also suggests that a FNQ should be defined as an instance of expressing a discourse relation. Although the exact implementation remains to be worked out, we have seen that there is a correlation between prosodic phrasing and interpretation such that each phonetic realization (e.g., distinctive pitch patterns) as a consequence of information partitioning often serves to determine the preferred interpretation in the discourse.

Selected References

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