

# Case, Coordination, and Information Structure in Japanese \*

Akira Ohtani<sup>a,b</sup> and Mark Steedman<sup>a</sup>

<sup>a</sup>School of Informatics, University of Edinburgh,  
2 Buccleuch Place, Edinburgh, EH8 9LW, Scotland, United Kingdom

<sup>b</sup>Faculty of Informatics, Osaka Gakuin University,  
2-36-1 Kishibe-minami, Suita, Osaka 564-8511, Japan  
{aotani, steedman}@inf.ed.ac.uk

**Abstract.** This paper investigates the nature of Japanese argument cluster (Steedman 2000b). Based on Combinatory Categorical Grammar, a type-raising analysis of case particles which captures some aspects of the information structure in Japanese is discussed, including contrastive interpretation of coordination, *wh*-constructions, and some theme and rheme-related grammatical phenomena. These observations offer further support for the study of syntax, semantics, and phonology interface and the earlier analysis of English information structure.

**Keywords:** argument cluster, Japanese case particles, information structure, Combinatory Categorical Grammar (CCG), coordination, *wh*-constructions, multiple-*ga*, theme, rheme

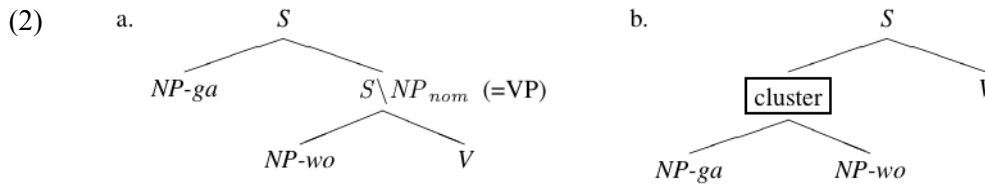
## 1. Introduction

Steedman (2000b: p.172) accounts for a number of facts about “non-constituent” coordination in Japanese by allowing type-raised subject and object *NPs* in Japanese to combine not only by forward application to the verb (>), as in (1b) below, but also by forward-composition (>**B**), as in (1c) below, under the framework of Combinatory Categorical Grammar:

- (1) a. Ken-ga Naomi-wo tazune-ta.  
Ken-NOM Naomi-ACC visit-PAST  
'Ken visited Naomi.' (Steedman 2000b: p.172, (3a))
- b. 
$$\frac{\frac{\text{Ken-ga}}{S/(S\backslash NP_{nom})} \xrightarrow{>T} \frac{\frac{\text{Naomi-wo}}{(S\backslash NP_{nom})/((S\backslash NP_{nom})\backslash NP_{acc})} \xrightarrow{>T} \frac{\text{tazune-ta}}{(S\backslash NP_{nom})\backslash NP_{acc}}}{S\backslash NP_{nom}}}{S} \xrightarrow{>}$$
- c. 
$$\frac{\frac{\text{Ken-ga}}{S/(S\backslash NP_{nom})} \xrightarrow{>T} \frac{\frac{\text{Naomi-wo}}{(S\backslash NP_{nom})/((S\backslash NP_{nom})\backslash NP_{acc})} \xrightarrow{>T} \frac{\text{tazune-ta}}{(S\backslash NP_{nom})\backslash NP_{acc}}}{S/((S\backslash NP_{nom})\backslash NP_{acc})} \xrightarrow{>B}}{S} \xrightarrow{>}$$
 (Steedman 2000b: p.172, (3b))

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The derivation in (1b) is isomorphic to a standard phrase structure analysis, as in (2a) below. However, the derivation in (1c) allows the *NPs* to compose *non-standard* constituent cluster, as shown in (2b):

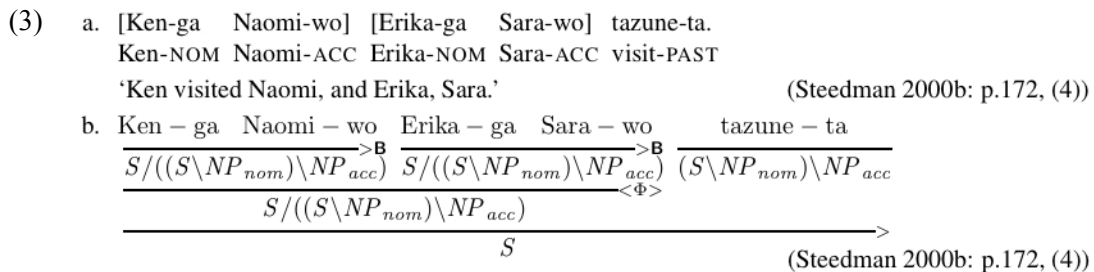


In this paper, we discuss the nature of non-standard constituent cluster in Japanese. Based on Combinatory Categorical Grammar (CCG) (Steedman 1996, 2000b, Steedman and Baldridge 2007), we propose a type-raising analysis of case particles which captures some aspects of the information structure in Japanese/Korean.<sup>1</sup> This account of the information structure of argument clusters offers further support for the earlier analysis of English information structure.

## 2. A CCG Analysis of Gapping

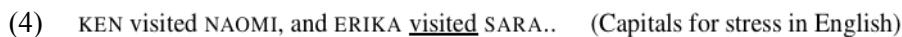
### 2.1. Gapping Revisited

One motivation for the non-standard structure in (2b) is the tendency of argument clusters to act like constituents under coordination, and the relation of this phenomenon to the base order of constituents across SOV, VSO and SVO language and/or construction (Ross 1970). Ross's generalization follows as a theorem from the axioms of CCG, as illustrated by Japanese gapping construction like (3a) and the possibility of the non-standard constituent illustrated in (1c) as its part, as in derivation (3b):



The possibility of semantically surface-compositional syntactic derivations like this is one of the main theoretical attractions of CCG. The availability of two different derivations in (1b) and (1c) for sentences like (1a) allows us to consider the possibility that they are semantically and pragmatically distinct in some way.

There are some specific properties of gapping that are interesting in this respect. See below:



In English, the second occurrence of the verb *visited* in (4) can be gapped. The arguments left in the gapped conjunct are in a contrastive relation to the correspondents in the full conjunct.<sup>2</sup>

Note that the same intuition is hold for Japanese gapping sentence in (3a), repeated as (5):

<sup>1</sup> Steedman (2000b) deals exclusively with Japanese data. We also use Japanese data mainly by assuming that Japanese and Korean pattern together in grammatical phenomena discussed in this paper.

<sup>2</sup> This is reflected in the intonation aspect of gapping, which requires that both remnants and the correspondents they are contrasted with carry pitch-accents (Sag 1976).

- (5) KEN-ga NAOMI-wo tazune, (soshite) ERIKA-ga SARA-wo tazune-ta.  
 Ken-NOM Naomi-ACC visit and Erika-NOM Sara-ACC visit-PAST  
 ‘Ken visited Naomi, and Erika visited Sara.’ (Capitals for accent in Japanese)

Apart from the direction of gapping, two pairs of subject and object *NPs* in (5) are mutually in a contrastive relation.

The involvement of contrast in the argument clusters in (5) suggests a deeper link between such clusters and the concept of information structure. In particular, it is natural to assume that derivation (1c), rather than (1b), applies in the case where the *NPs* are an information unit such as the “theme” or “rheme” in the sense of Steedman (2000a, 2000b). We will return to this question in section 3.

## 2.2. Clustering with Case Particles

Before going into further discussion of information structure, we will review the combinatory mechanism of argument cluster formation.

The full derivation of (1c) using the case-particle categories in (7) is as follows:

$$(6) \quad \frac{\frac{\frac{N \quad -ga \quad Naomi}{(S/(S \backslash NP_{nom})) \backslash N} \quad N \quad -wo \quad tazune - ta}{((S \backslash NP_{nom}) / ((S \backslash NP_{nom}) \backslash NP_{acc})) \backslash N} \quad (S \backslash NP_{nom}) \backslash NP_{acc}}{S / (S \backslash NP_{nom})} < \quad \frac{S \backslash NP_{nom} / ((S \backslash NP_{nom}) \backslash NP_{acc})}{S / ((S \backslash NP_{nom}) \backslash NP_{acc})} <}{S / ((S \backslash NP_{nom}) \backslash NP_{acc})} > B \longrightarrow S$$

- (7) a.  $-ga := (S \backslash \$ / (S \backslash \$ NP_{nom})) \backslash N$   
 b.  $-wo := (S \backslash \$ / (S \backslash \$ NP_{acc})) \backslash N$

The categories in (7) are schematized using the “\$-convention” (Steedman 2000b: p.42, (32)). For example, the category  $S \backslash \$ NP_{nom}$  denotes the set of leftward-looking function categories whose domain is  $\$ NP_{nom}$  and whose range is a set  $S \backslash \$$  defined as the recursive transitive closure over  $S$  and all leftward functions onto  $S \backslash \$$ .

Thus,  $-ga$  has the following lexical categories:

$$(8) \quad -ga := \{(S / (S \backslash NP_{nom})) \backslash N, ((S \backslash NP_{acc}) / ((S \backslash NP_{acc}) / NP_{nom})) \backslash N, \dots\}$$

(The first category applies to standard SV intransitive and SOV transitive verbs. The second category is that of the nominative first argument of an OSV verb.)

The categories in (7) allow case-marked *NPs* to compose to form clusters in many orders. Thus we have the following examples:<sup>3</sup>

- (9) a. KEN-ga NAOMI-ni (soshite), ERIKA-ga SARA-ni Anna-wo syoukai-shi-ta.  
 Ken-NOM Naomi-DAT and Erika-NOM Sara-DAT Anna-ACC introduction-do-PAST  
 ‘Ken introduced Anna to Naomi, and Erika introduced Anna to Sara.’  
 b. ??KEN-ga Anna-wo NAOMI-ni (soshite), ERIKA-ga Anna-wo SARA-ni syoukai-shi-ta.

- (10) a. ??KEN-ga Anna-ni NAOMI-wo (soshite), ERIKA-ga Anna-ni SARA-wo syoukai-shi-ta.  
 ‘Ken introduced Naomi to Anna, and Erika introduced Sara to Anna.’  
 b. KEN-ga NAOMI-wo (soshite), ERIKA-ga SARA-wo Anna-ni syoukai-shi-ta.

<sup>3</sup> In (11), to avoid entering into the “focus” or “rheme” relation, we mark the subject with *wa*, which is interpreted as “topic” or “theme” in the sense of Bolinger (1965) and Steedman (2000a, 2000b).

- (11) a. Anna-wa KEN-ni NAOMI-wo (soshite), ERIKA-ni SARA-wo syoukai-shi-ta.  
 ‘Anna introduced Naomi to Ken, Sara to Erika.’  
 b. Anna-wa NAOMI-wo KEN-ni (soshite), SARA-wo ERIKA-ni syoukai-shi-ta.
- (12) ANNA-ga KEN-ni NAOMI-wo (soshite), JOE-ga ERIKA-ni SARA-wo syoukai-shi-ta.  
 ‘Anna introduced Naomi to Ken and Joe introduced Sara to Erika.’

The arguments of ditransitive verb *syoukai-suru* ‘introduce’ can be treated in essentially the same way, the only difference being that the arguments are in a contrastive focus relation between a subject and on indirect object *NP* in (9), a subject and on direct object *NP* in (10), an indirect and a direct object *NP* in (11), and among three *NPs* in (12). We can also give the derivation of cluster, for example, (11a) and (12) are derived as the following (13a) and (13b), respectively.

- (13) a. 
$$\frac{\frac{\frac{\text{Anna - wa}}{S/(S\backslash NP_x)} \quad \frac{\frac{\text{Ken - ni}}{(S\backslash NP_{nom})/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\text{Naomi - wo}}{(S\backslash NP_{nom})/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}}}{(S\backslash NP_{nom})/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\frac{\text{Erika - ni}}{(S\backslash NP_{nom})/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\text{Sara - wo}}{(S\backslash NP_{nom})/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}}}{(S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\text{syoukai - shi - ta}}{(S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}}}{S\backslash NP_{nom}} \quad \frac{S}{S}$$
- b. 
$$\frac{\frac{\frac{\text{Anna - ga}}{S/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\text{Ken - ni}}{S/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\text{Naomi - wo}}{S/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}}}{S/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\frac{\text{Joe - ga}}{S/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\text{Erika - ni}}{S/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\text{Sara - wo}}{S/((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}}}{((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \quad \frac{\text{syoukai - shi - ta}}{((S\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}}}{S}$$

The awkwardness of sentences (9b) and (10a) remains unexplained. We assume that this is an information-based “heaviness” effect. These sentences induce the whole of arguments contrast reading as (12), supporting our claim that the cluster can be composed with a serial *NPs* type-raises by case particles.

This claim is supported by parallel heaviness-sensitive constraints on the remnants of gapping and right node raising in English (cf. Abbott (1976)):

- (14) a. #ANNA introduced NAOMI to KEN, and JOE, SARA to ERIKA.  
 b. ANNA introduced her MOTHER to KEN, and JOE, his FATHER to SARA.
- (15) a. #KEN gave NAOMI an APPLE, and ERIKA, SARA a FLOWER.  
 b. KEN gave a TEACHER an APPLE, and ERIKA, a POLICEMAN a FLOWER.

We leave the question of the precise semantic and/or pragmatic origin of such “heaviness” effects for further research.

The next section links the syntactic argument cluster with the concept of information structure.

### 3. *Wh*-constructions

#### 3.1. *Wh*-question

Utterance meaning consists of information structure and propositional content. Information structure characterizes the relation of components of propositional content to the context of utterance (Halliday 1967, Hajičová, Skoumalová and Sgall 1995), notably with respect to what already is common ground (Clark 1996), and what the utterance itself causes to become common ground (Steedman 2007) content of utterance. Much work has been done on the determination of information structure: here we only mention the test using question-answer pairs to identify the “rheme”, as the answer to a *wh*-question. Thus, to the question in (16a) below, we can obtain the answer (16b) in which only *nezumi* ‘mouse’ is rhematic, either in the

context of a discussion of a small set of animals, e.g. in discussing a pet shop, as in (17), or by (in the sense of Lewis (1979) and much subsequent literature) “accommodating” such a set..

- (16) a. *Dono doubutsu-ga youzinbukai-desu-ka?*  
 which animal-NOM cautious-COP -Q  
 ‘Which animal is cautious?’  
 b. *Nezumi-ga youzinbukai-desu.*  
 mouse-NOM cautious-COP  
 ‘It is a mouse that is cautious.’

(17) pet shop: {bird, gold fish, mouse, dog}

We can also obtain the following answer in (18) to the same question (16a), when a larger set of animals is either available, as in (19), or accommodated:

- (18) *Nezumi(-to) hitsuji-ga youzinbukai-desu.*  
 mouse-and sheep-NOM cautious-COP  
 ‘It is a mouse and a sheep that are cautious.’

(19) zoo: {lion, tiger, bear, mouse, sheep, ... }

The derivation without forward composition is as follows:<sup>4</sup>

$$(20) \frac{\frac{\frac{\text{nezumi}}{N : mouse(x)} \quad \text{to} \quad \frac{\text{hitsuji}}{N : sheep(x)}}{N : mouse_{conj} sheep(x)} \quad \frac{\text{ga}}{(S/(S \setminus NP)) \setminus N : \lambda Q \lambda P \exists x [Q(x) \& P(x)]} \quad \frac{\text{youjinbukai desu}}{S \setminus NP : cautious(x)}}{S/(S \setminus NP) : \lambda P \exists x [mouse_{conj} sheep(x) \& P(x)]} \quad \leftarrow}{S : \exists x [mouse_{conj} sheep(x) \& cautious(x)]} \rightarrow$$

Japanese nouns have no distinction on number morphology, and singular and plural are expressed with the same form. Thus, *dono doubutsu* ‘which animal(s)’ in the question in (16a) is ambiguous and it is not clear whether it requires a unique individual or a plurality of individuals. The answers in (16b) and (18) giving an exhaustive listing reading are often distinguished as “restrictive focus”, presupposing a set specified in discourse of which the constituent is a member (Erteschik-Shir 1997).

In contrast, the present theory follows Steedman (2000a, 2000b) in assuming that restrictive and nonrestrictive rhemes are semantically and grammatically indistinguishable, and only differ in the nature of the context in which they are uttered. We draw the following distinctions:

- (21) a. A theme is a part of the meaning of an utterance that the speaker claims some participant in the conversation supposes (or fails to suppose) **already** to be common ground;  
 b. A rheme is a part of the meaning of an utterance that the speaker claims some participant in the conversation **makes** (or fails to make) common ground.

Thus, the theme is a predication over the existing context or common ground, and the rheme seeks to effect an update on the context or common ground.

### 3.2. Multiple Wh-question

In section 2.1, we adopted Steedman's claim that Japanese gapping sentence (3a), repeated in (22) below, is argument cluster coordination (Steedman 2000b: p.172), and claimed on the basis

<sup>4</sup> The semantics of *to* ‘and’, *conj*, is tentative.

of an analogy with gapping in English that the coordinated clusters admit a contrastive interpretation:

- (22) [KEN-ga NAOMI-wo] [ERIKA-ga SARA-wo] tazune-mashi-ta.  
 Ken-NOM Naomi-ACC Erika-NOM Sara-ACC visit-POLITE -PAST  
 ‘Ken visited Naomi, and Erika, Sara.’ (Steedman 2000b: p.172, (4), slightly modified)

In support of this analysis, consider the multiple *wh*-question (23), with the common ground in (24) and the corresponding list-pair answer (22).

- (23) Dono gakusei-ga dono sensei-wo tazune-mashi-ta-ka?  
 which who-NOM which teacher-ACC visit-POLITE -PAST -Q  
 ‘Which student visited which teacher?’

- (24) students: {Ken, Erika} teachers: {Naomi, Sara}

(22) can be the answer to the *wh*-question, and hence the relevant part of the sentence is considered to admit rheme interpretation from the view point of information structure.

Steedman and Baldrige (2007) point out that the following alternatives to (22) are also possible:

- (25) a. [Naomi-wo Ken-ga,] [Sara-wo Erika-ga] tazune-ta.  
 Naomi-ACC Ken-NOM Sara-ACC Erika-NOM visit-POLITE -PAST  
 ‘Ken visited Naomi, and Erika, Sara.’  
 b. ?[Naomi-wo Ken-ga,] [Erika-ga Sara-wo] tazune-ta.  
 (Steedman & Baldrige 2007: p.34, (94) and (95), gloss and derivation are omitted.)

Sentence (25) is most natural as an answer to the following order-variant multiple *wh*-question:

- (26) Dono sensei-wo dono gakusei-ga tazune-mashi-ta-ka?  
 which teacher-ACC which who-NOM visit-POLITE -PAST -Q  
 ‘Which student visited which teacher?’

(23) and (26) differ only in the order of *wh*-words. Most speakers consider (25a) a natural answer to (26), whereas (25b) sounds awkward as an answer for both (23) and (26). Moreover, (25a), in turn sounds awkward for the question in (23).

The clusters in (25b) have different types as follows, according to the present theory:

- (27) a.  $Naomi-wo\ Ken-ga := S / ((S \setminus NP_{acc}) \setminus NP_{nom})$   
 b.  $Erika-ga\ Sara-wo := S / ((S \setminus NP_{nom}) \setminus NP_{acc})$

It follows that they cannot under the present theory conjoin at all. We conjecture that the marginal acceptability of (25b) depends on some process distinct from simple constituent coordination, perhaps the same process as that involved in English medial verb-gapping. The nature of that process remains a topic for further research.

With regard to marked and unmarked answers of multiple *wh*-questions, Kuno (1982: p.141, (9)) argues that the fronted *wh*-word represents the key for sorting relevant pieces of information in the answer. While not going into an in-depth survey of his analysis, we suggest that it is the differing *types* of the *wh*-questions in (23) and (26) and of the clusters in their respective expected answers in (22) and (25a) that determine their implications for (sorting), and that the reason why (25b) sounds awkward is that it is consistent with *no* sorting key of the kind that Kuno postulates.

### 3.3.Clefting

The bracketed clusters in the following several instances of cleft sentences in (29) from (28) are rhemes, while the *-no-wa*-marked constituents are themes:

- (28) Anna-ga Ken-ni Naomi-wo syoukai-shi-ta.  
 Anna-NOM Ken-DAT Naomi-ACC introduction-do-PAST  
 ‘Anna introduced Naomi to Ken.’
- (29) a. Anna-ga syoukai-shi-ta no-wa [Ken-ni Naomi-wo] da.  
 Anna-NOM introduction-do-PAST NM-TOP Ken-DAT Naomi-ACC COP  
 ‘It is Naomi to Ken that Anna introduced.’  
 b. Ken-ni syoukai-shi-ta no-wa [Anna-ga Naomi-wo] da.  
 ‘It is Anna Naomi that introduced to Ken.’  
 c. Naomi-wo syoukai-shi-ta no-wa [Anna-ga Ken-ni] da.  
 ‘It is Anna to Ken that introduced Naomi.’  
 d. Syoukai-shi-ta no-wa [Anna-ga Ken-ni Naomi-wo] da.  
 ‘It is Anna Naomi to Ken that introduced.’  
 (NM: nominalizer Note. English translations are all ungrammatical.)

From the point of view of X-bar theory, these constituents are hard to account for. Takano (2002) calls these elements “surprising constructions” and claims that they are formed by otherwise anomalous movement of an element to another element that does not dominate it.

We note the great interest of Takano’s (2002) data including clefts, merely noting that the participation of such non-standard constituents in the grammar of information structure is a prediction from the assumptions of CCG, rather than a surprising anomaly at odds with the theory of grammar.

Since we have assumed that there are several ditransitive verbs in Japanese, with different “scrambled” argument orders, there is in fact more than one possible derivation for the above sentences, with different verb categories for *syoukai-shi-ta*. We assume that these variants differ in the sorting presuppositions identified by Kuno, but have not yet investigated this question in detail.

The following example discussed by in Takano (2002) is interesting in this connection:

- (30) \*Bill-ga Mary-ni ageta to omotteiru no wa John-ga hon-wo da.  
 Bill-NOM Mary-DAT gave that think NM TOP John-NOM book-ACC COP  
 (Lit.) ‘It is John a book that thinks that Bill gave to Mary.’  
 (‘John thinks that Bill gave a book to Mary.’) (Takano 2002: p.245, (8), Gloss is mine.)

Tanako claims that the ungrammaticality of (30) is due to a clausemate condition on movement. The implication of Takano's observation in present terms is either that *Bill-ga Mary-ni ageta to omutteiro no wa* cannot form a constituent of type  $(NP \setminus NP_{nom}) \setminus NP_{acc}$ , or that the copula does not have a category that can apply to the cluster *John-ga hon-wo*. We note that in English, multiple *wh*-questions like the following, which would violate such a clausemate condition seem grammatical, if strained.

- (31) What did who think that Bill gave Mary?

We therefore assume that it is the category of the copula that imposes this limitation, as it does in English:

- (32) a. It is John who thinks that Bill gave Mary a book.  
 b. It is a book that John thinks that Bill gave Mary.  
 c. \*It is John a book that thinks that Bill gave Mary.

## 4. Other Rhematic Constructions

### 4.1. Multiple-ga

In section 3.1, we discussed the pragmatics of exhaustive list readings, using example (16b), repeated as (33) below:

- (33) [Nezumi-ga] youjinbukai.  
 mouse-NOM cautious  
 ‘It is a mouse that is cautious.’ (Slightly modified.)

Japanese and Korean has a construction that generates more than one nominative/subject. The following is the instances of such a construction:

- (34) [Tokai-ga] nezumi-ga youjinbukai-desu.  
 city-NOM mouse-NOM cautious-COP  
 ‘It is a city where mouse is cautious.’
- (35) [Yoru-ga] tokai-ga nezumi-ga youjinbukai-desu.  
 night-NOM city-NOM mouse-NOM cautious-COP  
 ‘It is the night when mouse is cautious in a city.’

The bracketed sentence-initial *NP-ga* is obligatorily marked with focus or “rheme” if the predicate of a sentence presents a state or a habitual/generic action (Kuno 1973). The following *NPs* cannot be marked with rheme although the *NPs* are in serial and they can be if in the sentence-initial. The reason why these *NPs* cannot compose a cluster is reduced to their categorial status. They are adjunct, not arguments led by type-raiser particles. The derivation, for example, of (34) is as follows:

$$(36) \frac{\frac{\text{tokai - ga}}{S/S : \lambda Q \exists y [\text{city}(y) \ \& \ \text{about}(y, Q)]} \left\langle \frac{\frac{\text{nezumi - ga}}{S/S \setminus NP : \lambda P \exists x [\text{mouse}(x) \ \& \ P(x)]} \left\langle \frac{\text{youjinbukai}}{S \setminus NP : \text{cautious}(x)} \right\rangle \right\rangle}{S : \exists x [\text{mouse}(x) \ \& \ \text{cautious}(x)]} \right\rangle}{S : \exists y [\text{city}(y) \ \& \ \text{about}(y, \exists x [\text{mouse}(x) \ \& \ \text{cautious}(x)])]} \right\rangle$$

In (36), in addition to the type-raiser as in (37a), we introduce the other type of *ga* in (37b):

- (37) a. -ga :=  $(S / (S \setminus NP_{nom})) \setminus N : \lambda Q \lambda P \exists x [Q(x) \ \& \ P(x)]$   
 b. -ga :=  $(S / S) \setminus N : \lambda Q \lambda P \exists x [Q(x) \ \& \ \text{about}(x, P)]$

Successive layers of *ga*-marked *NPs* shown in (34) and (35) are derived recursively with predication function given by (37). With regard to multiple subjects, a number of linguists, e.g. Kuno (1973)(S), Fukui (1986)(V') and Kuroda (1988)(VP), have proposed adjunction analysis, which we broadly follow.

### 4.2. A Lexicalized Subjectivization

To capture syntactic, semantic and pragmatic characters of multiple-subject construction, we propose two types of *ga*. This brings a right prediction on the so called *subjectivization* (Kuno:1973).



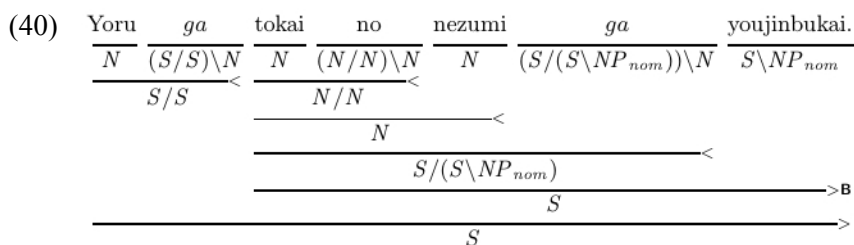
Kuno (1973) claim that in most multiple subject, there is a genitive-head relation between two adjacent just as inside a single noun phrase. Without going into the detail of Kuno's transformation-based mechanism, which deriving a nominative phrase from the genitive phrase by adjoining to S-node, let us see the application of subjectivization to (35):

- (38) a. Yoru-ga tokai-ga nezumi- $\{ga/*no\}$  youjinbukai.  
 b. Yoru-no tokai-ga nezumi- $\{ga/*no\}$  youjinbukai.  
 c. Yoru-no tokai-no nezumi- $\{ga/*no\}$  youjinbukai.  
 d. Yoru-ga tokai-no nezumi- $\{ga/*no\}$  youjinbukai.

In (38), the innermost *NP* cannot be replaced with genitive case marker *no*, and this distinction between outer and innermost *ga* obviously coincide with classification of *ga* in (37). We propose the lexicalized subjectivization under the framework of CCG by assuming the following *no* category:

- (39)  $-no := (N/N) \setminus N : \lambda P \exists y \exists x [P(x) \ \& \ about(x, y)]$

The following is, for instance, the derivation for the sentence in (38d) (Semantics is omitted).



Note that *ga* in (37b) and *no* in (39) differ in their combinatorics of syntactic categories but combinatory process and semantics is substantially the same.

On this point, it may be thought that both (37b) and (39) are only recasting under the CCG framework the mechanism of multiple nominative against V' and multiple genitive against N' case licensing proposed by Fukui (1986). However, our motivation for some parallels between adjoining *ga* and genitive *no* is based on the semantics that is exactly the heart of this phenomenon. The semantics that we described for these categories are the same as Latin *de* as in the book title *De Magnete*.

## 5. Concluding Remarks

The basic intuition that we pursue in this paper comes from Dowty's (1988) and Steedman's (2000b) analysis of the argument cluster coordination. At first we suggest that the coordinated parts admit a contrastive interpretation based on the analogy of English gapping interpretation. Next we show that unlike English, Japanese allows more than one argument to appear in the focus position with composing a cluster. Then we explore some focus-related grammatical phenomena with discussing evidences linking the CCG analysis of argument cluster with the theory of information structure.

We believe that these observations will be helpful to the study of syntax, semantics, phonology interface and the theory of information structure in universal grammar.

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