

Contrastive Topic, Focus Particles, and the Square of Opposition

David Y. Oshima
Stanford University
davidyo@stanford.edu

Draft of October 13, 2002

Abstract

In this paper I will argue that the semantics of contrastive topic (CT), which is commonly treated as a discourse related notion on a par with topic and focus, can be assimilated to that of a paradigm of focus particles, showing evidence from CT related phenomena, e.g., reversed polarity presupposition, scalar implicature, and scope inversion.

1 Introduction

Contrastive topic (CT; also known as topic-focus (Kadmon 2001), independent focus (Jackendoff 1972) etc.) has been commonly treated as an information structure/discourse related notion on a par with topic and focus, and characterized as “partial topic” or “focus-marked topic” (see Roberts 1996, Büring 1997, 2000, Choi 1999, among others). CT is marked by a special pitch pattern (e.g. B-Accent or (L+)H*L-H% pattern for English), or (what Lee (1999a) terms as) “CT marker” morpheme (e.g. *wa* in Japanese, *nun* in Korean). Below are some examples from English and Japanese.

- (1) a. A: Well, what about FRED? What did HE eat?
B: [FRED]_{CT} ate the [BEANS]_F
(L+)H*L-H% (L+) H* L- L%
- b. A: Well, what about the BEANS? Who ate THEM?
B: [FRED]_F ate the [BEANS]_{CT}
(L+)H*L-L% (L+) H* L- H%
- (2) a. [Fred-wa]_{CT} [mame-wo]_F tabe-ta. (= (1aB))
Fred-CT beans-Acc eat-Past
- b. [Mame-wa]_{CT} [Fred-ga]_F tabe-ta. / [Fred-ga]_F [mame-wa]_{CT} tabe-ta. (= (1bB))
beans-CT Fred-Nom eat-Past Fred-Nom beans-CT eat-Past

The organization of this paper is as follows. In Section 2, I review formal analyses of CT recently proposed by Roberts (1996) and Büring (1997, 2000) and point out their drawbacks and problems yet to be accounted for. In Section 3, I develop a formal account of the semantics of CT; namely, I propose that when a sentence *S* involves a CT, and the “core” part of *S* (i.e. *S* without CT marking) expresses a proposition *P*, a presupposition is induced that at least one of the alternative propositions of *P* (roughly, propositions expressed by a sentence equivalent to *S* except that the CT-marked element is replaced by its alternatives) does not hold or is not known whether to hold (i.e. “weakly” negated in terms of Kleene’s (strong three-valued logic). As such, the semantics of CT fits in the “missing corner” of the logical square of opposition (cf. Levinson 2000, Ch.1 and Ch.2) formed by the paradigm of focus particles. In Section 4, I show that the proposed analysis provides straightforward account of two phenomena pertaining to CT, namely, the scalar interpretation of CT, and the scope inversion.

2 Pragmatic Approach and its Problems

In past studies, contrastive topic (or independent focus, topic-focus etc.) has been, as the terminology suggests, treated as a discourse/information-structure based notion (cf. Jackendoff 1972, Vallduví 1992, Choi 1999, Lee 1999a, b). In this section, I will review a recent formal (and pragmatic) account of CT by Büring (2000), which builds on Roberts’ (1996) theory of information structure and focus, and point out its drawbacks.¹

2.1 Account based on Information Structure

Roberts (1996) proposes to treat, following the line of Carlson (1983), conversation/discourse as a sort of cooperative game, whose ultimate goal is to discover and share with the other interlocutors the information about the world (or, to answer the Big Question “What is the way things are?”); players evolve this game making two types of linguistic **moves**, namely questions (set-up moves) and assertions (payoff moves). To carry out the goal(s) in an efficient way, players should pursue a right **strategy of inquiry** (sequences of questions): in particular, given a question, a reasonable speaker must either (i) give it an answer, (ii) concludes that it is practically unanswerable, or (iii) divide it into more manageable form i.e. pose a subquestion of the given question.²

¹A similar line of account is proposed by Kadmon (2001, Ch.20). I do not present her work here, for it shares basic ideas (the use of the notion of topic-value etc.) with Büring (2000), and also faces the same empirical problems that I will discuss presently.

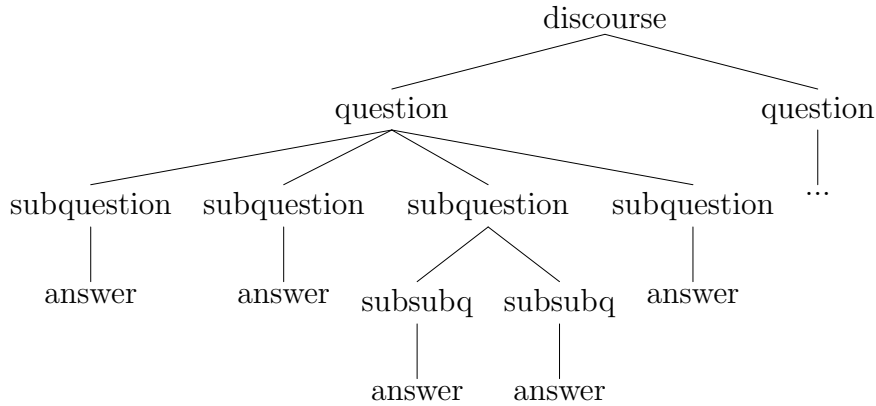
²The definition of subquestion (superquestion) is as follows: for any pair of questions Q_1 and Q_2 , Q_1 is a subquestion of Q_2 (Q_2 is a superquestion of Q_1) iff Q_2 entails Q_1 , i.e. every proposition that answers Q_2 answers Q_1 (ibid, p.94).

- (3) 1. Who ate what?
 a. What did Hilary eat?
 a_i. Did Hilary eat bagels?
 Ans(a_i). *Yes.*
 a_{ii}. Did Hilary eat tofu?
 Ans(a_{ii}). *Yes.*
 b. What did Robin eat?
 b_i. Did Robin eat bagels?
 Ans(b_i). *No.*
 b_{ii}. Did Robin eat tofu?
 Ans(b_{ii}). *Yes.*

(Roberts 1996, p.101)

In other words, once players are committed to pursue a particular question, they have to “stick to” it until it (or all of its subquestions) is sufficiently resolved (otherwise, a player could be rebuked for “changing the subject”). As such, the set of **questions under discussion (QUD)** in a discourse can be modeled as a sort of pushdown store (stack), or more visually lucidly, what Büring (2000) calls d(iscourse)-tree.

(4) Discourse Tree:



An answer must be properly focus-marked so that it is **congruent** with the question it address. Roughly put, a question-answer pair is congruent iff the denotation of the question, which is a set of propositions, is identical to the set of interpretations obtained by replacing all the focused constituents with variables, and then interpreting the result relative to each member of the set of all assignment functions which vary at most in the values they assign to those variables.

How would the notion of CT be integrated in this picture? Roberts proposes that CT is a focus, and the difference between foci marked by A-contour (L-L%) and those

marked B-contour (L-H%) (i.e. CT) is that the former is “chosen first” by the question under discussion, to the effect that the result is equivalent to its subquestion. Consider the following examples:

(5) a. [John]_{CT} ate [beans]_F.

b. [John]_F ate [beans]_{CT}.

Under the assumption that both CT-marked and F-marked constituents are foci, the utterances (5a) and (5b) presupposes (6) as a question under discussion.

(6) Who ate what?

Now, if we resolve only one of the wh-phrases in (6), the results (8a) and (8b) are identical to the denotation of subquestions (7a) and (7a) respectively.

(7) a. What did John eat?

b. Who ate beans?

(8) a. $\{u \text{ ate } u': u, u' \in D \wedge u = \text{John}\}$

b. $\{u \text{ ate } u': u, u' \in D \wedge u' = \text{beans}\}$

This means, says Roberts, (5a) and (5b) presuppose not only a single QUD, different complex question/sub-question strategies. As Büring (2000) remarks (see also Kadmon 2001), however, Roberts’ analysis is not satisfactory, lacking a proper implementation of the rules to relate A- and B- contours to a relevant subquestion. To remedy this problem, Büring provides a more elaborated analysis of discourse condition to license CT, using the formal device called CT-value (first introduced in Büring (1995) and called topic-value there). The function $\llbracket \cdot \rrbracket^{ct}$, applied to a declarative sentence α , yields a CT-value of α , which is a set of question meanings (i.e., a set of sets of propositions) where each question is formed by the following operations: (i) replacing the focus by a wh-word (and fronting it), and (ii) replacing the contrastive topic by some alternative to it. For example, the CT-value of (11a) is the set of questions listed below.

(9) What did John eat?

What did Fred eat?

What did Mary eat?

What did ... eat?

...

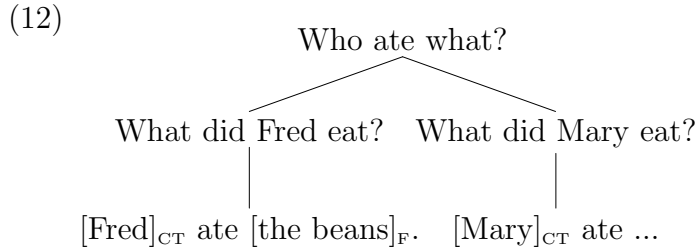
The discourse condition for CT is now defined as follows.

- (10) CT-Condition: A contrastive topic CT in a move M within a d-tree D indicates a strategy (subtree) in D.

where ‘indicate a strategy’ is defined as:

- (11) CT in M indicates a strategy iff there is a set Q’ of questions such that for each Q ∈ Q’, (i) Q is identical to or a sister of the question that immediately dominates M, and (ii) $\llbracket Q \rrbracket \in \llbracket M \rrbracket^{ct}$.

As Büring does not assume that CT is a focus, it is predicted that an utterance like (5a) and (5b) do not presuppose a superquestion (7) as a QUD; note that in the d-tree (12) the left branch *per se* satisfies the condition imposed by (10).



The presence of a superquestion dominating the left branch is, however, guaranteed by the stipulation that a question-answer sequence Q-A is well-formed iff there is a d-tree containing it as a subtree.³ Now, what does this account predict about the condition on which CT-marking becomes obligatory? Büring claims that (i) for any constituent which is not given (i.e. not previously mentioned) CT- or F-marking is obligatory (Givenness Condition), and (ii) when both CT- and F- markings are possible, CT-marking is preferred (Preference Principle), based on data like the following.

- (13) What did the pop stars wear?
- a. The [female]_{CT} pop stars wore [caftans]_F.
 - b. #The [female]_F pop stars wore [caftans]_F.
 - c. #The female pop stars wore [caftans]_F.

Finally, to preclude cases where a complete answer involves CT-marking, as in:

- (14) Q: How many abstracts got accepted?
 A: #[All]_{CT} abstracts got accepted.
 (cf. A’: [Some]_{CT}/[Most]_{CT} abstracts got accepted.)

³Büring also suggests the possibility that contrastive topic is a composite of F- and CT- marking, which indicate non-givenness and a strategy respectively. With this option, (6) would be straightforwardly presupposed by (7a) and (7b).

(15) Q: Who broke the vase?

A: $\sharp$ [John]_{CT} did.

Büring adds the following principle (but providing no independent motivations) so that a complete answer cannot indicate a strategy.

(16) Principle of highest attachment: If M is a complete answer to Q, Q immediately dominates M.

2.2 Problems

Roberts-Büring's account of CT is, I believe, not satisfactory in at least two respects. Firstly, it cannot explain (as opposed to Büring's claim) what is called Reversed Polarity Implicature (RPI) brought about by CT (cf. Lee 1999a,b). Secondly, some of the stipulated principles are, in presence of independently attested phenomena, unnecessary; Preference Principle even makes an empirically wrong prediction that there are no such contexts where the choice between CT- and F- marking is optional.

2.2.1 REVERSED POLARITY IMPLICATURE

(5a) above, recapitulated below as (17), gives “some sort of indication” (Büring 2000, p.8) that people other than Fred ate other things (thus did NOT eat beans); similarly, in (16) the answer implicates, if not presupposes, that Patrick and Ginevra did not pass the exam.

(17) [Fred]_{CT} ate [the beans]_F.

(18) A: Among Charles, Patrick, and Ginevra, who passed the exam?

B: [Charles]_{CT} did.

Büring attributes this effect, which is called “reversed polarity implicature” in the literature (cf. Lee 1999a,b, Komagata 2000), to a conversational implicature (generalized quantity implicature; cf. Gazdar 1979): e.g., as to (17), by the inference that “if the speaker knew that someone else ate beans, too, they could have been briefer and more informative if they had said ‘Fred and Y ate the beans’ instead”, a hearer might conclude that the speaker is not aware that any other people ate beans. This argument is problematic, however, building on the assumption that RPI is cancelable; in general, it is NOT:

(19) A: Among Charles, Patrick, and Ginevra, who passed the exam?

B: $\sharp$ [Charles]_{CT} did, and (in fact) so did Patrick and Ginevra.

B': [Charles did]_F, and so did Patrick and Ginevra.

- (20) A: Charles-to Patrick-to Ginevra-no nakade, dare-ga siken-ni ukat-ta-no?
 Charles-and Patrick-and Ginevra-Gen amongst who-Nom exam-Dat pass-Past-Q
 B: #Charles-wa ukat-ta-si, Patrick-to Ginevra-mo ukat-ta.
 Charles-CT pass-Past-and Patrick-and Ginevra-also pass-Past
 B': Charles-wa ukat-ta-kedo, Patrick-to Ginevra-wa ukar-anakat-ta.
 Charles-CT pass-Past-but Patrick-and Ginevra-CT pass-Neg-Past

The deviance of (19B) and (20B) is striking, I believe, to the degree comparable to (21) and (22), which involves presupposition failure (the second sentence is contradictory to the presupposed part of the first sentence i.e. there is at least one person who passed the exam, besides Charles).

- (21) #Charles passed the exam too, but no one else did.
 (22) #Charles-mo siken-ni ukat-ta-ga, hoka-ni-wa dare-mo ukar-anakat-ta.
 Charles-also exam-Dat pass-Past-but besides anyone pass-Neg-Past

One might be tempted to argue that, assuming that CT is a focus, the RPI can be assimilated to “exhaustiveness” effect of focus, and has nothing to do with the function of CT-marking itself: in fact, if we replace the CT-marking on *Charles* in (19B) with the F-marking, the implicature is still present that Patrick and Ginevra did not pass the exam, as by the exhaustive listing effect (19B) would implicate “Charles and only Charles passed the exam.”⁴ However, the exhaustive listing effect of focus in general and RPI should be distinguished: whereas “[X]_F **pred**” indicates that “only X **pred**” (hence “for all Y: X≠Y, Y not **pred**”), “[X]_{CT} **pred**” merely indicates that “there is at least one Y: X≠Y, Y is not known to **pred**”.

- (23) A: Who passed the exam?
 B: [Charles]_{CT} passed the exam. Patrick did too. But Ginevra didn't.
 B': ??[Charles]_F passed the exam. Patrick did too. But Ginevra didn't.
 (24) [Charles]_{CT/??F} passed the exam. But I don't know about Patrick and Ginevra.
 (25) A: Dare-ga siken-ni
 who-Nom exam
 ukat-ta-no?
 pass-Past-Q

⁴I believe that the exhaustive listing effect can be attributed to a generalized conversational implicature, namely the I-implicature “What is expressed simply is stereotypically exemplified” (which roughly corresponds to Grice's second Maxim of Quantity) and thus is cancelable (see Levinson 2000; see Kuno 1972, 1973, Kiss 1998, Hajičová et al. 1998 for discussion of the exhaustive listing effect).

B: Charles-wa ukat-ta. Patrick-mo ukat-ta. Demo Ginevra-wa ukaranakat-ta.
 Charles-CT pass-Past Patrick-also pass-Past but Ginevra-CT pass-Past
 B': ??Charles-ga ukat-ta. Patrick-mo ukat-ta. Demo Ginevra-wa
 Charles-Nom pass-Past Patrick-also pass-Past but Ginevra-CT
 ukar-anakat-ta.
 pass-Neg-Past

- (26) Charles-wa/??ga siken-ni ukat-ta. Sikasi, Patrick-to Ginevra-ni-kansite-wa
 Charles-CT/Nom exam pass-Past but Patrick-and Ginevra-as to
 sir-ana-i.
 know-Neg-Pres

Besides non-cancelability, there is another reason to believe that what is called RPI is not a mere implicature but a presupposition: it survives under negation, whereas the exhaustive listing effect does not.⁵

- (27) a. A: [Charles]_{CT} passed the exam.
 B: I don't think so. (Charles didn't pass it, either.)
 b. A: [Charles]_F passed the exam.
 B: I don't think so. (It is Patrick who passed the exam.)

To summarize, RPI cannot be assimilated either to a conversational implicature (as it is not cancelable) or the exhaustiveness effect (which I believe is a sort of conversational implicature) (as the former conveys a weaker indication than the latter), and should be treated as a part of the inherent semantics of CT. For these reasons, I will hereafter use the term Reversed Polarity Presupposition (RPP) instead of RPI. A formal representation of RPP will be developed in the following section.

2.2.2 CT PREFERENCE AND PRINCIPLE OF HIGHEST ATTACHMENT

Recall that according to Büring's analysis (i) CT-marking is preferred over F-marking when either is possible (Preference Principle), and (ii) a complete answer cannot involve CT-marking (Principle of highest attachment). These two principles are stipulated to predict the necessity/possibility of CT-marking, but they are not desirable nor necessary. First, the generalization (i) does not hold as it stands: in a discourse like the following, several CT- and F- marking configurations are equally felicitous, and the

⁵Komagata (2000) develops a similar argument for the presupposition inducing character of contrastive *wa*, though he does extend it to the notion of (or phenomena discussed under the name of) CT in general.

choice from these options doesn't seem to bring about significantly different implication.

- (28) A: Among Charles, Patrick and Ginevra, Who passed the exam?
 B: [Charles]_{CT} did, but [Patrick and Ginevra]_{CT} didn't.
 B': [Charles]_F did, but [Patrick and Ginevra]_F didn't.
 B'': [Charles]_F did, but [Patrick and Ginevra]_{CT} didn't.
- (29) Charles-wa ukat-ta-kedo, Patrick-to Ginevra-wa ukar-anakat-ta.
 Charles-CT pass-Past-but Patrick-and Ginevra-CT pass-Neg-Past
 Charles-ga ukat-ta-kedo, Patrick-to Ginevra-ga ukar-anakat-ta.
 Charles-Nom pass-Past-but Patrick-and Ginevra-Nom pass-Neg-Past
 Charles-wa ukat-ta-kedo, Patrick-to Ginevra-ga ukar-anakat-ta.
 Charles-CT pass-Past-but Patrick-and Ginevra-Nom pass-Neg-Past

As to (ii), as Büring admits, it is a rather *ad hoc* maneuver lacking an independent motivation.⁶ In fact, these two principles can be entirely dispensed with, given two independently attested factors i.e. RPP and the exhaustiveness effect. Namely:

(30) by RPP

- a. $\sharp$ (Among Charles, Patrick, and Ginevra) [Charles]_{CT} passed the exam, so did Patrick and Ginevra.
 b. $\sharp$ [All the students]_{CT} passed the exam.

(31) by the exhaustiveness effect

- a. ??[Charles]_F passed the exam, and Patrick did too.
 b. ??[Charles]_F passed the exam, but I don't know about Patrick.

On the other hand, (28B) is, satisfying all the conditions posed by RPP and exhaustiveness effect, predicted to allow both F- and CT- marking patterns.

⁶A previous version of this constraint (Büring 1997; terminology amended):

- (i) Given a sentence A, containing a contrastive topic, there must be at least one element Q in [A]^{ct} such that Q is still under consideration after uttering A.

does no better. Though such a principle seems to have somehow better grounds than the Principle of highest attachment (at least CT defined as such would be a useful tool to design information structure), it cannot explain the contrast between (ii) and (iii) (it would wrongly preclude (iii)).

- (ii) [All the students]_{CT} passed the exam.
 (iii) Speaking of Charles and Patrick, [Charles]_{CT} passed the exam but [Patrick]_{CT} didn't.

3 Contrastive Topic as an Paradigmatic Operator

In this section I develop a formal account of RPP, integrating it into the semantics paradigm of focus particles (or paradigmatic operators) like *only*, *even*, and *also*: namely, “[α]_{CT} **pred**” presupposes that “there is at least x : $x \neq \alpha$ such that x doesn’t **pred** is not known whether to **pred**”. I believe this presupposition is the core meaning of CT, which brings about ramifications like the uncertainty effect and the scope inversion phenomenon, which are to be discussed in this and the next sections.

As is mentioned above, how CT is realized varies among languages: in many languages including English, CT is marked by a specific intonation pattern, whereas in languages like Japanese and Korean, it is indicated by a morpheme that is homophonous to the so-called topic-marker (or, the form of the topic marker also has a use as CT-marker). I will first discuss the semantics of CT by drawing on data from Japanese, where the integrity of CT and focus particles is evident not only at the semantic level, but at the syntactic level, and then consider English examples.

3.1 Contrastive Topic Marker

It is broadly known that the particle *wa* in Japanese has two arguably distinct uses, namely the “thematic” use, which marks a constituent that stands as topic or thematic topic as opposed to the “comment”, and the “contrastive” uses. The thematic *wa*, unlike the contrastive *wa*, does not induce RPP.

- (32) Charles-wa, hoka-no kodomo-tati-to onazi-yoo-ni, bideo geemu-o site-i-ru .
 Charles-Top other-Gen child-with like video game-Acc do-Asp-Pres
 “Charles is playing a video game, just like the other children.”
- (33) Subete-no ningen-wa sis-u-beki sonzai de-a-ru.
 all-Gen human-Top die-Pres-bound to entity be-Pres
 “All men are mortal.”

Some other differences between the thematic and contrastive uses of the particle *wa* are listed below (cf. Kuno 1972, 1973, Miyagawa 1987, Noda 1996, Nakanishi 2000, 2001, Komagata 2000):

- (34) a. **(De)focalizability:** An element marked by the thematic *wa* cannot be phonologically focus-marked, while one associated with contrastive *wa* is typically focus-marked.⁷

⁷In Japanese, foci are marked by (i) deaccenting of the following words which is obligatory, and (ii) emphasis of word internal accent and (iii) high-tone over particles marking foci, which are optional. Hence, an occurrence of contrastive *wa* always can (but need not to) have a high-tone over it. (cf. Beckman and Pierrehumbart 1986, Kori 1987, 1997)

- b. **Position within a clause:** A thematic *wa* tends to appear at the sentence-initial position; when *wa* occurs twice or more in a same clause, the second or later occurrence must be contrastive.⁸
- c. **Restriction on distribution:** *Wa* in its thematic use cannot appear in some types of subordinate clauses (e.g. relative/adverbial clauses), whereas a contrastive *wa* has no such restriction.

Defocusing of a constituent associated with contrastive *wa* seems to be possible only if it is contextually established that the constituent is “contrasted to” some alternative (cf. Kadmon 2000, Ch.16 too).

- (35) A: Ginevra-wa Charles-ni-wa at-ta ga, Patrick-ni-wa awa-nakat-ta.
 Ginevra-Top Charles-Dat-CT meet-Past but Patrick-Dat-CT meet-Neg-Past
 ‘Ginevra saw Charles but not Patrick’
- B: Iya, Kim-ga Charles-ni-wa at-ta ga, Patrick-ni-wa
 no Kim-Nom Charles-Dat-CT meet-Past though Patrick-Dat-CT
 awa-nakat-ta.
 meet-Neg-Past
 ‘No, Kim saw Charles but not Patrick./It is Kim who saw Fred but not Patrick.’

In past studies, both two uses (sometimes only the contrastive use) of *wa* have been classified as a focus particle (FP; or in terms of the traditional Japanese grammar, *toritate-shi* (‘picking-up particles’)), along with *sae* ‘even’, *dake* ‘only’, and *mo* ‘also’ etc., based on the fact they have a host of common properties (cf. Numata 1986, Teramura 1991, Noguchi and Harada 1996, Komagata 2000):

- (36) **Morphosyntactic:**
 -has similar distributions to those of other FPs (*sae*, *mo*, *dake* etc.): e.g. obligatorily “alternates” nominative/accusative case-markers (*ga* and *o*) and agglutinatively attach to other particles (adpositions). (cf. (37))

Semantic:

- somehow “mention” to alternatives.
- is (usually) associated with focus.
- may take a variety of scope. (cf. (38))

⁸There are, however, alleged cases where the second occurrence of *wa* is not contrastive (cf. Noda 1996, pp.212-213).

- (37) a. Charles-wa Patrick-ni-wa hon-o age-ta.
Charles-Top Patrick-Dat-CT book-Acc give-Past
(cf. Charles-wa Patrick-ni-mo hon-o age-ta. ‘Charles also gave Patrick a book’)
- b. Charles-wa ki-ta.
Charles-CT come-Past
(cf. Charles-ga ki-ta. ‘Charles came.’/Charles-mo ki-ta. ‘Charles came too.’)
- c. Charles-wa Patrick-wa mi-ta.
Charles-Top Patrick-CT see-Past
(cf. Charles-wa Patrick-o mi-ta. ‘Charles saw Patrick.’/Charles-wa Patrick-mo mi-ta. ‘Charles saw Patrick too.’)
- (38) a. Ocha-mo non-da si, sake-mo non-da.
tea-also drink-Past and sake-also drink-Past.
‘(I/he) drank some tea, and drank some sake too.’
- b. Tabako-mo sut-ta-si, ocha-mo non-da.
cigarette-also smoke-Past-and tea-also drink-Past.
‘(I/he) smoked, and drank some sake too.’
(cf. Tabako-o sui-mo-si-ta-si, ocha-o nomi-mo-si-ta.)
- c. Ocha-wa non-da-ga, sake-wa nom-anakat-ta.
tea-CT drink-Past-but sake-CT drink-Neg-Past.
‘(I/he) drank some tea, but didn’t drink sake.’
- d. Tabako-wa sut-ta-ga, ocha-wa nom-anakat-ta.
cigarette-CT smoke-Past-but tea-CT drink-Neg-Past.
‘(I/he) smoked a cigarette, but didn’t drink sake.’
(cf. Tabako-o sui-wa-si-ta-ga, ocha-o nomi-wa-si-nakat-ta.)

In (37b), Not only the *mo*-marked NP *okasi* but the whole sentence except the topicalized subject, *okasi-wo tabeta* ‘ate some sweets’ is within the scope of *mo*. A similar observation holds for contrastive *wa* in (38b), i.e., what are contrasted are not “tea” and “cookie”, but rather “to drink tea” and “to eat cookies”. (The sentences in parentheses, where particles mark VP, unambiguously have the same interpretation but sounds somehow circumlocutory and less natural.) The treatment of contrastive *wa* as a focus particle also conforms to the generalization (35a) as it is a general property of focus particles that they are semantically associated with the focus in ordinary contexts.

Before considering the semantics of (contrastive) *wa* as a focus particle, let me sketch out the semantics of other focus particles like *even* and *also*. There have been proposed several analyses of focus particles (Rooth (1985), von Stechow (1990), and König (1991) among others), which share basic insights and which provide more or less unified treatment of focus particles. Here I adopt a semi-formal and framework neutral representation of FP, following König (1991) (for more elaborated analyses of focus particles, see references mentioned above), and assume that FPs take two arguments, the first a proposition abstract and the second the constituent associated with FP.

(39) FP $(\lambda x.P, y)$

Sentences containing focus particles generally express a bipartite statement, which is the conjunction of the meaning of the core sentence, and another proposition mentioning to the alternatives of the constituent associated with the focus particle. I will call the former the **core proposition** and the latter the **paradigmatic proposition**, respectively. A sentence containing *mo* or *also*, for example, presupposes its paradigmatic proposition (40c) and asserts its core proposition (40b):

(40) *mo* ‘also’

- a. $\text{mo } (\lambda x.\beta, \alpha)$
- b. $\beta(\alpha)$ (assertion)
- c. $\exists x : x \neq \alpha. [\beta(x)]$ (presupposition)

A sentence containing *dake* ‘only’, on the other hand, presupposes its core statement and asserts its paradigmatic statement.

(41) *dake* ‘only’

- a. $\text{dake } (\lambda x.\beta, \alpha)$
- b. $\beta(\alpha)$ (presupposition)
- c. $\forall x : x \neq \alpha. [\neg\beta(x)]$ (assertion)

The meaning of *sae* ‘even’ is less straightforward, in that it induces some semantic scale of informativeness, unlike other particles. Following Kay (1990), I assume that *sae* (and *even*) indicates that a proposition that involves it (“target proposition”) is more informative or stronger than some particular distinct proposition (“context proposition”). Given that the scale is a sort of set, the semantics of the *sae* can be approximated as follows:

(42) *sae* ‘even’ (alternative analysis after Kay 1990)

- a. *sae* ($\lambda x.\beta, \alpha$)
- b. $\beta(\alpha)$ (assertion)
- c. $\exists p. p = \{x \mid \forall x. [\text{informativeness}(\beta(\alpha)) > \text{informativeness}(\beta(x))]\} \neq \emptyset$
(presupposition)
- d. $\Leftrightarrow \exists p'. \forall x : x \in p' \wedge x \neq \alpha. \beta(x)$ where p' is a contextually salient, non-empty
“scale of informativeness”

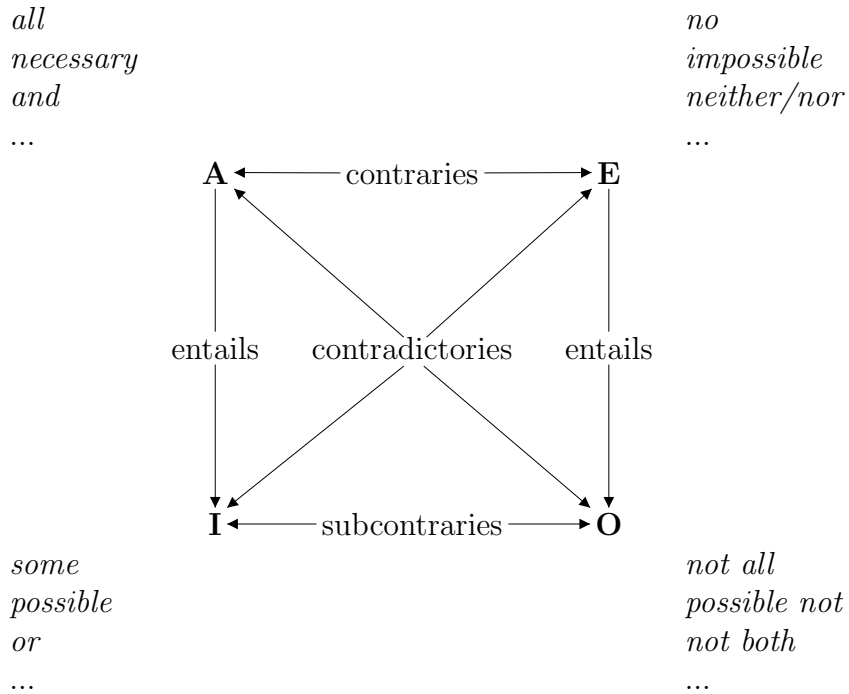
Note that p in (42c) is not necessary a “full” scale that covers all the (contextually appropriate) alternatives of the element associated with *sae* (i.e. any non-null subset of the set of alternatives would qualify as p), which makes it possible that some of the alternative propositions (the proposition abstract applied to the alternatives), whether they are more informative or less informative than the target proposition, have the polarity opposite to the target proposition, or be unspecified as to their truth.

- (43) Max-wa ika-sae tabe-ru-ga, kai-o tabe-na-i.
 Max-Top squid-even eat-Pres-but shellfish-Acc eat-Neg-Pres
 ‘Max even eats squid, but he doesn’t eat shellfish.’

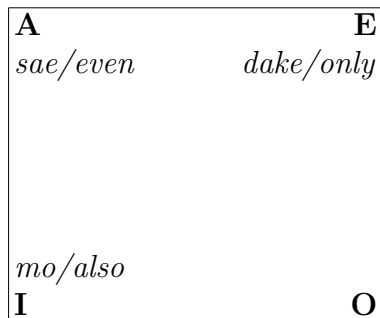
More simplistic analyses, e.g. where *sae* induces the presupposition “ $\forall x : x \neq \alpha. \beta(x) \wedge \text{informativeness}(\beta(\alpha)) > \text{informativeness}(\beta(x))$ ” would make wrong predictions in this regard.

It is easy to observe that these particles form their version of the square of opposition, as is illustrated in (45), although their semantics are not exactly symmetric to each other, given the inconsistency of the pairing of assertion-presupposition and core-paradigmatic statement and the scale inducing property of *sae* (so that the square is somehow “distorted”, so to speak).

(44) the Square of Opposition (cf. Levinson 2000, Ch.1, 2)



(45)



Now I believe it is quite a natural move to hypothesize that the semantics of contrastive topic might fit to the missing corner (O corner) of the square of opposition, and this actually is the analysis suggested by Noguchi and Harada (1996) (in passing) and Komagata (2000), which would be represented, with the notation adopted here, as follows.

(46) contrastive *wa* (tentative)

a. $wa (\lambda x.\beta, \alpha)$

- b. $\beta(\alpha)$ (assertion)
- c. $\exists x : x \neq \alpha. [\neg\beta(x)]$ (presupposition)

Although it provides a straightforward account of RPP, the semantic representation like (46), which renders *wa* in its contrastive use the exact mirror image of *mo* ‘also’, is not viable as it stands, because it cannot explain the contrast between (47a) and (47b).

- (47) a. Charles-wa ki-ta ga, hoka-no hito-ni-tuite-wa sir-ana-i.
 Charles-CT come-past but other people-as to know-Neg-Pres
 ‘Charles came, but I don’t know about the others.’
- b. ‡Charles-mo ki-ta ga, hoka-no hito-ni-tuite-wa sir-ana-i.
 Charles-also come-past but other people-as to know-Neg-Pres
 ‘Charles came too, but I don’t know about the others.’

The solution I propose is that the semantics of CT involves a weak negation in three-valued logic, which is defined as in the rightmost column in (49).

(48) contrastive *wa*

- a. $wa(\lambda x.\beta, \alpha)$
- b. $\beta(\alpha)$ (assertion)
- c. $\exists x : x \neq \alpha. [-\beta(x)]$ (presupposition)

(49) Variants of negation in the strong Kleene three-valued logic (cf. Rescher 1969)

P	¬P	⇒P	−P
T	F	F	F
I	I	F	T
F	T	T	T

The definition says that $−P$ is true just in case P is false or it is not known whether P is true or false. Of course, we may alternatively use different tools e.g. epistemic logic, but I believe that the 3-valued logic is the simplest yet sufficient for the present purpose.

According to the analysis shown in (48) contrastive *wa* is a quasi-subcontrary of *mo*,⁹ which makes an interesting and correct prediction that wrapping a sentence involving

⁹Note that this is an exception to the cross-linguistic generalization that the O ($\exists\neg$) corner of the square of opposition is not lexicalized; still, the contrastive *wa* in accordance to the generalization, in that it is not a form exclusively marking CT and arguably a derived or secondary use of the thematic

the contrastive *wa* by two negations makes it quasi-equivalent to a sentence involving also *mo*, and vice versa.

- (50) a. [Charles-wa ko-nakat-ta] to-iu-koto-wa-nai.
Charles-CT come-Neg-past it is not the case that
 $\simeq$ Charles-mo kita. ‘Charles came too.’
- b. [Charles-mo ko-nakat-ta] to-iu-koto-wa-nai.
Charles-also come-Neg-past it is not the case that
 $\simeq$ Charles-wa kita. ‘[Charles]_{CT} came.’
- (51) a. I don’t think [Charles]_{CT} didn’t come. $\simeq$ (I think) Charles came too.
- b. I don’t think Charles didn’t come either. $\simeq$ (I think) [Charles]_{CT} came.

The proposed analysis also accords with Ward and Hirschberg’s (1985) claim that the fall-rise contour in English conveys the “speaker uncertainty”.¹⁰

3.2 Contrastive Topic Contour

The semantic analysis of CT presented above is basically applicable to the CT contour in English, but there are several interesting differences between the possible CT marking patterns between English and Japanese, arguably because of the differences of the mode of CT-marking (morphological vs. intonational). Firstly, it seems that in English it is fairly rare that a sentence involves only a CT-marking but not another, ordinary focus besides it (see Roberts 1996), whereas it is fairly common that a constituent associated with contrastive *wa* stands as the only focus of a sentence (cf. Nakanishi 2000). Buring (1997, 2000), however, notes that sentences involving only contrastive topic are possible in English (but not in German (see Buring 1997, Ch.3)) as demonstrated in (51b) (underlines indicate deaccenting):

- (52) a. (Who ate what? –) [Fred]_{CT} ate [the beans]_F.
- b. (Who ate the beans? –) [Fred]_{CT} ate the beans/#did.
(cf. [Fred]_{CT} can.)

topic marker (cf. De Wolf 1983, for example; as far as I know, however, a clear answer has not been given to the question which function is primary from the diachronic perspective). It would be an interesting question whether there exist languages equipped with an exclusive form for the O corner member of the square of associative operators.

¹⁰Ward and Hirschberg (1985)’s proposition that the fall-rise contour in English always conveys the “speaker uncertainty” as a conventional implicature, however, seems to be strong, given counterexamples like (28B).

Another difference is that whereas in Japanese CT can be a non-focus, English does not allow a deaccented CT, i.e. CT in English must be a focus.

- (53) A: Charles-wa chuugoku-go-wa hanas-e-ru (ga, nihon-go-wa
Charles-Top Chinese-CT speak-can-Pres but Japanese-CT
hanas-e-na-i.)
speak-can-Neg-Pres
B: Iya, Fred-ga chuugoku-go-wa hana-se-ru.
no Fred-Nom Chinese-CT speak-can-Pres

- (54) A: Charles can speak [Japanese]_{CT}.
B: #No, Fred can speak [Japanese].
(H*)L-H%

I suppose this is because the pattern indicating contrastive topic, H*L-H%, cannot be decomposed into two parts (say, a CT marking part and a focus marking part) (contra Büring 2000) but it indicates the complex of contrastive topic and focus marking as a whole.

Finally, CT-marking in English has a more restricted syntactic distribution compared to that in Japanese. For example, it is impossible for a contrastive topic to mark a constituent within a relative clause, and (56) sounds odd, least to say.

- (55) [(Charles-wa mi-nakat-ta ga,) Patrick-wa mi-ta] eiga
Charles-CT see-Neg-Past but Patrick-CT see-Past movie
'The movie that Patrick (but not Charles) saw'

- (56) #This is the movie that [Charles]_{CT} (but not Patrick) saw.

As noted above, such differences should be attributed to idiosyncratic constraints to device used for CT-marking (i.e. intonation patterns), as the data from Japanese suggest that cases like (53B) and (55) are not deficient as long as the semantics concerns.

4 Ramifications of Reversed Polarity Presupposition

This section is about two phenomena pertaining to the contrastive topic, which are given a straightforward account by the proposed analysis. The first is what I tentatively call the scalar interpretation of contrastive topic, and the second the scope inversion (between a universal quantifier and a negation) apparently associated with CT-marking.

4.1 Scalar Interpretation

There are alleged cases of “scalar interpretation” of contrastive *wa*, which are exemplified in the following (cf. Ward and Hirschberg 1985, Teramura 1991):

- (57) a. 3-nin-wa ki-ta.
 3-classifier-CT come-Past
 ‘Three men came.’
- b. Yuushuu-na gakusei-wa kono mondai-o tok-e-ru.
 good student-CT this problem-Acc solve-can-Pres
 ‘Good students can solve this problem.’

Teramura (1991) notes that when *wa* marks a NP denoting a non-specific quantity/number, that NP indicates the meaning of “at least” (ibid., pp.40-1). But what is the meaning of “at least”? The semantic contribution of *at least* modifying a quantifier is virtually vacuous, given that in general “at least N(umeral) **pred**” is entailed by “N **pred**” (e.g. “Three men came” entails “At least three men came”): however, at the level of pragmatics, it has an effect to suppress the I-implicature (cf. Levinson 2000), explicitly mentioning the possibility that alternative propositions with larger numerals (or more generally, higher members of the relevant scale) might hold.

- (58) a. 3-nin-ga ki-ta.
 3-classifier-Nom come-Past
- b. Three men came.
- c. +> Exatly three men came.
- (59) a. Sukunaku-tomo 3-nin-ga ki-ta.
 At least 3-classifier-Nom come-Past
- b. At least three men came.
- c. +> Possibly more than three men came.

Now, if we look at the assertion and presupposition of (57a) where CT is associated with the numeral (three), it asserts that (60a), three men came, and presupposes (60b).

- (60) a. 3 men came.
- b. $\exists x : x \in \{1, 2, 3, 4, 5, \dots\}. [x \neq 3 \wedge -(x \text{ men came})]$

- c. $\exists x : x \in \{\text{1, 2, 3, 4, 5, ...}\}. [\neg(x \text{ men came})]$

But as (60a) logically entails that two men came and one man came, (60b) is virtually equivalent to (60c), and (57c) can thus be paraphrased as “[3 men came] $\wedge$ ($\neg$ [4 men came] $\vee$ $\neg$ [5 men came] $\vee$ $\neg$ [6 men came] $\vee$...)”: this is not semantically equivalent to the meaning of (59a) but not surprisingly it shares the same pragmatic effect with sentences with a *at least* phrases modifying numerals, involving explicit reference to alternative propositions and leave their truth value open. CT and *at least* phrases are, as it were, two different strategies to avoid the implicature caused by a neutral, unmarked utterance like (58a).

4.2 Scope Inversion

Another interesting phenomenon related to the contrastive topic is that it appears to cause the inversion of the scopal relation between a universal quantifier and a negation, as is shown in (61) and (62).

- (61) a. [All students]_F didn’t come. ($\forall\neg, ?\neg\forall$)
 b. [All students]_{CT} didn’t come. ($\neg\forall, *\forall\neg$)
- (62) a. Subete-no gakusei-ga ko-nakat-ta. ($\forall\neg, ?\neg\forall$)
 all student-Nom come-Neg-Past
 b. Subete-no gakusei-wa ko-nakat-ta. ($\neg\forall, *\forall\neg$)
 all student-CT come-Neg-Past

Büring (1997) proposed that this phenomenon can be explained using the notion of topic value and the discourse principle presented in Section 2: he assumes that the sentence “all men did not come” itself allows two readings, and the contrastive topic marking makes infelicitous the reading where *all* takes a wide scope over *not*, to the effect that only the other reading is possible. My analysis allows a similar line of explanation, as the CT-marking on “all students” is bound to cause presupposition failure, as illustrated in (63).

- (63) a. all students not-came
 b. $\exists x : x \in \{\text{all, all but one, most, many, ... , one}\}. [x \neq \text{all} \wedge \neg(x \text{ students came})]$
 c. $\exists x : x \in \{\text{all, all but one, most, many, ... , one}\}. [\neg(x \text{ students came})]$

That all students are non-comers entail that for every quantifier Q on the scale of quantifiers (à la Horn), Q students are non-comers, so that the existential requirement in the presupposition (63b), which is induced by the contrastive topic marking cannot be satisfied. The other reading, where the negation takes a wider scope, is exempt from this problem and thus it is the only possible reading.

5 Summary

In this paper, I argued that the semantics of contrastive topic (CT), which is commonly treated as a discourse related notion on a par with topic and focus, can be integrated to that of a paradigm of focus particles, showing evidence from CT related phenomena, namely, reversed polarity presupposition, scalar implicature, and scope inversion. The present work has advantages over previous analysis (Roberts 1996, Büring 1997, 1999, 2000, Kadmon 2001), providing more straightforward and/or empirically adequate account of phenomena pertaining to CT.

The proposed analysis, that CT-marked proposition presupposes either the denial or suspension of (at least one of) its alternative propositions (provided that the speaker knows whether they hold) gives straightforward account of the reversed polarity presupposition, and at the same time it conforms to Ward and Hirschberg's (1985) observations that the fall-rise contour in English conveys the speaker uncertainty. The scalar implicature or "at least" interpretation of CT directly follows as well, as a proposition involving a CT-marked element explicitly leaves open whether alternative propositions hold where the CT-marked element is substituted by other elements outranking it in the relevant scale. Finally, the proposed analysis also explains the interaction of (contrastive) topic and scope inversion phenomenon, without postulating an additional discourse condition like the disputability requirement.

References

- Beckman, Mary E. and Gayle Ayers Elam (1997) *Guidelines for ToBI Labelling* v.3.
- Beckman, Mary E. and Pierrehumbert, Janet D. (1986) "Intonational Structure in Japanese and English" in *Phonology Yearbook* 3, 255-309.
- Büring, Daniel (1995) "The Great Scope Inversion Conspiracy", *SALT* V, 37-53.
- Büring, Daniel (1997b) *The Meaning of Topic and Focus – The 59th Street Bridge Accent*, Routledge.
- Büring, Daniel (2000) "On D-Trees, Beans, and B-Accents", ms. UCLA, available from <http://www.linguistics.ucla.edu/people/buring>.

- Carlson, Lauri (1983) *Dialogue Games: An Approach to Discourse Analysis*, Reidel, Dordrecht.
- Choi, Hye-Won (1999) *Optimizing Structure in Context*, CSLI.
- É. Kiss, Katalin (1998) “Identificational Focus versus Information Focus”, *Language* 74(2), 245-273.
- Gazdar, Gerald J. M. (1979) *Pragmatics: Implicature, Presupposition, and Logical Form*, Academic Press.
- Hajičová, Eva, Barbara H. Partee and Petr Sgall (1998) *Topic-Focus Articulation, Tripartite Structures, and Semantic Content*, Kluwer.
- Horn, Lawrence R. (1972) *On the Semantic Properties of Logical Operators in English*, Ph.D. dissertation, UCLA.
- Horn, Lawrence R. (1989) *A Natural History of Negation*, Stanford University Press.
- Jackendoff, Ray S. (1972) *Semantic Interpretation in Generative Grammar*, MIT Press.
- Kadmon, Nirit (2001) *Formal Pragmatics*, Blackwell.
- Karttunen, Lauri and Stanley Peters (1979) “Conventional Implicature”, in Choon-Kyu Oh and David A. Dinneen (eds), *Syntax and Semantics 11: Presupposition*, Academic Press.
- Kay, Paul (1990) “Even”, *Linguistics and Philosophy* 13, 59-111.
- Kitagawa, Chisato (1982) “Topic Constructions in Japanese”, *Lingua* 57, 175-214.
- Kleene, Stephen C. (1952) *Introduction to Metamathematics*, Elsevier.
- Komagata, Nobo (2000) “Contrastive Function of the Japanese Particle *wa*”, Draft of July 21, 2000, available from <http://www.cis.upenn.edu/~komagata/papers.html>; an earlier version presented at NECSS 98, Ithaca, NY.
- König, Ekkehard (1991) *The Meaning of Focus Particles*, Routledge.
- Kori, Shiro (1987) “Kyôtyô to intonêsyon (Emphasis and intonation)” in Miyoko Sugito (ed.) *Kôza nihongo to nihongokyôiku – nihongo no onsei to onin* (Lecture on Japanese and Japanese-language education – Japanese Phonetics and Phonology) vol.1, Meiji Shoin, 316-342.

- Kori, Shiro (1997) “Nihongo no intonêsyon – kata to kinô (Intonation in Japanese – Patterns and Function)” in Tetuya Kunihiro (ed.) *Akusento, intonêsyon, rizumu to pôzu, Sanseido* (Accent, intonation, rhythm and pause), 169-202.
- Kuno, Susumu (1972) “Functional Sentence Perspective: A Case Study from Japanese and English”, *Linguistic Inquiry* 3(3), 269-320.
- Kuno, Susumu (1973) *The Structure of Japanese Language*. MIT Press.
- Lee, Chungmin (1999a) “Contrastive Topic: A Locus of the Interface.” in K. Turner (ed.) *The Semantics/Pragmatics Interface from Different Points of View*, Elsevier Science.
- Lee, Chungmin (1999b) “Topic, Contrastive Topic and Focus: What’s on Our Minds”, plenary paper presented at the second international conference on cognitive science, Waseda, Tokyo.
- Lee, Chungmin (2000) “Contrastive Predicates and Conventional Scales”, *CLS* 36-1.
- Miyagawa, Shigeru (1987) “*Wa* and the WH Phrase”, in John Hinds, Senko K. Maynard, and Shoichi Iwasaki (eds.) *Typological Studies in Language vol.14 Perspectives on Topicalization: the Case of Japanese Wa*, John Benjamins Publishing Company, 185-217.
- Nakanishi, Kimiko (2000) “Prosody and Information Structure in Japanese: a Case Study of Topic Marker *wa*” in *Japanese/Korean Linguistics 10*. Stanford: CSLI.
- Nakanishi, Kimiko (2001) “Prosody of Topic/Focus and Scopal Effects in Japanese”, paper presented at The Workshop in Intonation and Meaning, University of California at Santa Barbara.
- Noda, Hisashi (1986) “Hukubun ni okeru *wa* to *ga* no kakarikata (Dependency patterns of *wa* and *ga* in complex clauses)”, *Nihongogaku* 5-2, 33-43.
- Noda, Hisashi (1996) *Wa to Ga (Wa and Ga)*, Kurosio Publisher.
- Noguchi, Naohiko and Yasunari Harada (1996) “Toritate-josi no kinô to kaisyaku (Function and Interpretations of Focus Particles)” in Gunji Takao (ed.) *Seiyaku ni motozuku Nihongo no kôzô no kenkyû* (Constraint-based Studies on the structure in Japanese, *The International Research Center for Japanese Studies Nichibunken Japanese studies series* 10).

- Numata, Yoshiko (1986) “Toritate-si (Focus particles)”, Ch.2 of Okutsu, Keiichiro, Yoshiko Numata, and Takeshi Sugimoto (eds.) *Iwayuru nihongo josi no kenkyû* (Studies on so-called particles in Japanese), Kurosio Publisher.
- Rescher, Nicholas (1969) *Many-valued Logic*, McGraw-Hill.
- Roberts, Craige (1996) “Information Structure in Discourse: towards an Integrated Formal Theory of Pragmatics” in J. Hak Yoon and A. Kathol (eds.), *Ohio State University Working Papers in Linguistics* 49.
- Rooth, Mats (1985) *Association with Focus* Doctoral Thesis, University of Massachusetts.
- Rooth, Mats (1992) “A Theory of Focus Interpretation”, *Natural Language Semantics* 1.1, 75-116.
- Rooth, Mats (1996) “Focus”, in Shalom Lappin (ed.), *Handbook of Contemporary Semantic Theory*, Blackwell, 271-91.
- von Stechow, Arnim (1990) “Focusing and Backgrounding Operators” in Werner Abraham (ed.) *Discourse Particles*, John Benjamins, Amsterdam, pp.37-84.
- Teramura, Hideo (1991) *Nihongo no sintakusu to imi* (Japanese Syntax and Semantics) III, Kurosio Publisher.
- Vallduví, Eric (1992) *The Informational Component*, Garland, New York.
- Ward, Gregory and Julia Hirschberg (1985) “Implicating Uncertainty: The Pragmatics of Fall-Rise Intonation” *Language* 61(4), 747-776.