A New Approach to Contrastive Topic: Partition Semantics and Pragmatics

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1. Introduction

To the semantics and pragmatics of contrastive topic, there have been two approaches proposed in the literature: one is to take contrastive topic as an information-structural discourse regulating notion on a par with focus (Roberts 1996, Büring 1999, Kadmon 2001) and the other is to analyze a contrastive marker, phonetic or morphological as an focus-sensitive operator with its inherent semantic and pragmatic content (Lee 1999, 2006, Hara 2006, Oshima 2002). In the current work, we will review the two approaches and show that both of them have empirical problems; then, we will present an alternative analysis of contrastive topic couched in the so-called partition semantics of questions proposed by (Groenendijk & Stokhof 1984, Groenendijk 1999). It will be seen that the proposed analysis has the best of both worlds so to speak, being empirically more adequate than the existing analyses of either approach. A word is in order about the marking of Contrastive Topic. Crosslinguistically, there are more than one way of marking CT; by means of, e.g. a morpheme like *–wa* in Japanese and *–nun* in Korean and H*LH% or L+H*LH% tone (Pierrehumbert 1980) in English. In the following, a CT-marked constituent is marked with subscript CT or a CT-marker morpheme (*wa* in Japanese).

2. Two Existent Approaches to Contrastive Topic

2.1. CT as an information-structural discourse-regulating device
(Roberts 1996, Büring 1999, Kadmon 2001)

Consider the question-answer discourse in (1). It is intuitively clear that CT has much to do with the fact that the questions and the answer are congruent with each other as they occur in the order in which they do. The congruence can be described as follows: (1c) directly answers (1b), and (1b) is a sub-question of (1a), or to use Robert's terms, (1b) is part of "strategy of inquiry" aimed at answering (1a).

(1)   a.   Who kissed whom?
       b.   Well, who did Larry kiss?
       c.   [Larry]$_{CT}$ kissed [Nina]$_F$

Büring proposed that a contrastive topic induces a third type of semantic value besides ordinary and focus semantic values, called *topic* semantic value. He proposed that the topic semantic value of an expression is the set of alternatives of the focus semantic value in the sense of Rooth (1985, 1991). Then, the topic semantic value of a declarative sentence is a set of sets of propositions, i.e. a set of questions; the topic semantic value of (1c) is (2).

(2)   {'Who did Larry kiss?', 'Who did Bill kiss?', 'Who did John kiss?', …}

Kadmon (2001) argued the focus and the topic semantic values for (1c) can account for the congruence in question; first, the focus semantic value of (1c) being equal to the ordinary value of (1b) is considered to be a formal semantic characterization of (1c) being a direct answer to (1b), and second, (1b) being an element of the topical semantic value of (1c), which is the set of the subquestions of (1a) accounts for the intuition that (1c) answers (1b) as part of "strategy of inquiry" aimed at answering (1a).

The above analysis of CT as an information-structural discourse-regulating device seems to be very successful as long as it is applied to sentences with one instance of CT and one instance of focus like (1c). However, in Japanese, there are simply garden-variety examples with more than one instance of CT and/or with no instance of focus like (3).[1] The apparent problem here is that the denotation type of topic semantic value, i.e. a set of questions cannot be assigned to such examples.

(3)   Jon-wa   Mearii-wa   Biru-ni-wa   shookai-shi-ta.
       John-CT   Mary-CT   Bill-to-CT   introduction-do-Past
       'John$_{CT}$ introduced Mary$_{CT}$ to Bill$_{CT}$.'

2.2 CT as a focus-sensitive operator

2.2.1 Lee (1999, 2006) & Hara (2006)

The other approach takes CT to be a focus-sensitive operator on a par with particles like English *even*, *only*, and *also*, or their counterparts in the other languages. Lee (1999, 2006) and Hara (2006) proposed the following analysis of CT:

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[1]Noah Constant (p.c.) informed me that in English, he can think of examples that have two CT's without a focus, but he hasn't seen any examples with three CT's.

(4)   *Semantics and Pragmatics of CT as a Focus-Sensitive Operator*

     a. $CT(\langle \beta, \alpha \rangle)$ (semantic representation)
     b. $\beta(\alpha)$ (assertion)
     c. $\exists x[x \neq \alpha \wedge \neg[\beta(x)]]$. (conventional implicature)

A word is in order about the notations in (4). First, in (4a), which is the semantic representation of a sentence with a CT, $\langle \beta, \alpha \rangle$ is the structured meaning of the sentence with β and α being the background and the focus parts, respectively. Second, in (4b), which is the assertion of the sentence, $\beta(\alpha)$ is the result of function-applying β to α or α to β whichever is possible, being the ordinary semantic meaning of the sentence. The part of (4c) is supposed to capture the so-called "Reversed Polarity Implicature" (henceforth RPI) of CT; a sentence with a CT-marked constituent tends to imply a "contrasting" sentence with the constituent replaced with an alternative and of the opposite polarity. However, the matter of fact is that the alleged implicature can be absent as seen in (5), which should not be the case if it were really a conventional implicature.

(5)   Jon-wa   kita   ga   sonohokano   hito   nikanshitewa   shira-nai.
       John-CT   came   but   the other   people   about   know-not
       '[John]$_{CT}$ came, but as for the other people, I don't know.'

2.2.2 Oshima (2002)

The above problem, in fact, can be got around by Oshima's (2002) variant in which the pragmatic feature of a CT sentence is not a conventional implicature, but the presupposition that there is some alternative to the CT-marked constituent such that it is not known that it has the property denoted by the background part, formalized as in (4c′).

(4)   c′. $\exists x[x \neq \alpha \wedge -[\beta(x)]]$ (presupposition), where $-$ is a weak negation in
         three-valued logic.

However, it is doubtful that (4c′) is a presupposition of a CT-sentence. Consider the following question-answer dialog:

(6)   Q: Dare-ga   paatii-ni   ki-mashi-ta   ka.
         who-Nom   party-to   come-Polite-Past   Q
         'Who came to the party?'
       A: Jon-wa   ki-mashi-ta   (kedo).
         John-CT   come-Polite-Past   (but)
         'John$_{CT}$ came.'

According to (4c′), at the time of the utterance of (6A), it would be presupposed that somebody other than John is not known to have come to the party or not. From which it follows that the questioner would be required to have the presupposition. However, the matter of fact is that simply, the utterance of (6A) is perfectly felicitous in contexts where she does not have the presupposition, or is rather more natural without the presupposition.

Independently of Oshima (2002), Hara & van Rooij's (2007) proposed a very similar analysis. They proposed that CT should have as its pragmatic component the following implicature, which is reformulated in our terms as in (4c″):

(4)   c″. $\exists x[x \neq \alpha \wedge \neg \mathsf{K}_{sp}[\beta(x)]]$ (implicature)

In (4c″), K_{sp} is an epistemic operator and '$\mathsf{K}_{sp}\phi$' is read as "the speaker knows that ϕ". (4c″) is different from (4c′) only in that the absence of the relevant knowledge is required only of the speaker and the requirement is a conventional implicature, not a presupposition. However, it is as easy to find counterexamples for Hara & van Rooij's version as for Oshima (2002). Consider the following scenario. A test was administered to a class of pupils, the teacher knows of all the pupils who passed the test or not, and the father of Mary, a pupil, who is rather nosy, asks the teacher who passed the test. To the question, the teacher can answer perfectly felicitously as in (7).

(7)   Mearii-wa   goukakushimashi-ta   ga,
         Mary-CT   pass (the test)-Past   but

         (hokano   seito   nikanshitewa   iemase-n.)
         other   pupils   as to   can-tell-not
         'Mary$_{CT}$ passed the test, (but I can't tell as to the others if they passed it or not).'

In (7), the speaker, i.e. the teacher knows of all the students including Mary if they passed the test or not, but she can felicitously utter "Mary$_{CT}$ passed the test", which is contradictory to Hara & van Rooij's prediction. The use of CT in (7) is not so much characterized as ignorance on the part of the speaker as confidentiality, or secrecy.

The fact that the implicational/presuppositional features of CT sentences are very elusive, or hard to identify, I claim, suggests that they are not inherent attributes of the meaning of CT, but epiphenomena arising from some unique feature of CT in conjunction with their particular uses. Along the line of this view, I will propose a novel approach to CT in the following section. Before we move on to the new approach, let us review that CT sentences like (3) are problematic to the currently reviewed approach as well.

Let us summon (3) again.

(3)   John   wa   Mary   wa   Bill   ni   wa   shookai-shi-ta.
       CT   CT   to   CT   introduction-do-Past
       'John$_{CT}$ introduced Mary$_{CT}$ to Bill$_{CT}$.'

In the current approach, which views CT as a focus-sensitive operator, (3) will necessarily be taken to have three instances of the operator, so the semantic representation will be alleged to be something as in (8).

(8) $CT(\langle \lambda x.CT(\langle \lambda y.CT(\langle \lambda z.\text{INTRDUCED-TO}(x, y, z), bill\rangle), mary\rangle), john\rangle)$

Simply, it is by no means clear what (8) would mean in any of the analyses along with the current approach, or more seriously what implicature or presupposition (8) would be associated with.

In the next section, we will propose an alternative approach to CT that can capture the insights of both of the existing approaches, yet will be free from the problems to them.

3. Alternative Approach: Partition Semantics and Pragmatics of Contrastive Topic

3.1. Partition Semantics and Pragmatics of Question and Answer: Groenendijk (1999), Groenendijk & Stokhof (1984)

In this section, we will briefly review a semantic framework in which our current analysis of CT will be couched. It is a dynamic-semantic analysis of question and answer; specifically, one presented in Groenendijk (1999). The gist of the analysis is that not only indicative sentences but also interrogative sentences are interpreted as context change potentials (CCP). To accommodate interrogative sentences, contexts cannot be simply sets of possible worlds as in Stalnaker (1978); instead, they are now defined as equivalence relations on a set of possible worlds as follows:

(9)   Definition (*Context*)

       A context is an equivalence relation on a subset of the set of possible worlds.

       To define the CCP of an interrogative sentence we first specify the *abstract*, or *predicate* meaning of the interrogative sentence.

(10)   Definition (*Abstract, or Predicate Meaning of an Interrogative*)

The predicate meaning of an interrogative sentence is a lambda abstract binding the variables substituted for the WH-phrases in the interrogative sentence. (When there is no WH-phrase, i.e., the interrogative sentence is a YES-NO question, the predicate meaning is a proposition denoted by the corresponding declarative sentence.)

The predicate meanings of interrogative sentences will be illustrated with the following examples:

(11)

	Interrogative sentences	Predicate meanings
a.	'Who came to the party?'	$\lambda x.\text{came-to-the-party}'(x)$
b.	'Who bought what?'	$\lambda y \lambda x.\text{bought}'(x, y)$
c.	'Who ate what at which place?'	$\lambda z \lambda y \lambda x.\text{ate-at}'(x, y, z)$
d.	'Did John come to the party?'	$\text{came-to-the-party}'(j)$

In general, when there are *n* WH-phrases in an interrogative sentence, the predicate meaning of the interrogative sentence is an *n*-place predicate; notably, when there is no WH-phrase, i.e., the interrogative sentence is a YES-NO question as in (11d), the predicate meaning is a 0-place predicate, i.e. a proposition. In terms of structured meaning approach to focus, the predicate meaning of an interrogative sentence coincides with the background part of the background-focus meaning.

Now that contexts and predicate meanings of interrogative sentences have been defined, we can proceed to define CCPs of interrogative sentences.

(12)   Definition (Context Update by Interrogatives)

Suppose that $\lambda \vec{x} \phi$ is the abstract meaning of an interrogative and C is a context. The update of C by the interrogative, denoted $C + \lambda \vec{x} \phi$ is defined as follows:

$$C + \lambda \vec{x} \phi = \{\langle w, w' \rangle \in C : [\![\lambda \vec{x} \phi]\!]^{w} = [\![\lambda \vec{x} \phi]\!]^{w'} \}.$$

In words, given a context C and an interrogative sentence whose predicate meaning is $\lambda \vec{x} \phi$, updating C with the utterance of interrogative sentence turns C into an equivalence relation between possible worlds with respect to their extensions of $\lambda \vec{x} \phi$. In terms of partition, C will be partitioned into the cells of possible worlds such that every possible world in each cell has the same extension of $\lambda \vec{x} \phi$ with one another.

Let us illustrate how the update works diagrammatically. Suppose that C is a context in which w_1, w_2, and w_3 are compatible with what has been known so

far, i.e., $C = \{\langle v, u \rangle : v, u \in \{w_1, w_2, \text{and } w_3\}\}$, which is represented as in (13).

(13)

$$C = \begin{cases} \langle w_1, w_1 \rangle & \langle w_2, w_1 \rangle & \langle w_3, w_1 \rangle \\ \langle w_1, w_2 \rangle & \langle w_2, w_2 \rangle & \langle w_3, w_2 \rangle \\ \langle w_1, w_3 \rangle & \langle w_2, w_3 \rangle & \langle w_3, w_3 \rangle \end{cases}$$

Suppose, furthermore, that John came to the party in worlds w_1 and w_2 and he didn't in w_3. Then, the update of C with the utterance of 'Did John come to the party?', whose predicate meaning is **came-to-the-party′(j)** results in the following context, C', which is diagrammed as in (14).

(14)

$$C + \text{came-to-the-party}′(j) = C' = \begin{cases} \langle w_1, w_1 \rangle & \langle w_2, w_1 \rangle \\ \langle w_1, w_2 \rangle & \langle w_2, w_2 \rangle \\ & & \langle w_3, w_3 \rangle \end{cases}$$

In the form of partition, C' is diagrammed as in (15).

(15)

$$C + \text{came-to-the-party}′(j) = C' = \boxed{\begin{array}{l} \text{(the set of possible worlds where)} \\ \text{John came to the party} \\ \hline \text{(the set of possible worlds where)} \\ \text{John didn't come to the party} \end{array}}$$

Having reviewed how a context is to be updated with an interrogative sentence, let us move on to the case of indicative sentence. The CCP of an indicative sentence is defined as in (16).

(16)   Definition (Context Update by Indicatives)

Suppose that ψ is the meaning of an indicative sentence and C is a context. The update of C by the indicative sentence denoted $C + \psi$ is defined as follows:

$C + \psi = \{\langle w, w' \rangle \in C: [\![\psi]\!]^w = [\![\psi]\!]^{w'} = 1\}$.

What the utterance of an indicative sentence does to a context is to eliminate from

C, the ordered pairs of possible worlds such that the indicative sentence is false in one or both of the possible worlds. In terms of partition, it eliminates from a partition, the cells of possible worlds in which the indicative sentence is false.

Let us illustrate the update of a context with the utterance of an indicative sentence as defined in (16) going over some examples. Recall context C′, which has been updated with 'Did John come to the party?', i.e. (14), a set of ordered pairs of possible worlds, or equivalently, (15), a partition of a set of possible worlds. The update of C′ with e.g. (17) '(Yes,) John came to the party' (**came-to-the-party′(j)**) will be illustrated as in (18) and (19), where John came to the party in possible worlds w_1 and w_2, but not in w_3.

(17)   (Yes,) John came to the party: came-to-the-party′(j)

$$(18) \quad C': \left\{ \begin{array}{ll} \langle w_1, w_1 \rangle & \langle w_2, w_1 \rangle \\ \langle w_1, w_2 \rangle & \langle w_2, w_2 \rangle \\ & \langle w_3, w_3 \rangle \end{array} \right\} + (17) = \left\{ \begin{array}{ll} \langle w_1, w_1 \rangle & \langle w_2, w_1 \rangle \\ \langle w_1, w_2 \rangle & \langle w_2, w_2 \rangle \\ \end{array} \right\}$$

(19)

C′:	John came to the party		+ (17) =	John came to the party
	John didn't come to the party			

Next, let us go over the case of a WH-question. In the following, we will solely adopt the partition format for the ease of illustration. Suppose that C is to be updated with e.g. (11a), an interrogative sentence with one occurrence of WH-phrase, which will be reproduced here as (20), resulting in C″ in (21). There, it is assumed that John and Mary are the only relevant people to consider whether they came to the party or not, and the block with $\{a_1, a_2, \ldots, a_n\}$ represents the cell for the set of possible worlds in which $a_1, a_2, \ldots, a_n$ and only $a_1, a_2, \ldots, a_n$ came to the party.

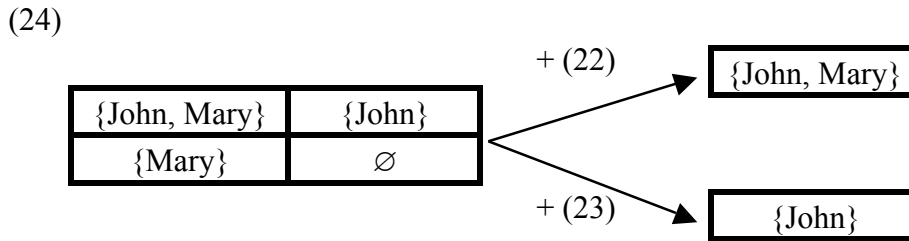(20)   'Who came to the party?': $\lambda x.\text{came-to-the-party}'(x)$

(21)

C″ =	{John, Mary}	{John}
	{Mary}	∅

The results of updating C″ with e.g. (22) and (23) will be as shown in (24)[2].

(22)   Meari to   Jon-ga   ki-mashi-ta.
        Mary   and   John-Nom   come-Polite-Past
        'Mary and John came.'

(23)   Jon-ga   ki-mashi-ta.
        John-Nom   come-Polite-Past
        'John came.

(24)

{John, Mary}	{John}
{Mary}	∅

+ (22) → {John, Mary}

+ (23) → {John}

Following is the case of a WH-question with two WH-phrases:

(25)   Dare-ga   nani-o   tabe-mashi-ta   ka.
        who-Nom   what-Acc   eat-Polite-Past   Q
        'Who ate what?'

Suppose that the domains of the eaters and the eatees relevant here are {John, Mary} and {hamburger, salad}, respectively. Then, the context resulting from updating C with (25) will be something as in (26) in terms of partition, where each cell represents the set of possible worlds in which for each ordered pair, the person of the first coordinate ate the foods of the second coordinate and no other eating events obtained.

(26)

$\langle j,\{h,s\}\rangle,\langle m,\{h,s\}\rangle$	$\langle j, \{h\}\rangle,\langle m, \{h, s\}\rangle$	$\langle j, \{s\}\rangle,\langle m, \{h, s\}\rangle$	$\langle j, \varnothing\rangle,\langle m, \{h, s\}\rangle$
$\langle j, \{h, s\}\rangle,\langle m, \{h\}\rangle$	$\langle j, \{h\}\rangle,\langle m, \{h\}\rangle$	$\langle j, \{s\}\rangle,\langle m, \{h\}\rangle$	$\langle j, \varnothing\rangle,\langle m, \{h\}\rangle$
$\langle j, \{h, s\}\rangle,\langle m, \{s\}\rangle$	$\langle j, \{h\}\rangle,\langle m, \{s\}\rangle$	$\langle j, \{s\}\rangle,\langle m, \{s\}\rangle$	$\langle j, \varnothing\rangle,\langle m, \{s\}\rangle$
$\langle j, \{h, s\}\rangle,\langle m, \varnothing\rangle$	$\langle j, \{h\}\rangle,\langle m, \varnothing\rangle$	$\langle j, \{s\}\rangle,\langle m, \varnothing\rangle$	$\langle j, \varnothing\rangle,\langle m, \varnothing\rangle$

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[2]Here it is assumed that sentences (22) and (23) are interpreted exhaustively as they share the same focus structure with (20).

3.2. Partition Semantics and Pragmatics of Contrastive Topic

Now that we have reviewed the partition semantics of questions and answers presented in Groenendijk (1999), I will propose to apply it for a novel analysis of contrastive topic. The thesis is intuitively as follows. The use of a sentence with contrastive topics "presupposes" a question under discussion (QUD), explicit or implicit; however, the sentence does not directly answer the QUD, but a "sub-question" derived from the QUD by restricting the values of the WH phrases to the denotations of the contrastive topics. The implicational/presuppositional features observed surrounding CT are to be attributed to reasons why the speaker opts to answer the sub-question instead of the QUD.

   Following is our analysis of the semantics and the pragmatics of CT. First is the semantic component:

(27)   *Semantics of CT*

       Suppose that

       (i)   γ is a sentence with CT marked phrases,

       (ii) ?-γ is the interrogative sentence directly corresponding to γ in that
             only the focused phrases are replaced by the corresponding
             WH-phrases and if there are no focused phrase, ?-γ is a polar interro-
             gative sentence,

       (iii) the sequence of the semantic representation of the CT-marked phrases
             and that for the variables for the WH-phrases are denoted $\vec{t}$, and $\vec{x}$,
             respectively,

       (iv) the predicate meaning of ?-γ is $\lambda\vec{x}.R$,

       (v)   *wh*-γ is the interrogative sentence resulting from γ by replacing the
             CT marked phrases as well as the focused phrases if any with the
             corresponding WH-phrases,
       and,

       (vi) the sequence of the variables for the WH-phrases corresponding to
             the CT marked phrases is denoted $\vec{y}$.

       Then,

       (vii) the predicate meanings of *wh*-γ is $\lambda\vec{y}\lambda\vec{x}.R[\vec{t}/\vec{y}]$, where $R[\vec{t}/\vec{y}]$ is the
             result of replacing $\vec{t}$ in R with $\vec{y}$.

Next is the pragmatic component:

(28)   *Pragmatics of CT*

Sentence γ explicitly or implicitly assumes interrogative sentence *wh*-γ as QUD; however, the answerer, or the utterer of γ opts to answer ?-γ instead of *wh*-γ *for some reason.*

Let us illustrate the current analysis by going over (1), which is reproduced here as (29).

(29)   a.   Who kissed whom?
        b.   Well, who did Larry kiss?
        c.   [Larry]$_{CT}$ kissed [Nina]$_F$

Let us recall the original observation about the congruity among the sentences in (29) made by Roberts (1996). That is, (29c) directly answers (29b), and (29b) is a "sub-question" of (29a), or to use Roberts' terms, (29b) is part of "strategy of inquiry" aimed at answering (29a). And we have reviewed Kadmon's account of the congruity with reference to CT in terms of Büring's *topic meaning* and Rooth's *focus meaning*. The account roughly went as follows. The focus meaning of (29c) and the ordinary meaning of (29b) are identical, which makes (29c) a congruent "direct" answer to (29b). The ordinary meaning of (29b) is an element of the topic meaning of (29c), whose generalized union is identical to the ordinary meaning of (29a). This warrants (29b) being a sub-question of (29a).

The above account of CT as a discourse-regulator based on *focus* and *topic* meanings seems quite reasonable for what I call "canonical" examples of CT, i.e. sentences with exactly one instance of CT phrase and exactly one instance of focused phrase. However, as we have demonstrated with example (3), in Japanese, there are commonly sentences in which more than one instance of CT phrase and no apparent focused phrase occur. To those "non-canonical" examples of CT sentences, Roberts-Büring-Kadmon's line of analysis cannot be extended.

Now let us go back to our current analysis and see how it can account for the workings of CT in relation to the congruity displayed in discourse (1). The CT sentence in question here, (29c) is γ in (27). Thereby, (29b) and (29a) correspond to ?-γ and *wh*-γ in (27), respectively. For the characterization that (27c) is a "direct" answer of (27b) and (27b) is a "sub-question" of (27a), there have already been relevant notions worked out in the theory which the current analysis is couched in, i.e. the semantic theory of questions and answers by Groenendijk & Stokhof (1984) and Groenendijk (1999). The relevant notions are *complete answer* and *partial answer*. Given a partition of the set of possible worlds induced by the predicate meaning of an interrogative sentence as in (12), each block of the partition as a proposition represents a *complete* (and exhaustive) answer to the

question, while the union of some but not all blocks is a *partial* answer, eliminating some blocks as not being the case. In terms of those semantic notions of answerhood, the following fact holds of ?-γ and *wh*-γ:

(30)   Every complete answer to ?-γ is a partial answer to *wh*-γ.

It is reasonable to take *complete answer* to be a formal rendition of "direct answer" and to define that question Q_1 is a "sub-question" of Q_2 when every complete answer to Q_1 is a partial answer to Q_2. From this and (30), it follows that γ (as interpreted exhaustively) is a direct answer to ?-γ and ?-γ is a sub-question of *wh*-γ; in particular, (29c) is a direct answer to (29b) and (29b) is a sub-question of (29a). In this sense, the current semantic analysis of CT is as adequate as Roberts-Büring-Kadmon's in characterizing the congruity among the sentences in (29). In fact, I contend that the current analysis is superior in that it is applicable to the "non-canonical" examples of CT sentences like (3) as well. Note that in the semantic rules of CT in (27), there is no restriction on the number of CT phrases (other than at least one) or of focused ones in a sentence. Thus, CT sentences with more than instance of CT and no apparent focused phrase like (3) will pose no problems to the current analysis, unlike to the Roberts-Büring-Kadmon's. For example, (3) will be analyzed as γ with ?-γ and *wh*-γ being 'Did John introduce Mary to Bill?' and 'Who introduced who to whom?', respectively.

We have shown that our current analysis of CT can capture Roberts' original insights of CT as a discourse-regulator as adequately as Roberts-Büring-Kadmon's; in fact, it is superior in that it can deal with the "non-canonical" examples as well as the "canonical" ones. Next, we will see how the current analysis fares with the other existent approach to CT, specifically, how it can account for the implicational/presuppositional features surrounding CT. In Section 2.2, we have reviewed the existing analyses along the line of the approach to CT that takes CT to be a focus-sensitive operator with some implicature or presupposition attached. For any of them, we have demonstrated that it is easy to find a counterexample to the alleged implicational/presuppositional contents, or that they are cancelable. Although, of course, the fact alone does not invalidate the approach per se, we also have pointed out that "non-canonical" examples of CT sentences will be problematic to the approach in question as well because it is by no means clear what their associated implicatures or presuppositions will be like.

In the current approach we take the position that there is no implicational or presuppositional content that is hard-wired in the meaning of a CT sentence. Rather, we propose that what seems to be implicational or presuppositional features characteristic of CT be actually conversational implicatures arising from the use of a CT sentence instead of the corresponding non-CT version of the sentence. The clause relevant here is (28), *Pragmatics of CT*, which says that the use of a CT sentence indicates that instead of answering a QUD, the speaker opts to answer one of its sub-questions for some reason. Our contention is that what has

been observed and claimed to be (conventional) implicatures and presuppositions of CT sentences is actually conversational implicatures due to particular reasons why the speaker chooses to answer a sub-question instead of the QUD itself. At this point, I don't know if there is any fixed number of reasons for the use of CT sentence or if there is, how many of them there are. We will not attempt to resolve this issue, for this is not directly relevant to the point of the paper. In the following we will put forward some, but enough reasons to cover what has been proposed to be the implicational/presuppositional features of CT in the literature.

For illustration, let us use the following CT sentence and interrogative sentences for γ, *wh*-γ, and ?-γ in (27) as a case example.

(31) γ: Jon-wa   paatii-ni   ki-mashi-ta.
              John CT   party-to   come-Polite-Past
              'John$_{CT}$ came to the party.'

(32) *wh*-γ: Dare-ga   paatii-ni   ki-mashi-taka   ka
              who-Nom   party-to   come-Polite-Past   Q
              'Who came to the party?'; $\lambda x.$came-to-the-party$'(x)$

(33) ?-γ: Jon-wa   paatii-ni   ki-mashi-taka   ka
              John-CT   party-to   come-Polite-Past   Q
              'Did John come to the party?'; came-to-the-party$'(j)$

According to the current theory, the utterance of (32) "presupposes" interrogative sentence (32), or the question denoted by it as QUD; however, instead of directly answering the question, the speaker answers interrogative sentence (33) for some reason. As in Section 3.1, suppose that the relevant domain of discourse is {John, Mary} and assume the diagrammatic conventions for partitions adopted there. Then, the partition representing the context updated with (32) is C″ in (21), which is reproduced in (34).

(34)

$$C'' = \begin{array}{|c|c|} \hline \{\text{John, Mary}\} & \{\text{John}\} \\ \hline \{\text{Mary}\} & \varnothing \\ \hline \end{array}$$

On the other hand, the partition for the context updated with (33) is C′ in (15), which is equivalently reproduced as in (35) to highlight its contrast with C″. In C′, the upper block and the lower one represent the set of possible worlds where John came to the party and that where John didn't, respectively and both of the blocks are non-committal about whether the other people, in this case, Mary came to the party or not.

(35)

$$C' = \begin{array}{|c:c|} \hline \{\text{John, Mary}\} & \{\text{John}\} \\ \hdashline \{\text{Mary}\} & \varnothing \\ \hline \end{array}$$

The question here is why the speaker opts to resolve the issue represented by C′ instead of that by C″.

Possible Reason 1: Lack of Information

As to John, the speaker knows for sure that he came to the party, but for the other people, in this case, Mary, she doesn't know if they came to the party. So she restricts her assertion only to that John came, shying away from the issue as to whether the other people came to the party or not. This will nicely account for the continuation displayed in (36).

(36)   Jon-wa/$^{\#}$ga   paatii-ni kita   ga,
        John-CT/Nom party-to   came but
        sonohokanohito nikanshitewa   shira-nai.
        the-other-people about   know-not
        'John$_{\text{CT}}$ came to the party, but I don't know about the other people.'

This feature of CT, i.e. that it can be used when the speaker doesn't have enough information to resolve the original question under consideration, is what Oshima's (2002) analysis and Hara & van Rooij's, (2007) took a special notice of and tried to capture. If the answerer uttered (37) instead of (31) in the state of information described above, she would be taken by the hearer to imply that no other people came to the party due to the exhaustification mechanism (See van Rooij & Schulz 2006 for a formal formulation), which would violate the Maxim of Quality.

(37)   Jon-ga   paatii-ni   ki-mashi-ta.
        John-Nom   party-to   come-Polite-Past
        'John came to the party.'

Possible Reason 2: Secrecy, or Confidentiality

When the issue under discussion is who came to the party and furthermore, the answerer is willing to proffer only the information about John keeping secret, that about the other people. What she can do in terms of question and answer will be that instead of answering question 'Who came to the party?', she will answer a restricted version of the question in that 'who' is restricted to 'John', i.e., 'Did John came to the party?'. This is exactly what the current theory specifies a CT sentence to be used for. The proposed use of CT in conjunction of secrecy is mo-

tivated by the natural continuation observed between the first and the second sentences in examples like (38).

(38) Jon-wa/$^\#$ga   paatii-ni kita   ga,
      John-CT/Nom party-to   came but

      sonohokanohito   nikanshitewa   ie-nai.
      the-other-people about   can-tell-not
      'John$_{CT}$ came to the party, but I can't tell about the other people.'

The counterexample presented above against Hara & van Rooij's theory, i.e. (7) is just another example of the use of a CT sentence motivated by secrecy, or confidentiality.

Possible Reason 3: Extension Specification by Positive and Negative Instances

When the extension of a one-place predicate is asked by an interrogative sentence like (32), one way to specify the extension is to specify the positive instances of the extension and let the exhaustification (See again van Rooij & Schulz, 2006) imply that the rest of the domain is in the negative extension of the predicate. Another way is to specify both the positive and the negative instances of the extension (not necessarily exhaustively) separately. Specifically, for the positive instances of the predicate, the answerer specifies that it is true that they are in the extension of the predicate, and for the negative instances, she specifies that it is not true that they are in the extension the predicate. This can be seen as an act of answering a WH-question by answering two Yes-No questions. To use (31) as an example, in our current analysis, (31) can be seen as the part of specifying the positive instances by answering the (implicit) question 'Did John come to the party?' in the two-part way of specifying the extension of the predicate under discussion. Then, (31) is expected to be followed by a sentence specifying some of the negative instances. For example, suppose that John, but not Mary came to the party. In terms of partition of C″ in (39), the speaker could choose the shadowed block to be the case by uttering (37) plus exhaustification, 'Only John came to the party', or 'John and nobody else came to the party'.

(39)

{John, Mary}	{John}
{Mary}	∅

$C'' =$

Alternatively, she can utter first (40a) and then (41a) to choose the shadowed blocks in (40b) and (41b), respectively to the same effect as designating the shadowed block in (39) to be the case directly.

(40) a. Jon-wa   ki-ta.
          John-CT   come-Past
          'John$_{CT}$ came.'

    b.

$C' =$

{John, Mary}	{John}
{Mary}	∅

(41) a. Mearii-wa ko-naka-tta.
          Mary-CT come-not-Past
          'Mary$_{CT}$ didn't come.'

    b. $C'' =$

{John, Mary}	{John}
{Mary}	∅

This use of CT sentences, i.e. that a CT sentence is used for specifying the positive instances being followed by a separate CT sentence for the negative instances or vice versa in identifying the extension of a predicate, is considered to be a feature of CT sentences that was discussed as Reversed Polarity Implicature (RPI) in section 2.2.1.

In the above, we have examined what the current theory of CT can say about the implicational/presuppositional features of CT that have been taken to be essential properties of CT in the approach that views CT as focus-sensitive operator. We have demonstrated those features can be seen as conversational implicatures arising as the addressee infers the reason why given a QUD, *wh-γ*, by uttering a CT sentence, γ, the speaker opts to answer a sub-question, ?-γ instead of *wh-γ*.

4. Conclusions

We have reviewed two representative existent approaches to CT: one that views CT as an information-structural discourse-regulating device, specifically, it characterizes a CT sentence as an direct answer to a sub-question of a QUD, and the other takes a CT to be a focus-sensitive operator with conventional implicatures or presuppositions. The former approach, or strictly speaking, the particular analysis on the approach, we have demonstrated, is not general enough as a theory of CT because it cannot be extended to the so-called "non-canonical" examples of CT sentences, which has more than one instance of CT phrase and/or no focused phrase, and it does not address the implicational/presuppositional features of CT. As for the latter approach, the alleged implicatures and the presuppositions for CT

proposed in the literature have all been shown to be easy to find counterexamples to or to be cancellable, which strongly suggests that those are not hard-wired in the pragmatics of CT. Furthermore, the non-canonical examples have turned out to be problematic to the approach as well in that it is not clear what their projected implicatures or presuppositions would be like.

We have proposed a new analysis of CT couched in the partition semantics of question and answer presented in Groenendijk & Stokhof (1984) and Groenendijk (1999) and demonstrated that the new analysis can capture the insights of both of the above approaches and is yet free from the problems for them. That is, the new analysis can characterize a CT sentence as a direct answer to a sub-question of a QUD whether it is a 'canonical' or 'non-canonical' example and will analyze the implicational/presuppositional features of CT as conversational implicatures arising as the addressee infers the reason why the speaker opts to answer the sub-question instead of the QUD. In this sense, the current analysis can be said to have the best of both worlds of the existent approaches and more.

There are certainly many things about CT that have not been touched upon in this paper, among which is the fact that Cut's can also occur in other types of sentences than declarative sentences at least in Japanese: interrogative, imperative, exhortative, and perfomative, as was pointed out by Tomioka (2007). The issue whether the current analysis can be extended to the occurrences of CT in non-declarative sentences is left for future research.

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