Exhaustivity in the *pen33*-Cleft in Thai: A formal semantics account

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Abstract

This paper addresses exhaustivity derived through the *pen33*-cleft construction in Thai. Based on a formal semantic account, the paper is aimed at analysing the meaning and nature of exhaustivity observed in this particular construction. The analyses show that exhaustivity in the *pen33*-cleft is not truth-conditional. Moreover, applying Büring and Križ's (2013) parthood relation approach, the paper proposes that the exhaustive meaning in *pen33*-cleft suggests that the clefted argument is not a proper part of the sum of the arguments that share the property as determined in the cleft clause.

Keywords: clefts, exhaustivity, Thai, parthood relation, *pen33*

การวิเคราะห์ความหมายหมดจดในโครงสร้างประโยคเคล็ฟต์ ที่ประกอบด้วยคำว่า "เป็น" ในภาษาไทย โดยวิธีทางอรรถศาสตร์แนวทฤษฎี

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บทคัดย่อ

งานวิจัยชิ้นนี้นำเสนอการวิเคราะห์ความหมายหมดจด (exhaustivity) ในโครงสร้างประโยคเคล็ฟต์ที่ประกอบด้วยคำว่า “เป็น” ในภาษาไทยตามแนวทางการวิเคราะห์ทางอรรถศาสตร์เชิงทฤษฎี ผลการวิเคราะห์พบว่า ความหมายหมดจดที่ปรากฏในโครงสร้างดังกล่าวไม่ได้เป็นส่วนหนึ่งของเงื่อนไขความเป็นจริง (truth conditions) นอกจากนั้น จากการประยุกต์แนวทางการวิเคราะห์ความหมายหมดจดที่อิงความสัมพันธ์ parthood relation ของบิวริงและคริซ (2013) พบว่า argument ที่ถูกเน้นในโครงสร้างเคล็ฟต์ที่ประกอบด้วยคำว่า “เป็น” นั้น ไม่ถือเป็น proper part ของ argument ทั้งหมดที่มีลักษณะตามที่บ่งชี้ในประโยคย่อย

คำสำคัญ โครงสร้างประโยคเคล็ฟต์ ความหมายหมดจด ภาษาไทย ความสัมพันธ์ของส่วนย่อยและส่วนใหญ่ เป็น

1. Introduction

Cleft is one of the constructions that has been widely studied from various linguistic perspectives. This construction in Thai, however, which is prominent in the language, has not received much attention. Moreover, while studies on Thai have extensively been conducted under different linguistic accounts, an analysis based on formal semantics is not common. It is undeniable that previous linguistic investigations on Thai have revealed a number of insightful findings which offer new accounts for linguistic phenomena observed in the language. However, underlying logic and philosophy within the language has not been seriously investigated. This paper offers a formal semantics account for the interpretation of the *pen33-cleft* in Thai with special reference to its exhaustive interpretation.

The semantic investigation of cleft constructions mainly involves the existence of exhaustivity as observed in the use of the English *only*. Originally, clefts have been assumed to carry exhaustiveness in the same manner as the English *only*. In other words, when a cleft is used, it suggests that the individual *x* has the property *P* and it is the only individual that has the property *P*. Following this, (1), in which *only* is present, and (2), where the *it*-cleft is used, the implication is equal as shown in (3).

(1) Only Danai has a Siamese cat.
(2) It's Danai that has a Siamese cat.
(3) i) Danai has a Siamese cat.
ii) Danai is the only person that has a Siamese cat.

The assertive exhaustiveness of the cleft element as opposed to other alternative elements is originally believed to appear in a cleft sentence and has been the main interest of semanticists who explore the constructions. The *pen33*-cleft in Thai, unlike the English *it*-cleft, is formed through the combined structure of a relative clause and the copula *pen33*. Regarding the syntax and semantics of Thai, while relative clauses have long been the centre of interest, the analyses on *pen33*-clefts and its semantic interpretations have rarely been offered. Furthermore, the existence of exhaustivity in the cleft constructions used in this language has not been extensively investigated. This paper is thus aimed at revealing how the *pen33*-clefts in Thai operate semantically. A large number of studies have offered different accounts for the exhaustive implications

shown in (3i) and (3ii). These accounts tackle two main issues, namely, how to treat the implications in terms of semantics and pragmatics and how to elaborate the nature of exhaustiveness. Based on these accounts, the current study has been carried out in order to find answers to two research questions:

- Applying the typical definition of exhaustivity, is exhaustive reading present in the *pen33*-cleft entailed or presupposed?
- What is the meaning of exhaustivity derived from the *pen33*-cleft?

The findings are aimed to shed light on how the construction is interpreted and to pave way for further research on speaker intention when the construction is used. In addition, they are expected to be a stepping stone for psycholinguistic and computational linguistic studies both on the cleft structure of Thai and other structures of the language which reveal the processing of the language in the brain. Moreover, it is hoped that the analyses on the exhaustivity implied in these constructions will contribute to the study of clefts in general.

The remainder of the paper is organised as follows: information about the two basic topics, namely, exhaustivity and the construction of the *pen33*-cleft, are provided in Sections 2 and 3, respectively. In Section 4, the two opposing ideas—exhaustivity as an entailment versus exhaustivity as a presupposition—are discussed. Section 5 presents an analysis of the status of exhaustivity in *pen33*-cleft while its meaning is offered in Section 6. Section 7 points out some puzzling cases which are beyond the scope of this study. Finally, concluding remarks are made in Section 8.

2. Exhaustivity

Exhaustivity refers to the definitive status of information. One general situation where exhaustivity is obvious is giving an answer to a question. An answer basically must suggest its relevance to the question, either explicitly or implicitly. Moreover, it represents the definitive information as regards to the issue under discussion that lies in the question. Consider (4):

(4) A: What did Danai buy at the supermarket yesterday?
B: A bag of jasmine rice and a bottle of coconut oil.

The answer in the above dialogue gives rise to an exhaustive interpretation. In other words, it suggests that the answer, which represents a plausible alternative, excludes other plausible alternatives as the definitive answer to the question (Groenendijk and Stockho, 1984; von Stechow and Zimmermann, 1984). As such, the answer in (4B) does not only suggest that a bag of jasmine rice and a bottle of coconut oil are the items that Danai bought at the supermarket yesterday, but also excludes other plausible alternatives.

The concept of exhaustivity presented above has been widely studied through many linguistic phenomena. Rooth (1985), for example, proposes an association between the exhaustivity in the sense of the English *only* and focus. A focused element is a member of a set which contains all alternatives that are relevant to the issue under discussion. The formation of the set can be clarified through a question and answer, as shown in (5). The set of alternatives in (6), for example, is established from substitution made at the position in the sentence that receives focus which, in this example, is indicated by the subscripted F as exhibited in (5B).

(5) A: What will Danai bring for the party tonight?
B: He will bring [two bottles of Provençal red wine]$_F$.

(6) {cheese, salad, Chardonnay wine, sparkling wine, quiche, …}

The set of alternatives in the case of (5) is formed by the question in (5A). The question word *what* represents all plausible alternatives, while the remaining components of the question determine the specific properties that the alternatives in the set must contain. The question suggests that Danai will bring *x* for the party tonight, where *x* refers to the plausible alternatives which include the potential items that Danai will bring for the party tonight. *x* also represents the component in the sentence on which the focus is placed. The objects that can substitute *x* at this position are qualified as the alternatives of this set. The alternative that finally appears in (5B) is the selected alternative which receives focus while at the same time suggesting an exhaustive interpretation, i.e. the two bottles of Provençal red wine are the only items Danai will bring to the party. Other items are excluded.

3. The construction of *pen33*-clefts in Thai

Thai is an SVO language in which overt verb infections are unavailable. This is shown in (7) and (8):

(7) da22nay33 chɔɔp42 waay42naam45
Danai like swim
'Danai likes swimming.'

(8) da22nay33 tham33 kaan33baan42
Danai do homework
'Danai does/is doing/did his homework.'

Moreover, Thai is an aspectual language. Unlike English, tense does not exist and time expressions and aspect markers are used. (9) and (10) illustrate this:

(9) mɯa42kɔɔn22 da22nay33 chɔɔp42 waay42naam45
in the past Danai like swim
'Danai used to like swimming.'

(10) da22nay33 tham33 kaan33baan42 set22 mɯa42waan33nii45
Danai do homework finish yesterday
'Danai finished his homework yesterday.'

According to Kuno and Wongkhomthong (1981), normally a sentence containing *pen33* like (11) is a predicational sentence which expresses the characterisation of the subject argument.

(11) da33nay33 pen33 phuu42cha45na45 kaan33khɛɛŋ22khan24 nii45
Danai COP winner contest this
'Danai is the winner of this contest.'

Basically, as (12) shows, a *pen33*-cleft is composed of a cleft constituent, the copula *pen33* and a cleft clause. The cleft clause contains a nominal head, the complementiser *thii42*, which is omissible in some cases, and a VP. Semantically, a *pen33*-cleft suggests a predicational interpretation. The reverse construction in unacceptable. This is exemplified in (13):

(12) da33nay33 pen33 khon33 (thii42) thaa33sii24 pra22tuu33
Danai COP person (REL) paint door
'It's Danai who painted the door (predicational).'

(13) *khon33 thii42 thaa33sii24 pra22tuu33 pen33 da33nay33
person REL paint door COP Danai
'The person who painted the door was Danai (reverse predicational).'

In addition, both subjects and objects can be clefted. (14) and (15) exemplify a subject cleft and an object cleft, respectively:

(14) da33nay33 pen33 khon33 (thii42) s~~uu~~45 s~~ua~~42 hay42
Danai COP NOM.person (REL) buy shirt give
maa33lii33
Malee
'It's Danai who bought a shirt for Malee.'

(15) maa33lii33 pen33 khon33 thii42 da33nay33 s~~uu~~45 s~~ua~~42
Malee COP NOM.person REL Danai buy shirt
hay42
give
'It's Malee who Danai bought a shirt for.'

The *pen33*-cleft construction can be semantically distinguished from the ordinary *pen33* construction through the assignment of focus. As illustrated in (16), (16B) provides information as required by the question in (16A). Applying Rooth's (1985) notion of focus, the cleft constituent thus receives focus while the cleft clause provides background information which designates a set of specific qualified members.

(16) A: khray33 pen33 khon33 (thii42) thaa33sii24 pra22tuu33
who COP NOM.person (REL) paint door
Who was it that painted the door?

B: $[da33nay33]_F$ pen33 khon33 (thii42) thaa33sii24 pra22tuu33
Danai COP NOM.person (REL) paint door
It's Danai who painted the door.

Conversely, in an ordinary *pen33* sentence the subject argument functions as topic whereas the relativized clause offers comment which characterises the subject argument. The question and answer in (17) exhibit this:

(17) A: da33nay33 pen33 khray33
Danai COP who
Who is Danai?
B: da33nay33 pen33 khon33 (thii42) thaa33sii24 pra22tuu33
Danai COP NOM.person (REL) paint door
Danai is the person who painted the door.

4. Exhaustivity in cleft constructions

An exhaustive meaning has been claimed to be derived through a cleft sentence (18). In (18), the *it*-cleft suggests that the clefted constituent Sunan is the only person who missed the train and that the addition of another person is not acceptable.

(18) It's Sunan who missed the train.

However, semantically, whether this meaning should be treated as an entailment or a presupposition has been a subject of controversy.

4.1 Exhaustivity as an entailment

According to Bolinger (1972), when a cleft is used, exhaustivity becomes an entailment or part of an assertion suggesting that the exhaustive status of an element attaining a particular property is emphasized. Accordingly, in the restated (19), Danai, a single member of the set of the persons who have a Siamese cat, is stressed. As such, the addition of other elements to the sentence such as in (20) is unacceptable.

(19) It is Danai who has a Siamese cat.

Entails:

i) Danai has a Siamese cat.

ii) Danai is the only person that has a Siamese cat.

(20) *It is Danai who has a Siamese cat and Sunan has one, too.

Szabolsci (1981) investigates the case of preverbal focus in Hungary and proposes that exhaustivity is, with a connection to quantification, an entailment which

suggests that a particular property is quantified by the universal quantifier. The result is that the quantified element is the only element that has the property. Applying the formula in (21) to the sentence with *only* in (22) and *it*-cleft in (23), the element that has the property *borrowed Candide from the library* is exhaustive in the sense that it is the only element that has this particular property. This interpretation is shown in (24):

(21) P (y) ∧ ∀x[P (x) ⟶ x = y]

(Szabolsci 1981, as modified in Velleman et al. 2012, p. 444)

(22) Only Danai borrowed Candide from the library.

(23) It was Danai that borrowed Candide from the library.

(24) borrowed Candide from the library (d) ∧ ∀x[borrowed Candide from the library (x) ⟶ x = d]

Entails:

i) Danai borrowed Candide from the library.

ii) There was only one person that borrowed Candide from the library and that person was Danai.

Importantly, this implication is part of the truth condition of the sentences. Thus, the sentences are true if and only if Danai borrowed Candide from the library and he was the only person who did it. Thus, the addition of a follow-up sentence which offers another element that shares the same property like in (25) and (26) is unacceptable.

(25) *Only Danai borrowed Candide from the library. Thani borrowed it, too.

(26) *It was Danai that borrowed Candide from the library. Thani borrowed it, too.

4.2 Exhaustivity as a presupposition

Exhaustivity has also been claimed in a number of studies to be presuppositional. Halvorsen (1978) strongly supports the claim that exhaustivity relates to uniqueness. The exhaustive interpretation for (19) is shown in the formula given in (27). It implies that the set of the persons who has a Siamese cat is a singleton set and Danai is the member of it. Accordingly, the person who has a Siamese cat cannot be anyone but Danai.

(27) $\exists x[\forall y[$have a Siamesse cat $(y) \longrightarrow y = x]]$

Presupposes:

i) There is only one person who has a Siamese cat.

ii) This person is Danai.

Horn (1981) also supports the idea of exhaustivity in clefts as a presupposition. He claims that exhaustivity entailed by the *it*-cleft construction does not hold in some cases. His test yields results supporting his idea as shown in (28) and (30). Interestingly, the use of the construction in the case in which the property *P* is already available in the speaker's background knowledge is awkward. On the other hand, entailing exhaustiveness through the use of *only* is fine under this context. These also apply to the case of negative utterances as shown in (29) and (31).

(28) # I know Danai has a Siamese cat but I've just heard it is Danai that has a Siamese cat.

(29) I know Danai has a Siamese cat but I've just heard only Danai has a Siamese cat.

(30) # I know Danai has a Siamese cat but it is not Danai that has a Siamese cat.

(31) I know Danai has a Siamese cat but it is not only Danai that has a Siamese cat.

Researchers have conducted studies to examine the nature of exhaustiveness in cleft constructions. Onea and Beaver (2011) oppose the claim that exhaustivity in the Hungarian pre-verbal focus is part of truth conditions. The results of their two experiments confirm the presuppositional status of exhaustivity in this construction. The experiment participants do not treat an utterance in which the exhaustivity inference fails to project from the presence of an immediate pre-verbal focus as a false sentence.

Another experimental study conducted by Destruel (2012) also supports the idea of presuppositional exhaustivity in clefts. The status of exhaustivity in the French *c'est*-cleft is examined through experiments developed from the experiments created by Onea (2009) and Gabriel (2010). The results from two experiment show that the French-speaking participants do not strongly deny the exhaustivity in a *c'est*-cleft. This

indicates that, unlike the at-issue exclusive meaning, the meaning of exhaustivity in the French *c'est*-cleft is not part of the semantic truth-conditions.

The presuppositional, not at-issue status of exhaustivity is also observed in the German *it*-cleft. In their experimental study, Drenhaus et al. (2011) compare the nature of exhaustiveness yielded by the German *only* and the German *it*-cleft. Results from a questionnaire study and an event-related brain potentials study reveal that the violation of exhaustiveness in the *it*-cleft sentences is more acceptable than in the sentences in which *only* appears; this suggests the different nature of exhaustiveness generated by *it*-clefts and *only*. Moreover, an event-related brain potentials study shows that the processes of violation in the two cases are different.

In addition, Büring and Križ (2013) propose an idea which regards exhaustivity in the cleft construction as presuppositional. They further this idea by offering the parthood relation approach to account for the nature of exhaustivity in this specific construction. Similarly, Velleman et al. (2012) support the idea that exhaustivity is presupposed and not entailed. Exhaustivity is proposed to be part of the inquiry terminating constructions and derived through the operations of MIN_S and MAX_S operators. Both the parthood relation approach and the inquiry terminating constructions are applied in order to verify the nature of exhaustivity derived through the *pen33*-cleft. The results are presented in Sections 6.2 and 6.3.

5. Exhaustivity in *pen33*-clefts: An entailment or a presupposition?

This section investigates further the status of exhaustivity appearing in the *pen33*-cleft construction to check whether it is entailed as part of an assertion or if it is presuppositional.

The investigation begins with the first assumption that exhaustivity in these constructions represents entailment. Horn's (1981) tests are thus used to verify it. The results are shown in (32)-(35):

(32) # chan24	ruu45	waa42	da33nay33	pay33	phuu33kɛt22	tɛɛ22
I	know	COMP	Danai	go	Phuket	but
chan24	day42yin33	waa42	khaw24	pɛn33	khon33	(thii42)
I	hear	COMP	he	COP	NOM.person	(REL)

pay33 phuu33kɛt22
go Phuket
'I know that Danai went to Phuket but I've heard that it's him who went to Phuket.'

(33) chan24 ruu45 waa42 da33nay33 pay33 phuu33kɛt22 tɛɛ22 chan24
I know COMP Danai go Phuket but I
hear waa42 khaw24 pɛn33 **khon33** **diaw33**
day42yin33 COMP he COP **NOM.person only**
(thii42) pay33 phuu33kɛt22
(REL) go Phuket
'I know that Danai went to Phuket but I've heard that he was the **only** person who went to Phuket.'

(34) # chan24 ruu45 waa42 da33nay33 pay33 phuu33kɛt22 tɛɛ22
I know COMP Danai go Phuket but
chan24 day42yin33 waa42 khaw24 may42day42 pen33 khon33
I hear COMP he NEG COP NOM.person
(thii42) pay33 phuu33kɛt22
(REL) go Phuket
'I know that Danai went to Phuket but I've heard that it's not him who went to Phuket.'

(35) chan24 ruu45 waa42 da33nay33 pay33 phuu33kɛt22 tɛɛ22 chan24
I know COMP Danai go Phuket but I
day42yin33 waa42 khaw24 may42day42 pen33 **khon33**
hear COMP he NEG COP **NOM.person**
diaw33 (thii42) pay33 phuu33kɛt22
only (REL) go Phuket
'I know that Danai went to Phuket but I've heard that it wasn't **only** him who went to Phuket.'

The results of the tests reveal that under the contexts in which *P*, which is introduced in the first clause, is already available in the background knowledge,

repeating and negating it is unacceptable. This is not the case when *only* is used; the clause with *only* provides a new piece of information that is not a duplicate of the background information, suggesting that exhaustivity derived from *only* is not entailed but is presupposed. The co-occurrence of *only* gives the same effect in the case in (35) where the second clause is negated.

Apart from Horn's tests, exhaustivity in *pen33*-cleft has been proven to be presuppositional in a test conducted by Tawilapakul (2014). In this test, which is a replication of the test initiated by Onea and Beaver (2011), background information is introduced in the antecedent of the discourse. In order to encourage hearers' responses, the antecedent is composed in a tag question as shown in (36).

(36) Context: Last Sunday Danai and Thani finished painting Suda's house. Sunan asked Suda,

Sunan:	da33nay33	pen33	khon33	thaa33sii24	baan42	hay42
	Danai	COP	NOM.person	paint	house	give
	la22si22					
	yes/no QW					

'It's Danai who painted the house for you, wasn't it?'

The test participants have been asked to choose one of the three options provided as their response. The three response options are shown in (37):

(37) a) Yes, but Thani painted it, too.
b) Yes, and Thani painted it, too.
c) No, Thani painted, too.

The assumption is that, if exhaustivity is entailed in the *pen33*-cleft, participants are likely to select (37c), which strongly denies exhaustivity, as their response. On the other hand, if exhaustivity is only presuppositional, either (37a) or (37b) is likely to be chosen.

Out of 37 participants, 22 (59.46%) and 14 (37.84%) selected (37a) and (37b) as their responses, respectively. Interestingly, only one participant responded the question tag with (37c). The results clearly reveal that exhaustivity is actually not entailed but only presupposed.

The results from the tests above confirm that exhaustivity existing in the *pen33*-cleft is not a presupposition, not an entailment.

6. The meaning of the presuppositional exhaustivity in *pen33*-cleft

In this section, presuppositional exhaustivity in the *pen33*-cleft construction in Thai will be further investigated. In order to find out the nature of presuppositional exhaustivity in these constructions, different characteristics of presuppositional exhaustivity proposed by researchers will be discussed.

6.1 Uniqueness presupposition

Ruangjaroon (2007) proposes that presuppositional exhaustivity observed in the Thai *pen33*-cleft constructions represents existential and uniqueness presuppositions in the same sense as proposed by Halvorsen (1978). In (38), the existential presupposition indicates that someone *x* bought a shirt for Malee. The sentence presupposes that *x* refers only to Danai, not anyone else. Accordingly, Danai is the member of the singleton set containing the persons who bought a shirt for Malee.

(38) da22nay33 pen33 khon33 (thii42) s~~uu~~45 s~~u~~a42 hay42
Danai COP NOM.person (REL) buy shirt give
maa33lii33
Malee
'It's Danai who bought a shirt for Malee.'
Presuppositions:
(i) Existential: *x* bought a shirt for Malee: ∃*x*[bought a shirt for Malee (*x*)]
(ii) Uniqueness: *x* = only Danai: ∃*x*[∀*y*[bought a shirt for Malee (*y*) → *y*=*x*]]

In order to check if uniqueness like in (38ii) is presupposed in the constructions, the test proposed by Atlas and Levinson (1981) is applied. The basic idea of the test is that, if uniqueness is presupposed, the action in the predicate is performed by only one single argument. However, as shown in the responses in (40i) - (40iii), the *pen33*-cleft allows more than one argument to perform the action *'painting the house'*. Thus, the set of the people painting the house is not a singleton set and uniqueness as presupposed in (39) is not presupposed in these cases.

(39) da22nay33 pen33 khon33 (thii42) thaa33sii24 baan42
Danai COP NOM.person (REL) paint house
'It's Danai who painted the house.'
Uniqueness presupposition:
x = only Danai
$\exists x[\forall y[\text{painted the house } (y) \rightarrow y=x]]$

(40) (i) da33nai33 may42day42 pen33 khon33 (thii42) thaa33
Danai NEG COP NOM.person (REL) paint
tha33nii33 kap22 dee33chaa33 pen33 khon33 (thii42)
Thani and Decha COP NOM.person (REL)
thaa33 taaŋ22haak22
paint PART
'It wasn't Danai who painted the house; **Thani and Decha** did it.'

(ii) **thaa33nii33** pen33 khon33 thaa33sii24 baan42 **lɛɛ45**
Thani COP NOM.person paint house **and**
da33nay33 kɔɔ42 (pen33 khon33 thii42) thaa33 duay42
Danai PART (COP NOM.person REL) paint also
muan24kan33
same
lit.: 'It's Thani who painted the house. Danai did it, too.'

(iii) thaŋ45 **da33nay33 lɛɛ45 thaa33nii3** pen33 khon33 (thii42)
Both Danai and Thani COP NOM.person (REL)
thaa33sii24 baan42
paint house
'It's **both Danai and Thani** who painted the house.'

The presuppositional exhaustivity in *pen33*-cleft does not indicate that the clefted element is unique in the sense that it is the only element that has the property presented in the cleft clause.

6.2 Inquiry Terminating constructions

Velleman et al. (2012) propose that both a sentence with *only* and a *it*-cleft signal the information given is the definitive information involving a particular issue under discussion; they thus terminate the inquiry. Through the inquiry terminating constructions, Velleman et al. offer an approach to tackle the issue concerning the exhaustive implication in cleft constructions. Basically, the inquiry terminating constructions rely on MIN_S and MAX_S operators which operate in accordance with current questions under discussion or *CQ* and a set of plausible alternatives under the context or *S*. The relationships of these key factors are summarised as quoted in (41). Corresponding to a current question under discussion and set up under a particular context, MIN_S operator offers the least strong answer in the set of plausible answers while MAX_S operator offers the strongest answer to the question.

(41) a. $MIN_S\ (p) = \lambda w.\ \exists q \in CQ_S\ [q(w) \wedge (q \geq_S p)]$

"There's a true answer at least as strong as *p*."

b. $MAX_S\ (p) = \lambda w.\ \exists q \in CQ_S\ [(q >_S p) \rightarrow \sim q(w)]$

"No true answer is strictly stronger than *p*." (p. 451)

Applying the mechanisms of MIN_S and MAX_S operators, the presence of *only* in a sentence, as shown in (42), presupposes there is a true answer at least as strong as that associated with *only* and asserts that there is no true answer that is stronger than this answer.

(42) $[[only]] = \lambda w.\ \lambda p\colon MIN_S\ (p)\ (w)\ .\ MAX_S(p)\ (w)$ (p.451)

Conversely, a cleft sentence, as shown in (43), presupposes MAX_S and makes MIN_S as at-issue. The clefted element represents the strongest answer and asserts that it is the least strong element that has the property as designated in the cleft clause.

(43) $CLEFTS = \lambda w.\ \lambda p\colon MAX_S\ (p)\ (w)\ .\ MIN_S\ (p)\ (w)$ (p. 452)

Applying the account to (44), for example, the meaning of the *pen33*-cleft is shown in (45):

(44) Context: Thani came home and found that one of his mugs was broken. He suspected that one of the boys – Danai, Sutha, and Weera – must have broken it. After the interrogation, he found that:

da33nay33	pen33	khon33	tham33	kɛɛw42	tɛɛk22
Danai	COP	NOM.person	do	mug	be broken

'It's Danai who broke the mug.'

(45) λ*w*: MAX_S (broke the mug (*d*)) (*w*) . MIN_S (broke the mug (*d*)) (*w*)

a. Requires a question of the form *'Who was the person that broke the mug?'*

b. Presupposes that there is no true answer strictly stronger than *'Danai broke the mug.'*

c. Asserts that at least Danai broke the mug.

According to the above meaning, the statement in (44) leads to the exhaustive implications as shown in (46i)-(46iv):

(46) (i) *broke the mug(d)*

'Danai broke the mug.'

(ii) *~broke the mug(d ⊕ s)*

'It is not the case that Danai and Sutha broke the mug.'

(iii) *~broke the mug(d ⊕ w)*

'It is not the case that Danai and Weera broke the mug.'

(iv) *~broke the mug(d ⊕ s ⊕ w)*

'It is not the case that Danai, Sutha and Weera broke the mug.'

One problem of the MIN_S and MAX_S operators is that they fail to account for the constructions in which the combination of *only* and *pen33*-clefts is present as illustrated in (47):

(47) Context: Thida told Sunan that on Saturday someone would come to paint her house. Sunan knew that Danai, Thani and Sutha were at Thida's house on Saturday but did not know who was the person who painted it. She found out from Thida that:

thaa33nii33	pen33	khon33	thaa33sii24	baan42	khon33	diaw33
Thani	COP	NOM.person	paint	house	CLASS	only

'It's only Thani who painted the house.'

The above combined construction blurs the operation of MIN_S and MAX_S operators involving assertion and presupposition. A question, however, arises from this combination. Given that the *pen33*-cleft presupposes that no answer stronger than *painted the house(t)* is true and only asserts that no answer stronger than *painted the house(t)* is true, what is the purpose of the use of this combination?

6.3 Parthood relation

Büring and Križ (2013) propose an approach to account for presuppositional exhaustivity. The approach is developed from the concept of parthood relation in Boolean logic. Parthood relation basically involves the sum of the members of a set and the proper part of the sum. In (48) below the quantifier *all* suggests that all members of the set *the cats* share the same feature *roaming the garden*. In other words, the sum of the cats roamed the garden and none of them is a proper part of the sum of the cats.

(48) The cats roamed the garden.

Assertion: All the cats roamed the garden.

Presuppositions:

1) All the cats roamed the garden or no proper parts of the cats roamed the garden.
2) It is not the case that some of the cats roamed the garden.
3) No roamer is a proper part of the sum of the cats.

The concept above also applies to the negated version of the sentence in (49) which suggests that none of the cats roamed the garden. In this case, a proper part does not exist.

(49) The cats did not roam the garden.

Presuppositions:

1) None of the cats roamed the garden.
2) It is not the case that some cats did not roam the garden.
3) No cat is a proper part of the sum of the cats that did not roam the garden. However, the derivation of a proper part is possible in the cases in (50) and (51) in which not all members of the set share the same feature *roamed the garden*:

(50) A: The cats roamed the garden.

B: Not all the cats roamed the garden. Garfield slept on the couch.

Presupposition: Garfield is a proper part of the sum of the cats.

(51) A: The cats roamed the garden.

B: #No, the cats didn't roam the garden. Garfield slept on the couch.

Presupposition:

1) It is not the case that all cats roamed the garden.

2) Garfield is a proper part of the sum of the cats.

Following this approach, in an English *it*-cleft, the clefted argument, which is exhaustive, is not the proper part of the sum of the arguments that share the same features. This is illustrated in (52).

(52) It was *a* that *P*

Assertion: [[*P*]] ([[*a*]])

Presupposition:

$\forall x \in \max([[P]])$: $[[a]] \not\subset x$

(where for any $P \in Det$, $\max P = \{x \in P \mid\mid \sim\exists y \in P[x \subset y]\}$ (p. 8)

When an *it*-cleft is used, it asserts that the cleft argument *a* has the property *P* and presupposes that *a* is not a proper part of the sum of the argument *x* that share the property *P*.

The application of the above derivation is exhibited through the affirmative and negative clefts in (53) and (54):

(53) It was Danai Thida invited.

Assertion: Thida invited Danai.

Presupposition: Danai is not a proper part of the sum of all people invited by Thida.

(54) It wasn't Danai Thida invited.

Assertion: Thida didn't invite Danai.

Presupposition: Danai is not a proper part of the sum of all people invited by Thida.

The exhaustive interpretation for the restated (55) based on the parthood relation approach is provided in (56):

(55) da33nay33 pen33 khon33 tham33 kɛɛw42 tɛɛk22
Danai COP NOM.person do mug be broken
'It's Danai who broke the mug.'

(56) Assertion: [[*broke the mug*]] ([[*Danai*]])
Danai broke the mug.
Presupposition: $\forall x \in \max([[broke\ the\ mug]])$: $[[Danai]] \not\subset x$
Danai is not a proper part of the sum of those who broke the mug.

In order to account for the occurrence of *only* in the cleft construction which is the issue not accounted for by the inquiry terminating constructions, Büring and Križ propose, based on Groenendijk and Stockhof's (1984) notion of exhaustivity, that [[*only* DP]] exhausts the same predicate that DP exhausts. This is to say, *only DP* is not a proper part of the some of the arguments that have the property *P*. This solution is shown in (57) while its application to a cleft sentence is demonstrated in (58):

(57) $[[only\ DP]] = \lambda P: [[DP]]\ (P).exh([[DP]], P)$ (p.17)

(58) da33nay33 pen33 khon33 diaw33 thii42 thaa33sii24 baan42
Danai COP NOM.person only (REL) paint house
'It's only Danai who painted the house.'
Assertion: Only Danai painted the house.
Pressupposition: *'Only Danai'* true of the predicate painted the house and is not the proper part of any maximal quantifier that is true of *P*.'

So far, the inquiry terminating constructions and the parthood relation approach have revealed some characteristics of *pen33*-cleft. Firstly, the exhaustivity derived through the *pen33*-cleft construction is presuppositional. Secondly, the exhaustive nature of the *pen33*-cleft conforms with the concept of the parthood relation. The clefted argument is not the proper part of the sum of the argument that has the property designated in the cleft clause. The parthood relation approach also efficiently explains the case in which *only* co-occurs in *pen33*-cleft.

7. Beyond presuppositional exhaustivity

Even though the characteristics and meaning of exhaustivity in the *pen33*-cleft have been revealed in the current study, there are still some semantic and pragmatic features of the construction that need further investigations.

7.1 The presence of additive particles

An example of a case in which exhaustivity is compatible with additive implications is given in (59). The construction does not entail a singleton set as suggested through the parthood relation from which the account is formed. It is not the case here that the exhaustive argument Thani is not the proper part of the sum of all people who painted the house. It is actually part of it.

(59) thaa33nii33 pen33 khon33 thaa33sii24 baan42 **lɛɛ45**
Thani COP NOM.person paint house and
da33nay33 kɔɔ42 (pɛn33 khon33 thii42) thaa33 **duay42**
Danai PART (COP NOM.person REL) paint also
lit.: 'It's Thani who painted the house and Danai did it, too.'

There are also cases in which *only* and additive particles appear in *pen33*-clefts. Consider (60):

(60) Context: Thani came home and found that one of his mugs was broken. He suspected that one of the boys – Danai, Sutha, and Weera – must have broken it. Thani seeks the truth:

Thani: khray33 pen33 khon33 tham3 kɛɛw42 tɛɛk22
who COP NOM.person do mug be broken
'Who was it that broke the mug?'

Weera: a) da33nay33 pen33 khon33 tham33 (kɛɛw42 tɛɛk22)
Danai COP NOM.person do (mug be broken)
da33nay33 tham33 khon33 **diaw33** lɘɘy33
Danai do CLASS only PART
'It's Danai who did it/broke the mug. **Only** him.'

Weera: b) da33nay33 pen33 khon33 tham33 (kɛɛw42 tɛɛk22)
Danai COP NOM.person do (mug be broken)
su22thaa33 kɔɔ42 tham33 **duay42**
Sutha PART do also
lit.: 'It's Danai who did it/broke the mug. Sutha did it, **too**.'

The *pen33*-cleft constructions in (60a) and (60b) reveal that *pen33*-cleft constructions in Thai are not likely to yield exhaustive effects on the interpretation. Interestingly, this tendency also occurs to the ordinary canonical construction as illustrated in (61):

(61) Context: Thani heard a strange sound from the kitchen which sounded like something had been broken. He knew that Danai, Sutha and Weera were in the kitchen. He ran there to seek the truth:

Thani: khray33 tham3 kɛɛw42 tɛɛk22
who do mug be broken
'Who broke the mug?'
Weera: a) da33nay33 tham33 (kɛɛw42 tɛɛk22)
Danai do (mug be broken)
da33nay33 khon33 diaw33 lɘɘy33
Danai CLASS only PART
'Danai did it/broke the mug. Only Danai'
Weera: b) da33nay33 tham33 (kɛɛw42 tɛɛk22)
Danai do (mug be broken)
su22thaa33 kɔɔ42 tham33 duay42
Sutha PART do also
'Danai did it/broke the mug. Sutha did it, too'

7.2 Definiteness

The analyses in the present study do not cover the non-interchangeability of the *pen33*-cleft and the ordinary canonical order. This involves definiteness which lies in a set of specific alternatives and the definite descriptions which designate the qualifications of the alternative. Consider (62) and (63):

(62) Context: Thani came home and found that one of his mugs was broken. He suspected that one of the boys – Danai, Sutha, and Weera – must have broken it. After the interrogation, he found that:

da33nay33	pen33	khon33	tham33	kɛɛw42	tɛɛk22
Danai	COP	person	do	mug	be broken

'It's Danai who broke the mug.'

(63) Context: Thani heard a strange sound from the kitchen which sounded like something was broken. He knew that Danai, Sutha and Weera were in the kitchen. He ran there and found that:

da33nay33	tham33	kɛɛw42	tɛɛk22
Danai	do	mug	be broken

'Danai broke the mug.'

The sentence in (62) suggests that a *pen33*-cleft is preferred when a set of specific alternatives and a definite description are available. The alternatives must be eligible to map with the definite description. Applying Büring's (2011) idea regarding clefts and definiteness to the case in (62), one possible explanation is that, the individual(s) *x* that broke the mug maps a property *Q* to true if there is an individual *Y* that broke the mug which has *Q* and presupposes that *x* is a part of *Y*. In contrast, the context in (63), even though it refers to a specific set of alternatives, lacks a definite description. Thus, the sentence with an ordinary canonical order is selected.

Moreover, the *pen33*-cleft, unlike the English *it*-cleft, is used as a response to a cleft question. This might follow Coppock and Beaver's (2011) account for exclusives, (62) requires the current question *'Who is the person who broke the mug?'* which invokes all plausible alternatives that can be mapped with the definite description the person who broke the mug. On the contrary, (63) requires either a broad question *'What happened?'* or a question with double foci *'Who did what?'*. These are illustrated in (64) and (65):

(64) Context: Thani came home and found that one of his mugs was broken. He suspected that one of the boys – Danai, Sutha, and Weera – must have broken it. Thani seeks the truth:

Thani: khray33 pen33 khon33 tham3 kɛɛw42 tɛɛk22
who COP NOM.person do mug be broken
'Who was it that broke the mug?'
?kray tham33 kɛɛw42 tɛɛk22
who do mug be broken
?'Who broke the mug?'

(65) Context: Thani heard a strange sound from the kitchen which sounded like something was broken. He knew that Danai, Sutha and Weera were in the kitchen. He ran there and found that:

Thani: kray tham33 kɛɛw42 tɛɛk22
who do mug be broken
'Who broke the mug?'
?khray33 pen33 khon33 tham3 kɛɛw42 tɛɛk22
who COP NOM.person do mug be broken
'Who was it that broke the mug?'

In addition to a specific context which suggests a set containing particular members expected by the speaker, a cleft statement is selected as the answer to a cleft question. This is exhibited in (66):

(66) Context: After coming home from work, Thani walked to the kitchen to find something to drink. He found that his favourite mug was broken. He asked Sunan:

Thani: khray33 tham3 kɛɛw42 tɛɛk22
who do mug be broken
'Who broke the mug?'
#kray pen33 khon33 tham33 kɛɛw42 tɛɛk22
who COP NOM.person do mug be broken
#'Who was it that broke the mug?'
Sunan: da33nay33 tham33 (kɛɛw42 tɛɛk22)
Danai do (mug be broken)
'Danai did it/broke the mug.'
#da33nay33 pen33 khon33 tham33
Danai COP NOM.person do
#'It's Danai who did it/broke the mug.'

8. Conclusion

Based on the typical claims about cleft constructions and their exhaustive implications, this paper has shown that, in contrast to the assertive meaning of *only*, the exhaustive meaning derived from the *pen33*-cleft construction is presuppositional. In order to respond to current approaches which deal with the nature of exhaustivity, the accounts proposed by Velleman et al. (2012) and Büring and Križ (2013) have been used. This reveals the meaning of the exhaustivity existing in the pen33-cleft conforms with the concept of the parthood relation proposed by Büring and Križ. The account provides an effective explanation for the case in which *only* is present in the *pen33*-cleft. Although the two research questions have been answered, the issues concerning the presence of additive particles and definiteness in both affirmative and interrogative clefts still need to be solved.

References

Atlas, J. & Levinson, S. (1981). It-clefts, informativeness and logical form: radical pragmatics (revised standard version). *Radical pragmatics*, 1-62. Academic Press.

Bolinger, D. (1972). A look at equations and cleft sentences. In E. Firchow (Ed.), *Studies for Einar Haugen* (pp. 96-114). The Hague: Mouton.

Büring, D., & Kriz, M. (2013). It's that, and that's it! Exhaustivity and homogeneity presuppositions in clefts (and definites). *Semantics and Pragmatics*, *6*(6), 1-29.

Büring, D. (2011). *Conditional exhaustivity presuppositions in clefts (and definites).* Unpublished manuscript.

Coppock, E. & Beaver, D. (2011). Sole sisters. *Semantics and Linguistic Theory (SALT)*, 21, 197–217.

Destruel, E. (2012). The French *c'est*-cleft: An empirical study on its meaning and use. *Empirical issues in Syntax and Semantics*, *9*, 95-112.

Drenhaus, H., Zimmermann, M., & Vasishth, S. (2011). Exhaustiveness effects in clefts are not truth-functional. *Journal of Neurolinguistics*, *24*(3), 320-337.

Gabriel, C. (2010). On focus, prosody and word-order in Argentinian Spanish: A minimalist OT account. *ReVEL*, 4, 183-222.

Groenendijk, J., & Stokhof, M. (1984). *Studies in the semantics of questions and the pragmatics of answers*. University of Amsterdam PhD thesis.

Halvorsen, P. (1978). The syntax and semantics of cleft constructions. *Texas Linguistics Forum*, 11. Austin: University of Texas Department of Linguistics

Horn, L. (1981). Exhaustiveness and the semantics of clefts. *North Eastern Linguistic Society*, 14, 108-31.

Kuno, S., & Wongkhomthong, P. (1981). Characterizational and identificational sentences in Thai. *Studies in Language*, 5, 65-109.

Onea, E. (2009). Exhaustiveness of Hungarian focus: Experimental evidence from Hungarian and German. In A. Riester & E. Onea (Eds.), *Proceedings of focus at the syntax-semantics interface*. Publikationen des SFB 732, Stuttgart

Onea, E. & Beaver, D. (2011). Hungarian focus is not exhausted. In E. Cormany, S. Ito & D. Lutz (Eds.), *Semantics and Linguistic Theory (SALT)*, 19, 342-359.

Rooth, M. (1985). *Association with focus*. Amherst, MA: University of Massachusetts PhD thesis.

Ruangjaroon, S. (2007). Thai Wh-Expressions at the Left Edge of the Clause: Contrastive and Identificational Wh-Clefts. *Concentric: Studies in Linguistics*, *33*(2), 121-157.

von Stechow, A. & Zimmermann, T.E. (1984). Term answers and contextual change. *Linguistics*, 22(1), 3-40.

Szabolcsi, A. (1981). The semantics of topic-focus articulation. In J. Groenendijk, M. Stokhof & T. Janssen (Eds.), *Formal methods in the study of language 2* (pp. 513-540). Amsterdam: Mathematisch Centrum

Tawilapakul, U. (2014). Exhaustivity and definiteness in the wh-cleft construction in Thai. Unpublished manuscript.

Velleman, D., Beaver, D., Destruel, E., Bumford, D., Onea, E., & Coppock, L. (2012). It-clefts are IT (inquiry terminating) constructions. *Semantics and Linguistic Theory*, 22, 441-460.