

On the Discourse Analysis in Korean Dialogues

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ABSTRACT

The purpose of the paper is twofold. First, we revise the well-known Centering Theory of anaphora resolution and propose the Controlled Information Packaging Theory (CIPT, for short). Second, we suggest a solution to the resolution of the antecedents of pronouns within the framework of CIPT. For this purpose, we select a dialogue of hotel reservation as a domain-restricted discourse, and discuss the characteristics of the distribution of pronouns. We suggest that we need to place the Slot-Link element on the top of the forward centering list. We claim that we need to establish a constraint on conceptual compatibility. As for the pronouns in the main dialogue, we propose a constraint of discourse command (d-command).

1. INTRODUCTION

In Korean, the zero anaphora is very common in a domain restricted dialogue such as the one found in the situation of hotel reservation as follows¹:

- (1) U1: iss e-yo?
 exist
 (Is there a room free?)
 U2: nalcca encey-sip-nikka?
 date when
 (For what date are you going to make a reservation?)
 U3: onul cenyek-ey.
 today night
 (I'd like to make a reservation for tonight)
 [U = Utterance, = zero pro-form]

In the above example, a long discussed issue is how to establish the antecedent of the zero anaphors. In this study we propose a reasonable and reliable solution to the problem.

The following five types of information structures are assumed in CIPT:

- (2) a. Link - Tail - Focus structure (L-T-F structure)
 b. Link- Focus structure (L-F structure)
 c. Tail - Focus structure (T-F structure)
 d. Focus structure (F structure)
 e. Slot Link - Focus structure (SL-F structure)

The SL-F structure is the one defined by Lee & Lee(1998), in addition to the original information packaging theory of Vallduvi (1994). We adopt the concept of the frame theory devised in the Artificial Intelligence community.

¹ We thank Professor Jungyun Seo of Sogang University and Professor Hyunho Lee of Tongyang Technical College for allowing us to use the corpus they constructed for the Soft Science Project.

- (6) a. A: In the Netherlands I got the president a big Delft china tray that matches the set he has in the living room.
Was that a good idea?
b. B: No. [_L The president] [_F HATES] [_T the Delft china set])
Abbreviations: L = Link; F = Focus; T = Tail.

In a dialogue such as (6), when the sentence "The president hates the Delft china set" is uttered, only the verb 'hates' becomes the focus. The phrase 'the president' is a link component and 'the Delft china set' a tail component. Accordingly, the cognitive processing will go on as in (7).

- (7) a. Look up the information card of 'the president'.
b. Replace any previous information concerning the relation between the president and the Delft china set with the new information 'HATES'. (Information updating)

If the same sentence is uttered in a different context, the information structure will be different as shown in (8).

- (8) a. A: I'm arranging things for the president's dinner.
Anything I should know?
b. B: Yes. [_L The president] [_F hates the Delft CHINA SET].

In this case, 'the president' is a link component and 'hates the Delft china set' becomes the focus component. Here, in the cognitive process, the first step is to look up the information card of the noun phrase 'the president'. Then we are supposed to add the information 'hates the Delft china set' to the card.

In the example in (9) we see that no explicit link component appears.

- (9) a. A: In the Netherlands I got the president a big Delft china tray that matches the set he has in the living room. Was that a good idea?
b. B: No. [_F (He) HATES] [_T the Delft china set])².

Here only 'hates' becomes the focus component, and the noun phrase 'the Delft china set' functions as the tail component. We do not have the link component 'the president'. In this case, we assume that the information card for 'the president' has been activated and continues to be in the activated state. In the card we replace any previous information related to the relation between the president and the Delft china set with 'hates'.

Let us now examine a situation where the example (8) is uttered in a different context as in (10).

- (10) a. A: I'm arranging things for the president's dinner.
Anything I should know?
b. B: Yes. The president always uses plastic dishes. [_F (He) hates the Delft CHINA SET].

Here the whole verb phrase 'hates the Delft china set' is the focus component. This information is added to the activated card of 'the president'.

3. CONTROLLED INFORMATION PACKAGING THEORY(CIPT)

In this section, we discuss the two characteristics of the Controlled Information Packaging Theory(CIPT, for short). The CIPT is distinguished from Vallduvi's Information Packaging Theory in two respects.

First, in our CIPT we postulate the fifth SL-F structure. Vallduvi(1994: 16) discusses dialogues like

² The pronoun 'he' is not overtly pronounced. This is just to show the place where 'the president' is assumed to appear.

the one given in (11).

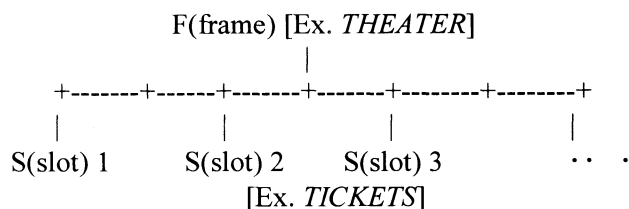
- (11) a. A: Why don't you go to the theater more often?
 b. B: TICKETS are expensive.

He notes that the sentence in (11b) is not about any particular referent. He observes that in this case no particular focus of update is designated. He suggests that a salient general temporary situation file card be used to record the new information. This sentence is sometimes termed to be reporting a situation.

If we look at the situation closely, however, we can clearly see that the noun phrase 'tickets' in (11b) is referentially related to the noun phrase 'the theater' in (11a). If we use the notion of frame suggested by Minsky(1975) to represent our cognitive knowledge of the actual world, we can naturally relate 'tickets' to 'the theater'. Minsky assumes that our knowledge about the world is represented in terms of frames, each of which in turn consists of many slots. The theater provides us a frame of world knowledge and the noun phrase 'tickets' fills in one of the slots.

The idea can be represented as in (12).

- (12) Structure of the 'Frame and Slots'



In this frame and slot analysis, we can say that when (11a) is uttered, the information card of 'the theater' is activated in the cognitive structure of the hearer, and the noun phrase 'tickets' can be triggered by this activation, which is exemplified in [] in (12)

By introducing this idea of frame and slot representation, we extend Vallduvi's theory and postulate the fifth information structure, namely Slot Link-Focus structure. We now analyze (11b) as in (13).

- (13) [_{SL} TICKETS] [_F are expensive].

As shown in (13) we treat the noun phrase in (11b) as a kind of link component. We now introduce a new notion of Hyper-link. The new information 'is expensive' is not directly linked to the noun phrase 'the theater' in (11a). We assume there to be a hyper-link between 'the theater' and 'tickets' by making an additional information card. The information conveyed by the verb phrase 'is expensive' is indirectly linked to the theater through this hyper-linking card.

The new Slot Link-Focus device can naturally explain the so-called bridging phenomena discussed by I.-H. Lee(1994). Look at the examples in (14).

- (14) a. John entered a large dining room.
 b. The chandelier hung by an imported gold chain.

The noun phrase 'a large dining room' in (14a) need to be related in some way to the noun phrase 'the chandelier' in (14b). This referential relation can be properly captured by the hyper-link structure, which may be represented by the sentence in (15).

- (15) The large dining room had a chandelier.

The sentence in (15) bridges (14a) to (14b). We see that Vallduvi's original information packaging theory cannot appropriately handle examples like (11) and (14). We see that our extended information packaging theory, including the Slot-Link Focus structure, can provide a proper account of the data in question.

Second, our CIPT assumes a center controlling file card that includes the informations about the

discourse structure and ordinary file cards. A center controlling card is assumed to have the structure depicted in (16).

(16) A Center Controlling Card (CCC)

Card Number
The set of discourse referents on the same level
Forward-looking center list of the immediately previous utterance
Hyper link with the center controlling card of the immediately higher level
Hyper link with the center controlling card of the immediately lower level

An example of the center controlling card is shown in (17).

(17) An example of CCC

3
7 9 10 14 15
[14 15]
1
4

With the center controlling card, we also have to assume that the ordinary file card must have the information about the discourse level to which it belongs. Accordingly, we assume that an ordinary file card has the structure given in (18).

(18) An Ordinary File Card

Card Number

Special information about the discourse objects
Hyper link with the center controlling card of the same discourse level

This idea of the center controlling card enables us to deal with the anaphor in the global discourses. Detailed examples will be discussed in Section 5 below.

4. ZERO ANAPHOR

In a series of utterances, there is a list of items, each of which may become the center of the dialogue (Walker & Prince 1997). According to Choe & Lee (1999), this notion of center is useful in establishing the antecedent of zero anaphor in Korean. Let us examine the discourse in (19).

(19)

- a. tokkocwun un ssuki lul memchwu essta.
tokkocwun TP writing AccP stop Pst DP
(Tokkocwun stopped writing.)
- b. han kay namun kamca lul cipese ip ey ne essta.
one remained potato AccP pick mouth put in
(picked up one remained potato and put it in the mouth.)
- c. son ul ppetese pyekcangmun ul yenta.
hand stretch closet door open
(stretched out (his) hand and open the closet door.)
- d. wi alayy twu khan ulo nanwiecin pyekcang an un
tachaylopta. up down two part divided closet
in colorful
(The inside divided into two parts is colorful.)

This series of utterances may produce the centers given in (20). Here Cb means the backward center — similar to the traditional notion of Topic — which may function as the antecedent of the zero/explicit anaphor, while Cf means the list of forward-looking centers.

- (20) a. Cb = [?] Cf = [Tokkocwun]
b. Cb = Tokkocwun Cf = [Tokkocwun, kamca 'potato', ip 'mouth']
c. Cb = Tokkocwun Cf = [Tokkocwun, son 'hand', pyekcangmun 'closet door']
d. Cb = (?) pyekcang 'closet' Cf = [pyekcang 'closet']

As shown in (20b), the zero anaphor in (19b) is interpreted as having *Tokkocwun* as its antecedent, because *Tokkocwun* is the backward center in (20b), namely in (19b). Now, let's examine a dialogue for hotel reservation!

(21)

- U1 G: Os iss e-yo?
exist
(Is there a room free?)

- U2 H: nalcca encey-sip-nikka?
date when
(For what date are you going to make a reservation?)
- U3 G: Os onul cenyek-ey.
today night
(I'd like to make a reservation for tonight)
- U4 H: ney?
yes?
(I didn't understand, what you said.)
- U5 G: Os onul cenyek
today night
(I'd like to make a reservation for tonight)
- U6 H: yey, Os kanunghanteyyo.
Yes possible
(Yes, It's possible to make reservation for tonight.)
- U7 G: yey?
Really
(Is it really possible?)
- U8 H: chwaci(CHARGE)nun sipiman chenweninteyyo.
price TOP 120,000 1,000 be
(The price is 121,000 Won.)
- U9 G: yey
yes
(I see.)
- U10 H: e- Os cehuy hotheyl khatu kathun kes socihako
Well us hotel card like thing have
kyeysin kes issusipnikka?
HON thing HON
(Well, do you have any credit card for this hotel?)
- U11 G: Os epseyo.
Nothing
(I have nothing like that.)
- U12 H: kuleseyyo.
so
(I understand.)
- U13 G: ney.
Yes
(It's so.)
- U14 H: kulayto cehuyka ttokkathiyo, Os Oo samsip
though we in the same way 30
phulo(pheseynthu) tisukhawunthu hay tulilkkeyyo.
Percent discount do give
(Anyway, we will discount 30% for you in the same way
as you might have a hotel card.)

[U = Utterance, G=Guest, H=Hotel Os/ Oo= zero pro-form]

In the above dialogue, we see frequent appearance of null anaphor. If we recover the antecedent of each of the null anaphor, we obtain the following.

- (22) U1 Os = empty room
U3 Os = dates of stay
U5 Os = dates of stay
U6 Os = reservation
U10 Os = hearer

- U11 Os = speaker
 U14 Os = speaker, Os = hearer

The antecedents of the null anaphors in the above dialogue are related to the hotel reservation. Thus, viewing from the notion of frame, we can say that the hotel reservation frame is activated and that such slots as 'empty room,' dates of stay,' 'reservation' are also activated in the frame. In this way the antecedents of the null anaphors are interpreted. Accordingly, we claim that the fifth utterance U5: *Os onul cenyek* 'Os tonight' has the following information structure.

(23) [Os]_{SL} [onul cenyek]_F

In this way, the null anaphors appearing in a restricted dialogue such as a Hotel reservation dialogue show the Slot Link-Focus structure. Thus, we propose a revision of the centering forward information structure as shown in (24), so that the notion of information structure is included in the centering theory, following Choe & Lee(1999):

(24) Slot Link component > {Speaker, Hearer}> Subject> Indirect Object > Direct Object

From this point of view, the slots in the frame of hotel reservation, we will have 'empty room,' 'rate,' 'staying days,' 'reservation,' etc. We need to have a process of deciding the proper antecedent of the null anaphor in the dialogue (e.g., U5). The relevant constraint for the decision is postulated as in (25), following Kook Chung et al.(1998).

(25) **The constraint on conceptual compatibility**

Every individual which is not explicitly expressed must be interpreted in terms of the explicit expression which is conceptually compatible.

This constraint is supported by the expressions used as slots with the specific predicates in the frame of hotel reservation. The relationship between slots and predicates may be arranged as in (26).

(26)
 empty room :: isseyo? 'have?' issupnita 'have', eosupnita 'have no'
 rate :: elmayo? 'how much'
 period :: ilpak 'one night', ipak 'two nights'
 date :: onul 'today', nayil 'tomorrow'

The constraint makes it possible to select the most appropriate candidate for a null pronoun.

5. MAIN DIALOGUE AND SUB-DIALOGUES

In general, a dialogue consists of a series of utterances. Some of the utterances may constitute a sub-dialogue, which may cause a pause in the stream of the main dialogue, as shown in (4), repeated here in (27).

(27) U1: Seoul ollawa-se-nun meyn cheum-ey
 came-after at first
 ince ku Naksan kkokteyki-ey ku acu ku chenmakchon
 well, the top at well the tent
 kathun tey inca.
 like place well
 (When I arrived in Seoul, I (went) to the top of the
 Naksan mountain, well, to the poor village)
 <Sub-dialogue>

U2(S1): naksan-imyen ce Tongdaymunccok ?
direction
(Do do you mean the Nagsan mountain near East Gate?)

U3(S2): yey ... Tongtaymun-ye i-ss-upni-ta.
yes at exist
(Yes, it is. It is located near Tongtaymun.)

U4(S3): yey, yey.
yes, yes
(I see. I see.)

</Sub-dialogue>

U5: *kuli* kass-ess-nun-tey,
there went...
(I went there, ...)

With this dialogue, H. Lee(1998) claims that the antecedent of the pro-form *kuli* 'there' must be searched in the immediately preceding sub-dialogue. We see this claim is too strong, if not incorrect. Let us examine another discourse in (28), which we adopt adopted from a TV talk show.

(28)

U1: kulayse incey ey cohci nayka kulay hanta hay kaciko hay
therefore well oh good me so try determined
Pollanikka talun kenun casinissnuntey swuhak-i mwunceyeyyo.
be_willing to other thing convinced mathematics-NOM problem
(Therefore, I determined that I would try to do that. But the mathmatics was a problem.)

U2: um.
well
(Well.)

U3: kulay incey chengkyeychen ke ka kaciko cenkwa
so well Chengkyeychen go PERF reference book
4 haknyenccalipwuthe chem hwulthenaylyeka ponikka
4th grade_from at first glance EXP
4 haknyenccalipwuthe pwaya toykeysstelakwuyo.
4th grade_from learn find out

(So, I firstly glanced the reference books and found out that I should learn the mathmatics from the 4th grade.)

<Sub-dialogue1>

U4: kwukminhakkyo 4 haknyen?
the primary school 4th grade
(Do you mean the 4th grade of the primary school?)

U5: yey.
Yes
(Yes.)

U6: yey.
so
(It's so)

<Sub-dialogue2>

U7: pwunswu nanwuki ilen
fraction division these
(The subjects were those like the fraction and divison.)

U8: [@-@]

U9: kuke ta icepeyessunikkan
those all forgot_because
(Because I forgot all the mathematical knowledges.)

U10: yey.

Yes

(I see.)

</Sub-dialogue2>

</Sub-dialogue1>

U11: *kuke* it *nun* mollyay kamchwenohko incey kukel pomyense cakkwu

it TOP secretly hide now it learn often

ponikka incey kuken swuipkey toytelakwuyo.

learn now it easy got

(I learned the book, hiding the book secretly and then I could easily understand the contents, because I often learned it.)

U12: yey, yey.

so

(It was so.)

U13: kwukminhakkyo keki that *nun* kumpang tetume ponikka toyko,

Primary school that TOP soon turn fumble in reach

(I could early reach some goal through just fumbling in the book on the primary school level.)

U14: kulehkeyhayse incey hakwenul tunglokul hakey toyn kecyo

Therefore now private institute enroll PERF

mollyay.

secretely

(So, I've secretely enrolled in a private institute.)

In the above dialogue, we see a complex dialogue which include a sub-dialogue, which in turn has another sub-dialogue. Here we call attention to the pronoun *kuke* 'it' in U11. How can we establish the antecedent of this pronoun? If we follow H. Lee's theory, we have to search the antecedent in the immediately preceding sub-dialogue. In the preceding sub-dialogue, however, we do not see the phrase *cenkwa 4 haknyen* 'reference book 4th grade'. The antecedent of the pronoun *kuke* 'it' in U11 cannot be found in the sub-dialogues. We see the antecedent *cenkwa 4 haknyen* 'reference book 4th grade' in the U3, which is the utterance just before the first sub-dialogue. This shows that the antecedent of the pronoun is not necessarily found in the immediately preceding sub-dialogue. This fact proves that H. Lee's claim is not correct.

Considering the search of the antecedent of pronouns appearing in the global dialogue, as an alternative to H. Lee's(1998) theory of subdialogue we propose the discourse command constraint as in (29)

(29) Discourse command constraint

In a discourse the antecedent of a pronoun must be able to discourse command the pronoun.

The discourse command (d-command) is defined as in (30).

(30) Discourse command

In a discourse an expression A discourse commands an expression B iff one of the following is satisfied:

(i) A and B belong to the same level of the dialogue.

(ii) B belongs to the level of dialogue lower than the level of dialogue to which A belongs.

According to the discourse command constraint, the antecedent of a pronoun must be sought in the same or higher level of dialogue. as discussed above, the antecedent of the pronoun *kuke* 'it' in the utterance U11 in (28) is in the same level of discourse, not in the sub-dialogue. As for the pro-form *kuli* 'there' of U5 in (27), its antecedent appears in the sub-dialogue U2. Thus, this phenomenon seems to support the theory of sub-dialogue. But the antecedent also appears in U1 which uttered before the start of the sub-dialogue. Notice that U1 and U5 are in the same level of dialogue. Therefore, this case observes the discourse command constraint.

Let us now see how the discourse command constraint is incorporated in the Controlled Information Packaging theory (CIPT). Let us examine an example.

(31)

U1: kulesici malko, cenyong chasenul kekise samkaciseputhe namyengdongkkacinun com
so do not car lane there Samkakci_from Namyengdong_to please
epse cusitenka.

erase give

(Please erase the car lane from Samkakci to Namyengdong.)

U2: ha ha, yey, yey.

Ha ha, Yes, yes.

(Oh, yes! Yes!)

U3: yey, animyen yey, chasenul hana te mantule cuseyyo.

if not car lane one more make give

(Yes, if not, please make another car lane more.)

U4: ney.

(Yes.)

U5: chasenul yak 300m nayci 400m te manrul swuka isseyo.

car lane about or more make possible

(We can make a car lane of about 300 or 400 meter long.)

<Sub-dialogue>

U6: chaseni com nelptanun malssumikwunyo. kulenikka ku ccoki

car lane little bit wide you say well that side

'You mean that the car lane is a little bit wide. Well that side'

U7: yey yey

'Yes, yes.'

U8: yey yey

'Yes, yes.'

</Sub-dialogue>

U9: *kukes* com hay cwusyessumyen cokheysseyo.

it please do give nice

(It will be nice if you do it.)

U10: yey.

(Yes.)

In this dialogue the pronoun *kukes* 'it' in U9 has an event, namely the event of making the car lane of about 300 or 400 meter long, as its antecedent. This event is one of centers activated by the utterance U5, because an event may be considered to be one of the centers in the forward centering list. The noun chasen 'car lane' in U6 is a backward center only in the sub-dialogue. Thus, we have to search the antecedent of the pronoun *kukes* 'it' in U9 in U5 which belongs to the same level of dialogue. In this case, the event itself is the antecedent. Thus, it cannot be found in the sub-dialogue U6 through U8. This can be predicted by the discourse command constraint.

6. CONCLUSION

This paper discussed the searching mechanism of antecedent of pronouns in Korean dialogue. We discussed the characteristics of zero pronouns appearing in a restricted dialogue of hotel reservation. In this case we claimed that, viewing from the information structure, the Slot-Link element is the possible antecedent of the null pronoun and that it must be place on the highest position in the forward-looking centers list in the centering theory. We suggested the constraint on conceptual compatibility for selection of appropriate antecedent out of many possible ones. Concerning search of antecedent of pronouns in a global dialogue, we introduced a center controlling card to account for the anaphoric relation induced by the hierarchical structure of the global dialogue and the sub-dialogue. On the basis of the levels we postulated the general discourse command(d-command) constraint to the effect that the antecedent must

discourse command its pronoun.

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