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Procedural Information of Anaphoric Expressions: Pronouns, Ellipses and Metarepresentations¹

Takahiro Otsu

Abstract

This article examines computational processes of anaphoric expressions (i.e. pronouns and elliptical expressions) through a relevance-theoretic framework. Anaphora resolution regarding pronouns and elliptical expressions undergoes a process of saturation: an instruction on referent identification by way of linguistic clues (i.e. pronouns and ellipses themselves). I propose that computational processes of anaphoric processes are based on ‘metarepresentation’ (i.e. interpreted thought or utterance) (Wilson (2000); Noh (2000)) involving a pragmatic enrichment of the incomplete logical form of anaphoric expressions. Anaphora resolution relies heavily on the hearer’s metarepresentational abilities in the sense that the referents of anaphoric expressions are accessible in the mental representations of the hearer who interprets the utterance in which those expressions are included. In other words, anaphoric expressions, phonologically realized or not, encode a procedure instructing the hearer to access their referent within the metarepresentations in order to reach the intended interpretation of the utterance in which they occur.

Key Words: pronouns, ellipsis, procedural information, metarepresentation

1. Introduction

An anaphoric expression, referring to a pronoun or an elliptical expression in this article, is a commonly-used cohesive device which is exploited in linguistic and non-linguistic contexts, but whose antecedent may or may not be linguistically overt. Another observation is that the same anaphoric expressions are used in linguistic and non-linguistic contexts, as examples (1) and (2) indicate (my emphasis).

- (1) a. Isobel Thompson took off her scarf and ruffled her grey curls. “Goodness me. You are cross.” “I’m angry. And miserable. Peter deserves better.” “Shall I go away?” “Please don’t.” Isobel said, “I don’t expect Peter minds as much as you do.” (BNC: CMJ)
- b. He made a swift gesture of drawing a knife across his throat, rolled up his eyes and gagged. The sound was horribly realistic, a gush of blood in the throat. She cried out: “Oh don’t, Darren, please don’t!” (BNC: CJF)
- (2) a. Fenny Cole pushed back her chair. “You know what happens if we try to force it, Lilith. We’ve done well enough for one night, and it’ll be standeasy soon. Let’s all try again

- tomorrow.” “Shall we?” Lilith looked directly at Vi. “Tomorrow night, after supper?” (BNC: CEH)
- b. The record ended and Erika walked off the floor with Herman in attendance. Herr Hocher put on another record, an amateurish jazz band. “Shall we?” Herman said. “I thought that you said this was decadent music,” Erika replied. (BNC: A7A)

Examples (1) and (2) include elliptical expressions: “don’t” and “shall we?” Those expressions have a linguistic antecedent in (1a) and (2a), whereas they have no overt linguistic antecedent in (1b) and (2b). In (1a) and (2a), the elliptical expression has its antecedent in the previous discourse: i.e. “go away” in (1a) and “try again” in (2a). In example (1b), on the other hand, “don’t” is eventually pragmatically enriched into, say, “don’t kill me”; in example (2b), “Shall we?” is eventually enriched into, say, “Shall we dance?” Taking the third personal pronouns, for example, it is also self-evident that the same lexical expressions are used both in linguistic and non-linguistic contexts.

With regard to this fact, however, so far there have never been any straightforward and conclusive accounts other than syntactic and pragmatic accounts separately provided. Carston (2000) claims “The relevance-theoretic view... picks out a natural class of environmental phenomena, namely, ostensive stimuli, and the same comprehensive strategy is taken to click into action in response to these stimuli, whether linguistic or not” (p.8). Based on the relevance-theoretic argument that the same lexical expression is subjected to the single interpretive strategy, this article proposes that anaphoric processes are controlled by the same cognitive principle. In section 2, I examine the previous approaches to anaphoric processes, most of which are very fragmentary and inconclusive. Section 3 suggests that pronouns and elliptical expressions go through the same computational processes (i.e. saturation). Section 4 proposes a metarepresentational approach, in which anaphoric processes may be adequately explained by focusing on the relevance-theoretic term ‘metarepresentation’, which constrains the recovery of the implicit import of anaphoric expressions. As this account suggests, pronouns and elliptical expressions encode a procedural meaning of instructing the hearer to access the metarepresentation (i.e. the mental representation of the source representation) in order to reach at the intended interpretation. Section 5 is a brief conclusion.

2. Previous Approaches

2.1. Surface/Deep Dichotomy

One traditional account regarding the process of comprehending anaphoric expressions is a surface/deep dichotomy, which claims that natural language has two classes of anaphora, traditionally characterized as ‘surface anaphora,’ represented by a verb-phrase ellipsis, stripping, sluicing or gapping, and ‘deep anaphora,’ represented by pro-nominals, null compliment anaphora or *do it*. Sag and Hankamer (1984: 325) characterized the anaphoric processes of surface and deep anaphora as follows:

- (3) a. only deep anaphora can be used deictically, or...can be ‘pragmatically controlled’
 b. only surface anaphora requires parallelism in syntactic form between anaphor and antecedent

This dichotomy is based on a distinction in the control mechanism between ‘linguistic control’ and ‘pragmatic control’: i.e., anaphors are linguistically controlled when they are anaphoric to a linguistic antecedent, and pragmatically controlled when they directly refer to a real-world object or situation in the way deictic expressions do.

However, even this long-accepted dichotomy cannot make a clear-cut distinction between two types of anaphora, because it allows some exceptions. To begin with, verb-phrase ellipses occurring in discourse-initial contexts are commonly observed, as Hankamer and Sag (1976), Schachter (1977), Stainton (1997), Stanley (2000), and Merchant (2004) indicate. Of direct relevance to this discussion are (4) and (5). In neither case is there any appropriate linguistic antecedent in the discourse.

- (4) [Hankamer brandishes a cleaver, advances on Sag.]
Sag: Don’t! My God, please don’t! (Hankamer and Sag (1976))
- (5) [John pours another martini for Mary. She says:]
I really shouldn’t. (Schachter (1977))

Ad hoc explanations have been given as to why these constructions actually take place. Hankamer and Sag (1976: 409) exclude pragmatically-controlled surface anaphora examples such as (4) by arguing that the requirement of syntactic control for surface anaphora holds only for the cases used in declarative sentences (i.e. sentences with an illocutionary force of statements). But it is not clear why the illocutionary force such as an order or invitation raises the pragmatic controllability of surface anaphora. In order to answer this question, Schachter (1977: 764) attempts to explain that non-declarative sentences such as imperatives cover a narrower referential range of an antecedent than declarative sentences, and therefore non-declarative sentences can be more often interpreted correctly based on the extralinguistic context alone. Obviously, however, this does not adequately account for his own example (5), which allows a declarative sentence with the illocutionary force of statements a wider referential range than either imperatives or questions.

Second, deep anaphora is also subject to a sort of linguistic control, which affects the linguistic property of the antecedent. Linguistic information, as well as non-linguistic information, plays a crucial part in interpreting the deictic use of deep anaphora (cf. Tasmowski and Verluyten (1981, 1982, 1985)). Consider now (6) and (7).

- (6) [John wants his pants that are on a chair and he says to Mary:]
John: Could you hand them / *it to me, please?
(Tasmowski and Verluyten (1982))
- (7) [Same situation, but with a shirt:]
John: Could you hand it / *them to me, please? (*ibid.*)

Although the real-world objects ‘pants’ or ‘shirt’ do not have any direct relationship with the linguistic category of singularity or plurality, the choice between a singular ‘it’ or a plural ‘them’ is obviously affected by the linguistic form of its antecedent. This fact indicates that deep anaphors, which have been defined as directly referring to real-world objects, are also affected by certain linguistic factors.²

2.2. Linguistic Controllability of Antecedentless Anaphors

This section examines the cognitive mechanism of anaphoric expressions such as third-person pronouns and verb-phrase ellipses, which are both used in discourse-initial contexts and do not have a linguistic antecedent.

As Tasmowski and Verluyten observed in (6) and (7), even the pronouns without an antecedent in discourse are linguistically controlled, as well as pragmatically controlled. The control mechanism they propose regarding those ‘antecedentless anaphors’ (i.e. anaphors occurring discourse-initially in non-linguistic contexts) includes the assumption of absentee linguistic antecedents. This argument is briefly represented in (8):

- (8) absentee linguistic antecedent <linguistically controls> pronoun

In adopting this control mechanism, antecedentless pronouns refer to a perceived salient real-world object or situation not directly but through the assumption of an absentee linguistic antecedent.

Similar arguments hold for Stanley’s (2000) or Merchant’s (2004) accounts of the discourse-initial cases of verb-phrase ellipses. Linguistic controllability on anaphoric resolution is also dominant in the analysis of this type of surface anaphora. Now consider example (9).

- (9) [Looking at some boys about to bungee jump off a bridge over a river]
John won’t. Stanley (2000: 404)

In (9), Stanley claims that “the expression ‘bungee jump’ has been made salient as a [an absentee] linguistic antecedent for the syntactic ellipsis by the context” (p.405). He elaborates it thus: in front of a group of friends, John and Bill are expected to bungee jump; they are expecting Bill to go first; when Bill is standing high on the platform of a crane above the water, ready to jump into the water below, Sarah, aware of John’s terror of heights, utters example (9) to her friends, shaking her head. Merchant (2004) follows and extends Stanley’s line of reasoning: discourse-initial verb-phrase ellipses have [_{VP} *do it*] as the ellipted VP, whose meaning is licensed by the relevant actions in discourse, and this assumed VP can be ellipted or deleted when those actions are raised to enough salience.

However, these two proposals need a more cognitive explanation to give full support to such a complicated (i.e. linguistic-pragmatic combined) view, which assumes an absentee linguistic antecedent and allows perceptual salience of discourse entities in a physical environment. In particular, what is left unsolved is where and how such an absentee linguistic antecedent is expected to exist while discourse is produced and comprehended and how absentee linguistic antecedents are assumed.

In contrast to the syntactic analysis, Cornish (1987, 1996) argues that both absentee linguistic antecedents and the linguistic controllability of antecedentless anaphors are inadequate. Let us consider example (10), where there is not a single candidate textual antecedent for the pronoun ‘him’, nor is there a referent unidentified in the extralinguistic context.

- (10) [Passage of a speech by the Vice-Chancellor of the University of Kent to the academic staff concerning the situation the University found itself in at the time. At this point in the speech, the VC is broaching the issue of the search for a new Chancellor:]
 ‘...all nominations should be in by 5 November... [laughter from the floor]... We hadn’t consulted HIM!’
 (Cornish (1996: 29))

Cornish claims that the hearer will have reasonably accessed a mentally-represented entity for the referent being in focus attention in the discourse model. In his framework, an “antecedent-trigger” such as a significant gesture helps the hearer to create a conceptual mental representation of the referent. In (10), the laughter of a male person unidentified by the speaker serves as a trigger for the pragmatic inference on the part of the speaker and the audience who do not identify the man in question either. This approach is supported by Bosch (1988), who claims that “anaphoric referential expressions never link up directly with any other referential *expressions* (i.e. antecedents), but always with a mental representation of their referent, which may have been created by the interpretation of an antecedent expression, by inference, or otherwise” (p.223). Cornish’s and Bosch’s conceptual models may indeed account for the licensing of ‘number’ marking in Tasmowski and Verluyten’s examples (6) and (7) and ‘gender’ marking in (10). However, the question still remains unsolved as to where a mental representation of the referent is expected to exist and how it is comprehended.

Let us summarize what we have found to be the drawbacks of the previous approaches seen over section 2, as in (11).

- (11) a. Comprehension of anaphoric expressions needs both syntactic and pragmatic considerations.
 b. Syntactic accounts of antecedentless anaphors are not satisfactory. Conceptual accounts are more convincing, but it should be clear where and how a mental representation of the referent is expected to exist while discourse is produced and comprehended.

Linguistic or cognitive theories of anaphora should explain these facts.

3. Computational Processes of Pronouns and Ellipses: Same or Different?

Pronouns and elliptical expressions have been given a separate description of their computational processes due to superficial morphosyntactic differences. In Relevance theory, however, the computational processes of both expressions can be defined as the process in which the explicature (i.e. explicitly communicated meaning) of the utterance is derived in order to reach an intended interpretation of the utterance.

According to Sperber and Wilson (1995: 9-15), the explicature of the utterance is recovered in three ways: disambiguation, reference assignment and contextual enrichment. Sperber and Wilson’s example (12) includes the task of reference assignment in its interpretation.

- (12) I’ll come tomorrow.

Grammar cannot help the hearer to interpret what thought is expressed by a sentence. For example, grammar is not sufficient to determine that ‘I’ in (12) refers to the speaker. The interpretation of an utterance needs the pragmatic level of decoding that determines who the speaker actually is. Wilson and Sperber (1993: 20) formulate this identification process as the procedure of the first-person pronoun ‘I’: “an instruction to identify its referent by first identifying the speaker”. In other words, the intended referent of ‘I’ is not the speaker on a grammatical level but an individual entity of the speaker in a particular context.³ Along the lines of this relevance-theoretic framework, Hedley (2005a, 2005b) suggests that the third-person pronoun “he” indicates a procedure for the hearer to “find an individual concept with the feature ‘male’”. These pragmatic strategies apparently indicate that pronouns encode some information about the direction of the hearer in relation to the referent and the interpretation of the utterance including it and, furthermore, that the hearer interprets the referent of the pronouns so that the assignment can be optimally relevant in the context.⁴

On the basis of Sperber and Wilson, Carston (1998, 2000) expands and elaborates how the explicature of an utterance is derived, by claiming the following distinctive pragmatic processes: saturation, free enrichment and *ad hoc* concept formation. These three processes are illustrated in Carston’s (2000) examples (13a-c), respectively.

- (13) a. He is too young. <saturation>
 b. I haven’t eaten. <free enrichment>
 c. This custard is raw. (Uttered by someone who has seen the hearer stirring it over a flame.) <*ad hoc* concept formation>

Saturation is a pragmatic process in which a logical form of an utterance requires that contextual values be supplied to indexicals in explicature derivation.⁵ In (13a), for example, if it is not specified what John is too young for (i.e. criteria for saying ‘too young’), the truth condition of the utterance will not be satisfied. Free enrichment is a pragmatic process in which the explicature of an utterance is contextually enriched according to pragmatic requirements for supplying constituents. ‘I haven’t eaten’ in (13b) would be contextually enriched into the most relevant interpretation “I haven’t eaten in the last few hours” in the speech situation where the speaker uses (13b). *Ad hoc* concept formation is a process in which the concept a particular lexical item encodes is pragmatically adjusted (via narrowing or loosening) to the concept communicated by the speaker. The encyclopedic concept of ‘raw’ in (13c) is apparently understood to be a loosened concept ‘uncooked’.

Relevance theory has yet to provide straightforward descriptions of the computational processes required for the interpretation of elliptical expressions. The question I pose here is whether pragmatic processes with regard to elliptical expressions belong to saturation or free enrichment. As the starting point of this discussion, let us compare a saturation process (examples (14a, b)) with free enrichment (examples (15a, b)) in detail.

- (14) a. It’s hot enough. [for what?]
 b. I like Sally’s shoes. [shoes in what relation to Sally?]

- (15) a. It's raining [in Christchurch, New Zealand, at time t_x].
 b. It'll take [quite a long] time for your knee to heal.

Saturation is a linguistically-mandated pragmatic process. Lexical items such as 'enough' in (14a) and a genitive in (14b) contribute to the proposition expressed by an utterance by way of signaling the supply of an implicit argument. Thus, examples (14a, b) would not be semantically complete until a constituent to fill a variable answering the bracketed questions [for what?] and [shoes in what relation to Sally?] is contextually supplied. Carston (1998, 2000) includes reference assignment into the category of a saturation process presumably because both lexical items (e.g. 'too', 'enough' or 'Sally's') and pronouns serve as signals or pointers to complement the incomplete encoded meaning of an utterance. Unlike saturation, free enrichment is regarded as a linguistically-unmandated but pragmatically-mandated process. Examples (15a, b) without bracketed materials are already semantically complete. However, it could not be fully propositional nor truth valuable without further pragmatic adjustments, as the content within brackets is contextually supplied.

Intuitively, computation of elliptical expressions undergoes a process of saturation. Let us then compare saturation examples (14a, b) with ellipses such as "don't" and "shall we?" in (1) and (2). What both of the cases encode in common is a linguistic instruction; for instance, 'enough' in (14a) and 'don't' in (1) both instruct the hearer to access hidden constituents from the context in order to arrive at an intended interpretation of the utterance. In other words, elliptical expressions also operate a linguistically-mandated process of searching for the constituents to complete the incomplete logical form of an utterance.⁶

However, the differences are more significant. One of the crucial differences in saturation processes between examples (14a, b) and elliptical expressions is that ellipses limit the referential range of the antecedent: one can observe that 'don't' instructs the access to a verb phrase. Another difference lies in the process of accessing the missing constituents completing the interpretation of the utterance. In a saturation process indicated by examples (14a, b), such elements are not existent in linguistic or non-linguistic contexts, but are directly accessed from the hearer's contextual assumptions in order to arrive at a relevant interpretation of the utterance when the hearer hears it. An elliptical expression, on the other hand, instructs or points the hearer to access its referent in his contextual assumptions concerning the previous discourse or a physical situation. The hearer then interprets the referent of the elliptical expression so that the saturation process can be optimally relevant in the context. Conceived of in this manner, elliptical expressions, as well as pronouns, encode some information about the direction of the hearer to the intended constituent and the intended interpretation of the utterance including it.

Thus, we can observe that pronouns and elliptical expressions undergo a different process of saturation from the one examples (14a, b) require. The similarity of the computational processes between ellipses and pronouns seems to be strengthened by the fact that pronouns also have a narrow referential range due to specification of the lexical property (i.e. gender and number) of the referent and that they are a linguistic device the speaker uses in order to help the process of anaphora resolution without gratuitous effort toward identifying the referent.

4. Anaphoric Expressions and Metarepresentation

4.1. Interpretive Resemblance

The theoretical shortcomings of the preceding approaches summarized in (11) lead to an alternative account covering two different control mechanisms—linguistic control and pragmatic control—in a cognitively sound way. In section 3, I suggested that, unlike saturation processes where hidden variables are to be contextually supplied to indexicals at a time of utterance, saturation processes of pronouns and elliptical expressions include the identification of the referent existent in the hearer’s contextual assumptions concerning the previous discourse (whether immediate or distant) or a physical situation. However, we have yet to elucidate referent identification. Rather than directly identifying the referent in the previous discourse or in a physical situation, the hearer seems to process an individual or thing, event, etc. as ostensive stimuli and, then, to represent the candidate referent in order to achieve an optimally relevant interpretation of the utterance.

In order to provide a consistent and unified account of anaphoric expressions, I propose here that they may be adequately explained by a relevance-theoretical notion ‘metarepresentation’, which triggers a pragmatic enrichment of the incomplete logical form of anaphoric expressions. Metarepresentation is characterized briefly as the use of one representation to represent another using some interpretive resemblance between the two, in either content or form. According to Wilson (2000: 426), interpretive resemblance is thought of as “resemblance in terms of shared implications”. It is claimed that two representations resemble each other in a context to the extent that they share logical and contextual implications. Resemblance between two representations is a matter of degree: in other words, any two representations, the original and the interpreted, can more or less resemble each other.

As Noh (2000) elaborates, the notion of resemblance is divided into interpretive use (resemblance in content) and metalinguistic use (resemblance in linguistic form). The notion of interpretive resemblance has been so far considered through other frameworks for the pragmatic account of utterance meaning. The derivation of I-implicatures proposed in Levinson (1987, 2000) seems to indicate a resemblance between what is said and what is implicated.⁷ Levinson claims that I-inference induces what is implicated as a specific interpretation of what is said. Let us now consider Levinson’s examples (16).

- (16) a. John pushed the cart to the checkout.
 b. John pushed the cart full of groceries to the supermarket checkout in order to pay for them.

In the derivation of what is implicated from what is said, (16a) is contextually enriched into (16b) under the specificity of I-implicatures governed by I-inference. The key point of this specificity is isomorphism between what is said and what is implicated, as (17) explains.

- (17) *p* is *more specific than q* if (a) *p* is more informative than *q* (e.g., *p* entails *q*); and (b) *p* is isomorphic with *q* (i.e., each term or relation in *p* has a denotation that is a subset of the denotations of the corresponding expressions in *q*). (Levinson (2000: 115))

In (17), *p* indicates what is implicated, *q*, what is said. In this framework, what is implicated is generally geared towards a specific interpretation with a resemblance in form to what is said. When (16a) is contextually enriched into (16b) according to the isomorphism between the two propositions, we can recognize that (16b) is derived as a representation of another representation (16a) without spending too much time and energy.⁸

Wilson (2000) claims that the interpretive use of thoughts or utterances involves three distinct cognitive abilities with regard to what is represented. They are called metapsychological, metacommunicative, and metalogical abilities, as briefly outlined in (18a-c).

- (18)
- a. When mental representations (e.g. thoughts) are interpreted, metapsychological abilities are involved.
 - b. When public representations (e.g. utterances) are interpreted, metacommunicative abilities are involved.
 - c. When abstract representations (e.g. sentences or propositions) are interpreted, metalogical abilities are involved.

The metapsychological abilities in (18a) and metacommunicative abilities in (18b) manage representations such as thoughts or utterances attributed to someone other than the speaker, or attributed to the speaker at some other time, whereas the metalogical abilities in (18c) manage only non-attributed representations characterized as sentences or propositions. As (18) indicates, metarepresentation involves a higher-order representation with a lower-order representation embedded inside it. The higher-order representation is generally an utterance or a thought. Three main types of lower-order representations are public representations (e.g. utterances), mental representations (e.g. thoughts) and abstract representations (e.g. sentences or propositions) (cf. Wilson 2000: 414).

There have been various kinds of research applying this notion to linguistic surveys: quotations, echoic use, etc. (19) is an example of echoic use provided by Sperber and Wilson (1986).

- (19)
- a. Peter: It's a lovely day for a picnic.
[They go for a picnic and it rains]
 - b. Mary: (sarcastically) It's a lovely day for a picnic, indeed.
 - c. Mary: (sarcastically) It's a fabulous day for a picnic.

Mary's echoic use of Peter's utterance takes the form of linguistic metarepresentation (i.e. public representation of public representation). Obviously, the attribution to the original (Peter's) utterance is responsible for Mary's sarcastic echoes. Besides the recent prevailing application of metarepresentation to linguistic surveys, this notion also serves as the key to non-linguistic metarepresentation.

Comprehension processes of anaphoric expressions involve another form of metarepresentation: i.e. a mental representation of another representation.⁹ The application of this notion to the anaphoric processes yields a conclusive model with regard to pronouns and ellipses occurring in linguistic and non-linguistic contexts. So, the metarepresentational process of referent identification might look

something like (20).

- (20) mental representation (i.e. thought) of:
- a. public representation (e.g. utterance)
 - b. mental representation (e.g. unspoken thought, assumption or implication)
 - c. sensory representation (e.g. physical object or event)

In this model, the higher-order representation is regarded as the hearer's mental representation (i.e. thought); and embedded are lower-order representations such as utterances, unspoken thoughts and implication attributed to the originator (i.e. the speaker whose utterance or thought is accessed as the source of referent identification) or sensory representations. I assume that sensory representations, as well as abstract representations, are non-attributed in that the hearer represents what he sensed in the same way he represents what he read or heard. The other key point coming out of this model is that the referent of anaphoric expressions is accessed in the hearer's mental representation of the originator's utterance or thought or of a sensory representation, not directly accessed in the discourse or in a physical object or event immediately existing.

4.2. Resemblance Between Metarepresentation and Original

In this section, I propose that anaphoric processes are successfully accounted for by the resemblance between a source or attributed representation (i.e. originator's utterance or thought) and the hearer's representation of it. Let us consider examples with varying degrees of interpretive resemblance. To begin with, a so-called 'syntactic ellipsis' is comprehended by way of 'literal resemblance' between a source or attributed representation and the hearer's mental representation of it. Consider (21) and (22).

- (21) A: Do you think John will take charge of my son?
B: Maybe he won't.
- (22) A: The garbage needs to be taken out.
B: Well, I refuse to. (Murphy (1985))

The metarepresentation involved is based not only on formal linguistic properties but also on content. In (21), for instance, the referent of "he won't" is accessed in the hearer's own representation of speaker A's utterance (as an attributed representation). The hearer's representation of the attributed utterance takes a form like "Speaker A is asking B whether John will take charge of speaker A's son". In (22), resemblance between speaker A's utterance and the hearer's representation of it makes it possible for the hearer to comprehend that the "refuse to" is pragmatically enriched into "refuse to take the garbage out". In other words, the hearer metarepresents speaker A's utterance as "The speaker A wants someone to take the garbage out". 'Pragmatic reconstruction' (Carston (2000)) yielding pronoun alternation and polarity switches in the case of a syntactic ellipsis is an outcome derived from the contribution of metarepresentation to anaphora resolution.

Second, 'pragmatically-controlled' surface anaphora is comprehended by way of 'loose or no formal

resemblance' between the original utterance or thought and the hearer's mental representation of it (i.e. implicature). Thus, resemblance between two representations is in content, rather than in linguistic form. Let us then consider (23)-(26). Examples (23) and (24) are extracted from movie scripts and examples (25) and (26) are repetitions of (1b) and (2b) (my emphasis).

- (23) Henry: Come on, you stupid beast! Come on!
 Danielle: [Throwing an apple at Henry to keep him from stealing her father's horse.]
 Oh, no you don't. (*Ever After*, 1998)
- (24) [Will is persuading Marcus not to go onto the stage alone]
 Will: What, you think those people out there are gonna make you happy?
 Hang on. Wait. Marcus, don't. (*About A Boy*, 2002)
- (25) He made a swift gesture of drawing a knife across his throat, rolled up his eyes and gagged. The sound was horribly realistic, a gush of blood in the throat. She cried out: "Oh don't, Darren, please don't!" (BNC: CJF)
- (26) The record ended and Erika walked off the floor with Herman in attendance. Herr Hocher put on another record, an amateurish jazz band. "Shall we?" Herman said. "I thought that you said this was decadent music," Erika replied. (BNC: A7A)

In (23), what the hearer uses as a source representation is Henry's utterance "Come on, you stupid beast! Come on!" and what he contextually metarepresents as the first accessible interpretation of it is along the lines of "Henry is intending to take Danielle's father's horse." Indeed, Henry's utterance and the hearer's representation of what it intends to convey do not bear an explicit resemblance, but resemblance in content is exhibited by the shared contextual implication. In (24), what is used as a source representation by the hearer is regarded as Will's utterance. It would not be so difficult a task for the hearer to represent it as meaning that Marcus is going onto the stage in spite of Will's strong objection. In (25) and (26), on the other hand, what is used can be a sensory representation, rather than a public representation, because there seems to be no linguistic clue as a source representation. Cornish (1987, 1996) proposes that significant gestures serve as the 'antecedent-trigger' to create a conceptual mental representation of the referent. Metarepresentational accounts seem to have stronger grounds: i.e., the hearer is induced to represent sensory representations, including what Cornish calls an 'antecedent-trigger', in order to arrive at the intended interpretation of the elliptical expressions. In short, the gestures of showing off the knife and calling someone while jazz music is playing (as sensory ostensive stimuli) are interpreted as representing Darren's intention to kill her and Herman's invitation to dance together, respectively.

Adopting this approach into pronominal interpretation reveals the problems of Tasmowski and Verluyten's (1981) examples (6) and (7) (repeated as (27) and (28)).

- (27) [John wants his pants that are on a chair and he says to Mary:]
 John: Could you hand them / *it to me, please?
- (28) [Same situation, but with a shirt:]
 John: Could you hand it / *them to me, please?

Tasmowski and Verluyten's significant suggestion is that the number of pronouns in (27) and (28) are marked despite the fact that real-world objects 'pants' and 'shirt' do not have any direct relationship with the linguistic category of singularity or plurality. With the notion of metarepresentations, however, we could answer the question of how such a linguistic property of the referent is licensed by a linguistic antecedent being absent. The presence of an object or a situation can be constructed as a sensory representation shared by all the participants in a perceptual environment: in (27) and (28), participants can represent in their minds the appearance of the shirt or pants on the chair. The hearer, who perceives such real-world objects as ostensive stimuli, must be equipped with a cognitive ability to represent the sensory representation in order to achieve the expected degree of relevance. In short, most of the hearers attempt to identify some appropriate desires, beliefs or intentions that they can attribute to the speaker John (i.e. mental states which account for his behavior).¹⁰ If so, it is likely that the hearer represents the sensory representation as 'John needs his pants or his shirt on the chair for some particular reason.' Thus, the referents of 'them' and 'it' in these examples can be quite accessible within the mental representation of the sensory representation.

Deep anaphora frequently exhibits no formal resemblance between source representation and the representation of it via contextual implications. Consider the following example (my emphasis).

- (29) [Will has been persuading his friend Marcus to quit singing as often as opportunities allow]
 Marcus: My accompanist left.
 Will: Well, that's brilliant. Then you don't have to do it. (About A Boy, 2002)

Deep anaphoric expressions, as well as discourse-initial surface anaphoric expressions, induce the hearer to access his mental representation of someone's thought. Example (29) takes place in the situation where Will has been persuading his friend Marcus to quit singing as often as opportunities allow. As soon as he learns that Marcus' accompanist is gone, he takes it as an excellent chance to encourage Marcus to quit singing. The metarepresentational process on referent identification is briefly illustrated in (30).

- (30) a. Marcus's accompanist left.
 b. If Marcus's accompanist leaves, it is difficult for him to sing.
 c. This will discourage Marcus from singing.

Interpretive resemblance is found between Marcus' utterance "My accompanist left" and an implicated conclusion, "Marcus will be discouraged from singing," derived from the combination of Marcus' utterance (30a) and (30b) as an implicated premise. The referent of 'do it' is presumably in the hearer's representation of Marcus's utterance.¹¹

Overall, from a metarepresentational point of view, anaphoric processes are accounted for in a cognitively sound way, regardless of whether the referent is linguistically overt or not. Distinguishing anaphoric processes amounts to distinguishing the source representation in which the candidate for the referent is accessible.

4.3. Procedural Information of Anaphoric Expressions

Anaphoric expressions can be regarded as a conventional communicative device satisfying well-known conversational maxims: Grice's (1975) second quantity maxim ("Do not make your contribution more informative than is required") and Levinson's (2000) I-principle ("What isn't said is the obvious"). By means of this device, the hearer of the utterance in which such expressions take place can understand the anaphoric relation with accuracy and without any gratuitous effort. This indicates that anaphoric expressions, whether phonologically realized or not, are expected to encode some particular procedure to successfully arrive at the intended interpretation of the utterances which contain them.

The significance of interpretive resemblance for a relevance-oriented comprehension is not to be underestimated. Interpretive resemblance between a source representation and the representation of it guides a process of anaphoric resolution without extra time and effort. The direction of interpretation towards isomorphism (i.e. resemblance in form) and resemblance in content satisfy the presumption of relevance. Considering the interpretive guidance or instructions anaphoric expressions are responsible for, the meaning encoded by those expressions is definitely procedural. So, the procedural information of anaphoric expressions might be formulated as in (31).

- (31) find a referent in the metarepresentational thought of a representation attributed to the originator

What the hearer is expected to access first is some other participant's public or mental representation or sensory representation relevant enough to warrant the hearer's attention. Then, in search of the intended referent, the hearer acquires access to the metarepresentational thought with more or less resemblance to the original representation. The cognitive process of resorting to resemblance in form or content would achieve the expected degree of relevance thereby.

The degree of interpretive resemblance contributing to anaphora resolution varies depending on which of an utterance or a thought is attributed. Which of a thought or utterance would be mentally represented as an attributed representation, it is assumed, depends upon a general comprehensive procedure of selecting the most accessible interpretive hypothesis in computing cognitive effects (cf. Wilson (2000: 420-421)), as in (32).

- (32) *Relevance-theoretic comprehension procedure*: follow a path of least effort in computing cognitive effects.
- (a) Consider interpretation in order of accessibility.
 - (b) Stop when your expectation of relevance is satisfied.

When the first comprehension strategy does not satisfy the successful level of relevance, then the next most accessible strategy would be tried. The observation that the same anaphoric expression occurs in linguistic and non-linguistic contexts reflects this general comprehension strategy being utilized for the identification of the intended referent.

5. Concluding Remarks

Working from a relevance-theoretic framework, I have attempted to present a bold solution to the fundamental problems of the previous approaches detailed in the extensive literature with regard to anaphoric processes. One of the obvious questions is why both syntactic and pragmatic considerations are requisite to the analysis of anaphora, and the other key question is how and where a mental representation of the referent is expected to exist while it is processed. The general cognitive framework on the basis of metarepresentation provides plausible answers to these questions.

Procedural expressions reduce the processing effort on the part of the hearer by limiting the range of hypotheses in checking the intended meaning. Pronouns and elliptical expressions are both indispensable communicative devices to point the hearer economically towards the intended referent. On an intuitive level, therefore, both expressions (one is linguistically overt, the other is not) would seem to demand the same manipulation of conceptual representations.

This article does not include Hedley's significant considerations that each type of pronoun has its own distinctive procedure prescribing the gender of its referent. However, I do not ignore the standpoint which contends that elliptical expressions also encode distinctive procedural formulation indicating the syntactic property of the referent accessed by the hearer. Otherwise, it might be a matter of subcategorizing the procedure, whose key point is that to 'access a referent in the metarepresentation' is a higher-level procedure and to 'find an individual referent with a particular syntactic property' is a lower-level procedure. I will leave further minute investigations of this issue, including the procedural difference between pronouns and ellipses, for another time.

Notes

- ¹ This article was revised and expanded from the presentation I made at the 11th International Pragmatics Conference held in Melbourne on July 11-14, 2009. The work for this article is partially supported by a Grant-in-Aid for Scientific Research(c) (No. 21520408) from the Japan Society for the Promotion of Science, for which I am grateful.
- ² The use of pronouns in examples (6) and (7) corresponds to the terms of Halliday's (1967) 'situationally recoverable' or Yule's (1979) 'contextually salient' expressions.
- ³ Indeed, in order to understand the thought communicated by this utterance, we also need to determine what day 'tomorrow' refers to, beyond its grammatical meaning 'the day after the utterance'.
- ⁴ Hedley (2005a:13) regards pronouns not as empty items, but as 'pro-concepts'.
- ⁵ The term 'saturation' originates in Recanati (1993).
- ⁶ Elliptical expressions occurring in discourse initial positions (i.e. those occurring in non-linguistic context) should not be equated with fragments or non-sentential utterances (cf. Stainton (1995, 1997)), whose pragmatic process undergoes free enrichment, not saturation. Even though phonetically unrealized, the logical form of those utterances is regarded as fully sentential. For a fuller account, see Carston (2000: 17-18).
- ⁷ Note that 'what is implicated' and 'implicatures' as used by Levinson indicates a theoretically

different notion from Relevance theory's 'implicatures', whose content consists of what is wholly pragmatically inferred. In most of Levinson's examples, 'what is said' amounts to what is linguistically encoded, and 'what is implicated', what is explicitly communicated by it (i.e. explicatures) in Relevance theory.

- ⁸ Examples of I-implicatures Levinson (2000) adopted from other papers are miscellaneous: some of them are linguistically mandated saturation, others are linguistically unmandated but pragmatically mandated free enrichment.
- ⁹ Carston (2002) paraphrases mental representation as 'a conceptual sentence in the language of thought.'
- ¹⁰ From the minimally provided information in the situation of (27) and (28), I read John's ostensive behavior of showing his desire to wear the pants or shirt. In general, ostensive behavior involves a communicative intention to make manifest an informative intention. Understanding utterances or other ostensive behaviors is prerequisite to forming a representation of a representation attributed to the speaker.
- ¹¹ Metarepresentational approaches seem to account for the difference in cognitive status between deictic expressions and anaphoric expressions, which has been dealt with within the same framework in the previous literature (cf. Hankamer and Sag (1976), Sag and Hankamer (1984)). Deictic expressions instruct the hearer to alter his attention focus from an existing object of discourse towards a specific object derived via the situational context of utterance; whilst anaphoric expressions signal the hearer to sustain the existing attention focus as it was established earlier in the hearer's mind. See Otsu (2007) for discussions on the procedural differences between the two expressions.

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Abbreviations:

BNC=The British National Corpus