

Asymmetry in Anaphoric Dependencies: A Cross-Linguistic Study of Inclusive Reference

Sean Madigan and Masahiro Yamada*

1 Introduction

In this paper, we argue that there are yet uninvestigated issues in the domain of anaphora and coreference, namely what den Dikken et al. (2001) have called Inclusive Reference (IR). Inclusive reference denotes a construction in which an anaphoric element overlaps in reference with its antecedent, ultimately yielding a [sg...pl] dependency.

The structure of this paper is as follows. In the following section, we discuss the phenomenon of IR in detail and show that it is productive enough across the world's languages to warrant serious investigation and explanation. In section 3, we illustrate that, while [sg...pl] dependencies like IR are allowed, there is a universal ban on anaphoric dependencies of the type *[pl...sg]. Building on the empirical claims in sections 2 and 3, section 4 shows that control constructions can also be seen as a form of IR and that there exists a ban on *[pl...sg] dependencies in these structures as well. In section 5, we attribute the asymmetry in dependencies to a General Principle of Anaphoric Dependency (GPAD) which describes possible interpretations. We then provide a way of deriving the GPAD from an analysis which includes the following assumptions: 1. Reflexive anaphors (including PRO) are atomic entities (*a la* Kawasaki 1989) and 2. Reflexive anaphoric elements that show IR have an associative plural component which allows contextually determined referents.

2 Inclusive Reference: What Is It and Is It Productive?

Den Dikken et al. (2001) employ the term Inclusive Reference (IR) to refer to constructions where an anaphoric element overlaps in reference with its

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antecedent. The authors give an apparent IR construction involving reflexives in Hungarian 1st person plural contexts (1).¹

- (1) En magunkat laton.
 I ourselves see-1SGDEF
 'I see ourselves.' (den Dikken et al. 2001)

This type of IR anaphora, however, is ruled out in English in all persons (cf. Lasnik 1981).

- (2) a. *I saw ourselves.²
 b. *You(sg) presented yourselves as real linguists.
 c. *He hates themselves.

Generative accounts of binding theory (e.g. Lasnik 1981, Chomsky and Lasnik 1993) cannot explain example (1). These studies predict that (1) is impossible as, essentially, anaphors are assumed to have a strict identity requirement with their antecedent.

Den Dikken et al.'s (2001) explanation of the IR data above is that the structure of the Hungarian 1st person plural reflexive is possessive pronoun+NP (3). In short, it is not a reflexive, but a pronoun.

- (3) mag-unk-at
 core-our-ACC

We do not disagree with this analysis of Hungarian reflexives. However, in this paper, we seek to make the claim that, contrary to common assumption, IR involving anaphoric elements is productive enough in the world's languages to deserve explanation. We illustrate below that there is a large amount of data that takes the form:

- (4) <singular binder> ... <plural reflexive anaphor>

¹Abbreviations: NOM = Nominative; ACC = Accusative; DAT = Dative; TOP = Topic; PL = Plural; DEF = Definite; CL = Classifier; 1, 2, 3 = 1st, 2nd, 3rd person; sg = Singular; pl = Plural; PST = Past tense; DC = Declarative; VOL = Volitional; ASP = Aspect; C = Complementizer.

²Judgments on this sentence vary from speaker to speaker. However, the majority of our consultants found this sentence ungrammatical.

2.1 IR Constructions are Productive

The examples in (5) below illustrate the IR phenomenon in five different languages. In these examples, all of the reflexive anaphors include in their set of denoted individuals the antecedent plus other contextually determined referents.

- (5) a. Japanese: John-wa zibun-tachi-ni tsuite hana-shi-ta.
 J-TOP self-PL-DAT about talk-do-PST
 'John₁ talked about the group₁₊₂ that includes him.'
 (Kawasaki 1989)
- b. Korean: John-i caki-tul-i ik-yess-ta-ko mal-ha-yess-ta.³
 J-NOM self-PL-NOM win-PST-DC tell-do-PST-DC
 'John₁ said that they₁₊ won.' (Cho 1996)
- c. Chinese: Ta you zai kuanjiang ta-men-ziji la.
 3sg again at praise 3-PL-self ASP
 '(lit.) (s)he is praising themselves again.'
- d. Kuching Malay: Kameq sukah diri kameq orang semua.^{4,5}
 1sg like self.1pl
 '(lit.) I like ourselves.'
- e. Indonesian: Yassir bangga pada diri mereka.
 Y be.proud of self.3pl
 '(lit.) Yassir is proud of themselves.'

All of the examples in (5) exhibit IR anaphora. For example, in the Chinese sentence in (5c), the 3rd person plural reflexive *ta-men-ziji* must include in its set of individuals, the antecedent *ta* '(s)he' as well as one or more contextu-

³Most speakers we consulted prefer *-ney* instead of *-tul* in this sentence, the group (or cohort) plural form in IR constructions. However, many informants also found *-tul* acceptable as indicated in Cho's judgment.

⁴These forms are known as pseudo-reflexives (see Cole et al. 2003 for other Malay forms, Kotani et al. 2006 for Kuching Malay). The judgments given are on the reflexive reading of these forms.

⁵The literal translation of the Kuching Malay plural reflexive *diri kameq orang semua* is as in (i).

i) diri kameq orang semua
 self 1st person all

We assume the following structure, where *orang* and *semua* combine to form a plural marker.

ii) diri kameq orang.semua
 self 1st PL

ally determined individuals. In this way, the anaphoric element overlaps in reference with its antecedent.

The reflexive portions of IR anaphors are truly bound anaphors and behave accordingly. For example, a well-known characteristic of bound anaphors is the fact that only sloppy readings are available under ellipsis.⁶

- (6) John talked about himself, and Bill did so too.
(sloppy identity only: Bill talked about Bill)

IR reflexive elements also show a bound variable interpretation with regards to strict and sloppy readings. (7a) below shows that only a sloppy reading is available for a singular reflexive reading in Korean, and the same behavior is exhibited in IR (7b).

- (7) a. John-i caki-lul kwasin-ha-yess-ko,
J-NOM self-ACC overtrust-do-PST-and,
Mary-to kule-ha-yess-ta.
M-also so-do-PST-DC
'John over trusted himself, and Mary did too.'
(sloppy identity only)
- b. John-i caki-tul-i ik-yess-ta-ko mit-ess-ko,
J-NOM self-PL-NOM win-PST-DC-C believe-PST-C
Bill-to kule-hay-ss-ta.
B-also so-do-PST-DC
'John believed that they won, and so did Bill.'
(sloppy identity only) (Cho 1996)

Of course, IR anaphors differ in the plural portion of their sloppy readings from regular reflexives. This is due to the fact that the plural portion of IR reflexives is able to pick up contextually determined referents. This is in opposition to plurals which cannot take these kinds of referents, like English -s.

- (8) The linguists criticized themselves and the psychologists did so too.

⁶One reviewer pointed out that this argument is not so straightforward because there are instances of reflexives under ellipsis that seem to yield strict readings.

i) Einstein considered himself a genius, but at that time no one else did.
In our analysis, we abstract away from cases like this and assume that VP ellipsis in (6) does yield only a sloppy reading.

(8) above can only mean that the linguists criticized themselves (the linguists) and the psychologists criticized the psychologists (not the psychologists plus the linguists or some other people).

In this section, we have shown that IR is a productive process in a number of different languages. We also outlined a basic property of IR anaphors, namely that the plural component can freely refer to any contextually determined set of referents, unlike non-IR reflexive plurals.

3 Asymmetry in Anaphoric Dependencies: *[pl...sg]

Den Dikken et al. (2001) also show that, just as in English (9a), Hungarian singular reflexives may not be anteceded by a plural entity (9b).

- (9) a. *We saw myself.
 b. *Mi magamat latjuk.
 1pl myself.ACC see.1pl.DEF

In this section, we make the claim that the pattern of ungrammaticality wherein a plural entity may not antecede a singular anaphoric element is not limited to reflexives of the type in (9). Instead, we claim that configurations of the type in (10) are universally banned for all anaphoric dependencies.

- (10) *<plural binder> ... <singular reflexive anaphor>

The following data is illustrative of the universal ban in (10).

- (11) a. English: *We like myself.
 b. Kuching Malay: *Kameq orang semua sukah diri kameq.
 1pl like self.1sg
 '(lit.) We like myself.'
 c. Indonesian: *Mereka bangan pada diri nya.
 3pl be.proud of self.3sg
 '(lit.) They are proud of himself.'

In the examples in (11), it can be seen that a plural entity may not antecede a singular reflexive. On a cautionary note, some languages appear to allow [pl...sg] dependencies. However, given a proper understanding of semantic number in these constructions, we can see that the ban on *[pl...sg] still holds. Take, for example, the sentences in (12).

- (12) a. Chinese: Tamen you zai kuajiang ziji la.
 they again at praise self ASP
 'They are praising themselves again.' (Huang 2001)
- b. Korean: Ai-tul-i caki-ka miwa-ha-ta.
 child-PL-NOM self-NOM hate-do-DC
 '(lit.) The children hate self.'
- c. Japanese: San-nin-no gakusei-ga zibun-o
 Three-CL-GEN student-NOM self-ACC
 hihan-shi-ta.
 criticize-do-PST
 '(lit.) Three students criticized self.'

The sentences in (12) above seem to exhibit [pl...sg] dependencies. However, this is not true semantically, as the only possible readings for (12a-c) are distributive. For example, in the Korean sentence in (12b), the only possible reading is one where each child hates only himself. So, there are, for example, three children (a, b, c) and *a hates a, b hates b, c hates c*, etc. This sentence cannot mean that a group of children collectively (a+b+c) hated one member of their group (a). Thus, the relevant anaphoric dependency is as in (13).

- (13) Dependencies in (12) = [*<a,a>*,*<b,b>*,*<c,c>*,...]
 but NOT,
 [*<a+b+c+...,a>*]

Given this analysis, the ban on *[pl...sg] dependencies still holds.

In the following section, we expand the generalizations made in sections 2 and 3 to control constructions.

4 Expanding the Generalization to Control Constructions

In this section, we show that the IR phenomenon and the ban on *[pl...sg] dependencies are also observed in control constructions. Consider first the partial control examples in English and Korean in (14a) and (14b) respectively.

- (14) a. Sachie_i promised PRO₁₊ to gather in room 302.
 b. Jwuhi_i-ka [PRO₁₊ moi-keyss-ta]-ko yaksok-ha-yess-ta.
 J-NOM gather-VOL-DC-C promise-do-PST-DC
 'Jwuhi promised to gather at 6.' (Madigan 2005)

The sentences in (14) are strikingly similar to the reflexive cases in (5). In these partial control structures, a singular controller controls a plural controllee. In both cases, the controller must be one of the individuals included in the set of individuals denoted by the plural PRO. What is crucial is that there exists a set of contextually determined referents with whom the controller is gathering. This is the same behavior we see with IR reflexive anaphors.

Furthermore, the ban on *[pl...sg] dependencies also holds in control relationships. Consider the English and Korean examples in (15a-b) below.

- (15) a. The boys₁₊ tried PRO₁ to do the math problem.
 (OK on distributive reading only)
- b. Ai₁-tul-i [PRO₁ cip-ey ka-keyss-ta]-ko
 child-PL-NOM home-to go-VOL-DC-C
 yaksok-ha-ta.
 promise-do-yess-PST-DC
 'The children promised to go home.'
 (OK on distributive reading)

In both of the examples above, a plural controller is attempting to bind a singular PRO. Just as in the case of Japanese-type IR reflexives in section 3, these sentences only allow a distributive reading. In other words, only a [sg...sg] dependency is allowed.

Given the above data, we draw the conclusion that IR effects and the ban on *[pl...sg] dependencies ranges over all anaphoric dependencies. In the following section, we formulate a general principle to describe these facts and provide a brief semantic analysis of IR and non-IR reflexives and their plural components which derive this principle.

5 The General Principle of Anaphoric Dependence

In the above commentary, we have shown that natural language allows [sg...sg], [pl...pl], and [sg...pl] anaphoric dependencies, while it rules out [pl...sg] anaphoric dependencies. We propose a descriptive generalization in (16).

- (16) General Principle of Anaphoric Dependence (GPAD):
 Any two ordered elements, α ... β , existing in anaphoric dependency, must be in a relation such that α is a part of β .

The GPAD correctly rules out [pl...sg] anaphoric dependencies, which are not observed in any of the languages included in the present study. In addi-

tion, it correctly predicts that apparent [pl...sg] cases seen in (12) are in fact legitimate anaphoric dependencies on the analysis that they are [sg...sg] dependencies. However, in its instantiation in (16), the GPAD is too strong and incorrectly predicts that *all* languages, including English, should exhibit IR dependencies. In what follows, we account for the lack of [sg...pl] cases in English-type constructions involving reflexives, and the ban on *[pl...sg] anaphoric dependencies, by deriving the GPAD from deeper semantic properties of the relevant anaphoric elements and their plural components.

5.1 Deriving the GPAD

To derive the GPAD and account for all of the data presented above, we propose two properties given in (17) that dominate all anaphoric phenomena.

- (17) a. Reflexive anaphors are variables that are atomic individuals (*a la* Kawasaki 1989 for *zibun*) (cf. Link 1983).
 b. *IR plural markers* allow contextually determined referents.

In the vein of Kawasaki (1989) for Japanese *zibun*, (17a) implies that an IR anaphor must obey the following:

- (18) An IR anaphor must be a variable that satisfies Atomic (x).

The second property that we adopt in (17b) is that all IR elements, reflexives and controlled PROs, have a plural component (i.e. an IR plural marker) that results in IR behavior. Specifically, it is the ability of the plural portion of the IR element to pick up contextually determined referents not included in the antecedent that creates the IR reading. We refer to these types of plural markers here as *IR plural markers*. IR plural markers are similar to *associative plural markers* which are essentially "... marker(s) (that when combined with a nominal) ... denote a set comprised of the referent of the nominal (the main member) plus one or more associated members" (Corbett 2000).

Perhaps the closest description of our sense of the term IR plural marker is found in Nakanishi and Tomioka's (2004) study of the Japanese associative plural marker *-tachi*. They propose the denotation of *-tachi* as in (19a-b). (19a) is for *-tachi* that attaches to a proper noun and (19b) for *-tachi* that attaches to a common noun.

- (19) a. $[[tachi]] \in D_{\langle e, \langle e, t \rangle \rangle} = \lambda x_e. \lambda Y_e. x \leq_i Y \ \& \ |Y| \geq 2 \ \& \ x \text{ represents } Y$
 b. $[[tachi]] \in D_{\langle \langle e, t \rangle, \langle e, t \rangle \rangle} = \lambda P_{\langle e, t \rangle}. \lambda Y_e. |Y| \geq 2 \ \& \ P \text{ represents } Y$

The denotation in (19a) essentially states that *-tachi* combines with an individual *x* who is a part of a contextually determined group *Y*, whose number is greater than or equal to 2 and *x* represents the group *Y*.

For our purposes, the crucial part of the denotation is the last part, *x represents Y*, which allows the IR reading. What we are not claiming is that IR plurals are associative plurals. For example, as noted by Nakanishi and Tomioka (2004), Japanese associative plurals do not allow generic readings. In contrast, however, the Korean plural marker *-tul* can combine with a human noun and yield a generic reading as shown in (20).

- (20) Babylonian-tul-un myelonang-ha-ess-ta.
 Babylonian-PL-TOP perish-do-PST-DC
 'Babylonians were extinct.' (Nemoto 2005)

For the IR phenomenon, we are not claiming that all of the IR plural components have exactly the same denotation as (19), but we do assume that the last portion of the denotation, *x represents Y*, will be the same.

It is worth noting, however, that PC PRO does not have the restriction that *-tachi* does, in that *x* does not necessarily have to represent *Y*. The sentence in (21) illustrates this point. In (21), *Sachie* is just one member of a group that gathers.

- (21) *Sachie*₁ agreed PRO₁₊ to gather in room 302.

Thus, in the case of PC PRO, for which we postulate a null IR plural marker, the later portion of the denotation would be more akin to that in (22).

- (22) [[IR plural portion of PC PRO]] = ...*x* is a member of *Y*

Having established the necessary machinery above, we now schematically illustrate how this analysis works to derive the GPAD. (23) lists the dependencies that need to be accounted for.

- (23) a. Korean/Japanese-type anaphors and PC PRO
 i) IR-anaphors: [sg...pl]
 ii) IR-anaphors: *[pl...sg]
 b. English-type anaphors
 i) non-IR-anaphors: *[sg...pl]
 ii) non-IR-anaphors: *[pl...sg]

As for IR-anaphors that exhibit a [sg...pl] dependency (23ai), these are illustrated in (24a-b) for Korean/Japanese-type reflexives and English partial control cases. In (24a) we hypothesize, based on the properties in (17), that *zibun* is atomic and that it has the IR plural marker *-tachi* that allows contextually determined referents which are associated with the antecedent. (24b) is analyzed in the same way: PC PRO is atomic and it has an IR plural component. Thus they are grammatical, in accordance with the GPAD.

- (24) a. Japanese: John-ga zibun-tachi-o hihan-shi-ta.
 J-Nom self-PL-ACC criticize-do-PST
 'John criticized themselves.'
 b. John_i promised PRO₁₊ to meet in the conservatory.

The Korean sentence in (25) exemplifies the second case, in which a [pl...sg] dependency is ruled out and a [sg...sg] relation is forced. Following analyses like that of Chierchia (1998), we assume that all plural marked DPs do not have atomic individuals in their denotation. Since *caki* can only take an atomic antecedent, as in (17a), only the distributive reading is available. The distributive reading is a [sg...sg] dependency, which is a legitimate relation given the GPAD.

- (25) Korean: Ai-tul-i caki-lul miwe-ha-yess-ta.
 child-PL-NOM self-ACC hate-do-PST-DC
 '(lit.) The children hated self.'
 'The child A hated himself, B hated himself, C...'

The third case listed in (23bi) is found in English-type reflexives. (26) has a [sg...pl] dependency which is a possible relation given the GPAD. Nevertheless, it is ungrammatical. The reason this reading is disallowed is due to the fact that the English plural marker *-s* is not an IR plural marker and thus cannot take contextually determined referents that are distinct from the antecedent. Given this, the sentence in (26) is ungrammatical.

- (26) *Wilson criticized themselves.

The last case is the *[pl...sg] dependency involving English-type reflexives. The ungrammatical example in (27) is correctly described by the GPAD.

- (27) *The boys hate himself.

To explain the above example, beyond the description given by the GPAD, consider the following example.

(28) Each of the boys hates himself.

In (28), an overt distributive marker, *each*, is used to obtain the same distributive type reading as in the Korean example in (25). English often allows distributive readings without overt distributive markers. So, the contrast between (27) and (28) is perplexing. This is especially true when considering that in English control sentences with a singular embedded PRO, distributive readings are in general acceptable, as in (29).

(29) The boys promised the teacher PRO_{sg} to leave the classroom.

The distributive reading in (29) is one in which each boy promised the teacher separately to leave the classroom. So, it remains curious why (27) is ungrammatical and that only an overt distributive marker saves the sentence. We argue here that this is because *himself* requires syntactic agreement with its antecedent, while PRO (and *caki* and *zibun* for that matter) does not. This is evidenced by the fact that third person singular marking is required on the verb in these sentences. Consider (30):

(30) Each of the boys hate*(s) himself.

In this section, we have given a descriptive generalization of the types of anaphoric dependencies shown above, namely the GPAD. We have derived the GPAD from more explanatory semantic and syntactic properties in the following way. We assumed that all anaphoric elements require atomic antecedents and that those anaphoric elements that allow IR have an IR plural component which allows contextually determined referents. Next, we showed that those constructions that appear to allow a [pl...sg] dependency only receive a [sg...sg] distributive reading. Finally, in order to explain the absence of distributive readings with English-type reflexives, we showed that these reflexives require a syntactically singular antecedent.

6 Conclusion

We started from the claim that there are yet uninvestigated issues in the domain of anaphora and coreference, namely Inclusive Reference. Given this claim, we provided data from numerous languages that show that IR is a real

phenomenon in natural language and deserves serious investigation and explanation. In addition, we observed a universal asymmetry with regard to possible anaphoric dependencies: In short, [pl...sg] is disallowed. An important finding to emerge from this study is the fact that this asymmetry exists in control dependencies as well as reflexive ones and can be described as a general principle in any anaphoric domain. We provided a descriptive statement about the possible anaphoric relations allowed in natural language, the GPAD. Finally, we derived the GPAD from the lexical requirements of anaphoric elements, claiming that they are atomic, as well as the properties of IR and non-IR plural markers.

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Department of Linguistics
University of Delaware
46 East Delaware Avenue
Newark, DE, 19716
smadigan@udel.edu
myamada@udel.edu

