Argument structure and animacy restrictions on anaphora[1]

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1. Introduction

This paper presents a new constraint, the Antecedent Closeness Constraint (ACC), which unifies the binding properties of control, Super Equi-NP constructions, picture NPs, and anaphors as specifiers of NPs (in English). The focus will be on the last three cases, which share the property of containing an anaphoric element that is exempt from binding theory (see section 4 for examples of the data under consideration).[2] The formal theory I am assuming is Head-driven Phrase Structure Grammar (HPSG; Pollard and Sag 1994), with the version of binding theory presented in Asudeh (1998) and briefly reviewed below.

The ACC formalizes the following facts about the antecedents of these anaphors: 1) animacy of antecedents matters for these constructions; 2) order also matters: any nonexpletive nominal α that commands an anaphor β can be an antecedent for β, so long as no *animate* potential antecedent γ is closer to β than α is; 3) this in effect sets up a chain composed of potential antecedents and having the anaphor as its tail: $\langle(animate), inanimate*, anaphor\rangle$.

The presentation is as follows: in section 2, I quickly review some relevant HPSG binding notions; section 3 presents the ACC; finally, section 4 shows the application of the ACC to the data.

2. A brief review of HPSG's binding theory

The binding theory assumed here is stated in terms of the obliqueness of a head's arguments, which are represented on an argument structure list (ARG-ST). As discussed in Asudeh (1998), ARG-ST is treated as a head feature, which means it will be passed from head daughters to mothers via the Head Feature Principle (Pollard and Sag, 1994). Obliqueness follows a hierarchy, with subjects as least oblique, and this is assumed to be universal: subject < primary object < secondary obj. < obliques < verbal/predicative complements.

The binding principle that applies to anaphors is Principle A, which states that "a locally [a]-commanded anaphor must be locally [a]-bound"[3] (Pollard and Sag, 1994: 254). Here *anaphor* is read to be the type of the nominal's CONTENT, and it has the subtypes *reflexive* and *reciprocal*. Crucially, due to the wording of this principle, anaphors that are not locally a-commanded are exempt from binding. It is precisely these anaphors that the ACC deals with.

The notions of command required are:

(1) **A-Command**:
Let Y and Z be *synsem* objects, with distinct LOCAL values[4], Y referential.

Then Y *a-commands* Z just in case either:
i. Y is less oblique than Z; or
ii. Y a-commands some X that has an ARG-ST containing Z.
(Asudeh, 1998: 40, (3.1))

(2) **Local A-Command**:
Let Y and Z be *synsem* objects, with distinct LOCAL values, Y referential.
Then Y *locally a-commands* Z just in case:
i. Y is less oblique than Z;
(Asudeh, 1998: 40, (3.2))

Finally Y (locally) a-binds Z if and only if Y and Z are coindexed and Y (locally) a-commands Z. Otherwise, Z is (locally) a-free.

3. The Antecedent Closeness Constraint

The ACC is based on the Intervention Constraint (IC)[5], which was first discussed with respect to 'Super Equi-NP Deletion' (Grinder, 1970; Jacobson and Neubauer, 1976). This construction contains an anaphoric relation between a noun phrase controller and the unexpressed subject of a gerund or infinitive. In the examples I mark the position of the understood subject with 'PRO'[6], but this is only for presentational purposes.[7]

(3) a. Chrystale$_i$ claimed [that [PRO$_i$ smearing herself with mud] was fun].
b. Gonzo$_i$ said [that it was difficult [PRO$_i$ to satisfy himself]].

I have used reflexives in these examples to accentuate the anaphoric relationship between the matrix subject and the understood subject of the gerund or infinitive.

Grinder (1970), who was the first to discuss these constructions in detail, noticed that not all instances of Super Equi-NP are grammatical, as exemplified by the following sentences which are highly similar to those in (3).

(4) a. *Chrystale$_i$ claimed that Craig said [that [PRO$_i$ smearing herself with mud] was fun].
b. *Gonzo$_i$ said that Chrystale complained [that it was difficult [PRO$_i$ to satisfy himself]].

The ungrammaticality of these sentences stems from the inclusion of an NP closer to the anaphor with which it cannot agree. Similarly, if we were to change the anaphors in (4a) and (4b) to *himself* and *herself* respectively, the sentences would be grammatical, albeit with different construals. This led Grinder (1970: 302, (23)) to observe that Super Equi is subject to the following constraint:

(5) **The Intervention Constraint** (first version)
Super Equi-NP deletion between NP^a and NP^b is blocked if there exists a possible controller NP^c in the deletion path.

Since Grinder's analysis was transformational, he defined 'being on the deletion path' of two NPs as intervening between them (in terms of linear order) at the point that the deletion transformation applies.

Jacobson and Neubauer (1976) observed that the Intervention Constraint seems to hold for picture NPs, too:

(6) a. John$_i$ thought that a picture of himself$_i$/herself$_j$[8] was given to Mary$_j$.

b. John$_i$ thought that Mary$_j$ was given a picture of *himself$_i$/herself$_j$.

(Jacobson and Neubauer, 1976: 435, (17a–b))

In sentence (6a), *John* can serve as the antecedent of *himself*, but in sentence (6b) this antecedent-anaphor relationship is blocked by the presence of the intervening NP *Mary*.

Pollard and Sag (1992, 1994) take the position that the IC is a "processing based factor that interacts with grammatical constraints in such a way as to render unacceptable a family of sentences that are otherwise grammatical" (1994: 269). However, they do not provide any evidence for the claim that the IC is a processing constraint. As such, it is just as reasonable to say that it is in fact a grammatical constraint. But there is also independent evidence for this. First, processing constraints can be overcome with practice or through the use of external representations (e.g. pencil and paper). For example, center embeddings like the following are assumed to be grammatical but subject to processing constraints.

(7) The linguist the psychologist the philosopher likes likes likes traces.

For most speakers of English (including linguists) this sentence is virtually indecipherable. However, it obeys the rules of English grammar and it is perfectly grammatical. In general, center embeddings become easier with practice, and it is also much easier to decipher the sentence by writing it down and marking it up. IC violations do not become better with practice or with the use of external aids to work them out. Second, it may seem obvious, but processing constraints usually arise due to processing difficulties. Thus, (7) is especially difficult because the NPs have to be kept track of and then matched up with the corresponding predicate. Furthermore, the first NP does not correspond to the first verb, but rather to the outermost one. But, I fail to see what the processing difficulty is in matching an anaphor with its antecedent in a sentence in which there *is* only one possible antecedent for the anaphor. Why should the sentence *John thought that Mary was given a picture of himself* be difficult to process when the only possible antecedent is *John* and the only other possible antecedent does not even agree with the anaphor? It seems trivially simple to tell what the antecedent is meant to be, but the sentence is ungrammatical anyway.

Thus, I take it that there is some evidence for treating the IC as a grammatical constraint, and no evidence for treating it as a processing constraint. The fact that it is a grammatical constraint means that the IC should be formulable as a constraint in HPSG. Of course, Grinder's definition of the IC does not make sense in a non-transformational theory such as this. In terms that are more amenable to HPSG, the Intervention Constraint states that an exempt anaphor cannot skip over a potential binder in its clause to take a higher one. But, what exactly is meant by a potential binder? Minimally, in HPSG terms, this must be a *nominal-object*, since these are the only entities that enter into syntactic binding relations. Furthermore, the binder's INDEX must be of sort *referential*, since expletive subjects cannot be binders. This fact is reflected by the grammaticality of the following example.

(8) John$_i$ said there was a picture of himself$_i$ in yesterday's paper.

Although *there* intervenes between *John* and *himself*, it is not a potential binder, since its index is of sort *there*, not *referential*. Thus, the potential binder must meet the usual requirements on antecedents.

As the following examples illustrate, there also seems to be a kind of animacy requirement (Pollard and Sag, 1994) for the intervening binder, and certain quantified intervenors also fail to trigger the IC. The relevant potential intervenor is italicized in these examples.

(9) a. Bill$_i$ suspected that *the silence* meant that [a picture of himself$_i$] would soon be on the post office wall.

b. Bill$_i$ thought that *nothing* could make [a picture of himself$_i$ in the *Times*] acceptable to Sandy.

(Pollard and Sag, 1994: 268, (87d), (88a))

As far as quantifiers go, the animacy requirement covers the appropriate ones. For example, if we replace *nothing* in (9b) with *no one* or *everyone*, the quantifier is an intervenor:

(10) a. *Bill$_i$ thought that *no one* could make [a picture of himself$_i$ in the *Times*] acceptable to Sandy.

b. *Bill$_i$ thought that *everyone* could make [a picture of himself$_i$ in the *Times*] acceptable to Sandy.

It seems that the animacy facts can be extended to quantifiers if it is understood to apply to their restriction. The quantifiers *no one* and *every one* have restrictions that refer to people and hence count as animate. On the other hand, *nothing* is restricted to quantify over things, which are not necessarily animate. In fact, according to standard HPSG, the quantified NP inherits the CONTEXT information of the noun (Pollard and Sag, 1994), resulting in the quantified NP being marked for animacy like other NPs.

Thus, we can conclude that the Intervention Constraint should only apply if the intervening noun phrase a) satisfies normal conditions on antecedents (i.e. it is a *nominal-object* with a *referential* index), and b) is animate. In addition, the IC must be stated such that the relative order of potential binders that are on the same ARG-ST list does not matter, as the following sentences illustrate.

(11) a. John$_i$ told Mary that some compromising pictures of himself$_i$ are available online.

b. John$_i$ heard from Mary that some compromising pictures of himself$_i$ are available online.

If *Mary* in sentences (11a) and (11b) were an intervening potential binder, we would expect the sentences to be ungrammatical. The fact that they are grammatical indicates that the IC is not in force here. Sentence (11b) also illustrates that point of view is not in effect here, as the point of view reported is Mary's, but the anaphor is still grammatical.

We can now reformulate the Intervention Constraint appropriately.

(12) **The Intervention Constraint** (second version)
No potential binder may intervene between an anaphor and its antecedent. A potential binder is an animate, referential nominal that is not a coargument of the antecedent.

Now that the informal version of the IC is in place, I will reformulate it as a constraint in HPSG. But, since my constraint is based on closeness of an antecedent and not intervention, I will call it the Antecedent Closeness Constraint instead. The ACC needs to refer to a-command, which is defined recursively, so the ACC itself cannot be formulated as a feature constraint directly; only instances of structures that do or do not satisfy the ACC can be given as feature structure constraints.

(13) **The Antecedent Closeness Constraint**[9]
If an anaphor Z has one or more close potential antecedents,
then there is a close potential antecedent Y, such that
$\mathrm{Y}_{\left[\text{INDEX} \ \boxed{1}\right]}$ and $\mathrm{Z}_{\left[\text{INDEX} \ \boxed{1}\right]}$.

(14) **Definition of Close Potential Antecedent**[10] (CPA)
Y is a close potential antecedent of Z if and only if

a. Y a-commands Z; and

b. There is no X such that

i. Y nonlocally a-commands X; and

ii. X a-commands Z; and

iii. $\mathrm{X}_{\left[\text{LOC} \begin{bmatrix} \text{CONT} \mid \text{INDEX} \ \boxed{1} \\ \text{CONX} \begin{bmatrix} \text{BACKGROUND} \left\{ \begin{bmatrix} \textit{animate\_rel} \\ \text{INSTANCE} \ \boxed{1} \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}\right]}$

Although there is something like intervention in the definition of close potential antecedent, the ACC itself does not really mention intervention. In fact, it guarantees that an anaphor selects a close potential antecedent, rather than ruling out derivations that display bindings that cross a potential antecedent, as the literature on the IC originally intended. In this sense, closeness applies more generally than intervention. Since intervention is a ternary relation (i.e. it only makes sense to talk about something intervening between two other things), if there is a situation that only involves two objects, intervention is undefined. However, closeness is only binary, which means that this notion applies so long as there are at least two things. The importance of this distinction will become obvious shortly. In fact, stating that an anaphor must be bound by its closest binder and stating that no potential binder may intervene between an anaphor and its actual binder amount to the same thing. Therefore, the constraint as formulated here will cover the correct intervention cases.

Now I will demonstrate application of the ACC to an exempt anaphor. In the following sentence, the ACC stipulates that the anaphor contained in the picture NP is coindexed with *Chrystale*, because *Chrystale* is a close potential antecedent, since it a-commands the reflexive[11] and there is no intervening a-commander that meets the requirements outlined in the second clause of the definition of close potential antecedent. In this case there is no X that is closer than *Chrystale* at all, as shown by the ARG-ST lists in (15b).

(15) a. Chrystale$_i$ likes photos of herself$_i$.

b. *likes*: ARG-ST $\langle NP[Chrystale]_i, NP[photosofherself_i]\rangle$
photos: ARG-ST $\langle PP[ofherself]_i\rangle$

The lexical entry for the anaphor guarantees that it must unify with its antecedent on the agreement features in INDEX, which it does in this case. And, as desired, if we were to replace *Chrystale* with *Andrew* or any other non-female NP, such as the pronoun *it* used to refer to, say, a pet fish, the corresponding sentences would be ruled out, due to this same agreement requirement.

Example (15) shows that the ACC as formulated here applies whenever there is sufficient locality, even if there is no intervention. Thus, if the notion of 'closeness' as formulated above is used, the ACC applies to cases like these. However, if intervention were specifically mentioned, these cases would not be covered, because the antecedent does not intervene between the reflexive and anything else, since there is no other potential antecedent between the actual antecedent and the reflexive.

In this section I have formulated the Antecedent Closeness Constraint as a further constraint on the anaphor-antecedent relationship. The ACC requires anaphors to be coindexed with a close potential antecedent, as defined in (14). The CPA must be referential, as required by the definition of a-command. Furthermore, in simple sentences like *Chrystale likes photos of herself*, the ACC predicts, as is the case, that the reflexive is bound by the next higher NP. However, if there is another closer but inanimate potential antecedent, the ACC does not force coindexation with the inanimate argument. In this manner, the ACC covers the cases discussed in Pollard and Sag (1992, 1994) as exempt anaphors. This will be more obvious in the next section, where I discuss further examples of the coverage of the ACC with respect to exempt anaphora.

4. Some results

Three major cases of exempt anaphora are covered in this paper: Super Equi-NP deletion, picture NPs, and specifiers of NPs. In this section, I will demonstrate how the ACC makes the correct generalizations about the binding properties of anaphors in these constructions.

4.1. Super Equi-NP deletion

The original motivation for the Antecedent Closeness Constraint was Super Equi-NP deletion. First I will examine examples that are predicted to be grammatical by the Antecedent Closeness Constraint and show how these work.

(16) a. Chrystale$_i$ claimed [that [PRO$_i$ smearing herself with mud] was fun].

b. Gonzo$_i$ said [that it was difficult [PRO$_i$ to satisfy himself]].

c. John$_i$ thought [that it was likely [to be illegal [PRO$_i$ to undress himself]]].

d. Mary$_i$ knew [that there would be no particular problem in [PRO$_i$ getting herself a job]].

e. John$_i$ thought [that Proposition 91 made [PRO$_i$ undressing himself] illegal].

(Pollard and Sag, 1994: 269, (91b–c), (92a))

In sentence (16a), the understood subject on the ARG-ST of *smearing* is exempt, since it is not locally a-commanded. The CPA of the understood subject is *Chrystale* and the ACC correctly predicts that *Chrystale* must be the antecedent of PRO and these arguments are coindexed. The situation in (16b) is similar, except that the CPA of *himself* is *Gonzo*. Expletive *it* cannot serve as a CPA, due to not having a *referential* index — and thus not being an a-commander — and it therefore also fails to block *Gonzo* being a CPA. Sentence (16c) gives another example of an expletive *it* not serving as a CPA, but the sentence also illustrates that the CPA can be a longer distance away, over a raising predicate. In example (16d), the matrix subject is again the CPA of the understood gerund subject, because the closer NP is an expletive with an index of type *there*.

Example (16e) is the crucial case. In this example, both *John* and *Proposition 91* are CPAs. The latter is a CPA because a) it a-commands the understood subject PRO, and b) there is no X such that i) *Proposition 91* nonlocally a-commands X,

ii) X a-commands PRO, and iii) X is animate. This predicts that *Proposition 91* could be the antecedent of PRO (assuming the reflexive were changed to *itself*), but I presume that in this case this reading is out due to pragmatics. However, *John* is also a CPA: *John* a-commands PRO, and there is no X that satisfies the conditions just mentioned. Although *Proposition 91* is nonlocally a-commanded by *John* and a-commands PRO, it is inanimate and therefore fails to block *John* as a CPA. This example illustrates that inanimate NPs can still be close potential antecedents, but they let the next higher NP be a CPA as well. If the next higher NP is inanimate, then this NP again lets the next higher NP be a CPA, and so forth. This predicts that sentences like the following are grammatical.

(17) Gonzo$_i$ moaned that the records showed that Proposition 91 made [[PRO$_i$ undressing himself in public] illegal].

Indeed, this sentence is perfectly fine, although a bit long.

It is also possible to construct situations in which the closer, inanimate argument can be a CPA, while allowing a higher argument to be a CPA, and in which both CPAs are pragmatically possible binders. These cases are discussed in section 4.4.

Next I turn to cases that are ruled out by the ACC.

(18) a. *Chrystale$_i$ claimed that Craig said that [[PRO$_i$ smearing herself with mud] was fun].

b. *Gonzo$_i$ said that Chrystale complained that [it was difficult [PRO$_i$ to satisfy himself].

c. *John thought that Mary was surprised by [the fact that [PRO$_i$ criticizing himself was hard]].
(Jacobson and Neubauer, 1976: 435, (15b))

In sentence (18a) *Chrystale* cannot be a CPA according to the definition in (14), since *Craig* is nonlocally a-commanded by *Chrystale* while simultaneously being animate and a-commanding PRO. In fact, the CPA for the understood subject is *Craig* and the ACC requires that the INDEX of *Craig* and the INDEX of the understood subject be re-entrant; therefore, PRO is actually coindexed with *Craig* and the sentence is out due to unification failure on the GENDER feature of the Super Equi target and that of the reflexive *herself*. However, since *Craig* is coindexed with PRO, a pronoun *her* that is anaphoric (in the discourse sense) on *Chrystale* would yield a grammatical sentence. A similar scenario obtains in (18b), except that the CPA is one clause further removed, since *it* cannot be a potential antecedent. Likewise, sentence (18c) is out for the same reasons as (18a), but the CPA *Mary* is further removed in the structure from the understood subject of *criticizing*. However, *Mary* is still the only CPA, and thus must be coindexed with PRO.

4.2. Picture NPs

With respect to picture NPs, the ACC predicts that the sentences in (19) are grammatical.

(19) a. Simon said Gonzo$_i$ likes photos of himself$_i$.

b. Elvis$_i$ said there should be pictures of himself$_i$ for sale at Graceland.

c. Gonzo$_i$ was sure that the delay indicated that a picture of himself$_i$ was coming through on the fax.

d. Andrew$_i$ hoped that something would prevent a picture of himself$_i$ in the *Real Estate Guide* from being seen by his friends.

Sentence (19a) is grammatical on the construal indicated, since the reflexive is coindexed with its close potential antecedent, *Gonzo*. The only CPA in (19b) is *Elvis*, since the expletive *there* is not a CPA and also does not block a higher argument from being a CPA. In sentences (19c) and (19d), *the delay*, and *something* respectively don't meet the animacy requirement in the ACC. Therefore, sentences (19c) and (19d) would fail to unify with the constraint on X in the third clause of the CPA definition, (14), due to conflicting background information. This has the result that the first CPA in these sentences is *Gonzo* and *Andrew* respectively.

Now I will turn to the sentences in (20), which the ACC predicts are ungrammatical.

(20) a. *Gonzo$_i$ said Chrystale sent a photo of himself$_i$ to *Strange Goatee Digest*.

b. *Simon$_i$ said Gonzo likes photos of himself$_i$.

Sentence (20a) is ruled out due to a gender mismatch. The close potential antecedent of *himself* is *Chrystale*, but there is unification failure due to the agreement features on the indices. *Gonzo* is not a close potential antecedent, since there is an X, *Chrystale*, that fulfills the blocking conditions in (14). Sentence (20b) would be ruled out by Principle C. The ACC requires coindexation between the reflexive and *Gonzo*, as *Simon* is not a CPA due to *Gonzo* being animate; if *Simon* is also coindexed with the reflexive, *Simon* will a-bind *Gonzo*.

4.3. Specifiers

The last case of exempt anaphora that I will consider here is that of anaphors in specifier position. In English, this is restricted to reciprocals. The ACC makes the correct predictions about the following sentences.

(21) a. [John and Mary]$_i$ knew that [the journal had rejected [each other's]$_i$ papers].

b. *[Hank and Peggy]$_i$ said that [Bobby ate [each other's]$_i$ apple brown betty].

c. [Hank and Peggy]$_i$ said that [[Bobby and Khannie]$_j$ like [each other's]$_{*i/j}$ wrestling moves].

In (21a) *the journal* refers to a publication, which is clearly inanimate. This means that both *John and Mary* and *the journal* are CPAs (since *the journal* is not animate it does not block the higher NP being a CPA). However, *the journal*'s index cannot be unified with the index of *each other's*, leaving only the higher NP as a CPA. The ACC is satisfied by coindexing this NP with the reciprocal. Example (21b) illustrates that an animate CPA prevents the higher NP from being a CPA, even if it cannot satisfy the ACC. This is directly predicted by the ACC, due to the definition of close potential antecedent. Since *Bobby* fulfills the condition on blocking in (14), *Hank and Peggy* is not a CPA. Therefore the sentence is ungrammatical, due to unification failure on the NUMBER feature of *Bobby* and *each other*'s indices. The last example shows that an animate CPA with the right index features (i.e. plural number), binds the reciprocal and prevents the higher NP from binding the reciprocal. Thus, the ACC gets the correct grammaticality results for these reciprocal cases as well.

4.4. Optional binding

The definition of CPA does not prevent inanimates from being CPAs; it just lets a higher animate be a CPA in addition to any lower, inanimate CPAs. As a result, the ACC can sometimes be satisfied optionally by coindexation to multiple CPAs:

(22) a. Louise teaches "embodied cognitive logic". She claims [a good formal logic]$_i$ should make [PRO$_i$ describing itself easy].

b. Louise teaches "embodied cognitive logic". She$_i$ claims a good formal logic should make [PRO$_i$ describing herself easy].

Of course, it's a stretch to think of cases where inanimate things can be the subjects of causatives as well as the subject of the causative complement, but sentence (22a) illustrates that, insofar as this is possible, an inanimate NP can serve as a CPA. And it does this without blocking binding by the animate, pronominal subject of *claims*, allowing the coindexation in (22b). Thus, the ACC makes correct, though delicate, predictions about possible antecedent-anaphor relationships for exempt anaphors.

It is also possible to construct similar examples with picture NPs and reciprocal specifiers:

(23) a. John is fascinated by this book. He$_i$ claims it contains [a description of himself$_i$].

b. John is fascinated by this book. He claims it$_i$ contains [a description of itself$_i$].

(24) a. [John and Mary]$_i$ said the journals rejected [each other's$_i$ papers].

b. John and Mary said [the journals]$_i$ rejected [each other's$_i$ papers].

These optional bindings are accounted for by the CPA, since it in effect sets up a chain of CPAs, any one of which can satisfy the ACC, modulo agreement of indices.

5. Conclusion

In this paper, I have shown how the Antecedent Closeness Constraint unifies the treatment of Super Equi-NPs, picture NPs and anaphors in specifier position. The antecedent-anaphor relation in all of these constructions was shown to exhibit animacy effects, which is accounted for by the ACC. In particular, the ACC can be read as setting up a chain of potential antecedents, such that if there is an animate member of the chain, it must be the first member. Another virtue of the ACC is that it makes subtle predictions about optional bindings for all three constructions. Finally, although this was only implicit here, adoption of the ACC simplifies binding theory, while maintaining a treatment of control verbs as taking VP complements with reflexive subjects (Asudeh, 1998).

Notes

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[2] For a detailed discussion of control and the ACC, see Asudeh (1998), which is available at http://www.stanford.edu/˜asudeh

[3] The terms used to be o-command, etc., for 'obliqueness'. But, with the move to defining binding on argument structure (see e.g. Manning and Sag 1999), the mnemonic has changed.

[4] This caveat is here to prevent a *synsem* from a-commanding itself or its gap. It will not be important for understanding the rest of this paper.

[5] While discussing the history of the ACC, I will continue to refer to it as the Intervention Constraint as this is what it was called in the literature cited.

[6] I use PRO simply for notational convenience in indicating the positon of the control target, since HPSG does not use this empty category.

[7] There is an apparent wrinkle in this data. It is not possible to assume that the understood subject is always a reflexive, due to examples like the following:

(i) Chrystale$_i$ claimed that smearing her$_i$ with mud was fun.

This sentence is grammatical, but it has the construal that someone other than Chrystale smeared mud on her. If the understood subject were a reflexive bound to *Chrystale*, this would result in a Principle B violation (the pronoun would be locally a-bound by the understood subject) and the sentence would not be possible. The fact that it is possible indicates that the understood subject in this sentence is in fact not a reflexive coindexed with *Chrystale*. In general, gerunds and infinitivals in subject position can optionally have arbitrarily referring (i.e. pronominal) understood subjects (Pollard and Sag, 1994).

[8] These are the judgements given by Jacobson and Neubauer. However, my informants found the *herself* binding to be ungrammatical.

[9] It may seem at first that the ACC and Principle A interfere with each other, since they both apply to the same type (*anaphor*). While it true that in local a-command situations the two constraints are partially redundant, they require the same binding for the INDEX of the anaphor, so there is no conflict (Asudeh, 1998: 54–55).

[10] In this definition, nothing guarantees that Z is of type *anaphor*. Thus, any argument can have a close potential antecedent. However, the ACC itself refers to Z being an anaphor. This makes the notion of CPAs general and extensible to other phenomena should further work motivate this.

[11] *Chrystale* a-commands the picture NP by a-command clause (i). The reflexive's index is structure shared with the case-marking PP[*of*], which is on the ARG-ST of the picture NP. By an application of a-command clause (ii), it follows that *Chrystale* a-commands the reflexive, since *Chrystale* a-commands something that has the reflexive on its ARG-ST list.

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