

# Binding in Picture Noun Phrases: Implications for Binding Theory

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## Abstract

This paper investigates the binding of pronouns and reflexives in “picture” noun phrases, and focuses on data showing that reflexives and pronouns are not in complementary distribution in picture NPs with possessors. In particular, we discuss data showing that whereas reflexives can take either the possessor or the subject of the sentence as antecedent, pronouns are restricted to an antecedent other than the possessor phrase. We suggest that this asymmetry can be straightforwardly explained if we assume that (1) the possessor of a picture NP is not part of the head noun’s argument structure and (2) Binding Theory is stated over “dependents” structure, the representation encompassing both a head’s argument structure and other phrases dependent on it in various ways. If the possessor of a picture NP (PNP) is not part of the head’s argument structure, it follows that reflexives in PNPs with possessors will be “exempt” from Binding Theory, which paves the way for an analysis of the reflexive data. Furthermore, we also show that if BT is regarded as defined over dependents structure, it follows that a pronoun in a picture NP with a possessor must be disjoint from that possessor phrase.

## 1 Introduction

This paper investigates the binding of pronouns and reflexives in “picture” noun phrases, and focuses on data showing that reflexives and pronouns are not in complementary distribution in picture NPs with possessors. In particular, we discuss data showing that whereas reflexives can take either the possessor or the subject of the sentence as antecedent, pronouns are restricted to an antecedent other than the possessor phrase. We suggest that this asymmetry can be straightforwardly explained if we assume that (1) the possessor of a picture NP is not part of the head noun’s argument structure and (2) Binding Theory is stated over “dependents” structure, the representation encompassing both a head’s argument structure and other phrases dependent on it in various ways. If the possessor of a picture NP (PNP) is not part of the head’s argument structure, it follows that reflexives in PNPs with possessors will be “exempt” from Binding Theory, which paves the way for an analysis of the reflexive data. Furthermore, we also show that if BT is regarded as defined over dependents structure—as opposed to argument structure—it follows that a pronoun in a picture NP with a possessor must be disjoint from that possessor phrase.

The remainder of Section 1 outlines the basic data we focus on. In Section 2 we provide three arguments from the interpretation of reflexives and pronouns that the possessor and the postnominal phrase in a PNP are not co-arguments. In Section 3 we provide some independent support for the

claim that a postnominal reflexive is exempt from Binding Theory and is susceptible to discourse and pragmatic factors. Section 4 outlines a new view of Binding Theory defined over dependents structure, from which it follows that a pronoun in a picture NP with a possessor must be disjoint from that possessor phrase. Section 5 explores alternative analyses and outlines some lingering issues for future work.

## 1.1 Possessed Picture NPs

Most approaches to Binding Theory predict that a reflexive in a PNP with a possessor phrase is bound by that possessor (see (1)), and that a pronoun in a PNP is disjoint from the possessor (see (2)).

- (1) Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>'s picture of himself<sub>j/\*i</sub>.
- (2) Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>'s picture of him<sub>i/k/\*j</sub>.

These predictions are made by the classic Principles & Parameters Binding Theory of Chomsky (1981, 1986), the “reflexivity” approach of Reinhart & Reuland (1993), as well as most versions of the HPSG Binding Theory, beginning with Pollard & Sag (1992, 1994), and more recently in Manning & Sag (1999). The predictions follow from two claims: (1) that reflexives and pronouns are in complementary distribution, which means that in a given binding domain, the sets of referents available to a reflexive and a pronoun are not overlapping; and (2) that a PNP containing a possessor phrase is a domain for binding. We will illustrate the HPSG analysis of (1) and (2) with the Manning & Sag (1999) version of the Binding Theory. The intuition behind the Manning & Sag approach is that Binding Theory is defined over the argument structure (ARG-ST) list (see (4)).

- (3) HPSG Binding Theory (Manning & Sag 1999)
  - Principle A: A locally a-commanded anaphor must be locally a-bound
  - Principle B: A personal pronoun must be locally a-free
  - Principle C: A non-pronoun must be a-free
- (4) A-command: If A precedes B on some argument structure (ARG-ST) list, A a-commands B.  
 A-binding: A a-binds B if A a-commands B and A and B are coindexed.

The data in (1) and (2) follow from the assumption that the head noun ‘picture’ has an ARG-ST containing both ‘Jacob’ and the ‘himself’/‘him’, as in (5) and (6):

- (5) ARG-ST: <[<sub>NP</sub> Jacob]<sub>j</sub>, [<sub>NP</sub> himself]<sub>j</sub>>  
 (6) ARG-ST: <[<sub>NP</sub> Jacob]<sub>j</sub>, [<sub>NP</sub> him]<sub>\*j</sub>>

For (1), since the anaphor ‘himself’ is a-commanded, it must be a-bound, in this case implying that it must be coindexed with ‘Jacob’. For (2), the pronoun must not be a-bound, which means it can have any index but that of ‘Jacob’. Thus, the complementary distribution of reflexives and pronouns is accounted for on the assumption that the NP is the domain for binding.

However, a number of recent studies (Runner, Sussman & Tanenhaus 2002, 2003, to appear; Keller & Asudeh 2001; Asudeh & Keller 2001; Jaeger 2004) have experimentally investigated these predictions with respect to PNPs containing possessors, and the findings indicate that reflexives and pronouns are not in complementary distribution in PNPs containing possessors. In particular, reflexives are not limited to taking only the possessor as antecedent; the subject of the sentence may also be the antecedent (see (7)). However, a pronoun in the same position is constrained to be disjoint from the possessor phrase (see (8)). Since the pronoun and the reflexive can both take the subject of the sentence as antecedent, this means their referential domains are partially overlapping; in addition, for the reflexive at least, the domain of binding cannot be restricted to the PNP.

- (7) Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>’s picture of himself<sub>j/i</sub>.  
 (8) Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>’s picture of him<sub>i/k/\*j</sub>.

## 1.2 The ARG-ST of Possessed PNPs

We begin by illustrating that if one abandons the claim that the possessor and postnominal phrase are co-arguments, an account of the binding in (7) can be developed. Since Principle A constrains only locally a-commanded anaphors, it follows that if an anaphor appears in an ARG-ST, but has no a-commanding co-arguments, Principle A is satisfied vacuously (see (9)):

- (9) ARG-ST: <[<sub>NP</sub> himself]>

Pollard & Sag (1992, 1994) call an anaphor with no a-commanding co-argument an “exempt” anaphor, and suggest that its distribution is constrained by pragmatic and discourse factors instead of structural Binding Theory. Reflexives in PNPs lacking possessor phrases are one of the ‘classic’ examples of exempt anaphors. It is well known that reflexives in simple PNPs can have antecedents outside the PNP, as in (10). Indeed, these exempt anaphors even occur with clause-external (or sentence-external) antecedents, as in (11) and (12) respectively. Researchers have suggested that non-syntactic factors may guide/license the use of such exempt anaphors. For

example, Pollard and Sag argue that something like the discourse notion of “point of view” is relevant to licensing the use of these exempt anaphors, see (12) vs. (13). In (12), which is interpreted from John’s perspective, the reflexive is acceptable, but in (13), in which the perspective is Mary’s, it is not.

- (10) John<sub>i</sub> saw [a picture of himself<sub>i</sub>].
- (11) John<sub>i</sub> said that there was [a picture of himself<sub>i</sub>] in the post office.
- (12) John<sub>i</sub> was going to get even with Mary. That picture of himself<sub>i</sub> in the paper would really annoy her, as would the other stunts he had planned.
- (13) Mary was quite taken aback by the publicity John<sub>i</sub> was receiving. \*That picture of himself<sub>i</sub> in the paper would really annoy her, as would the other stunts he had planned.

Let us now return to PNPs with possessors. In these constructions, if we assume that the possessor is not represented as part of the ARG-ST of the noun ‘picture’, the reflexive is alone on the ARG-ST, as in (9)—which makes it an exempt anaphor, according to Pollard and Sag’s approach. Under the view that this reflexive is an exempt anaphor, its choice of antecedent is not determined by Binding Theory, but rather by pragmatic and discourse-level factors. In an experimental investigation, Runner et al. (2003) found a preference for the possessor over the subject: participants chose the subject as antecedent on about 25-30% of the time, and the possessor on 70-75% of the time. The fact that the possessor was chosen significantly less often than the 100% predicted by Binding Theory suggests that antecedent choice is not guided purely by Binding Theory.

However, these experiments did not specifically set out to determine which discourse/pragmatic factors guide antecedent choice. In order for the non-co-argument account to succeed, further research is needed to investigate whether pragmatic and discourse factors are responsible for this pattern, and which factors are relevant. Moreover, the possessor preference may be related to locality conditions on anaphoric reference, which may be a factor that is related to or in addition to the other relevant discourse factors. We emphasize the importance of these issues as topics of future work.

It is worth noting that although the assumption that the possessor is not in the ARG-ST of the noun ‘picture’ seems to offer a way of capturing the reflexive data in (7), it results in the loss of the explanation for the fact that a pronoun in the same position must be disjoint from the possessor (see (8)). This disjointness only follows from Binding Theory if the possessor is on the ARG-ST of the head noun.

Thus, the question of whether the possessor phrase is a co-argument of the postnominal phrase is crucial to the analysis of (7) and (8). In the next sections, we provide evidence that it is not. Our argument has two parts. First, we present several independent reasons for not treating the possessor and the

postnominal phrase as co-arguments; these include the fact that a postnominal reflexive can be interpreted coreferentially under ellipsis and in the ‘only’ construction, and that a postnominal pronoun can be interpreted distributively. Then, we discuss findings showing that reflexives in PNPs are sensitive to discourse/semantic factors—which is expected if they are exempt anaphors due to not being co-arguments with the postnominal phrase. In the last part of the paper, we return to the disjoint pattern for pronouns.

## 2 The PNP Possessor

### 2.1 Reflexive Interpretations: Ellipsis

The first argument against treating the possessor as part of the ARG-ST of the picture noun comes from the interpretation of reflexives in PNPs under ellipsis. Ellipsis is a useful tool since it can be used to reveal meaning differences between bound variable and coreferential construals. Before turning to the crucial examples, it is worth noting that, as many researchers have observed (e.g., Grodzinsky & Reinhart 1993), pronouns elided via VP-ellipsis can be interpreted in two ways. Consider (14).

- (14) a. John thinks that he is a good cook, and Fred does, too.  
 b. John thinks that he is a good cook, and Fred thinks that Fred is a good cook, too. [Bound variable reading]  
 c. John thinks that he is a good cook, and Fred thinks that John is a good cook, too. [Coreferential reading]

The sentence in (14a) containing the elided VP can be interpreted as either (14b) or (c). The crucial difference is the source of the antecedent for the elided pronoun. In the (14b) the pronoun is interpreted as if bound by the local antecedent (Fred), for the “bound variable” (BV) interpretation. In the (14c) interpretation, the pronoun is interpreted as coreferring with the subject of a sentence prior in the discourse (John), for the “coreferential” (Coref) interpretation.

Kiparsky (2002), building on Hestvik (1990), argues that a bound variable reading is obligatory when a reflexive is bound by a co-argument, but not when it is bound by a non-co-argument. He provides (15a) and (16a) as evidence.

- (15) a. John hates himself, and so does Fred.  
 b. John hates himself, and Fred hates himself (=Fred). [BV]  
 c. \*John hates himself, and Fred hates John. [Coref]

- (16) a. John has a picture of himself, and so does Fred.  
 b. John has a picture of himself, and Fred has a picture of himself (=Fred). [BV]  
 c. John has a picture of himself, and Fred has a picture of John. [Coref]

The sentence with the elided VP in (15) can be interpreted only as ‘Fred hates himself’, not as ‘Fred hates John’; thus the elided reflexive behaves as a bound variable only. In contrast, the possessorless PNP example with the elided VP in (16) allows both interpretations (Kiparsky 2002, Grodzinsky & Reinhart 1993). It can be interpreted as either ‘Fred has a picture of himself’ (bound variable) or ‘Fred has a picture of John’ (coreferential). In (15) the elided reflexive and its antecedent are co-arguments, but in (16) they are not. Thus, the coreferential reading is available only when the anaphor is bound by a non-co-argument, but the bound variable reading is available in both co-argument and non-co-argument binding configurations. The Pollard & Sag approach correctly predicts the availability of both interpretations for reflexives in PNPs, since they treat these reflexives as exempt anaphors: the reflexive in (16) is not bound by a co-argument, and thus allows a coreferential interpretation.

We use the correlation between non-co-argumenthood and coreferential readings to probe the status of the possessor in possessed PNPs. If the possessor in a PNP is a co-argument of the postnominal phrase, then only a bound variable interpretation should be available to an elided reflexive in the post-nominal position. Runner, Sussman & Tanenhaus (2002) provide the example in (17b), and suggest that, in the appropriate contexts, such as that provided by (17a), both the coreferential and bound variable interpretations are available.

- (17) a. Context: The Kennedy mansion is having an estate sale. For sale are the personal photos and prints of the members of the Kennedy family. Since these items actually belonged to the Kennedys the prices were very high. A museum down the street, due to budget cuts, was going out of business and had to sell all of their photos, including their extensive collection of Kennedy prints. My friend Jimmy had always liked a particular photo of JFK and was pleased to find the one that JFK had owned at the Kennedy estate sale. He didn't know that the same print was available at the museum sale or he would've bought that one since he is on a tight budget.  
 b. Jimmy bought JFK's picture of himself for \$500 not realizing he could've bought the museum's for just \$100 in its going out of business sale.

In this context the coreferential interpretation of the elided reflexive is the strongly preferred reading. The elided NP is interpreted as ‘the museum's

picture of JFK', i.e. interpreted coreferentially, which suggests that it is not a co-argument of the possessor.

Furthermore, Runner, Sussman & Tanenhaus (to appear) discusses the results of an experimental investigation of bound variable and coreferential readings in PNPs, and reports that indeed coreferential interpretations are available to elided reflexives in PNPs containing possessors. Participants were seated in front of a set of dolls and a display containing pictures of these dolls (see Figure 1). They followed sequences of instructions such as (18). The material in angled brackets was present on half of the trials (see Runner et al. to appear for details). The reflexive was interpreted coreferentially—as referring to Harry's picture of Ken—more frequently when elided than when not.

- (18) Pick up Joe. Have Joe touch Ken's picture of himself. Now, have Joe touch Harry's <picture of himself>.



Figure 1. Runner et al. (to appear) display.

The availability of a coreferential interpretation under ellipsis in examples like (18) and (17b) provides our first argument against treating the possessor as part of the ARG-ST of the picture noun.

## 2.2 Reflexive Interpretations: 'Only'

Our second argument against treating the possessor as a co-argument of the postnominal phrase comes from the interpretation of 'only' constructions and builds on the claim that reflexives must be interpreted as bound variables if bound by a co-argument. Consider, for example, example (19), taken from Runner et al. (2002).



(19) Jimmy really wanted to see only Madonna's picture of herself.

The reflexive in this sentence can receive a coreferential interpretation in the appropriate context, such as one in which a photography gallery has assembled many photos of Madonna, including one that Madonna shot of herself. The coreferential interpretation is one where Jimmy wants to see that picture of Madonna and not any of the other pictures of Madonna. In contrast, a bound variable reading would be one where Jimmy wants to see a self-portrait of Madonna owned by Madonna and nobody else's self-portrait. In light of Kiparsky's observation regarding coreferential readings and non-co-argument binders (see Section 2.1), the availability of the coreferential interpretation in (19) provides further evidence against treating the possessor as part of the ARG-ST of the picture noun.

### 2.3 Collective and Distributive Pronoun Interpretations

The first two arguments against treating the possessor of the PNP as a co-argument of the postnominal phrase come from the interpretation of postnominal reflexives. Our third argument is based on the interpretation of postnominal pronouns. This argument is also taken from Kiparsky's (2002) discussion. Following Reinhart & Reuland (1993), he notes that co-arguments and non-co-arguments pattern differently with respect to collective vs. distributive readings. Examples such as (20), with co-argument binding, are acceptable but only on a collective interpretation; a distributed interpretation seems to be blocked. However, in the case of the binding of non-co-arguments as in (21), the distributed interpretation is also available.

(20) By an overwhelming majority, we preferred me.

(21) John and Mary both have a picture of him.

Kiparsky argues that the referent of plural expression *we* in (20) must act as a single collective entity and not as separate individuals. For example, (20) is true in a context where the preference is established by voting, even if there exists a small number of individuals who did not vote for the referent of *me*. However, it cannot be interpreted distributively, which would be the case if each individual just happened to prefer the referent of 'me' but not as a group per se. In contrast, the plural expression in (21), *him*, can be interpreted both collectively and distributively. For example, the collective interpretation would be true in a context where John and Mary own one picture together; but crucially a second distributive interpretation is available. In that case (21) would be true in a context where each person has a separate picture of John. The availability of both readings means, according to Kiparsky's approach,

that this is a case of non-co-argument binding—in other words, that the reflexive in (21) is an exempt anaphor as defined by Pollard and Sag.

Similar examples probing the distributive/collective distinction can be constructed with PNPs containing a possessor. If the possessor is a co-argument, the distributive reading should be excluded. This does not seem to be the case:

- (22) John prefers our pictures of me.  
(23) I prefer John and Mary's pictures of him.

Here it is possible to interpret the plural possessor as individuals. For example, (22) would be true in a situation in which either we as a group have pictures of me, or we as individuals have (possibly separate) pictures of me. And (23) would be true even in a situation where there are no pictures of John owned by both John and Mary, as long as John and Mary both separately own pictures of John. We follow Kiparsky in interpreting the availability of the distributive reading as an indication that the possessor and the postnominal pronoun are non-co-arguments.

This section, then, has provided three arguments against treating the postnominal NP in a picture NP containing a possessor phrase as a co-argument with the possessor phrase. The first two arguments were built on claims about differences in interpretations of reflexives that do and do not have co-argument antecedents; postnominal PNP reflexives behaved as if the possessor phrase were not a co-argument. The third argument built on the claim that pronoun interpretation depends on the co-argument status of the antecedent. Again, the postnominal PNP pronoun behaved as if the possessor phrase were not a co-argument.

In sum, these three arguments suggest that the possessor is not on the ARG-ST of the picture noun. If we remove the possessor from the ARG-ST of the picture noun, we can now begin to analyze examples such as (7), repeated here as (24):

- (24) Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>'s picture of himself<sub>j/i</sub>.

If 'Jacob' is not a co-argument of 'himself', 'himself' is an exempt anaphor and is free to take either 'Jacob' or 'Ebenezer' as antecedent. As mentioned earlier, the choice is presumably modulated by the discourse constraints on exempt anaphors. We acknowledge that for this account to be tenable, such a modulation needs to be demonstrated, and is an important question for future work.

### 3 Reflexives in PNPs as ‘Exempt’ Anaphors

The previous section provided evidence against treating the possessor in a PNP and a post-nominal reflexive as co-arguments. It follows, then, that this reflexive is a Binding Theory-exempt anaphor, since it has no o-commanding co-arguments.

Pollard and Sag claim that, unlike other reflexives, the distribution of exempt anaphors is not determined by the structural constraints of the Binding Theory, but by semantic, pragmatic and discourse factors. Little is known about the full range of these factors, though several likely candidates have been observed. As pointed out above, perspective can play a role in licensing these reflexives; see e.g., (12) and (13), repeated here as (25) and (26).

- (25) John<sub>i</sub> was going to get even with Mary. That picture of himself<sub>i</sub> in the paper would really annoy her, as would the other stunts he had planned.
- (26) Mary was quite taken aback by the publicity John<sub>i</sub> was receiving. \*That picture of himself<sub>i</sub> in the paper would really annoy her, as would the other stunts he had planned.

As we pointed out above, no obvious structural explanation will account for the acceptability of (25) and the contrast with (26). In this section we discuss experimental work that has been designed to explore some of the discourse/semantic factors that affect the interpretation of PNP reflexives, beginning with reflexives in PNPs lacking a possessor phrase and then turning to a study of PNPs with a possessor phrase. Overall, we will see that reflexives in PNPs do appear to be sensitive to non-structural factors. We take this as supporting evidence for the proposal we developed above, that reflexives in PNPs are exempt anaphors, even when appearing in PNPs containing a possessor phrase.

Kaiser, Runner, Sussman & Tanenhaus (in press), developing Kuno’s (1987) and Sells’ (1987) proposals, have experimentally investigated the role of the notion of “source of information” in licensing reflexives in PNPs. In one experiment, participants had to indicate whether a particular sentence matched the scene shown on a computer monitor (see Figure 2). Sentences such as (27), with either *tell* or *hear*, were used. With *tell*, the subject of the sentence is the “source of information”, but with *hear*, the object is the source.

- (27) Peter {told/heard from} Andrew about the picture of himself on the wall.

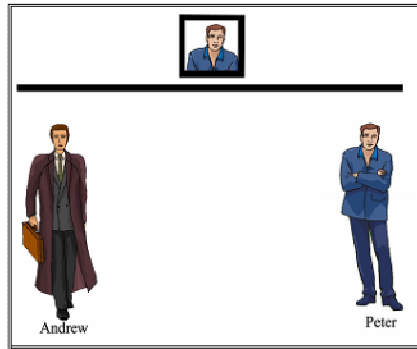


Figure 2

The results show that though participants had an overall preference for the subject NP as the antecedent of the reflexive, there was still a small effect of verb type. Participants were more likely to accept the object as antecedent of the reflexive if the object was the source of information.

In a second experiment, using eye-tracking methodology, participants had to click on the appropriate picture mentioned in sentences such as (27), above (see Figure 3).

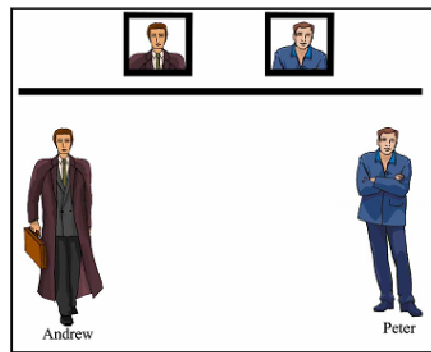


Figure 3

Again, target choices indicate a general subject preference, but there was also a small numerical effect showing that if the object is the source, participants are somewhat more likely to choose it as antecedent than if it is not the source. Furthermore, in addition to the picture choice data, participants' eye-movements show that they were more likely to consider the possibility of the object as antecedent if it was also the source of information. If sensitivity to source is characteristic of exempt anaphors, these findings provide evidence in favor of analyzing PNP reflexives as exempt.

Having considered PNPs lacking a possessor phrase, let us now consider the effects of non-structural factors in PNPs *with* possessors. The first argument in favor of treating reflexives in PNPs with possessors as susceptible to non-structural factors (and hence as exempt anaphors) comes from examples NP ellipsis examples such as (17b) and (18), repeated here as (28) and (29).

- (28) Jimmy bought JFK's picture of himself for \$500 not realizing he could've bought the museum's for just \$100 in its going out of business sale.
- (29) Pick up Joe. Have Joe touch Ken's picture of himself. Now, have Joe touch Harry's.

Though these examples have already been discussed above in the context of an argument against treating the possessor and the postnominal reflexive as co-arguments, it is important to note that the exempt anaphor analysis of PNP reflexives makes another claim as well—namely that these reflexives can receive coreferential interpretations, and in particular can receive their interpretation from something in the discourse context. This claim, which comes from the Pollard & Sag treatment of exempt anaphors, helps explain the Kiparsky observation that reflexives related to a non-co-argument antecedent can be interpreted coreferentially. Examples (28) and (29) illustrate this clearly since in both cases the interpretation of the elided reflexive comes from the discourse. Even if the elided NP is literally reconstructed, the reference of the elided reflexive comes from the antecedent NP's possessor. In other words, the ability of these reflexives to receive a coreferential interpretation directly rests on the claim that they are sensitive to discourse rather than structure (alone).

A second argument in favor of treating reflexives in PNPs with possessors as exempt comes from data presented in Jaeger (2004). Jaeger manipulated the semantic roles of the possessor and the subject such that sometimes the subject was a so-called “salient creator” of the PNP, and sometimes the possessor was the salient creator. Our understanding of ‘salient creator’ is that it refers to a well-known artist/photographer. In (30), the famous photographer Manray—the salient creator—is the subject, and in (31) it is the possessor:

- (30) Manray burned Mary's photo of himself.
- (31) Mary burned Manray's photo of herself.

In Jaeger's materials, the reflexive was always bound by the subject. His magnitude estimation experiments show that participants' ratings indicated that they preferred (30) to (31). In other words, given that the reflexive is bound by the subject, participants prefer sentences where the subject is also

the salient creator over sentences where the possessor is the salient creator. We take this to suggest that participants would have preferred the salient creator possessor as antecedent in (30), and that the notion of “salient creator” is relevant to the choice of antecedent for these reflexives. Thus, the non-structural factor “salient creator”, like “source”, seems to be relevant to the licensing of exempt anaphors. And the fact that reflexives in PNPs containing possessors show sensitivity to such factors supports our view of treating them as exempt anaphors.

## 4 Implications for Binding Theory

Section 2 provided three arguments against treating the possessor and postnominal phrase as co-arguments. We interpret this as showing that the possessor itself is not part of the argument structure (ARG-ST) of the picture noun. However, if the possessor is not part of the ARG-ST of the head noun, then how is it associated with the PNP? In addition, how can we account for the disjoint reference between the possessor and a pronoun in the PNP? Here, we outline a promising analysis of the relationship between the possessor and the head picture noun, and develop a modified version of Binding Theory which accounts for the disjoint reference.

In recent work on wh-extraction within HPSG, Bouma, Malouf & Sag (2001) argue that, in order for a lexicalist approach to wh-extraction to succeed, there must exist a level of representation containing the head as well as information about all of its “dependents”, including those listed in the ARG-ST as well as those more loosely related to the head, such as adverbials and adjuncts of various sorts. They name this dependents structure (DEPS). The main motivation for this structure comes from extraction involving adjuncts and other phrases that do not appear on a verb’s ARG-ST (see Bouma et al. 2001 for details).

As pointed out above, analyzing the possessor phrase as not part of the ARG-ST of the picture noun allows a straightforward account of the reflexive data. However, this proposal does not immediately explain the pronoun data discussed in Section 1. The pattern in (8), repeated here as (32), suggests that a disjointness constraint needs to be enforced at some level of representation containing both the pronoun and the possessor of the PNP.

(32) Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>’s picture of him<sub>i/k/\*j</sub>.

We argued above that the possessor is not associated with the head via ARG-ST, and in this section we pursue the possibility that the association takes place on the level of the DEPS structure instead. This would make DEPS a representation that contains both the possessor and the pronoun inside the PNP – in other words, precisely a level at which we can state the disjointness

constraint for pronouns. To implement this, we suggest that the Binding Theory should apply to DEPS structure rather than on ARG-ST:

(33) Binding Conditions

Principle A. A locally a-commanded reflexive must be locally d-bound.

Principle B. A pronoun must not be locally d-bound.

Principle C. A non-pronoun must not be d-bound.

D-binding is identical to a-binding, with the distinction that it applies on the DEPS list. Importantly, Principle A still refers to a locally a-commanded reflexive in its definition of which reflexives are so constrained. The intuition is that co-argumenthood is what is relevant for defining reflexives as either constrained or exempt from Binding Theory. However, it is “co-dependence” that is relevant to the disjointness requirement for pronouns.

To illustrate this account, let’s consider again the following examples in (34a) and (b) and the ARG-ST and DEPS lists for the head noun ‘picture’ in (c) and (d):

- (34) a. Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>’s picture of himself<sub>i/j/\*k</sub>.
- b. Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>’s picture of him<sub>i/k/\*j</sub>.
- c. ARG-ST <NP>
- d. DEPS <NP<sub>j</sub>, NP>

The reflexive in (a) and the pronoun in (b) will appear alone on their ARG-ST list, as in (c). As such, the reflexive will not come under the purview of the Binding Theory because it is not locally a-commanded; thus it will be an exempt anaphor. The reflexive and pronoun will both appear on a DEPS list with the possessor phrase (Jacob<sub>j</sub>), as in (d). Principle B will require, then, that the pronoun be disjoint from the possessor (not be locally d-bound).

In most cases, this version of Binding Theory will overlap with one based solely on ARG-ST. However, there are some cases where these two approaches differ. For example, as just illustrated, for PNPs with possessors our version of Binding Theory correctly places PNP reflexives outside the control of Binding Theory, and keeps PNP pronouns within Binding Theory. Another case where the Binding Theory based on DEPS does not overlap with that based on ARG-ST comes from well-known Principle C violations involving non-pronouns in adjoined phrases.

- (35) Mary<sub>i</sub> is tired. She<sub>i</sub> had to prepare dinner for Betsy when she<sub>i/\*Mary<sub>i</sub></sub> got home.

The ‘when’ clause is not associated with the ARG-ST of the head verb ‘prepare’ and thus the standard version of ARG-ST-based Binding Theory

cannot rule out the use of the non-pronoun here. On the assumption that Principle C is relevant to the binding in examples like (32), the version based on DEPS correctly accounts for it.<sup>1</sup>

To summarize, redefining Binding Theory on the DEPS list provides a straightforward analysis of the pronoun data in possessed picture NPs while also allowing reflexives in the same construction to be exempt anaphors. In the next section we briefly discuss the merits of and potential challenges for two alternative approaches to accounting for the data illustrated in (34).

## 5 Alternatives

### 5.1 Eliminating DEPS

During the Binding Theory Workshop at which this paper was originally presented, Ivan Sag proposed an alternative analysis of the basic data treated in this paper. His proposal allowed the Binding Theory to remain defined on ARG-ST (as opposed to DEPS). Consider again the examples from (34):

- (36) a. Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>'s picture of himself<sub>i/j/\*k</sub>.  
 b. Ebenezer<sub>i</sub> saw Jacob<sub>j</sub>'s picture of him<sub>i/k/\*j</sub>.

The goal of Sag's alternative analysis is a way to define the Binding Theory so that the reflexive in (36a) is exempt, while the pronoun in (36b) is not. The intuition behind the proposal is that while ARG-ST is relevant for the Binding Theory, the notion of exemption is defined with reference to valence features, namely "subject" (SUBJ). The possessor of the PNP would not be a SUBJ, but would presumably bear some other valence feature. The relevant definitions are listed in (37) and (38).

- (37) a-command (same)  
 s-command: A s-commands B if A a-commands b and A is also a SUBJ

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<sup>1</sup> One place where the DEPS approach appears not to make the correct predictions is the raising to object construction. It is usually assumed that in (i) the reflexive is a co-argument with the subject; however, under ellipsis a coreferential interpretation seems to be available, as in (ii), from Kiparsky 2002.

(i) John considers himself competent.

(ii) John considers himself competent, and so does Fred.

We do not yet have a complete analysis of these facts, but we recognize that they point to there being a difference between a true object and a raised object with respect to their relationship with the verb's subject. We leave open whether this difference is a matter of ARG-ST or DEPS or some other feature.



- (38) Principle A: a locally s-commanded anaphor must be locally a-bound.  
Principle B: a pronoun must be locally a-free.

To illustrate this account, we compare the analysis of (36a) and (b), and (38), which involves a BT-constrained reflexive.

- (38) Jacob photographed himself.

The relevant parts of the representations are in (39). (39a) is the representation for the picture NPs in (36), and (39b) is for the sentence in (38):

- (39) a. NP1's picture of NP2: [ARG-ST <NP1, NP2>, SUBJ <>]  
b. NP1 photographed NP2: [ARG-ST <[1]NP1, NP2>, SUBJ <[1]>]

Since NP1 in (39a) is not a SUBJ, NP2 can be an exempt anaphor. A pronominal NP2 in (39a), however, will be required to be disjoint from NP1, as desired. Since NP1 in (39b) is a SUBJ, if NP2 is a reflexive, it will be constrained by Principle A, and be restricted to being coindexed with NP1.

Though this alternative does correctly predict the data in (36) and (38), it does not immediately have an explanation for the data patterns we discussed in Section 2, i.e., the bound variable/coreference and distributive/collective data which suggest that the possessor and the postnominal phrase (reflexive or pronoun) are not co-arguments. Sag's alternative approach still places both phrases on the ARG-ST list of the head noun 'picture'.

## 5.2 Eliminating (obligatory) Principle A

Pollard (this volume) presents a modified version of our DEPS proposal. He follows our proposal in treating possessive determiners as dependents (not valents) which locally d-command (not o/a-command) PP complements of N. In addition, though, his proposal also allows for any reflexive in principle to be treated as an "exempt" anaphor. The relevant definitions are in (40).

- (40) Principle R': Every r-pronoun is either  
a. coindexed with a local d-commander, or  
b. interpreted according to certain pragmatic constraints involving logophoricity, contrastiveness, or discourse prominence.

Pollard makes clear that at this stage (40) is only a hypothesis, and whether it will turn to be correct is an empirical question. In particular, he provides an array of examples in which the range of binding possibilities is not entirely

clear. Whether an obligatory Principle A can truly be eliminated from the Binding Theory (as in (40)), then, is an empirical question.

One observation, though, is that if the contrasts we provided in Section 2, which are meant to distinguish between co-arguments and non-co-arguments, are on the right track, then it seems that an obligatory Principle A-type constraint could provide the basis for an account of the obligatory bound variable interpretations discussed in Section 2. That is, when an object reflexive takes the subject of the sentence as its antecedent, only a bound variable interpretation is available. This can be explained if it is precisely in that structural context (when the reflexive is locally a-commanded) that the reflexive must be coindexed with a locally a-commanding NP—that is, be bound by it. If a-binding is a subtype of variable binding, then the bound variable restriction is immediately accounted for.

## 6 Conclusion

Previous experimental data suggested that a reflexive need not be bound by the possessor in a possessed PNP but that a pronoun must be disjoint from the possessor. In this paper, we argued that the possessor and the postnominal phrase are not co-arguments and that the postnominal reflexive is an exempt anaphor. We presented a possible redefinition of Binding Theory on the level of DEPS structure, which allows us to capture the intuition co-argumenthood is relevant to determining whether a reflexive is ‘exempt’ or not, and that co-dependence is relevant to (non)pronoun disjointness. In future work, we hope to investigate the feasibility and potential wider implications of this approach in more depth, especially in comparison to the alternative approaches put forth by Sag and Pollard.

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