Experimental Evidence for a Predication-Based Binding Theory

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1 Introduction

According to formulations in the theoretical literature, binding theory predicts that anaphors (e.g., *herself*) and pronouns (e.g., *him*) are generally in complementary distribution:

(1) a. Hanna$_i$ admires *her$_i$/herself$_i$.
  b. Hanna$_i$ thinks that Peter$_j$ admires her$_i$/*herself$_i$.

This complementarity breaks down in certain constructions. A case that has generated much theoretical discussion is picture noun phrases (PNPs) without possessors, where anaphors and pronouns are reported as equally grammatical (see example (2)). The complementary distribution putatively reappears on either of two conditions: (i) there is a possessor in the picture NP (see (3)), or (ii) the picture NP is the argument of a certain class of accomplishment verbs that bring the PNP into existence (see (4)).[1]

(2) Hanna$_i$ found a picture of her$_i$/herself$_i$.

(3) a. Hanna$_i$ found Peter$_j$'s picture of her$_i$/*herself$_i$.
  b. Hanna$_i$ found Peter$_j$'s picture of *him$_j$/himself$_j$.

(4) Hanna$_i$ took a picture of *her$_i$/herself$_i$.

However, most of the data in the binding literature has been collected without imposing standard experimental controls. Schütze (1996) has shown that methodological negligence of this sort can compromise the data obtained. He argues that data in linguistics should be collected with the experimental rigor of standard methods from experimental psychology. One such method is magnitude estimation (Stevens, 1975), which has been used in eliciting linguistic judgments (Bard et al., 1996; Cowart, 1997). These issues are discussed further in Section 3.

[1] We assume the idiomatic meaning of *take picture* (i.e., *photograph*) throughout.

Keller and Asudeh (2001) used magnitude estimation to obtain experimental data on binding possibilities for anaphors (reflexives in particular) and pronouns in PNPs. The results supported some theoretical predictions and falsified others (see Section 4). The key finding was that anaphors can be bound from outside a picture NP, *even if there is a possessor in the picture NP* (contrast (5) with (3a)).

(5) Hanna$_i$ found Peter$_j$'s picture of herself$_i$.

This finding has recently been independently confirmed in an eye-tracking experiment (Runner et al., 2000). It falsifies a major prediction of all binding theories by showing that the presence of a possessor fails to influence the binding of anaphors in picture noun phrases.

In this paper, we show that these experimental findings are problematic for a structural account of binding and argue that they can be understood by tying binding to predication. In fact, the results allow us to remove a previously unwarranted assumption of predication-based binding theories: the assumption that the possessor of a PNP and a pronominal complement in the PNP are coarguments of the PNP's head.[2] This assumption effectively means that the possessor is the subject of the PNP. The putative facts in (1)–(4) aside, there is no reason to assume that the possessor of a picture NP is an argument of the PNP head, as the head bears no direct semantic relationship to it. Furthermore, it has been previously argued by Williams (1985) that the genitive possessor of an NP is not a subject; and Barker (1995, 6) argues that possessive phrases have a structure such that the initial DP and the entire picture NP are coarguments of a null possessor D (see (20) below). We review structural and predicational binding theories in Section 2, and argue for a predication-based binding theory that captures the experimental data on PNPs in Section 5.

We can also use the notion of predication to understand the pattern in (4), without positing a covert possessor (as previously proposed by, e.g., Chomsky 1986; Chomsky and Lasnik 1995). We propose that collocations like *take a picture* have become lexicalized as one predicate, in which case the anaphor or pronoun in such examples is actually a coargument of the subject and governed by binding theory. Thus, *Hanna$_i$ took a picture of her$_i$* is ungrammatical for the same reason that *Hanna$_i$ admires her$_i$* is ungrammatical: the pronoun is locally bound.

[2] We will refer to anaphors and pronouns together as pronominals.

2 Binding Theory: An Overview

Binding theory (BT) regulates the distribution and interpretation of nominals, of which three kinds are distinguished: anaphors (reflexives and reciprocals), pronouns, and full noun phrases (e.g., *Jesse*, *the woman*, *every man*). Typically, each type of nominal is governed by a binding theoretic condition/principle: Conditions A, B, and C, respectively.[3] Conditions A and B have generally been stated such that the patterns in (1)–(4) are predicted.

Here we will review two approaches to binding theory; the first is structural and the second is predication-based. On the structural approach (Reinhart, 1976; Chomsky, 1981; Reinhart, 1983; Chomsky, 1986; Chomsky and Lasnik, 1995), X binds Y iff X is coindexed with and c-commands Y. A local domain is defined, in which anaphors must be bound and pronouns must be free. Chomsky and Lasnik (1995) require that an anaphor/pronoun be bound/free in the *minimal complete functional complex* that contains the pronominal and a governor of the pronominal, in which the pronominal's binding conditions *could* be met. A complete functional complex (CFC) is "a projection containing all grammatical functions compatible with its head" (Chomsky and Lasnik, 1995, 102). Grammatical functions are defined configurationally: subjects are specifiers of VP or NP,[4] while objects and other internal complements are sisters to a head. This approach explains the data in (1)–(4) by allowing the local domain of an anaphor to extend outside of the PNP, just in case there is no possessor. When there is a possessor, it is the subject of NP (Chomsky and Lasnik, 1995, 103), and the NP is the minimal CFC. The anaphor can be bound, and so must be, while the pronoun can be free, and so must be. Chomsky and Lasnik explain (4) by postulating a covert possessor (PRO). The explanation for this case is then assimilated to the explanation for the ungrammaticality of an overt possessor binding a PNP complement pronoun.

Predication-based approaches define the domain for anaphoric binding in terms of a predicate and its arguments (Williams, 1987, 1994; Pollard and Sag, 1992, 1994; Reinhart and Reuland, 1993; Manning and Sag, 1999). According to the approach of Sag and his coauthors (formulated in Head-driven Phrase Structure Grammar (HPSG)) and that of Reinhart and Reuland, an anaphor must be bound by a dominating coargument, if there is one. Otherwise, the anaphor is "exempt" (from BT) and its reference is determined pragmatically. A pronoun must be free from a

[3]This is not quite how Reinhart and Reuland (1993) state BT, but the force of their analysis is similar.

[4]If the subject moves to the specifier of a higher functional category, it is the trace that is used to calculate the CFC (Chomsky and Lasnik, 1995, 102).

dominating coargument. Two arguments X and Y are coarguments iff they are both arguments of some head. X dominates Y iff X precedes Y on an argument structure list (on the HPSG account), or X c-commands Y (on Reinhart and Reuland's (1993) account).[5] Sentences (1a) and (1b) are accounted for because the pronominals are dominated coarguments of their clause's subject and must be bound/free as appropriate. In (2), there is no dominating coargument (of *picture*) for the pronominal: the anaphor refers pragmatically, and the pronoun is free. To explain (3), the possessor is crucially assumed to be a dominating coargument of the pronominal. Reinhart and Reuland (1993) explain example (4) on the assumption that there is an understood possessor, as in the structural account.

Both approaches to BT explain the data in (1)–(4) by effectively postulating that a possessor of a PNP is the PNP's subject. However, this is problematic, since the head of the PNP does not syntactically or semantically select for it (Williams, 1985; Barker, 1995). In section 5, we will argue that our experimental results are explained straightforwardly on a predication-based approach if we remove this assumption, which is unmotivated on that approach in any case. The structural approach will be shown to make wrong predictions, even without the problematic assumption.

3 Investigating Binding Preferences Experimentally

The data on which linguists base their theories typically consist of grammaticality judgments, i.e., intuitive judgments of the well-formedness of utterances in a given language. When a linguist obtains a grammaticality judgment, he or she performs a small experiment on a native speaker; the resulting data are behavioral data in the same way as other measurements of linguistic performance (e.g., the reaction time data used in psycholinguistics). However, unlike experimental psychologists, linguists are generally not concerned with methodological issues, and typically none of the standard experimental controls are imposed in collecting data for linguistic theory. As Schütze's (1996) recent work on empirical issues in linguistics demonstrates, such methodological negligence can seriously compromise the data obtained. Schütze (1996) argues for a more reliable mode of data elicitation in linguistics, based on standard methods from experimental psychology.

This criticism also applies to binding theory, where analyses are typically proposed on the basis of coreference judgments, a subtype of grammaticality judg-

[5]Reinhart and Reuland's analysis also depends on separate notions of syntactic versus semantic predicates and arguments. Since the details are not important to the point at hand, we refer the reader to Reinhart and Reuland (1993).

ments. A number of researchers have addressed this problem, including Gordon and Hendrick (1997), who used a questionnaire-based methodology to investigate basic predictions of binding theory. They found that experimentally elicited coreference judgments systematically differ from the predictions of binding theory, at least in its standard formulations (see Gordon and Hendrick 1998 for a theoretical account of their findings). Another relevant study is reported by Cowart (1997), who investigates the interaction of coordination and binding preferences using a grammaticality judgment task based on magnitude estimation.

Magnitude estimation (ME) is an experimental methodology that has recently been proposed by Bard et al. (1996) and Cowart (1997) as a way of addressing the issues raised by Schütze. As an experimental technique, ME is standardly used in psychophysics to measure judgments of sensory stimuli (Stevens, 1975). It requires subjects to estimate the magnitude of physical stimuli by assigning numerical values proportional to the stimulus magnitude they perceive. Highly stable judgments can be achieved for a whole range of sensory modalities, such as brightness, loudness, or tactile stimulation. Bard et al. (1996) demonstrated that linguistic judgments can be elicited in the same way as judgments of sensory stimuli, and that ME can yield reliable and fine-grained measurements of linguistic intuitions.

Recently, Keller (2000) and Keller and Asudeh (2001) have broadened the applicability of magnitude estimation to linguistic data. Keller (2000) showed that the paradigm can be successfully applied to judgments of contextualized utterances and that speech stimuli can be used instead of textual stimuli. In addition, Keller (2000) and Keller and Asudeh (2001) were the first to apply magnitude estimation to coreference judgments as used in binding theory (as opposed to straightforward grammaticality judgments investigated by Bard et al. 1996 and Cowart 1997). They show that the binding theoretic experiments of Gordon and Hendrick (1997) can be replicated using ME, i.e., the same significant effects were obtained as in the original study, and a high correlation was found between the mean judgments elicited in the original study and the replications.

Based on this validation study, Keller and Asudeh (2001) proceeded to investigate binding in picture NPs, a topic that has generated considerable interest in the theoretical literature (see Sections 1 and 2). The magnitude estimation paradigm is ideally suited to investigating binding in picture NPs, as the relevant intuitions are often very subtle (or even controversial), and thus require a maximally delicate experimental elicitation procedure.

Table 1: Examples for the stimuli used by Keller and Asudeh (2001), together with predictions of standard binding theory

NP_1	NP_2	binder	possessor	sample sentence	prediction
name	pronoun	subj.	no	(i) **Hanna** found a picture of **her**.	grammatical
name	anaphor	subj.	no	(ii) **Hanna** found a picture of **herself**.	grammatical
name	pronoun	subj.	yes	(iii) **Hanna** found Peter's picture of **her**.	grammatical
name	anaphor	subj.	yes	(iv) **Hanna** found Peter's picture of **herself**.	ungrammatical
name	pronoun	poss.	yes	(v) Hanna found **Peter's** picture of **him**.	ungrammatical
name	anaphor	poss.	yes	(vi) Hanna found **Peter's** picture of **himself**.	grammatical

4 Experimental Data on Picture NPs

Keller and Asudeh's (2001) study (their Experiment 2) was designed to determine the influence of structural and lexical factors on binding in PNPs.[6]

The influence of structural factors was tested by comparing the behavior of anaphors and pronouns in six configurations, listed in Table 1. Two structural factors were tested. Firstly, the position of the binder, which can either be the subject of the matrix clause (as in configurations (i)–(iv) in Table 1), or the possessor of the PNP (as in configurations (v) and (vi)). Secondly, the absence of a possessor (as in configurations (i) and (ii)), or its presence (as in configurations (iii)–(vi)).

The lexical factor included in Keller and Asudeh's (2001) study was the verb class of the main predicate, which has been observed to have an influence on binding in picture NPs. The experiment manipulated the aspectual status of the verb, as illustrated in (6)–(8). Here, *find* and *lose* are examples of achievement verbs, *take* and *destroy* are accomplishment verbs; *find* and *take* are [+existence], i.e., they presuppose the existence of their object, while *lose* and *destroy* are [−existence], i.e., they do not carry this presupposition.

(6) Hanna$_i$ found/lost a picture of her$_i$/herself$_i$. **achievement**

(7) Hanna$_i$ destroyed a picture of her$_i$/herself$_i$. **accomplishment [−exist]**

(8) Hanna$_i$ took a picture of her$_i$/herself$_i$. **accomplishment [+exist]**

[6] The experiment also contained two pragmatic factors, viz., definiteness of the PNP and the referentiality of the binder. The results indicated that the effect of these factors was small (though significant) compared to the structural and lexical factors, on which we focus in the present paper.

Keller and Asudeh's (2001) experiment was designed to test a set of binding theoretical predictions, which can be summarized as follows:

Prediction 1. A reflexive in a PNP with a possessor must be bound by the possessor.

(9) *Hanna$_i$ found Peter's picture of herself$_i$.

(10) Hanna found Peter$_j$'s picture of himself$_j$.

Prediction 2. Pronouns and reflexives in picture NPs without possessors are equally grammatical.

(11) Hanna$_i$ found a picture of her$_i$/herself$_i$.

Prediction 3. A pronoun in a PNP with a possessor must not be bound by the possessor.

(12) *Hanna found Peter$_j$'s picture of him$_j$.

Prediction 4. Pronouns in PNP objects of accomplishment [+existence] verbs cannot be bound by the subject of the verb.

(13) a. *Hanna$_i$ took a picture of her$_i$.

b. *Hanna$_i$ told a story about her$_i$.

Figures 1 and 2 graph the principal results of Keller and Asudeh's (2001) experiment. They show the mean grammaticality score for a given configuration (based on normalized, log-transformed judgments). The experimental results indicate that two of the binding theoretical predictions were falsified, one was partly falsified, and one was not falsified.

Most importantly, prediction 1 was found to be false: Keller and Asudeh (2001) found no significant difference between configurations (iii) and (iv) (compare the scores for pronouns and anaphors in the "subject binds, possessor" condition in Figure 1). Also, there was no significant difference between configurations (iv) and (vi) (compare the scores for anaphors in the "subject binds, possessor" and "possessor binds" conditions in Figure 1). This demonstrates that an anaphor does not have to be bound by the possessor in a PNP, contrary to the claims in the literature. In other words, an anaphor in a picture NP can be bound by the matrix subject, *even if there*

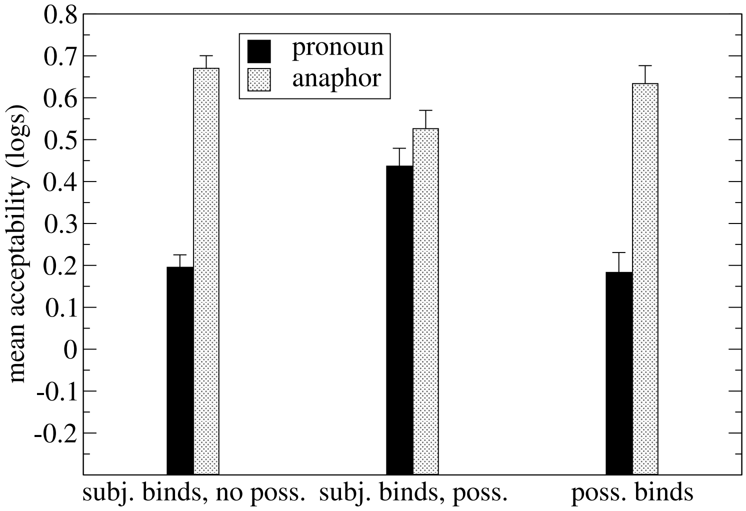


Figure 1: Structural effects on coreference judgments for binding in PNPs (from Keller and Asudeh 2001)

is an overt possessor. This finding has been verified independently by Runner et al. (2000) using an eye-tracking methodology.

Prediction 2 was also falsified: even in a PNP with no possessor, anaphors are highly preferred over pronouns. There was a significant difference between configurations (i) and (ii) (compare the scores for pronouns and anaphors in the "subject binds, no possessor" condition in Figure 1).

Prediction 3 was partly falsified: pronouns bound to the possessor of a PNP (configuration (v)) are only somewhat ungrammatical; they are not as ungrammatical as direct object pronouns bound by subjects. The mean grammaticality score for direct object pronouns bound by subjects (not graphed in Figure 1) is reported to be -0.1794 by Keller and Asudeh (2001, Experiment 1).

Prediction 4 was not falsified: pronouns are ungrammatical in picture NP complements of accomplishment verbs that bring the PNP into existence (see the "accomplishment [$+$existence]" condition in Figure 2). Note that Keller and Asudeh (2001) found that the ungrammaticality of pronouns is reduced for achievement verbs that bring the PNP into existence, and for accomplishment verbs that do not bring the PNP into existence (see the "achievement [$+$existence]" and "accomplishment [$-$existence]" conditions in Figure 2).

The falsification of prediction 1 is the key finding, since this prediction is a result of complicating the basic binding theory in various ways. We summarize the main results of Keller and Asudeh (2001):

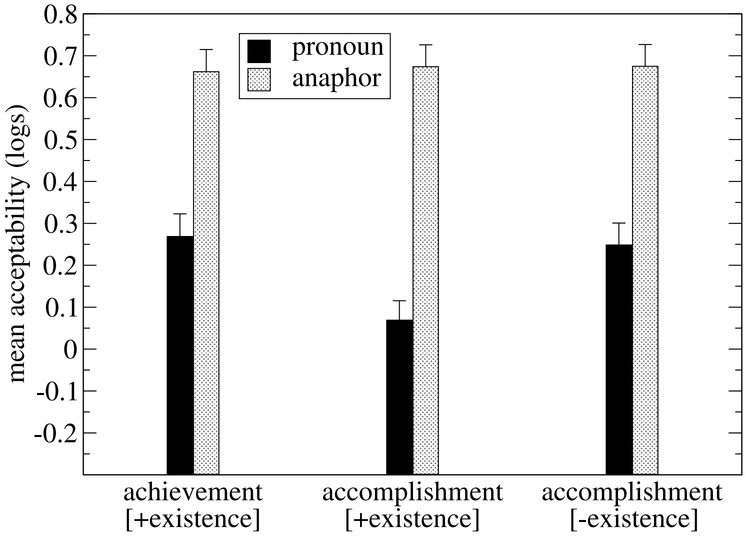


Figure 2: Effect of verb class on coreference judgments (subject binds, no possessor) (from Keller and Asudeh 2001)

(14) When the picture noun phrase contains an overt possessor:

a. An anaphor can be bound from *outside* the picture noun phrase (i.e., it does *not* have to be bound by the possessor).

b. Anaphors and pronouns are *equally grammatical* when bound from outside the picture noun phrase.

c. A pronoun bound by the possessor is not fully grammatical.

(15) When the picture noun phrase does not contain an overt possessor:
A pronoun is not fully grammatical.

(16) A pronoun is ungrammatical in a picture noun phrase that is the object of a [+existence] accomplishment verb.

5 A Predication-Based Binding Theory

A direct object reflexive must be bound to the subject of the clause, as in (17). Let us assume the following premise: if a PNP possessor is a subject, then a reflexive complement in the PNP has to be bound by the possessor. The consequent is false, as shown by (18).[7] Thus, we take (14a) as evidence that the possessor of a noun phrase does not have the same status as the subject of a clause. In other words, noun phrases do not have subjects on a par with sentences (Williams, 1985).

(17) *Hanna$_i$ respects himself$_j$.

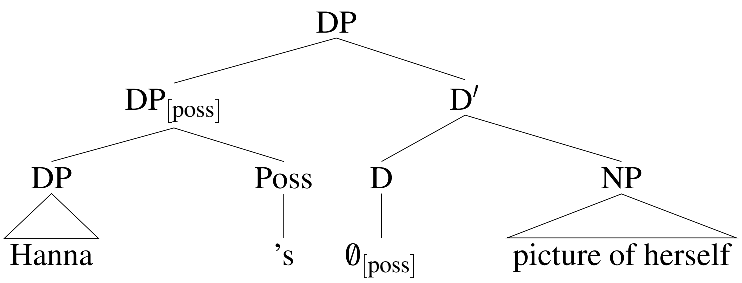
(18) Hanna$_i$ found Peter's picture of herself$_i$.

It is not the case that an anaphor in a picture NP *must* be bound by the overt possessor. The possessor *can* bind the anaphor:

(19) Hanna$_i$ found Peter$_j$'s picture of himself$_j$.

Finding (14a) and the data in (17)–(19) are straightforwardly explained by a predication-based binding theory. In (17), the reflexive is dominated by the coargument subject, but it is not bound. The sentence is correctly predicted to be ungrammatical. If the possessor is not an argument of the head of the PNP, the rest follows naturally. It has been previously argued by Williams (1985) that the genitive possessor of an NP is not a subject or any other sort of external argument. And Barker (1995, 6) argues that possessive phrases have the structure shown in (20), whereby the initial DP and the entire PNP are coarguments of a null possessor D.

(20)



Given that the possessor and anaphor are not arguments of the same predicate, the predication-based binding theory correctly accounts for the full grammaticality of anaphors in picture noun phrases, with or without possessors, and the necessity for local binding when anaphors are in matrix argument positions (as in (17)).

The structural binding theory cannot easily accommodate these facts, even if it is granted the assumption that [Spec,NP] is not a subject. The problem is due to the definition of binding domain, which is defined relative to a complete functional

[7] All coreference judgments involving PNPs in this section are as found in the data of Keller and Asudeh (2001), except where noted.

complex. Recall that a CFC is a head plus its grammatical functions, which are configurationally defined. Although the head of the picture NP now has only one required grammatical function, the *of*-complement, the minimal CFC containing the pronominal complement and a binder is the entire PNP, including the possessor. The only way for the reflexive to be bound past the possessor, whether or not it is a subject, is if the PNP does not constitute a CFC at all. And the only way for it not to constitute a CFC is if we make the further assumption that the *of*-complement is not a grammatical function of the head of the PNP either. This assumption is clearly problematic and unmotivated.

Note also that the structure in (20) is not a possible way out for the structural BT. According to this structure, the possessor does not c-command the pronominal in the PNP. The possessor is therefore not a binder and the minimal CFC for the pronominal is the clause containing the possessive DP. This makes several false predictions. First, it predicts that the possessor cannot bind the pronominal at all, since it does not c-command the pronominal. Second, the binder for calculating the binding domain would be outside the possessive DP. This wrongly predicts that a pronoun in the PNP must be free from the matrix subject in sentences like (25) below.

The predication-based binding theory predicts that pronouns as complements in PNPs are fully grammatical, whether there is a possessor or not, as the possessor is not a coargument of the pronoun. While it is true that pronouns in the two kinds of sentences are equally grammatical, they are not as grammatical as anaphors with the same bindings (see findings (14b), (14c), and (15)). Ideally, we would like this pattern of grammaticality to stem from a single principle. We offer the following:

(21) **Pronoun Distribution Principle (PDP):**
A pronoun is fully grammatical iff a reflexive in the same position would not be bound by the closest potential binder (under the same assignment of indices).

The notion of "closest potential binder" will not be spelled out in detail here, but intervention effects in resolving both syntactic and discourse anaphora are well-established in the literature (Grinder, 1970; Jacobson and Neubauer, 1976; Kuno, 1987; Pollard and Sag, 1992, 1994; Grosz et al., 1995; Asudeh, 1998, 2000). Let us simply state that α is the closest potential binder for β if there is no γ that binds β and is dominated by α.[8]

[8] Although (21) has a transderivational flavor, there is a corresponding model-theoretic interpretation: starting at the top of the tree and maintaining their order, pick out all the indices that are

The four kinds of sentences that are relevant are the following:[9]

(22) *Hanna$_i$ criticized her$_i$.

(23) ?*Hanna$_i$ found a picture of her$_i$.

(24) ?*Hanna found Peter$_j$'s picture of him$_j$.

(25) Hanna$_i$ found Peter's picture of her$_i$.

Sentence (22) is ruled out by the predication-based binding theory: the pronoun is coindexed with a dominating coargument and the sentence is a Condition B violator. Sentences (23) and (24) are handled straightforwardly by the PDP. On the indicated assignment of indices, a reflexive would be bound by the closest potential binder, and the PDP correctly predicts that the pronoun is degraded. Crucially, the PDP also captures (25), because a reflexive would not be bound by the closest potential binder and the pronoun is predicted to be grammatical.[10]

As for the possible theoretical status of (21), it could be cashed out in various ways, and it need not be construed as a principle of syntax. One way to construe it is as an instance of a Gricean maxim (plausibly quantity: "Say no more than necessary"). Since a pronoun can always refer deictically, using a reflexive always results in a more specific statement Reinhart (1983). This would effectively cash out (21) as a part of pragmatics. A second way to construe it is as an instance of blocking, whereby under identity of interpretation a more complex morphological form blocks a less complex one. A reflexive could be considered as morphologically more complex than a pronoun. This would mean (21) is a principle of morphosyntax.

Lastly, we need to consider result (16): pronouns are ungrammatical as internal arguments of PNPs embedded under [+existence] accomplishment verbs:

in a binding relation; a structure is degraded in grammaticality if the operation yields a list of indices such that there is a sequence of the same index with the second member being the index of a pronoun.

[9] We use the notation '?*' merely for convenience. The experiments used a continuous, open-ended scale for grammaticality, and the underlying assumption is that grammaticality is a *gradient* concept as advocated by Bard et al. (1996), Cowart (1997), Keller (2000), and others.

[10] We offer no explanation for why both the pronoun and anaphor are somewhat degraded in this case (compared to anaphors in the other two cases; see Figure 1). We speculate that it may be an intervention effect, as neither the pronoun nor the anaphor binds to the closest potential binder.

(26) a. Hanna$_i$ took a picture of *her$_i$/herself$_i$.

b. Hanna$_i$ told a story about *her$_i$/herself$_i$.

c. Hanna$_i$ drew a caricature of *her$_i$/herself$_i$.

These are all cases of picture noun phrases where there is complementary distribution between pronouns and anaphors, as in clausal argument positions.

One structural proposal for handling these cases states that such picture noun phrases obligatorily contain a PRO which is controlled by the matrix subject (Chomsky, 1986; Chomsky and Lasnik, 1995):

(27) Hanna$_i$ told [PRO$_i$ stories about her$_i$].

The pronoun is supposedly out because it would have to be free from binding by PRO. If this were the case we would expect (26a–c) to pattern like sentences with overt possessors. In fact, (27) is judged as much worse than (24), which is judged to be only as ungrammatical as (23). Williams also argues that the PRO analysis is untenable because the relevant control construal and binding restrictions occur even where PRO cannot occur due to the presence of overt material (Williams, 1985, 1987).

On the assumption that there is no covert subject, the PDP would partially account for (26a–c). In each case, the reflexive is bound by its closest potential antecedent, and the pronoun is ungrammatical. However, there must be something else at play here, since these sentences are judged to be worse than typical PDP cases and very nearly as bad as core binding theory violators, such as (17) and (22) (see Section 4 and Keller and Asudeh 2001 for details).

We propose instead that expressions like *take a picture*, *tell a story*, *draw a picture*, etc., are a kind of complex predicate,[11] with a two member argument structure:

(28) *take picture*: $\langle \text{NP}_1, \textit{of}\text{-NP}_2 \rangle$

In other words, in (26a–c) *Hanna* is the first argument (a subject) and the pronominal is the second argument (an oblique). When the two NPs are coindexed (i.e., $1 = 2$), the fact that the pronoun is ungrammatical and the reflexive is grammatical simply follows from Conditions A and B of the predication-based binding theory.

Preliminary evidence for the argument structure in (28) comes from topicalization. Internal NP complements cannot normally be topicalized, and neither can

[11]Note that we are not claiming that they are constituents.

PNP complements generally. But, it is possible to topicalize the *of*-complement of [+existence] accomplishment verbs, like it is possible to topicalize oblique verbal complements:[12]

(29) a. *Of the book, John ripped up several pages.

b. *Of Mary, John destroyed several pictures.

c. Of Mary, John took several pictures.

d. On Mary, John knows he can rely.

Runner (2001) also proposes (28), for independent reasons. He considers the following contrasts discussed by Chomsky (1995b, 200–211):

(30) John$_i$ wondered [which pictures of himself$_{i,j}$] Bill$_j$ saw.

(31) John$_i$ wondered [which pictures of himself$_{*i,j}$] Bill$_j$ took.

Based on these examples, Chomsky (1995b) argues that *take picture* forms a unit for interpretation and pronominal binding at LF. Runner (2001) argues that if *take picture* forms a unit at LF, then the DP object of *take* should occur only VP-internally. He presents standard evidence that the DP can be VP-external at LF: it can be definite, be headed by a strong quantifier, receive a proportional reading, license antecedent contained deletion, and undergo quantifier raising in general. Runner concludes that the DP does not have to be VP-internal at LF, and that the locus of idiom interpretation is not LF, but rather a level of argument structure. He proposes that *take picture* has an argument structure like (28). This accounts for the contrast in (30) and (31), and explains various other data as well (Runner, 2001).

6 Conclusion

Contrary to what has been reported in the theoretical literature, our experimental results demonstrate that anaphors in picture noun phrases do not have to bind to possessors ((18) and (19) are equally grammatical). This finding can be understood theoretically if reflexive binding is predication-based and if the genitive possessor in a PNP is not a subject or otherwise an argument of the picture NP's head. We can also use the notion of predication to understand the pattern for certain accomplishment verbs (as in (26)), without positing a covert possessor. We argued that *take a*

[12]These judgments were not part of our experiments and have not been experimentally verified.

picture, *tell a story*, etc., are single complex predicates, in which case the anaphor or pronoun is actually a coargument of the subject and governed by the predication-based binding theory. Lastly, we proposed the Pronoun Distribution Principle to account for our other results concerning pronouns, which did not behave as predicted by binding theory, except in the case just mentioned.

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