

Freeing Possessed NP's from Binding Theory

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PART I: BACKGROUND

A. Basic Binding

- (1) a. [S Bill_i saw him_{j/*i}]
b. [S Bill_i saw himself_{i/*j}]
- (2) a. [S Bill_i saw a picture of himself_{i/*j}]
b. [S Bill_i saw a picture of him_{j/*i}]
- (3) a. John_i saw [NP Bill_j's picture of himself_{j/*i}]
b. John_i saw [NP Bill_j's picture of him_{i/k/*j}]

Intuition:

- Reflexives and pronouns are in complementary distribution.
- Reflexives must find an antecedent (=must be "bound") and pronouns must not find an antecedent (=must be "free"), within a local domain.

Binding Theory

Condition A: a reflexive must be bound in D

Condition B: a pronoun must be free in D

D = S or possessed NP

Binding: A binds B iff A c-commands B, and A and B are coindexed.

C-command: a node A c-commands a node B iff the first branching node dominating A also dominates B, and A does not dominate B.

C-command is relevant:

- (4) a. $[_{NP} [_{NP} \text{John}]_i \text{'s father}]_j \text{ likes himself}_{j/*i}$
b. $[_{NP} [_{NP} \text{John}]_i \text{'s father}]_j \text{ likes him}_{i/*j}$

B. Problems for BT

Lack of complementarity

- (5) a. I told Albert_i that physicists like him_i / himself_i were a godsend
b. As for me_i / myself_i, I_i won't be invited

'Picture' NP's:

- NP's headed by 'picture', 'photograph', 'story', 'opinion', etc.
- May take one or more arguments

Basic cases seem to fit BT:

- (6) a. John_i saw [a picture of him_i / himself_i]
b. John_i saw $[_{NP} \text{Bill}]_j \text{'s picture of him}_{i/*j} / \text{himself}_{j/*i}$

But, reflexives in 'picture' NP's can be bound from outside of D:

- (7) John_i said that [_S there was [a picture of himself_i] in the post office]

They don't always require c-command:

- (8) That picture of himself_i in Newsweek dominated John_i's thoughts

They sometimes don't even require an antecedent in the same sentence:

- (9) John_i was going to get even with Mary. That picture of himself_i in the paper would really annoy her, as would the other stunts he had planned

Discourse/pragmatic factors are relevant (Kuno 1987), e.g. "point of view"; compare with (7):

- (10) Mary was quite taken aback by the publicity John_i was receiving.
*That picture of himself_i in the paper would really annoy her, as would the other stunts he had planned

Awareness:

- (11) a. John_i knows that there is a picture of himself_i in the morning paper
b. *John_i still doesn't know that there is a picture of himself_i in the morning paper

Indirect Agenthood:

- (12) a. I hate the story about himself_i that John_i always tells
b. *I hate the story about himself_i that John_i likes to hear

Referentiality:

- (13) a. Mary_i isn't interested in anybody's opinion of herself_i
b. *Mary_i isn't interested in John's opinion of herself_i

Focus:

- (14) a. John_i didn't tell MARY that there was a picture of himself_i in the post office; he told SAM
b. *JOHN_i didn't tell Mary that there was a picture of himself_i in the post office; SAM did

Summary: reflexives in 'picture' NP's

- can find an antecedent that
 - (a) is not in D
 - (b) doesn't c-command the reflexive
 - (c) may not even be in the same sentence
- discourse factors seem to be relevant

C. Why this is important

- The distribution of reflexives and pronouns has often been used to diagnose structure, based on the assumption that this distribution is structurally determined (e.g. Larson 1988, Lasnik & Saito 1991, Runner 1995, among others)
- These arguments only go through if it turns out the distribution of these phrases is indeed structurally determined.

Larson (1988), arguing for a particular structure for VP (from Barss & Lasnik 1986):

- (15) a. I showed John_i himself_i (in the mirror)
b. *I showed himself_i John_i (in the mirror)

Belletti & Rizzi (1988), arguing for a particular structure at D-structure:

- (16) That picture of himself_i in Newsweek worried John_i

Chomsky (1995), arguing for a particular structure at LF:

- (17) John wondered which picture of himself Bill took

A way to "save" BT?

- 'picture' NP reflexives are really just locally bound to null pronominal possessors in NP
- pronominal possessor is what is sensitive to discourse factors, being pronominal

- (18) a. John told a story about himself
b. John told [PRO's story about himself]
c. John_i told his_i story about himself_i

But:

- (19) does not have an interpretation requiring a possessor bound by 'John'
- possessors and demonstratives are usually in complementary distribution; this proposal must make unsupported claims about NP structure

- (19) a. That picture of himself_i in Newsweek dominated John_i's thoughts
- b. That [PRO_i's] picture of himself_i in Newsweek dominated John_i's thoughts
- c. That/*his_i picture of himself_i in Newsweek dominated John_i's thoughts

Also:

- proposal would require pronominal possessor in syntactic/semantic contexts not otherwise allowed

- (20) a. John said that there was a picture of himself in the post office
- b. John said that there was a/*his picture of himself in the post office

D. In search of a binding theory

We need a BT that can account for basic binding as well as 'picture' NP's.

- Pollard & Sag (1992)
- Reinhart & Reuland (1993)

Both P&S and R&R:

- there are two types of reflexive in English
- one class obeys BT
- other class, sometimes called 'logophors', are "exempt" from BT and are sensitive to pragmatic conditions
- the reflexives in possessor-less 'picture' NP's are logophors

Pollard & Sag's (1994) HPSG Binding Theory

The intuition: binding is calculated on the argument structure associated with a predicate. If a reflexive has no less oblique co-argument, then it is "exempt" from BT.

Obliqueness: Y is less oblique than Z if Y precedes Z in an argument structure list

Local o-command: Y locally o-commands Z if Y is less oblique than Z

Locally o-bound: locally o-commanded by a coindexed XP

HPSG Binding Conditions

- A. A locally o-commanded reflexive must be locally o-bound
- B. A pronoun must not be locally o-bound

- (21) a. Bill_i saw himself_i Arg-St: [NP₁, NP₂]
b. John_i saw [Bill_j's picture of himself_{j/*i}] Arg-St: [NP₁, NP₂]
c. John_i saw [a picture of him_i / himself_i] Arg-St: [NP₁]
d. John_i said that there was [a picture of himself_i] in the post office. Arg-St: [NP₁]

Reinhart & Reuland 1993

A predicate is reflexive iff two of its arguments are coindexed

A predicate (formed of P) is reflexive-marked iff either P is lexically reflexive or one of P's arguments is a SELF anaphor

R&R Binding Conditions

- A. A reflexive-marked (syntactic) predicate is reflexive
- B. A reflexive (semantic) predicate is reflexive-marked

Similarities between P&S and R&R

- BT is stated over "arguments" and "predicates" rather than tree structures
- possessor-less 'picture' NP reflexives are not constrained by BT, but by other factors

A difference between P&S and R&R

- P&S treat pronouns and reflexives in a parallel way: constrained by ordering on a single argument structure representation
- R&R have slightly different conditions for pronouns vs. reflexives. Reflexives are sensitive "syntactic" predicates while pronouns are sensitive to "semantic" ones

Possessed 'picture' NP's: a problem?

- both P&S and R&R distinguish between 'picture' NP's without a possessor (they are "exempt" from BT) and possessed 'picture' NP's, which are assumed to form the relevant sort of predicate and trigger BT

Two observations:

Kuno (1987):

- (22) a. Mary_i isn't interested in anybody's opinion of herself_i
b. *Mary_i isn't interested in John's opinion of herself_i

R&R (1993):

- (23) a. Lucie liked [a picture of herself]
b. */?Lucie liked [your picture of herself]

"This is the place to note that the judgments on NP anaphora are much less clear than the linguistic literature tends to assume. Ben-Shalom and Weijler (1990) report that in their informal empirical testing of judgments, speakers did not agree even on the basic facts, for example, that a contrast exists in [(23)]." R&R, p. 683.

Summary:

- P&S and R&R propose Binding Theories that allow for special behavior of 'picture' NP's, by dividing the class of reflexives into argument reflexives and BT-exempt, or logophoric, reflexives.
- Reflexives in possessed 'picture' NP's are not logophoric/BT-exempt
- There are some hints in the literature that reflexives in possessed 'picture' NP's do not behave as predicted by BT

Part II. A Probe for Binding Theory

Two hypotheses:

1. possessed 'picture' NP reflexives are also logophors, exempt from BT and subject to pragmatic conditions
2. possessed 'picture' NP reflexives are subject to BT, but the relevant domain (D) for binding is S, not NP.

What we need:

- a way to probe reflexive binding that is sensitive enough to allow us to test these hypotheses
 - independently manipulate structural and pragmatic variables
 - get reliable "judgments" on relevant examples

What we did:

- monitored eye movements of participants listening to spoken instructions to manipulate dolls in front of a display arranged with pictures of the dolls (see display below)
- instructions include picture NP's of two sorts: *Have Ken touch a picture of him/himself*; *Have Ken touch Joe's picture of him/himself*
- we measured latency of looks to target (picture touched) as well as target choice and number of looks to each of the pictures in the display

This yields the following types of data:

- how the instruction is interpreted (=we elicit a "judgment" without having to ask for an explicit judgment about the grammaticality of a particular reading)
- how long it takes to resolve the interpretation under various conditions
- what pictures other than the target are considered under the various conditions

Display



Have Joe touch Harry's picture of him/himself

Experiment 1: Possessor-less 'picture' NP's

Question

- can eye movements be revealing about binding preferences for pronouns and reflexives?

Binding Theory (BT)

- a reflexive must find its antecedent in a local domain (D)
- a pronoun must not take an antecedent within D

Sample Instruction:

Look at Ken. [_D Have Harry touch a picture of him/himself]

Binding Theory predictions:

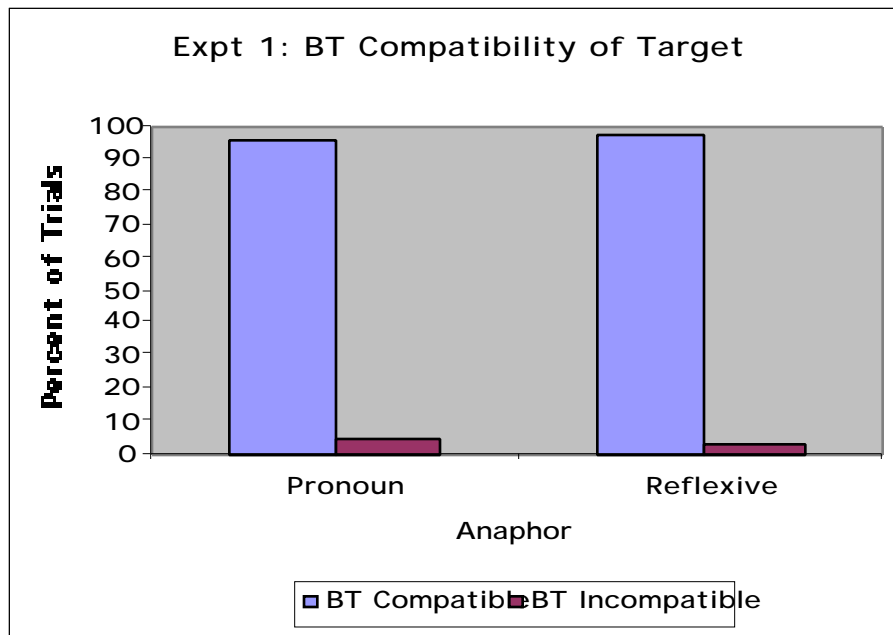
- **pronoun (*him*) condition:** only pictures of dolls not mentioned in D should be considered
- **reflexive (*himself*) condition:** only pictures of dolls mentioned in D should be considered

Instructions:

Look at Ken. Have Harry touch a picture of him/himself

Results

Anaphor	Lead-in (Ken)	Subject (Harry)
Pronoun (<i>him</i>)	95.12%	4.88%
Reflexive (<i>himself</i>)	2.38%	97.62%



Conclusions

- Binding Theory can be probed using eye-tracking methodology
- it is possible to embed binding in further on-line tasks

Experiment 2: Possessed 'picture' NP's

BT and Picture NPs with Possessors

- most versions of BT assume that a 'picture' NP with a possessor forms the structural domain in which a reflexive must find an antecedent and a pronoun must not
- there have been a few hints in the literature suggesting that this assumption is not always correct (Kuno 1987, p. 169; Reinhart & Reuland 1993, p. 683)

Questions

- what are the facts? do listeners take the NP with a possessor as the domain for binding?

Sample Instruction:

Look at Joe. Have Ken touch [_D Harry's picture of him/himself]

BT Predictions

- **pronoun condition:** only pictures of the dolls not mentioned in D should be considered (e.g. Joe & Ken)
- **reflexive condition:** only pictures of the dolls mentioned in D should be considered (e.g. Harry)

We tested these predictions with two conditions.

- **Different Lead-in:** doll mentioned in lead-in ("look at X") sentence is different from the doll mentioned as subject of action sentence
- **Same Lead-in:** the lead-in doll and subject doll are the same

Different Lead-in Instructions:

Look at Joe. Have Ken touch Harry's picture of him/himself

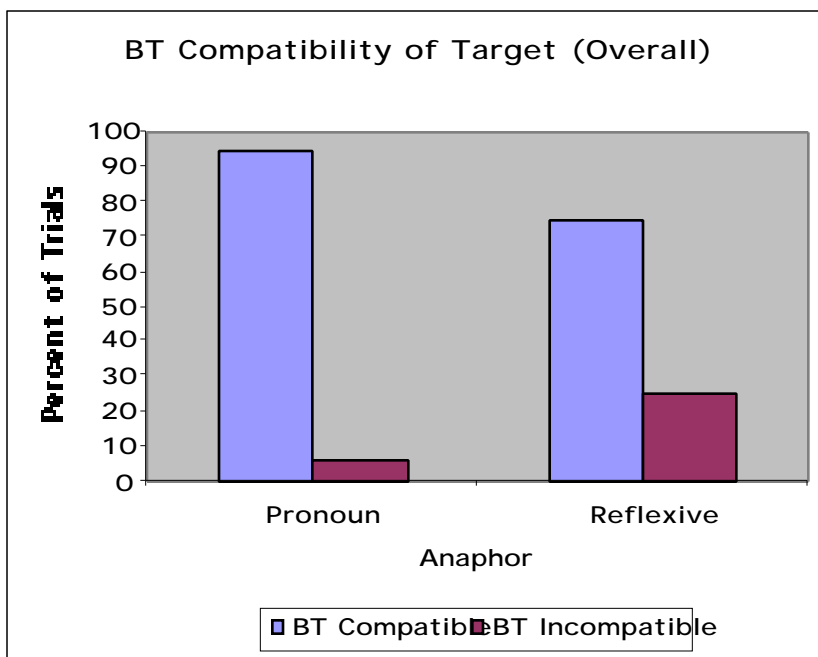
Same Lead-in Instructions:

Look at Ken. Have Ken touch Harry's picture of him/himself

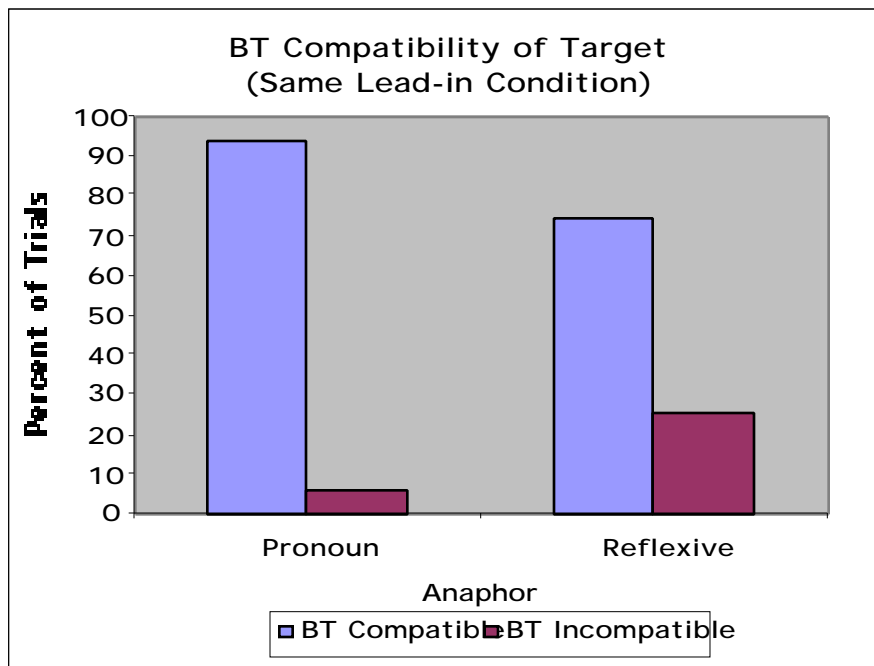
Results

Different Lead-in Condition			
Anaphor	Lead-in (Joe)	Subject (Ken)	Possessor (Harry)
Pronoun (him)	73.42%	21.52%	5.06%
Reflexive (himself)	1.20%	24.10%	74.70%

Same Lead-in Condition		
Anaphor	Subject/Lead-in (Ken)	Possessor (Harry)
Pronoun (him)	93.83%	6.17%
Reflexive (himself)	25.93%	74.07%



- Results show that pronoun reference is consistent with BT while 1/4 of the reflexives violate BT
- Even in the Same Lead-in condition, with equal number of potential antecedents, 1/4 of reflexives violate BT



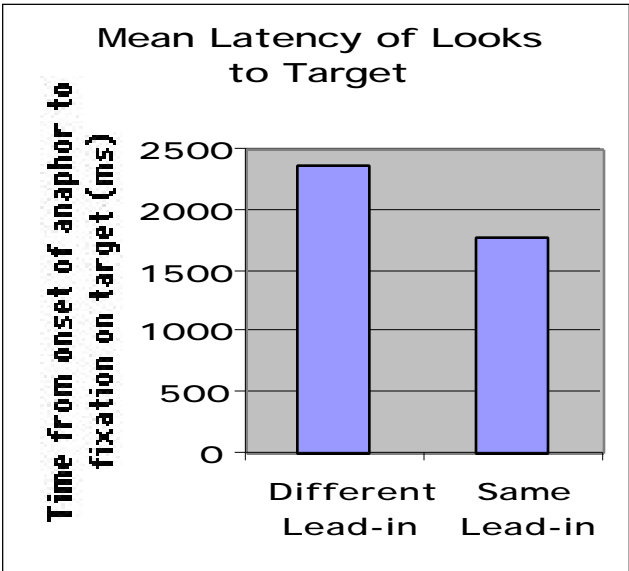
- interaction between compatibility with BT and type of anaphor is reliable as are all contrasts: reflexives violate BT significantly more than pronouns do

Result 1: BT does a good job of predicting target choice for pronouns, but not so good for reflexives in possessed 'picture' NP's.

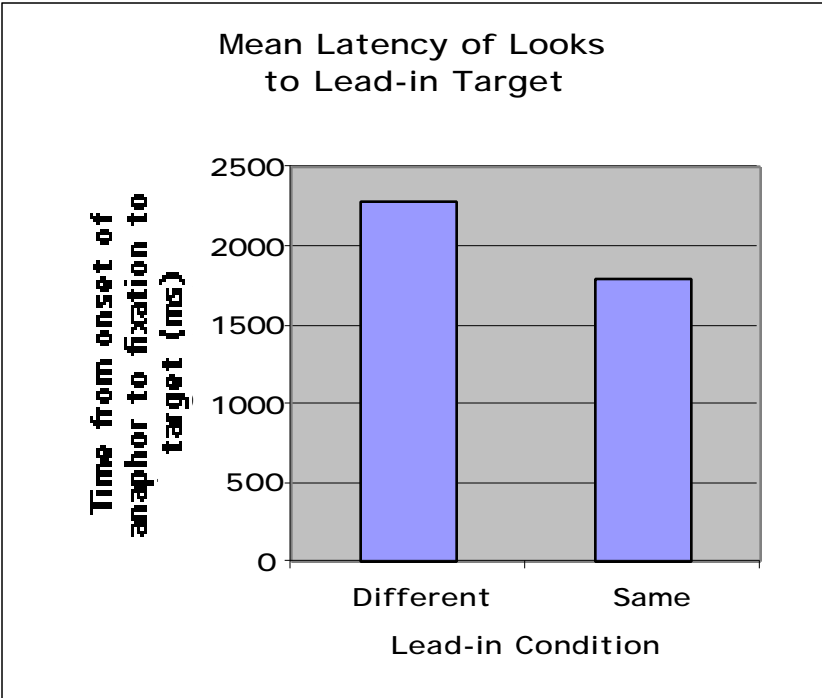
Competition

In Different Lead-in condition there are more potential antecedents available to pronoun

- a "competition effect" is observed: latency is significantly longer than in the Same Lead-in condition

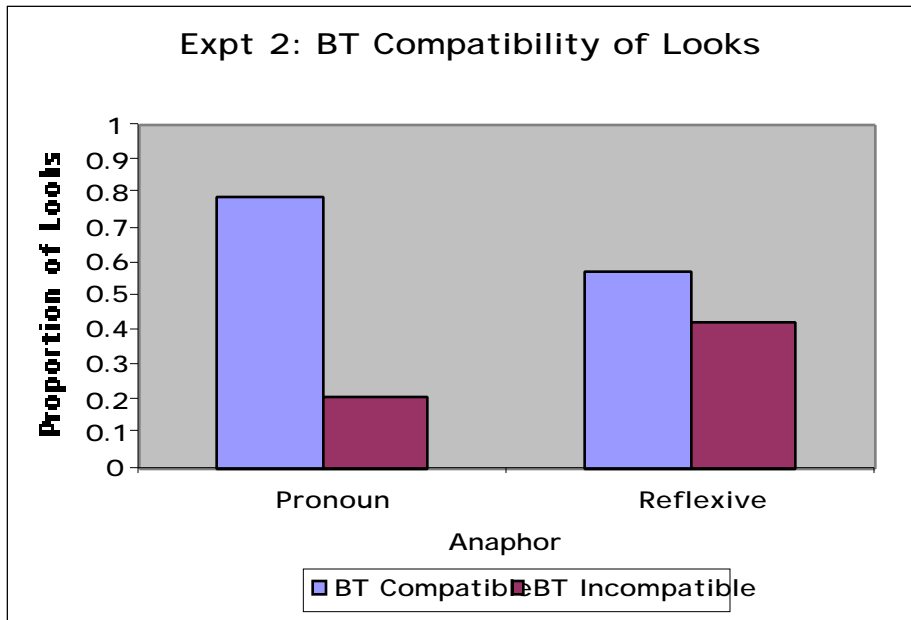


- even in trials when participants choose the lead-in there was significant competition from the subject referent



Where are they looking?

- target choice hints that BT is not correctly predicting choice of antecedent for reflexives (see graphs above)
- participants' looks even more revealing: they regularly considered referents incompatible with BT for reflexives, but not for pronouns



Experiment 2 Conclusions

- BT correctly predicts target and looks in pronoun condition
- BT does not completely account for reflexives data

Overall Conclusions

Summary Table:

BT Compatibility	Pronoun		Reflexive	
	Compatible	Incompatible	Compatible	Incompatible
Experiment 1	95.12	4.88	97.62	2.38
Experiment 2	94.37	5.63	74.39	25.61

1. Real-time tasks can be used to probe binding preferences.
2. In picture NPs with a possessor, subject of sentence weakly competes with possessor to be potential antecedent of reflexive.
3. While further research is needed, our results point towards the conclusion that the syntactic domains relevant to the binding of pronouns and reflexives are not the same.

Back to our two hypotheses:

1. possessed 'picture' NP reflexives are also logophors, exempt from BT and subject to pragmatic conditions
2. possessed 'picture' NP reflexives are subject to BT, but the relevant domain (D) for binding is S, not NP.

Our data from eye-tracking experiments are consistent with both hypotheses.

- if (1) is right, then we would expect reflexives in possessed 'picture' NP's to be sensitive to pragmatic factors
- if (2) is right, then BT needs to treat reflexives and pronouns differently, since we see that they behave differently in possessed 'picture' NP's.
 - recall that R&R's BT treated reflexives and pronouns differently: reflexives were sensitive to "syntactic" predicate, while pronouns were sensitive to "semantic" one.
 - however, R&R's definitions as they stand do not account for data, unless it can be motivated that possessed 'picture' NP's are a "semantic" but not "syntactic" predicate.

Part III The Future

- embed this methodology in contexts that manipulate pragmatic variables hypothesized to affect reflexive-binding
- further probe question of where complementarity between pronouns and reflexives breaks down

Ellipsis and Identity

Pronouns allow both strict and sloppy identity, or "other":

- (24) a. John saw his mother.
 b. Bill did, too.
 c. =Bill saw Bill's/John's/someone else's mother.

Reflexives allow only sloppy identity:

- (25) a. John saw himself.
 b. Bill did, too.
 c. =Bill saw Bill/*John/*someone else

Possessor-less 'picture' NP reflexives allow both strict and sloppy identity:

- (26) a. John saw a picture of himself.
 b. Bill did, too.
 c. =Bill saw a picture of Bill/John/*?someone else.

Claim: the availability of strict reading due to fact that these are logophors.

Prediction: if reflexives in possessed 'picture' NPs are logophors strict reading should be available under ellipsis.

NP Ellipsis

Sample Instructions:

Have John touch Bill's picture of himself

2 readings: possessor antecedent or subject antecedent

Now, have John touch Sam's

3 potential readings: possessor antecedent, subject antecedent, or other (?)

Six (total) possible readings:

- | | | |
|----|---|------------------------------|
| 1. | John touches Bill's picture of Bill
Then, John touches Sam's picture of Bill | (possessor ant.)
(strict) |
| 2. | John touches Bill's picture of Bill
Then, John touches Sam's picture of Sam | (possessor ant.)
(sloppy) |
| 3. | John touches Bill's picture of Bill
Then, John touches Sam's picture of John | (possessor ant.)
(other) |
| 4. | John touches Bill's picture of John
Then, John touches Sam's picture of Bill | (subject ant.)
(other) |
| 5. | John touches Bill's picture of John
Then, John touches Sam's picture of Sam | (subject ant.)
(sloppy) |

6. John touches Bill's picture of John (subject ant.)
Then, John touches Sam's picture of John (strict)

Prediction: if strict identity interpretation is available then possessed 'picture' NP reflexives may indeed be resolved by logophors

Stay tuned...

Testing Pragmatic Variables

Kuno (1987) discusses various pragmatic factors that seem relevant to 'picture' NP reflexives (see Part I)

- (27) a. John told Bill / Mary about the picture of him/himself on the wall
b. John told Bill / Mary that there is a picture of him/himself on the wall
- (28) a. John heard from Bill / Mary about the picture of him/himself on the wall
b. John heard from Bill / Mary that there is a picture of him/himself on the wall
- (27) a. John/Mary told/heard from Bill about the picture of him/himself on the wall
b. John/Mary told/heard from Bill that there is a picture of him/himself on the wall

Conclusions:

1. possessed 'picture' NP's may hold important clues to the various contributions of structural as well as non-structural factors determining reflexive-binding
2. eye-tracking is a feasible probe for testing predictions of binding theories, especially suited to assessing speakers' intuitions under complex pragmatic conditions
3. will ultimately help both linguists and psycholinguists because we may be able to better determine the data a binding theory needs to explain, as well as better understand what people are doing while resolving referential ambiguities on-line

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