

IS SYNTACTIC BINDING RATIONAL?

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Introduction: Rational Constraints

A constraint is **rational** iff it defines a regular tree language. Only rational constraints may be added to TAGs and MGs without increasing strong generative capacity (Graf 2011; Kobele 2011; Rogers 2003).

Research Question

Binding theory is one of the hardest problems in syntax. Can it be formalized in terms of rational constraints? Or are **TAGs and MGs too weak for binding theory?**

Limitations of a Rational Binding Theory

No Evaluation of Specific Readings

For any given sentence, one can only determine if there is **some grammatical reading** (Rogers 1998) \Rightarrow no semantics, only distribution

Syntactic Binding \neq Discourse Binding

Discourse binding is considered a distinct process by many linguists (Kiparsky 2002; Reinhart 1983; Reuland 2011). If one does not distinguish between the two, binding is at least NP-complete (Ristad 1993). Therefore we **only consider syntactic binding** (c-command, but no semantic restrictions).

For example, (1a) is ungrammatical with respect to syntactic binding because there is no grammatical reading in which both pronouns are syntactically bound.

- (1) a. * Every patient said that I want him to sedate him.
b. Every patient told some doctor that I want him to sedate him.

Why Binding is Difficult

- ▶ Finding antecedents is easy.
- ▶ But since we do not know what the antecedents of the respective pronominals are, **disjoint reference** is difficult to ensure.
- ▶ Hence reflexives are easy, while pronouns are hard.

There are obviative pronouns that always need a syntactic antecedent (e.g. Marathi *aapan*) \Rightarrow difficulty remains even if one conflates syntactic binding and discourse binding

A Counting Algorithm for Ensuring Disjointness

- ▶ **Given:** tree T , methods for computing obviation and available antecedents (i.e. some binding theory)
- ▶ For every set P of pronouns in T , each p in P adds one point of **debt** to P if there is no other pronoun p' in P such that p and p' may have the same referent.
- ▶ **Condition:** For every set S of (some) pronouns in T , the total number of available antecedents must not be less than the debt of S .

The procedure is rational iff **Limited Obviation** holds: **maximum debt is bounded** by some fixed value k .

But is Limited Obviation empirically sound?

Selected Data from English

We only need to consider constructions that may introduce an unbounded number of pronouns.

Adjuncts commonly show no obviation, and the same is true of nested DPs.

- (2) *Adjuncts*
No woman put the box in front of her(self).
- (3) *Recursion inside DPs*
a. Every post-modern artist must paint at least one [picture of [him(self) and a picture of him(self)]].
b. No client wanted to see a [presentation of [a presentation to him(self)] to him(self)].

Coordination is **illicit if the coordinated pronouns are syntactically bound and homophonous**. As a result, only a limited number of bound pronouns can be coordinated.

- (4) *Coordination*
a. Every football player told some cheerleader that the coach wants to see (both) him and her in his office.
b. * Every football player told his friend that the coach wants to see (both) him and him in his office.
c. Every football player told his friend that the coach wants to see (both) him (*deictic*) and him (*deictic*) in his office.

A Counterexample from American Sign Language?

The analogue of (4b) is grammatical in ASL.

However, binding in ASL

- ▶ involves pointing and thus is inherently deictic, and
 - ▶ is sensitive to semantic effects
(DPs quantified by *no* aren't viable antecedents).
- (5) a. [each politics person]_i; tell-story pro; want win
b. * [no politics person]_i; tell-story pro; want win
'Every/No politician_i said he, wants to win.'

Hence (4b) is **arguably an instance of discourse binding**, similar to (4c).

Conclusion

- ▶ Rational constraints give an upper bound on the extensibility of TAGs and MGs.
- ▶ We investigated whether binding exceeds these bounds.
- ▶ If one accepts the restrictions of rational constraints, binding reduces to a counting problem.
- ▶ But this counting problem is rational only if there is an upper bound on the number of antecedents needed by each binding domain.
- ▶ Neither English nor ASL (nor German) furnish counterexamples to this assumption.
- ▶ In sum, a rational theory of syntactic binding can easily be added to TAGs and MGs and is empirically sound, too.

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