BINDING THEORY
Tanya Reinhart

Binding theory is the branch of linguistic theory that explains the behavior of sentence-internal anaphora, which is labelled 'bound anaphora' (see entry Anaphora and its acquisition). To illustrate the problem, the sentences in (1) contain each an anaphoric expression (she, herself), and a potential antecedent (Lucie or Lili).

1)   a.   Lucie thought that Lili hurt her.
      b.   Lucie thought that Lili hurt herself.
      c.   *Lucie thought that herself hurt Lili.

The two anaphoric expressions have different anaphora options: In (1a), only Lucie can be the antecedent; in (1b), only Lili; in (1c), neither can. This pattern is universal. All languages have the two anaphoric types in (2), though not all have both anaphors. English does not have a SE anaphor; The Dravidian languages of India do not have a SELF anaphor; Germanic and many other languages have both.

2)   *Types of anaphoric expressions:*
      -Pronouns: (*she, her*)
      -Anaphors:
            a.   Complex SELF anaphors (*herself*)
            b.   SE (Simplex Expression) anaphors (*zich*, in Dutch)

The core restrictions on binding are most commonly believed to be purely syntactic. It is assumed that bound anaphora is possible only when the antecedent c-commands the anaphoric expression. (Node A c-commands node B iff the first branching node dominating A also dominates B (Reinhart, 1976).) In (1b), Lili c-commands herself, but in the illicit (1c), it does not.

The central problem, however, is the different distribution of the two anaphoric types. It was discovered in the seventies (Chomsky, 1973) that the two anaphora types correspond to the two types of syntactic movement illustrated below.

3)   wh-movement: Who$_i$ did you suggest that we invite t$_i$?
4)   NP-movement:
      a.   Felix$_i$ was invited t$_i$. (Passive)
      b.   Felix$_i$ seems [t$_i$ happy]. (Raising)

1

NP-movement is much more local than <u>wh</u>-movement. Chomsky's empirical generalization rests on observing the relations between the moved NP and the trace left in its original position: In the syntactic domain in which a moved NP can bind its trace, an NP can bind an anaphor, but it cannot bind a pronoun, as illustrated in (5) and (6). Where an anaphor cannot be bound, NP movement is excluded as well, as in (7).

5) a. $Felix_i$ was invited t_i
    b. $Felix_i$ invited $himself_i$
    c.   *$Felix_i$ invited him_i

6) a. $Felix_i$ was heard [t_i singing]
    b. $Felix_i$ heard [$himself_i$ sing]
    c.   Felix hoorde [$zich_i$ zingen] (Dutch)
    d.   *$Felix_i$ heard [him_i sing]

7) a)   *$Lucie_i$ believes that we should elect $herself_i$.
    b)   *$Lucie_i$ is believed that we should elect t_i.

In the early implementations of binding theory (Chomsky, 1981), this was captured by defining NP-traces as anaphors. Thus, the restrictions on NP-movement were believed to follow from the binding conditions. Skipping the technical definition of a local domain, these are given in (8), where 'bound' means coindexed with a c-commanding NP.

8)   *Binding conditions*:
     Condition A: An anaphor must be bound in its local domain.
     Condition B: A pronoun must be free in its local domain.

(5c) and (6d) violate condition B. (7a,b) and (1c) violate condition A. The others violate neither, hence are permitted.

Later developments in syntax enabled a fuller understanding of what this generalization follows from. A crucial difference between <u>wh</u>-traces and NP-traces is that NP-traces cannot carry case. (8) alone cannot explain why this should be so. This required an examination of the concept 'argument'. *An argument of some predicative head P is any constituent realizing a grammatical function of P (Thematic role, case, or grammatical subject)*. However, arguments can be more complex objects than just a single NP. In the passive sentence (5a), there is, in fact, just one argument, with two links. Arguments, then, need to be defined as chains: Roughly, *an A(rgument)-chain is a sequence of (one or more) coindexed links satisfying c-command, in a local domain* (skipping, again, the definition of the local domain, which requires that there are no 'barriers' between any of the links).

If A-chains count as just one syntactic argument, they cannot contain two fully independent links. Specifically, coindexation that forms an A-chain must satisfy (9).

9   The A-chain condition:
        An A-chain must contain exactly one link which carries structural case (at the head of the chain).

Condition (9) is clearly satisfied in (5a) and (6a), where the trace gets no case. Turning to anaphoric expressions, Reinhart and Reuland argue that while pronouns are fully case-marked arguments, anaphors, like NP traces, are case-defective. Consequently, it turns out that the binding conditions in (8) are just entailments of (9) (Fox 1993, Reinhart and Reuland 1993). If a pronoun is bound in the local domain, as in (5c) and (6d), an A-chain is formed. But the chain contains two case-marked links, hence (9) rules this out, as did condition B of (8). In all the other examples in (5) and (6), the A- chains satisfy (9), because they are tailed by a caseless link (Np-trace of anaphor). If an anaphor is not bound in the local domain, it forms an A-chain of its own. E.g. in (7a), Lucie and herself are two distinct A-chains (i.e. two arguments, rather than one). The second violates (9), since it does not contain even one case. Hence, (9) filters out the derivation, as did condition A of (8). Condition A then, is just a reflex of the requirement that arguments carry case, while condition B is the requirement that they do not carry more than one case, both currently stated in (9).

Recall that only arguments are required to have case. So (9) does not prevent an anaphor from occurring unbound in a non-argument position. E.g. the only difference between (7) and (10) is that the anaphor in (10) is embedded in an argument, but is not an argument itself.

7)   *Lucie$_i$ believes that we should elect herself$_i$.
10)   Lucie$_i$ believes that we should elect Max and herself$_i$.

Anaphors that are not part of a chain are commonly labeled 'logophoric', and the question when they are preferred over pronouns is dependent on discourse - rather than syntax - conditions (Pollard and Sag, 1992, Reinhart and Reuland, 1991).

There is, however, an aspect of bound local-anaphora that is not covered by (9) (or (8)). Regarding case, SE and SELF-anaphors are alike. Nevertheless, while both can occur in (6c), repeated in (11), SE is excluded in (12), which does not follow from (9). The difference is that in (12) a reflexive predicate is formed, because the anaphor and Max are co-arguments. But in (11) the anaphor is the subject of the embedded predicate. The same contrast is found in many languages.

11)   Max$_i$ hoorde [zich$_i$/zichzelf$_i$ zingen] (Max heard himself sing) (Dutch)
12   a)   *Max$_i$ hoorde zich$_i$.
        b)   Max$_i$ hoorde zichzelf$_i$. (Max heard himself.)

Reinhart and Reuland argue that, universally, the process of reflexivization requires morphological marking. Thus, another principle is active here:

13)   Reflexivity Condition:

A reflexive predicate must be reflexive-marked.

A predicate can be reflexive-marked either on the argument, with a SELF anaphor, or on the predicate. (In the dravidian language Kannada, the reflexive morpheme koḷ is used on the verb.) Since zich is not a reflexive-marker, (12a) violates (13).

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