

■ On binding relations

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KEYWORDS	ABSTRACT
binding theory binding relations reflexives coindexation linking Lexical-Functional Grammar	A central concern in the syntax of pronominals is the correct representation of the syntactic relationship between a pronominal and its antecedent, where we can think of the antecedent as the expression that determines the pronominal's interpretation. Elements like reflexives are of particular interest, because they must have syntactically circumscribed antecedents, in contrast to pronouns, which may refer deictically. Two common ways to represent the binding relation between a reflexive and its antecedent are through coindexation or linking, where these are seen as strict alternatives to each other. Coindexation is symmetric and transitive, whereas linking is asymmetric and intransitive. However, this raises a problem, as empirical data has shown that both transitivity and asymmetry are required of binding relations. A solution presents itself in the binding equations of Lexical-Functional Grammar, which are transitive due to their use of equality (a standard transitive relation), but asymmetric due to their use of an ANTECEDENT feature (if x is the ANTECEDENT of y , y is not the ANTECEDENT of x).

One common way to represent the relationship between a pronominal and its antecedent – let's call it “the coconstrual relation” (following Safir 2004a;b) – is through the use of indices on nominals:


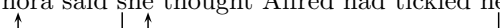
- (1) $Alli_1$ told $Thora_2$ that $she_{1/2/3}$ was next.

The proper names *Alli* and *Thora* have distinct indices, which is understood to mean that they refer to distinct individuals. The pronoun *she* can be coindexed with either of the proper names, in which case it refers to the same individual as the name in question. The indexing relation is transitive such that if *Alli* and *she* are coindexed, then *Thora* and *she* are contra-indexed, since *Alli* and *Thora* are contra-indexed. Lastly, the

pronoun need not be coindexed with either of the names mentioned, in which case it bears an index contra-indexed with both names.

Coindexation is a *symmetric* relation: if A is coindexed with B , then B is coindexed with A . A variety of *asymmetric* representations of the antecedent–pronominal relation have also been explored (Higginbotham 1983; 1985; Dalrymple 1993; Heim 1998; Fox 2000; Safir 2004a;b; Buring 2005a;b). As Higginbotham (1983) points out, only an asymmetric relation actually directly captures the antecedence relation. This is evident if we compare the coindexation representation in (2) to Higginbotham’s *linking* representation in (3), where the head of the arrow is at the antecedent and the tail of the arrow is at the anteceded element:

(2) Thora₁ said she₁ thought Alfred had tickled her₁.

(3) a. Thora said she thought Alfred had tickled her.

 b. Thora said she thought Alfred had tickled her.


The arrow notation makes it clear that the linking relation is asymmetric and represents that *Thora* is the antecedent of *she* and that *she* is the antecedent of *her* in (3b), whereas *Thora* is the antecedent of both *she* and *her* in (3a). In contrast, the coindexation in (2) does not capture whether *Thora* or *she* is the antecedent of *her*.¹ Heim (1998) proposes a notational variant of the linking arrows, using dual indices (which she calls “inner” and “outer” indices); Buring (2005a;b) also adopts a kind of dual indexation.²

¹ Coindexation per se does not even capture, e.g., whether *Thora* is the antecedent of *she* or vice versa, but independent considerations in any theory that uses coindexation would settle this question in favour of the former option.

² It should be noted that both the coindexation and linking syntactic representations in fact represent two different kinds of semantic relationship between the pronoun and its antecedent, where the exact nature of the relationship depends on the nature of the antecedent. If the antecedent is a referential noun phrase, the relationship can be one of simple *coreference*. If the antecedent is an operator, the relationship must be something akin to logical variable binding (Bach & Partee 1980; Buring 2005a, 81ff). The following standard sort of example makes this clear; for simplicity, let us assume that the others in question are not related to Harry:

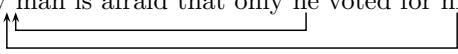
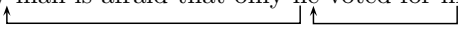
(i) Only Harry heard his sister.

Interpretation 1: Only Harry is an x who heard Harry’s sister.

Interpretation 2: Only Harry is an x who heard x ’s sister.

The first interpretation is a coreferential interpretation, such that the pronoun refers to whatever the proper name *Harry* refers to. On this interpretation, the others did not hear Harry’s sister, but may have heard their own sisters. The second interpre-

These representational differences in binding relations have linguistic consequences, although this is not obvious from (2) and (3) alone. Let us call the configuration in (3a) *cobinding* and the configuration in (3b) *transitive binding*, following Heim (1998) and Buring (2005b). The following example from Buring (2005b, 264) – modified to use the linking representation – illustrates that cobinding and transitive binding can give rise to distinct interpretations (all caps indicates focus):

- (4) Every man is afraid that only HE voted for his proposal.
- a. Cobinding:
 every man is afraid that only he voted for his proposal

- Fear: ‘No one else voted for my proposal!’
- b. Transitive binding:
 every man is afraid that only he voted for his proposal

- Fear: ‘No one else voted for his own proposal!’

A symmetric relation like coindexation cannot capture the distinction between cobinding and transitive binding, making it difficult for a theory that represents the antecedent–pronominal relation symmetrically to account for (4).

Another distinction between the coindexation relation and the linking relation is that the former is *transitive*, whereas the second is not. The issue of transitivity is a long-standing one in the syntax of pronominals. In the early literature on pronominal syntax (Jackendoff 1972; Wasow 1972), the problem concerned how to relate the reflexive to the matrix subject in (5) without introducing a rule that would also overgenerate (6). From this point on, I use bold face in example sentences to indicate coconstrual.

- (5) **Thora** worried that **she** might implicate **herself**.
- (6) ***Thora** worried that Alfred might implicate **herself**.

Coindexation plus a locality restriction on the antecedent–anaphor relation neatly solved this problem: the reflexive must have a suitable local antecedent. *Alfred* and *she* are both local, but only *she* is a suitable antecedent for the feminine reflexive (assuming *Alfred* names a male individual, as is

tation is the semantically bound interpretation, such that the pronoun is bound by the quantificational noun phrase *Only Harry*. On this interpretation, the others in question did not hear their own sisters, but may have heard Harry’s sister.


conventionally the case). If the reflexive is coindexed with *she*, it would be related to *Thora* in (5) by transitivity of coindexation, on the relevant reading where *Thora* is coindexed with *she*. However, it cannot be directly related to *Thora*, as would have to be the case for (6) to be grammatical, because the matrix subject is not sufficiently local to the reflexive.

The transitivity of coindexation similarly explains the pattern in (7), which turns out to be a problem for asymmetric relations such as linking:

- (7) a. ***Isak** said **he** saw **him**.
 b. **Isak** said **he** saw him.
 c. **Isak** said he saw **him**.

Isak can be the antecedent of *he* or *him*, as in (7b) and (7c), but it cannot be the antecedent of both, as in (7a). On the standard assumption that these pronouns can only take antecedents that are suitably non-local, if *he* and *him* are both coindexed with *Isak*, then *he* and *him* are also coindexed with each other, but *he* is too local to *him*. Lasnik (1976) discusses similar examples, in light of the previous work on transitivity of coindexation mentioned above.

Higginbotham (1983, 406) immediately observed that (7a) is problematic for an asymmetric antecedent–pronominal relation, because there is a cobinding representation in which *he* is not the antecedent of *him*, such that each of *he* and *him* have the relation to *Isak* that they have in (7b) and (7c), which are independently grammatical:

- (8) Isak said he saw him.


Büiring (2005b, 265) points out that these sorts of examples have normally lead to various theoretical complications for asymmetric theories of coindexation.

However, it is possible to simultaneously reap the benefits of asymmetric linking and transitive coindexation through an antecedent–pronominal relation that is *both asymmetric and transitive*. One such relation is that of Dalrymple (1993), which is couched in the theory of Lexical-Functional Grammar (Kaplan & Bresnan 1982; Bresnan et al. 2016; Dalrymple 2001).

Dalrymple’s relation can be abbreviated as follows, where f can be thought of as the pronominal in question:³

$$(9) \quad (f \text{ ANTECEDENT})_{\sigma} = f_{\sigma}$$

This constraint states that – at the level of *semantic structure* (Halvorsen & Kaplan 1988; Dalrymple 1999; 2001; Asudeh 2012), indicated by the subscript σ – the pronominal is equal to its antecedent. The feature ANTECEDENT introduces *asymmetry*: it is not the case that if A is the ANTECEDENT of B , then B is the ANTECEDENT of A . Equality introduces *transitivity*: if A is the antecedent of B and C , then (at semantic structure) A equals B and A equals C , which means that B equals C .

This relation captures the distinction between cobinding and transitive binding, as in (4), due to the asymmetry of the antecedent–anaphor relation. It also correctly captures the pattern in (7) while correctly ruling out (8), due to the transitivity of equality.

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³ This abbreviation also captures the effect of the basic Glue Semantics (Dalrymple 1999) treatment of anaphora, which treats the pronominal as a function on its antecedent. See Asudeh (2012) for further details.

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