

Weak Crossover and the Direct Association Hypothesis

Prerna Nadathur

Department of Linguistics, Philology & Phonetics
University of Oxford

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 - ▶ Dalrymple, Kaplan & King 2001 (traceless)

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- ▶ Additional data
 - ▶ Pied-piping
 - ▶ Double-object constructions and objectivity distinctions
 - ▶ Adjuncts and syntactic prominence
 - ▶ Multiple gaps

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- ▶ Additional data
 - ▶ Pied-piping
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 - ▶ Adjuncts and syntactic prominence
 - ▶ Multiple gaps
- ▶ Conclusions
 - ▶ Directions for further inquiry
 - ▶ Synthetic data
 - ▶ Summary

Weak Crossover (Postal 1971, Wasow 1972)

Transformational grammar regards *wh*-questions as formed when a *wh*-operator is fronted. A weak crossover “violation” occurs in cases like (1), when the operator must pass over a coreferential pronoun on its way to the head of a sentence.

Example (1)

- a. His_i mother greeted him_i.
- b. *Who_i did his_i mother greet?

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Example (1)

- a. His_i mother greeted him_i.
- b. *Who_i did his_i mother greet?

The acceptability difference *only* occurs when operator movement would involve crossing the pronoun: both examples in (2) are acceptable as indexed.

Example (2)

- a. He_i greeted his_j mother.
- b. Who_i greeted his_j mother?

Bresnan's (1995) account of weak crossover

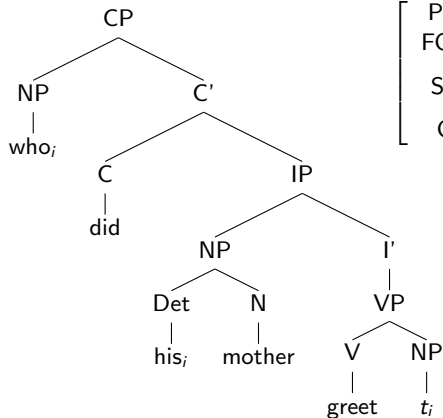
Bresnan represents traces in the c-structure of an example like (1)b (based on the treatment of long-distance dependencies in Kaplan & Bresnan 1982). Traces therefore also correspond to an f-structure, and in particular the same f-structure as the operator.

C- and f-structures for (1)b (Bresnan)

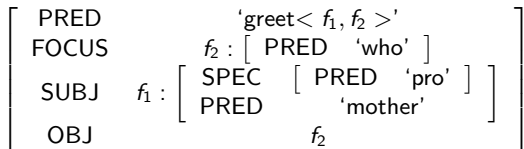
Example (3)

a. *Who_i did his_i mother greet?

b.



c.



Bresnan (1995) continued

For Bresnan, coreference phenomena are broadly constrained by two principles:

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- ▶ **Syntactic rank** comes from the **functional hierarchy** (Keenan & Comrie 1977)

SUBJ > OBJ > OBL > COMP (from Bresnan)

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- ▶ **Syntactic rank** comes from the **functional hierarchy** (Keenan & Comrie 1977)

SUBJ > OBJ > OBL > COMP (from Bresnan)

- ▶ **Linear order** is governed by **f-precedence**:

Let μ be the mapping from c-structure nodes to f-structures, and f and g be f-structures. Then f f-precedes g iff $\mu^{-1}(f) \neq \emptyset$, $\mu^{-1}(g) \neq \emptyset$, and all nodes in $\mu^{-1}(f)$ precede some node in $\mu^{-1}(g)$

Prominence constraints

To avoid a weak crossover violation for Bresnan (1995), a *wh*-question with coreferenced operator and pronoun must obey the following “prominence” constraints.

- ▶ **Syntactic prominence:**

An f-structure containing the pronoun may not be higher in syntactic rank than an f-structure containing the operator.

- ▶ **Linear prominence:**

The pronoun must not f-precede the operator.

*(Bresnan argues that the relative significance of these constraints varies crosslinguistically. Both must be satisfied in English.)

Bresnan (1995) continued

Example (3) is ungrammatical because it violates both prominence constraints:

- ▶ The operator is in the OBJ f-structure, and the pronoun is in higher-ranked SUBJ
- ▶ The pronoun appears before the trace (which is in the same f-structure as the operator) and so f-precedes the operator

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On the other hand, (2)b is fine:

Example (2)

- b. Who_i (*t_i*) greeted his_i mother?

The operator has rank SUBJ, while the pronoun is in OBJ; since both operator and trace occur before the pronoun, linear prominence is satisfied as well.

Dalrymple, Kaplan & King 2001

Dalrymple, Kaplan & King (2001) propose a revision of Bresnan's account that maintains the idea of prominence constraints but eliminates the need for a trace. This is based on Kaplan & Zaenen's (1989) treatment of long-distance dependencies via functional uncertainty.

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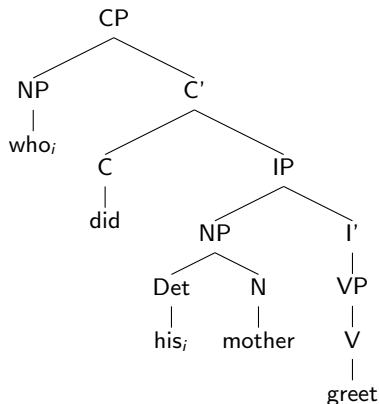
The idea underlying the revision is that “linear prominence requirements between an operator and a pronoun are determined by overt material which indicates the syntactic role of the displaced phrase,” rather than by the position of a covert trace.

C- and f-structures for (3) (Dalrymple et al)

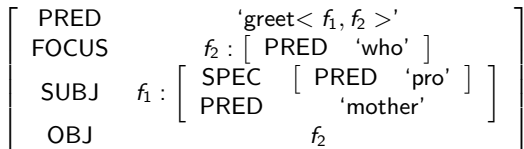
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Example (5)

*Who_{*i*} did Sue talk about his_{*i*} mother to (t_i)?

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- ▶ Both extracted element are pronoun are OBL; (5) is fine on syntactic prominence
- ▶ For Bresnan: the trace is at the end of the sentence, so the pronoun f-precedes the operator
- ▶ Dalrymple et al instead consider the overt preposition “to” – the revised proposal holds that the presence of “to” after the pronoun is what rules (5) out.

Revised prominence constraints

Dalrymple et al introduce **coarguments** to handle this formally:

- ▶ The **coarguments** of a predicate (e.g. “talk”) are all of its adjuncts and arguments.
- ▶ **CoargPro** is the coargument f-structure containing the pronoun
- ▶ **CoargOp** is the coargument f-structure containing the operator

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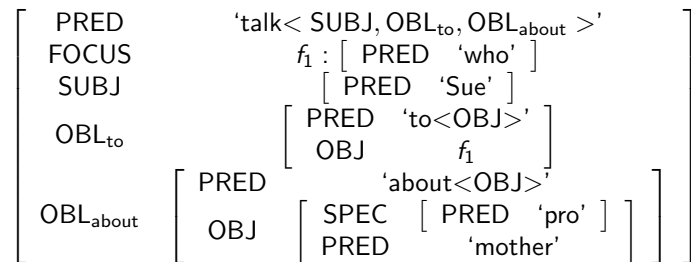
The prominence constraints are then:

- ▶ **Syntactic prominence:**
CoargOp must be at least as high as CoargPro on the functional hierarchy.
- ▶ **Linear prominence:**
CoargOp must f-precede the pronoun.

Revised prominence constraints

Example (5)

*Who_i did Sue talk about his_i mother to (t_i)?



- ▶ CoargOp is the f-structure OBL_{to}; CoargPro is OBL_{about}
- ▶ CoargOp contains both the “to” and “who” nodes
- ▶ The pronoun precedes “to,” so CoargPro f-precedes CoargOp, and (5) violates linear prominence

Dalrymple et al continued

Example (6)

Who_i did Sue talk to about his_i mother?

The revised constraints correctly predict grammaticality here. They also make the correct predictions for (2)b and (3):

Example (2)

b. Who_i greeted his_i mother?

Example (3)

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A direct link between the operator and the item selecting for it captures Dalrymple et al’s intuition about “overt” syntactic information, but eliminates the need for coargument structure. Following Dalrymple & King (2013), the subcategorizing element will be referred to as the **anchor**.

Weak crossover by direct association

Example (7)

*[Who_i]_{Op} did [his_i]_{Pro} mother [greet]_{Anch}?

Example (8)

[Who_i]_{Op} [greeted]_{Anch} [his_i]_{Pro} mother?

Example (9)

*[Who_i]_{Op} did Sue talk about [his_i]_{Pro} mother [to]_{Anch} ?

Example (10)

[Who_i]_{Op} did Sue talk [to]_{Anch} about [his_i]_{Pro} mother?

In (7) and (9) alone, the anchor follows the pronoun. These are the examples involving weak crossover violations.

Re-revised prominence constraints

According to the observation above, I revise linear prominence as follows:

- ▶ **Linear prominence:** the anchor (of the operator) must precede the pronoun.

Syntactic prominence remains as in Bresnan 1995:

- ▶ **Syntactic prominence:**
An f-structure containing the pronoun may not be higher in syntactic rank than an f-structure containing the operator.

Additional data

Example (11)

[To whom_{*i*}]_{Op} did you [give]_{Anch} [her_{*i*}]_{Pro} book (t_i) ?

Example (12)

[In whose_{*i*} hand]_{Op} did you [put]_{Anch} [his_{*i*}]_{Pro} pen (t_i)?

Example (13)

(?) [To whom_{*i*}]_{Op} did you [introduce]_{Anch} [her_{*i*}]_{Pro} neighbors (t_i)?

- ▶ Bresnan predicts ungrammaticality here
- ▶ The anchor account predicts acceptability
- ▶ Judgements elicited from speakers of American English have (11) ruled grammatical, (12) ruled grammatical by a majority, and (13) ruled grammatical half the time

Double object constructions

The dative alternation:

Example (14)

- a. John gave Mary the book.
- b. John gave the book to Mary.

- ▶ The status of the objects in (12) and (13) is similarly debated; Dryer (1986) suggests “split objectivity.”
- ▶ English double objects may be ambiguous in mental representation; this uncertainty about syntactic rank is reflected in judgements for (11)-(13).

Additional data continued

Example (15)

[Whose_{*i*} book]_{Op} did you [give]_{Anch} [her_{*i*}]_{Pro} friend (t_i)?

Example (16)

[To whom_{*i*}]_{Op} did Sue [talk]_{Anch} (t_i) about [his_{*i*}]_{Pro} mother (t_i) ?

- ▶ (15) unequivocally supports the anchor account over the trace account
- ▶ (16) has an ambiguous extraction site – maybe itself a mark against the trace account
- ▶ On the whole, separating anchor and trace favours anchor account

Objectivity distinctions

Example (17)

- a. (?) [Who_i]_{Op} did you [give]_{Anch} (*t_i*) [her_i]_{Pro} book?
- b. (?) [Whose_i book]_{Op} did you [give]_{Anch} [her_i]_{Pro} (*t_i*)?

- ▶ (17)a and b both satisfy linear prominence on the anchor account
- ▶ Direct objectivity would block (17)a on syntactic prominence, and permit (17)b
- ▶ Primary objectivity would allow (17)a and block (17)b

Adjuncts and syntactic prominence

Example (18)

*[With whom_i]_{Op} did Jessica [visit]_(Anch) [his_i]_{Pro} cousin (*t_i*)?

Example (19)

*[In whose_i car]_{Op} did Anne [meet]_(Anch) [him_i]_{Pro} (*t_i*) ?

Example (20)

*[From whose_i house]_{Op} did George [call]_(Anch) [her_i]_{Pro} (*t_i*) ?

Multiple anchor sites

Parasitic gaps (Engdahl 1983):

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- ▶ Bresnan 1995 rules these out
- ▶ If first possible anchor site is correct, anchor account predicts acceptability

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 - ▶ Other coreference phenomena (e.g. strong crossover)

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- ▶ Within English
 - ▶ Can the anchor account handle examples involving quantification, rather than *wh*-movement?
 - ▶ Other coreference phenomena (e.g. strong crossover)
- ▶ Formalization (within LFG and other frameworks)

Synthetic data

Following Dalrymple et al, I present “data” from hypothetical languages that would help to adjudicate between the three accounts. These are not exhaustive.

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Example (23)

Only linear prominence applies; fixed SVO word order, *wh*-fronting:

$[[\text{who}_i]_{\text{Op}}]_{\text{CoargOp, OBJ}} \text{ did } [[\text{his}_i]_{\text{Pro}} \text{ mother}]_{\text{CoargPro, SUBJ}} [\text{see}]_{\text{Anch}} (t_i) ?$

- ▶ Ungrammatical for Bresnan
- ▶ Grammatical for Dalrymple et al
- ▶ Anchor agrees with Bresnan (anchor and trace adjacent)

Synthetic data continued

Example (24)

Only linear prominence applies; fixed SOV word order, *wh*-fronting

- a. $[[\text{who}_i]_{\text{Op}}]_{\text{CoargOp, SUBJ}} (t_i) [[\text{his}_i]_{\text{Pro}} \text{ mother}]_{\text{CoargPro, OBJ}}$
 $[\text{saw}]_{\text{Anch}} ?$
- b. $[[\text{who}_i]_{\text{Op}}]_{\text{CoargOp, OBJ}} [[\text{his}_i]_{\text{Pro}} \text{ mother}]_{\text{CoargPro, SUBJ}} (t_i)$
 $[\text{saw}]_{\text{Anch}} ?$

- ▶ Extraction from subject position gives grammaticality from Bresnan and Dalrymple et al
- ▶ (24)a ungrammatical by anchor account; verb at the end of the sentence
- ▶ Extracting from object position gives ungrammaticality from Bresnan; others are unchanged

Synthetic data continued

Example (25)

Only linear prominence applies; fixed VSO word order, *wh*-fronting:

$[[\text{who}_i]_{\text{Op}}]_{\text{CoargOp, OBJ}} [\text{saw}]_{\text{Anch}} [[\text{his}_i]_{\text{Pro}} \text{mother}]_{\text{CoargPro, SUBJ}} (t_i) ?$

- ▶ Grammatical for Dalrymple et al and anchor account (anchor occurs early)
- ▶ Ungrammatical for Bresnan

Synthetic data continued

Example (26)

Both linear and syntactic prominence must be satisfied; fixed SOV word order, *wh*-fronting:

$[[\text{who}_i]_{\text{Op}}]_{\text{CoargOp, SUBJ}} (t_i) [[\text{his}_i]_{\text{Pro}} \text{ mother}]_{\text{CoargPro, OBJ}} [\text{saw}]_{\text{Anch}} ?$

- ▶ Grammatical for Dalrymple et al and Bresnan
- ▶ Word order constraints have anchor at the end of the sentence; anchor account predicts ungrammaticality

Synthetic data continued

Lastly, suppose there is a language which requires only that *one* of the constraints be satisfied. If an example satisfies syntactic prominence here, all three accounts will predict grammaticality; thus it is only helpful to consider violations of syntactic prominence to adjudicate between accounts. Using linear prominence alone gives the same predictions as in (23)-(25), modulo word order.

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- ▶ Traces are not strongly motivated by weak crossover
- ▶ The association needs further exploration (particularly with respect to double objects, multiple gaps)
- ▶ This paper provides a starting point for a more formal theory of direct association

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