

Weak Crossover and the Direct Association Hypothesis

Prerna Nadathur
Department of Linguistics, Philology & Phonetics
University of Oxford
pnadathur@gmail.com

May 8, 2013

The existence of traces and their role in the establishment of long-distance dependencies has for some time been a subject of debate in syntax, and moreover one that spans the divide between transformational theories of grammar and constraint-based ones. Weak crossover (Postal 1971) has figured prominently in this debate, as it was thought to provide evidence for the necessity of traces in long-distance dependencies in *wh*-questions. This paper aims to provide an account of weak crossover that does away with the need for traces, thereby questioning the motivation for traces in general.

Within LFG, both trace-based and traceless accounts of weak crossover have been proposed. Bresnan's (1995) account argues that weak crossover is governed by the following two "prominence" constraints:

- (1) **Syntactic prominence:** An f-structure containing the pronoun may not be higher on the syntactic hierarchy (cf. Keenan & Comrie 1977) than an f-structure containing the operator.
- (2) **Linear prominence:** The pronoun must not f-precede the operator.

As Bresnan's account relies on a treatment of long-distance dependencies very similar to Kaplan & Bresnan's (1982) framework, which incorporates traces into the c-structure, her linear prominence constraint ultimately relies on the order in which the proposed trace and pronoun appear in a sentence. Dalrymple, et al (2001) propose a revision of this constraint that does away with reliance on the trace: this is bolstered by Kaplan & Zaenen's (1989) proposal to handle long-distance dependencies in LFG via *functional uncertainty*. The intuition behind Dalrymple, et al's revision is that, while both syntactic rank and linear order are significant governing principles for coreference phenomena, linear prominence requirements between a displaced operator and a coreferential pronoun are properly determined by overt material which indicates the syntactic role played by the extracted element, and not by the position of an empty category. Both accounts (Bresnan 1995, Dalrymple et al 2001) thus give the same predictions for the following examples:

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

The trace-based account rules out (3) because the proposed trace occurs after the coreferential pronoun, and allows (4) because the trace occurs first. The traceless account, on the other hand, rules out (3) because the preposition "to," which indicates the syntactic role played by the displaced operator, occurs after the coreferential pronoun. It allows (4) because "to" occurs before the pronoun. Consideration of this relationship at f-structure requires the introduction of an intermediate level of "coargument" structure (see Dalrymple et al 2001).

The aim of this paper is to propose a version of the linear order constraint on weak crossover that captures the spirit of Dalrymple et al's revision, without the introduction of this intermediate level of structure. Pickering & Barry's (1991) "Direct Association Hypothesis" (DAH) proposes that filler-gap dependencies are characterized by a link made directly between an extracted element and the predicate or preposition that selects for it. This captures essentially the idea that it is overt syntactic material that enters into the structural relationship relevant for linearity constraints, and indeed makes the selecting relationship fundamental.

Following Dalrymple & King (2012), I refer to the subcategorizer as the “anchor” of a displaced element. The revised prominence constraint can thus be stated as follows:

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

Insofar as the DAH is a processing hypothesis and holds that a displaced element in some way is reactivated at the anchor position, this version of linear prominence requires that the referent occur prior to the pronoun. Together with the syntactic prominence constraint in (1), this can be shown to handle the English data that is predicted by both the Bresnan and Dalrymple et al accounts.

In addition, the proposed revision appears to have some advantages over a trace-based account of weak crossover. While the following example is predicted ungrammatical by the Bresnan (1995) account, judgment data and the anchor account agree that it is in fact acceptable.

- (6) [To whom_i]_{Op} did you [give]_{Anch} [her_i]_{Pro} book (t_i)?

The same can be shown for a number of other examples involving double-object constructions and pied-piping, including the following:

- (7) [Whose_i book]_{Op} did you [give]_{Anch} [her_i]_{Pro} friend (t_i)?

- (8) [In whose_i hand]_{Op} did you [put]_{Anch} [his_i]_{Pro} pen (t_i)?

Some interesting issues arise with double-object data, due to the questioned role played by the syntactic hierarchy with regards to double objects. I consider these in some detail, and conclude that on the whole the questioned judgements reflect the predictions made by the combination of syntactic prominence and the anchor constraint, rather than those made by a trace-based linear order constraint.

In addition, the anchor account promises to shed some light on the formal differences between adjuncts and arguments, as the question of whether or not adjuncts are anchored gives rise to varied predictions about grammaticality. The anchor account also raises some interesting questions regarding the nature of multiple-gap constructions, including both the *tough*-construction and constructions involving parasitic gaps. I present some data (along the lines of (9) and (10)) involving these constructions and consider its consequences both from a theoretical syntactic and from a processing perspective; the central issue will be whether or not the first occurring subcategorizer can be considered to be the unique anchor in these constructions.

- (9) Who_i (t_i) will be tough for us to get his_i mother to_i talk to (t_i)?

- (10) (?) Who_i did you advise (t_i) before his_i wife divorced ($-_i$)?

In summary, I propose to consider a direct link between an extracted element and its subcategorizer as providing the important structural relationship for weak crossover. I show that this handles the data so far treated by other LFG accounts of weak crossover, and in addition fares better on some key examples. The primary conclusion to be drawn from this work is that traces are not strongly motivated by weak crossover; a secondary conclusion is that direct association may provide a robust starting point for reexamining a number of phenomena involving filler-gap dependencies. This paper provides a starting point for these explorations.

References

- [1] Bresnan, J. 1995. “Linear order, syntactic rank, and empty categories: On weak crossover.” In *Formal Issues in Lexical-Functional Grammar*, Dalrymple, Kaplan, Maxwell, and Zaenen (eds.), pp 241-274. Stanford University: CSLI Publications.
- [2] Dalrymple, M., R. Kaplan, and T. King. 2001. “Weak crossover and the absence of traces.” In *Proceedings of the LFG01 Conference*, Butt and King (eds.). Stanford University: CSLI Publications.
- [3] Dalrymple, M. and T. King. 2012. “Nested and crossing dependencies.” Notes for the Syntax Working Group, Department of Linguistics, Philology, and Phonetics, Oxford University.

- [4] Kaplan, R. and J. Bresnan. 1982. "Lexical-Functional Grammar: A formal system for grammatical representation." In *Formal Issues in Lexical-Functional Grammar*, Dalrymple, Kaplan, Maxwell, and Zaenen (eds.), pp 29-130. Stanford University: CSLI Publications.
- [5] Kaplan, R. and A. Zaenen. 1989. "Long-distance dependencies, constituent structure, and functional uncertainty." In *Formal Issues in Lexical-Functional Grammar*, Dalrymple, Kaplan, Maxwell, and Zaenen (eds.), pp 137-165. Stanford University: CSLI Publications.
- [6] Keenan, E. and B. Comrie. 1977. "Noun phrase accessibility and universal grammar." *Linguistic Inquiry*, 8:1, pp 63-99.
- [7] Pickering, M. and G. Barry. 1991. "Sentence processing without empty categories." *Language & Cognitive Processes*, 6:3, pp 229-259.
- [8] Postal, P. 1971. *Cross-over Phenomena*. New York: Holt, Rinehart & Winston.