BREAKING OPAQUE DOMAINS

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It is well known that cross-clausal dependencies are not allowed in ellipsis, quantifier scope and other phenomena:

Sluicing

1. *One of the students said that Mary spoke to one of the professors, but I don't know which student to which professor. (Lasnik 2013: x, ex. 29)

2. *Some of the students wanted John to go to some of the lectures, but I'm not sure which to which. (Lasnik 2013: x, ex. 54)

Gapping

3. *John wanted Bill to read books and Mary ~~wanted Bill to read~~ magazines

Pseudogapping

4. *Kathy wants Henry to study astronomy, but she doesn't ~~want Henry to study~~ meteorology

Quantifier Scope Interaction

5. At least one man/some man thinks Bill's in love with each of these women.

*each > at least one not possible

Extraposition

6. *Mary wanted [John to buy *t*] until yesterday a gigantic new car

(ex. 3-6 taken from Lasnik 2006)

In other words, intervening CPs are opaque domains for a phrase to form an operational dependency with another phrase in a higher clause. So, for instance, a wh-phrase cannot be sluiced with another wh-phrase in a higher clause, although

English allows multiple sluicing as long as the wh-phrases are clause-mate; similarly, a quantificational element cannot outscope another quantificational element in a higher clause:

OPAQUE

DOMAIN

7. . . . $XP_{[+\alpha]}$ . . . [$_{CP}$ . . . $YP_{[+\alpha]}$ . . .

The representation in (7) shows that a phrase cannot undergo a certain operation (movement, QR, etc.) while there is another phrase of the same nature (QP, whP, $XP_{[+focus]}$, etc.) in a higher clause.

However, Lasnik (2006), Merchant (2001) and Nishigauchi (1998) have shown that these opaque domains can be broken when the Subject of the complement clause is a pronoun bound by the matrix Subject. In such cases, a phrase can form dependency with another phrase in a higher clause:

Sluicing

8. ?Some of the students thought they would go to some of the lectures, but I'm not sure which to which. (Merchant 2001: 113, fn. 4)

Gapping

9. ?John thinks that he will see Susan and Hary ~~thinks that he will see~~ Mary (Nishigauchi 1998)

Pseudogapping

10. ?*Kathy thinks she should study astronomy but she doesn't meteorology (Lasnik 2006: ex. 30)

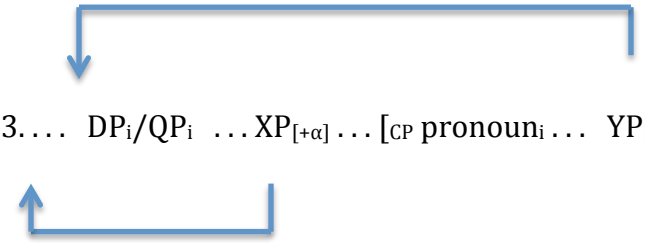
Quantifier Scope Interaction

11. At least one man/some man thinks he's in love with each of these women

each > at least one possible (Kayne 1998)

Extraposition

12. The absent-minded professor$_i$ will say that {he$_i$/Lucy}'s working, if you press him, on a new molecular compound for flubber (Lasnik 2006)



13. . . . DP$_i$/QP$_i$ . . . XP$_{[+\alpha]}$ . . . [$_{CP}$ pronoun$_i$ . . . YP$_{[+\alpha]}$ . . .

In (13), the embedded CP layer is no more an opaque domain, enabling a phrase to form a dependency relationship with another phrase in the higher clause or escape out of the complement clause as in extraposition.

The rest of the paper will focus on how these opaque domains are broken.

As shown by Merchant, Nishigauchi and Lasnik, a binding dependency between the matrix Subject and the embedded Subject is the key factor in breaking opaque domains given above:

14. DP$_i$/QP$_i$ . . . [$_{CP}$ pronoun$_i$ . . .

Binding is a sharing dependency in that two nominal expressions (generally a referential expression and a pronominal expression) share person, gender and number features (which of these features are specified on DPs and pronominals change from language to language) as well as the same index. In a sense, it is

similar to Subject-Verb and Object-Verb agreement, where the verb and a DP share person, gender and number features.

In this study, I propose that sharing dependencies/operations such as binding

(i) are more primitive than other dependencies/operations in syntax,

(ii) are built earlier than others in a syntactic derivation, and

(iii) break opaque domains for subsequent operations.

There are both movement and non-movement theories of binding. Move, Bind, Agree are among the mechanisms for Binding. In any case, Binding expresses entanglement (in the sense of Quantum entanglement), where once two elements get entangled (i.e. share person, number and gender features and a codependecny is established), that entanglement cannot be broken. In other words, the pronominal element bound by a referential expression cannot be bound by another referential expression. Similarly, in quantum physics, when two particles are entangled, they display the same behavior, even if they are non-local.

In a similar way, when a the matrix Subject DP binds a pronominal embedded Subject, an entanglement comes into existence, creating an escape hatch for lower phrases to move through/to scope out of, which would be impossible if the entanglement were not established (cf. (7) & (13)).

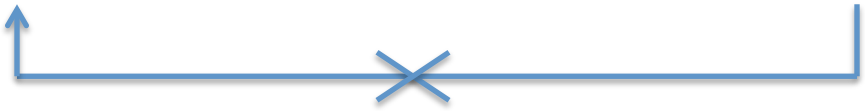
This is achieved because binding operation breaks an opaque domain and makes the main clause and complement clause local, and the phrases act as if they are clause-mate.

The next question is how come binding does not enable the escape of an element out of an island although binding is possible through an island:

15. Mary$_i$ called every student who she$_i$ thought took the Physics exam.

Notice that although *Mary* binds *she*, a wh-phrase inside the island cannot move out of the island:

16. * [Which exam]$_1$ did Mary$_i$ call every student who she$_i$ thought took _____ $_1$?



However, unlike complement clauses, even when there is no wh-phrase in the main clause, a wh-phrase cannot move out of an island, period. This shows that it is not another phrase of the same nature in a higher clause that blocks extraction:

17. *[Which exam]$_1$ did Mary call every student who took _____ $_1$?

18. [Which exam]$_1$ did Mary recall that every student took _____ $_1$?

Binding lacks the property of creating an escape hatch. At best, it reactivates an existing escape hatch. Therefore, islands behave the way they do because they lack an escape hatch.

-Binding is built before other A-bar movement dependencies

There are two camps with respect to where/when Binding is computed. One camp argues that binding is an interface condition and that therefore it is computed after Narrow Syntactic derivation is complete (Fox 2000; Sportiche 2003; Fox & Nissenbaum 2004). The other camp argues that binding is a Narrow Syntactic phenomenon (Hornstein 2001; Kayne 2002; Hicks 2009; Reuland 2011; Drummond et. al. 2011, a.o.).

If we follow Camp One, we need to assume that ellipsis is an LF operation, applied after binding is computed at the interface for the example below:

1. ?Some of the students thought they would go to some of the lectures, but I'm not sure which to which. (Merchant 2001: 113, fn. 4)

However, there is a considerable amount of work which shows that ellipsis cannot be an LF phenomenon (Merchant 2001; Lasnik 2001; İnce 2009; a.o.)
Therefore, if ellipsis is computed in Narrow Syntax, then binding also must be computed in Narrow Syntax since its computation precedes ellipsis. This supports Camp Two, which argues that binding is computed in NS.

The arguments by the two camps given above are mainly with respect to Binding Condition A, i.e. binding of reflexives and reciprocals. Agree-based binding theories (Reuland 2001, 2005), for instance, assume that pronominal binding is an extra-grammatical process and that it takes place at CI interface.
However, the data given above includes cases of pronominal binding; hence, pronominal binding must also be computed in NS and is not an extra-grammatical phenomenon.

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