IGRA 01: Syntax I

An Introduction to Opaque Rule Interaction in Syntax

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1. Introduction

Central question:
How do syntactic operations interact?

Background:
(i) Since the beginning of the Chomskyan revolution in linguistics (Chomsky (1957; 1975)), there has been a constant alternation of phases with a focus on *algorithmic* aspects of grammar and phases with a focus on *representational* aspects of grammar.
(ii) In the last couple of years, the main emphasis has arguably been on *representational* aspects in syntax; see, e.g., the cartography project (Rizzi (1997; 2004), Cinque (1999; 2005), among many others) and the nanogrammar project (Caha (2009), Starke (2009)).

(1) *Types of interaction of grammatical building blocks in syntax*
   a. *inhibitory, simultaneous*: competition
      (i) disjunctive blocking (*Subset Principle*, *Elsewhere Principle*, *Blocking Principle*, *Pānini's Principle*, *Proper Inclusion Principle*, etc.; Reinhart (1983), Di Sciullo & Williams (1987), Fanselow (1991), Burzio (1991), Richards (1997), Williams (1997)
      (ii) conflict: strata/levels (Chomsky (1965; 1981), Riemsdijk & Williams (1981), (more generally work that relies on the T-model); defaults: Gazdar et al. (1985), Pollard & Sag (1994), Sag & Wasow (1999); ranking: optimality theory (Prince & Smolensky (2004), Grimshaw (1997), Legendre et al. (1998), Fanselow et al. (1999), Samek-Lodovici (2006))
   b. *excitatory, simultaneous*: cooperation
      connectionist syntax/harmonic grammar (Smolensky (1986), Legendre et al. (1990)), coalition models (Dietrich (1994; 1999), Uszkoreit (1986), Jacobs (1988), Pafel (1998), Featherston (2005); OT syntax with local conjunction (Smolensky (1996; 2006), Aissen (1999; 2003), Fischer (2001), Keine & Müller (2008; 2011), Keine (2010))
   c. *excitatory, sequential*: feeding, counter-bleeding
   d. *inhibitory, sequential*: bleeding, counter-feeding

Goal:

- The main goal is to show the drastic consequences of different orders of syntactic operations for structure-building and probe/goal operations.

2. Rule Interaction

(2) *Two types of transparent rule interaction*
   a. *Feeding*:
      (i) Rule A creates the context in which rule B can apply.
      (ii) If A applies before B, there is feeding of B by A; A feeds B.
      (iii) If A does not apply, either B cannot apply; or it can apply because its context is present independently of A.
   b. *Bleeding*:
      (i) Rule A destroys the context in which rule B can apply.
      (ii) If A applies before B, there is bleeding of B by A; A bleeds B.
      (iii) If A does not apply, either B cannot apply because its context is not present independently of A, or B can apply because its context is present independently of A.

(3) *Two types of opaque rule interaction*
   a. *Counter-Feeding* (underapplication):
      (i) Rule A creates the context in which rule B can apply.
      (ii) If A applies before B, there is feeding of B by A.
      (iii) However, the evidence shows that B has not applied even though A has applied.
      (iv) Therefore, A must have applied *after* B.
   b. *Counter-Bleeding* (overapplication):
      (i) Rule A destroys the context in which rule B can apply.
      (ii) If A applies before B, there is bleeding of B by A.
      (iii) However, the evidence shows that B has applied even though A has also applied.
      (iv) Therefore, A must have applied after B.

Opacity:
Rule interaction in counter-feeding and counter-bleeding environments is opaque because it cannot be determined by simply looking at the respective output representations why rule B has not applied even though its context of application would seem to be present (*counter-feeding*), and why rule B has applied even though its context of application would not seem to be present (*counter-bleeding*).

(4) *Questions raised by output representations*:
   a. Counter-Feeding (underapplication):
      Why could rule B not apply even though its context seems to be present?
   b. Counter-Bleeding (overapplication):
      How could rule B apply even though its context does not seem to be present?

Rules of the thumb:

(i) A rule B that applies *early* will, as a tendency, be fed less often (therefore: counter-feeding), and will also, as a tendency, be bled less often (therefore: counter-bleeding).
(ii) Conversely, a rule A that applies *late* will, as a tendency, less often feed other rules (therefore: counter-feeding), and will also, as a tendency, bleed other rules less often (therefore: counter-bleeding).

Historical note:
The discovery of opacity in rule interaction marks the beginning of generative grammar: Chomsky (1951).

(5) *The first description of a counter-bleeding interation of grammatical rules* (Chomsky (1975, 25-26)):

> [Zelig] Harris suggested that I undertake a systematic structural grammar of some language. I chose Hebrew, which I knew fairly well. For a time, I worked with an informant and applied methods of structural linguistics as I was then coming to understand them. The results, however, seemed to me rather dull and unsatisfying. Having no very clear idea as to how to proceed further, I abandoned these efforts and did what seemed natural; namely, I tried to construct a system of rules for generating the phonetic forms of sentences, that is, what is now called a generative grammar. I thought it might be possible to devise a system of recursive rules to describe the form and structure of sentences, recasting the devices in Harris's *Methods* for this purpose, and thus perhaps to achieve the kind of explanatory force that I recalled from historical grammar. I had in mind such specific examples as the following. The Hebrew root *mlk* ("king") enters into such forms as *malki* ("my king"), *malka* ("queen"), *mlaxim* ("kings"). The change of *k* to *x* in *mlaxim* results from a general process of *spirantization* in post-vocalic position. But consider the construct state form *malxey* ("kings of"). Here we have *x* in a phonological context in which we would expect *k* (cf. *malki*, *malka*). The anomaly can be explained if we assume that spirantization preceded a process of *vowel reduction* that converted *malaxim* to *mlaxim* and *malaxey-X* ("kings of X", where X contains the main stress) to *malxey-X*. The processes of spirantization and reduction (general, antepretonic) are motivated independently, and by assuming the historical order to the spirantization-reduction, one can explain the arrangement of forms *malki*, *malka*, *malxey*, *mlaxim*. It seemed only natural to construct a synchronic grammar with ordering of rules such as spirantization and reduction to explain the distribution of existing forms. Pursuing this idea, I constructed a detailed grammar, concentrating on the rules for deriving phonetic forms from abstract morphophonemic representations. A version of this was submitted as an undergraduate thesis in 1949, and a more extensive version as a master's thesis in 1951.

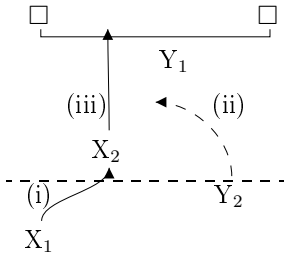
Note:
The official discovery of the four types of rule interaction, incl. the terminology (feeding/bleeding, transparent/opaque) goes back to Kiparsky (1973).

3. Opaque Rule Interaction in the Real World

Note:
Opaque interaction of rules is ubiquitous outside of grammatical theory. An example: football.

3.1. Counter-Feeding in Football: Offside

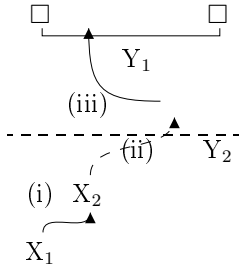
Offside & Counter-Feeding



Question:
Why is this an offside goal? (Underapplication of scoring rule)

3.1.1. Counter-Bleeding in Football: No Offside

Offside & Counter-Bleeding



Question:
Why is this not an offside goal? (Overrapplication of scoring rule)

4. Opacity in Syntax

Terminology:
Why does counter-bleeding qualify as *excitatory*, like *feeding* and *cooperation*?
Why does counter-feeding qualify as *inhibitory*, like *bleeding* and *competition*?

Excitatory interaction:
Feeding, counter-bleeding and cooperation have in common that one grammatical building block (rule, operation, constraint, ...) enhances another one. This may mean that the application of the second building block becomes possible as a result of the

application of the first one (feeding); that the application of the second building block is not blocked because the first one has not yet applied (counter-bleeding); or that the application of the second building block leads to results that it could not have if the first one had not applied (cooperation).

Inhibitory interaction:
Bleeding, counter-feeding and competition have in common that one grammatical building block (rule, operation, constraints, ...) impedes another one. This may mean that the application of the second building block becomes impossible as a result of the application of the first one (bleeding); that the application o fthe second building block is blocked by the lack of application of the first one (counter-feeding); or that the two building blocks compete for application (competition).

Note:
Opaque rule interactions occur in syntax in exactly the same way that they occur in phonology (or, for that matter, in morphology). Still, for some reason, the relevant terminology (counter-feeding, counter-bleeding) is not that widespread in syntactic work.

4.1. Counter-Feeding in Syntax: Wanna-Contraction in English

(6) *Control vs. Exceptional Case Marking (ECM)*
- a. Who do you want to meet ?
- b. Who do you wanna meet ?
- c. Who do you want to meet Mary ?
- d. *Who do you wanna meet Mary ?

Analysis (Bresnan (1972), Arregi & Nevins (2012)):
There are two relevant operations, viz. (i) wanna-contraction and (ii) wh-movement. Wanna-contraction precedes wh-movement.

(7)
- a. *Wanna-contraction* (optional):
  Contract *want* and *to*, yielding *wanna*, under strict phonological adjacency.
- b. *Wh-movement* (obligatory):
  Move a wh-phrase to SpecC.

Observations:
In (6-ab), *want* and *to* are adjacent to begin with; wanna-contraction can apply without problems. In (6-cd), the ECM-subject *who* initially shows up between *want* and *to*. Wh-movement of *who* would result in feeding of wanna-contraction, but it doesn't because (by assumption) this operation applies too late: *counter-feeding*.

Note:
This presupposes that one of the following statements holds:

- There is no structural subject in control infinitives.

- There is an empty subject in control infinitives (PRO, Chomsky (1981)), which does not block phonological adjacency.
- If there is an overt subject in control infinitives, and this is deleted by Equi NP deletion (or some other rule), then this latte rule must apply early, so that it can feed wanna-contraction.
- If the movement theory of control (MTC) is adopted (Hornstein (2001), Boeckx, Hornstein & Nunes (2010)), control movement to the matrix θ-position must take place early, so that it can feed wanna-contraction.

4.2. Counter-Bleeding in Syntax: Reflexivization in Imperatives

(8) *Reflexivization in Imperatives*:
- a. *Wash you!
- b. Wash yourself!

Analysis (Perlmutter & Soames (1979) and many others, but also cf. Pullum (1979))

(9)
- a. *Principle A*:
  An anaphor is bound within its minimal clause.
- b. *Imperative subject deletion*:
  In imperatives, subjects are deleted.

Note:
Subject deletion would bleed satisfaction of Principle A, but it doesn't if Principle A applies earlier in the derivation.

(10) *Not a complication*:
Fuck you!

Observation (Dong (1992)):
This is an epithet construction consisting of a quasi-verb and an NP (in this order); there is no imperative subject deletion.

4.3. Counter-Bleeding in Syntax: Wh-Movement from ECM Complements

Observation (Chomsky (1981)):
If one adopts both (a) the Subjacency Condition, and (b) the assumption that exceptional case marking (ECM) complements are TPs (rather than CPs or vPs or VPs), then a dilemma arises: Wh-movement from such an infinitive should be blocked as a violation of the Subjacency Condition.

(11) *Subjacency Condition* (Chomsky (1977)):
In a structure α ... [$_\beta$ ... [$_\gamma$ ... δ ...] ...] ..., movement of δ to α cannot apply if β and γ are bounding nodes.

(12) *Bounding nodes* (English):
DP and TP are bounding nodes; other XPs are not.

(13) *How$_1$ does [$_{\underline{TP_3}}$ she know [$_{CP}$ [$_{DP_2}$ which car] [$_{\underline{TP_4}}$ Mary fixed t_2 t_1]]] ?

(14) How$_1$ do [$_{\underline{TP_3}}$ you think [$_{CP}$ t'_1 that [$_{\underline{TP_4}}$ Mary fixed the car t_1]]] ?

(15) *The problem with wh-movement from ECM contexts*:
Who$_1$ do [$_{\underline{TP_3}}$ you believe [$_{\underline{TP_3}}$ t_1 to have left]] ?

Solution:
Wh-movement takes place successive-cyclically, via SpecC, thereby satisfying the Subjacency Condition. Subsequent CP deletion renders the resulting structure opaque.

(16) a. *Wh-movement 1*:
do [$_{\underline{TP_3}}$ you believe [$_{CP}$ who$_1$ [$_{\underline{TP_3}}$ t_1 to have left]]]
b. *Wh-movement 2*:
who$_1$ do [$_{\underline{TP_3}}$ you believe [$_{CP}$ t'_1 [$_{\underline{TP_3}}$ t_1 to have left]]]
c. *CP deletion*:
who$_1$ do [$_{\underline{TP_3}}$ you believe [$_{\underline{TP_3}}$ t_1 to have left]]

Conclusion:
In (16-c), Case assignment can take place under strict locality, albeit in an opaque structure that raises the question how the Subjacency Condition could be satisfied.

4.4. Counter-Bleeding in Syntax: Remnant Movement in German

Observation:
Exactly the same kind of argument can be made with remnant movement constructions (cf. Müller (1998)).

(17) *Traces within moved categories: anti-freezing with remnant movement vs. freezing effects*:
a. [$_{VP_2}$ t_1 Gelesen] hat das Buch$_1$ keiner t_2
read has the book no-one
b. *Was$_1$ denkst du [$_{VP_2}$ t_1 gelesen] hat keiner t_2 ?
what think you read has no-one
c. *Was$_1$ hat [$_{VP_2}$ t_1 gelesen] keiner t_2 ?
what has read no-one

(18) a. *Condition on Extraction Domain* (CED; Huang (1982), Chomsky (1986), Browning (1987), Cinque (1990)):
(i) Movement must not cross a barrier.
(ii) An XP is a barrier iff it is not a complement.
b. *X-Criterion*:
An [X]-marked XP must show up in SpecY, where Y requires [X] (= $Y_{[\bullet X \bullet]}$).

(From (18-b) it follows that a [topic]-marked XP must show up in SpecC$_{[top]}$, a wh-phrase must show up in SpecC$_{[wh]}$, a [Σ]-marked XP must show up in Specv[Σ] (scrambling), etc.)

Observations:

- In (17-a), VP topicalization should bleed scrambling via the CED, but it doesn't because it applies too late – scrambling applies earlier, when VP is still in situ and the CED can be respected by extraction: counter-bleeding.
- In (17-bc), VP movement (topicalization or scrambling) blocks scrambling via the CED because it applies earlier – scrambling applies later, when VP has already undergone movement, which violates the CED: bleeding.

Question:
What determines the order of operations presupposed here?

Answer:
The order here is determined by the most basic principle of a derivational grammar.

(19) *Strict Cycle Condition* (Chomsky (1973), Perlmutter & Soames (1979)):
Within the current cyclinc node α, a syntactic operation may not target a position that is included within another cyclic node β that is dominated by α.
(Assumption: Cyclic nodes are XPs.)

Question:
Is that all there is to say about the possible factors that determine the order of operations?

Answer:
No. We will come back to this issue.

4.5. Counter-Bleeding in Syntax: Reconstruction for Principle A

Observation:
Reflexive pronouns can undergo movement, or they can occur in phrases that undergo movement. After the movement operation, they should not be able to satisfy Principle A of the binding theory.

(20) *Reconstruction*
a. dass [$_{DP_{[\Sigma]}}$ sich]$_1$ der Fritz$_1$ gestern im Spiegel gesehen hat
that REFL the Fritz yesterday in the mirror seen has
b. [$_{DP_{[top]}}$ Himself]$_1$ John$_1$ does not really like
c. [$_{DP_{[top]}}$ Sich selbst]$_1$ gibt Maria$_1$ immer als letzte den Kaffee
REFL self gives Maria always as the last one the coffee
d. [$_{DP_{[top]}}$ Bücher über sich]$_1$ hat er$_1$ keine gelesen
books about REFL has he none read

e. $[_{DP_{[wh]}}$ Welche Bilder von sich $]_1$ hat die Diva gehasst ?
which books about SELF has the diva hated
f. $[_{DP_{[wh]}}$ Which book about himself$_{1/2}$] does John$_1$ think that Bill$_2$ likes ?

(21) a. *Principle A*:
An anaphor is bound within its minimal clause.
b. *X-Criterion*:
An [X]-marked XP must show up in SpecY, where Y requires [X] (= $Y_{[\bullet X \bullet]}$).

Analysis:
Movement would bleed satisfaction of Principle A, but it does not do so if Principle A can apply earlier (e.g., because it may be an 'anywhere principle'; see Belletti & Rizzi (1988)).

4.6. Counter-Feeding and Counter-Bleeding: (Anti-) Reconstruction for Principle C

(22) *Reconstruction and Anti-Reconstruction*:
a. Which claim $[_{CP}$ that John$_1$ made] was he$_1$ willing to discuss ?
b. *Which claim $[_{CP}$ that John$_1$ was asleep] was he$_1$ willing to discuss ?

Standard analysis (Lebeaux (1988), Freidin (1994), Chomsky (1995b), Epstein et al. (1998), Fox (2000)):

- CP in (22-a) is an adjunct, CP in (22-b) is an argument.
- Adjuncts can be merged *late*, after wh-movement.
- This is counter-cyclic. However, the violation of the Strict Cycle Condition can be tolerated in these cases.

(23) a. *Principle C*:
An R-expression must not be c-commanded by a co-indexed item.
b. *X-Criterion*:
An [X]-marked XP must show up in SpecY, where Y requires [X] (= $Y_{[\bullet X \bullet]}$).
(Here: A wh-phrase is moved to SpecC.)
c. *Adjunct insertion*:
Adjuncts can be inserted counter-cyclically, after regular structure-building has finished.

Reconstruction: Counter-bleeding:
From this perspective, (22-b) instantiates a case of *counter-bleeding*: Wh-movement, as such, could help to avoid a violation of Principle C (as an instance of bleeding), but cannot achieve this because Principle C is checked before wh-movement (since the CP here is not an adjunct, it must be merged early); this gives rise to a reconstruction effect. (This presupposes that Principle C, unlike Principle A, is not an anywhere principle.)

Question from a representational perspective:
Why does a violation of Principle C show up here, even though there is no co-indexed c-commanding item in the structure?

Anti-reconstruction: Counter-feeding:
In contrast, (22-a) instantiates *counter-feeding*, i.e., underapplication of Principle C: Adjunct insertion would feed a violation of Principle C, but it doesn't because it takes place (or at least can take place) too late, at a stage of the derivation where the wh-phrase has already undergone movement. When it enters the structure, the adjunct is not c-commanded by *he*.

Question from a representational perspective:
Why is there no violation of Principle C, given that there is a counter-bleeding Principle C effect in other contexts?

(24) *A more fine-grained analysis*:
a. (1) Adjunct insertion; (2) Principle C; (3) X-Criterion:
*(22-a), *(22-b)
b. (1) Principle C; (2) Adjunct insertion; (3) X-Criterion:
^{ok}(22-a), *(22-b)
c. (1) Principle C; (2) X-Criterion; (3) Adjunct insertion:
^{ok}(22-a), *(22-b)
d. (1) Adjunct insertion; (2) X-Criterion; (3) Principle C:
^{ok}(22-a), ^{ok}(22-b)
e. (1) X-Criterion; (2) Adjunct insertion; (3) Principle C:
^{ok}(22-a), ^{ok}(22-b)
f. (1) X-Criterion; (2) Principle C; (3) Adjunct insertion:
^{ok}(22-a), ^{ok}(22-b)

Assumed order: (24-b) or (24-c)
Principle C applies first.
Then, X-Criterion or Adjunct insertion applies.

Note:
It may be viewed as odd that there should be *ungrammatical* structures that are counter-bled (see (22-b)) or counter-fed (see (22-a)); normally we talk about *grammatical* structures in these terms. This uneasiness may to some extent go away if we reinterpret *Principle C* (repeated here as (25-a)) in terms of a *Disjoint Reference Constraint* (as in (25-b)). Now we don't have two sentences anymore, one grammatical, one ungrammatical, depending on the indices; rather, there is only one sentence with

certain properties (disjoint reference required or not).

(25) a. *Principle C*:
An R-expression must not be c-commanded by a co-indexed item.
b. *Disjoint Reference Constraint*:
Interpret an R-expression as disjoint in reference from all c-commanding items.

Side remark:
It is not clear whether the data really show what they are supposed to show. Cf. Chomsky (2004) for a different approach that does without counter-cyclic insertion of adjuncts (adjuncts are located on a different level, in quasi-three-dimensional representations); also see Fischer (2004, ch. 3 & 5) for an alternative acount that resorts to different levels of embedding as the relevant factor.

4.7. Counter-Feeding in Syntax: Adjunct Islands

(26) *Adjunct Condition* (Cattell (1976), Kayne (1984), Longobardi (1985), Chomsky (1986)):
Movement must not take place from an XP that is an adjunct.

(27) *Violations of the Adjunct Condition*:
a. *[$_{DP_1}$ Who] did you get jealous [$_{CP}$ because I talked to t_1] ?
b. *[$_{PP_1}$ To whom] did they leave [$_{CP}$ before speaking t_1] ?
c. *[$_{DP_1}$ Who] did they leave [$_{CP}$ before speaking to t_1] ?

Note:
There are (at least) two proposals in the literature as to how the Adjunct Condition could be derived by invoking assumptions about ordering of operations.

The bleeding approach (Uriagereka (1999), Nunes (2004), Johnson (2003)):
Before an adjunct is integrated into a structure, it is subject to an operation that makes it impossible to access parts of it. Proposals:
(i) *Cyclic spell-out* flattens the structure and creates a compound-like object.
(ii) *Renumeration* puts an adjunct created by regular structure-building operations back into the numeration before it can be integrated into another structure, and "elements in the numeration get their syntax to phonology mapping values fixed."

The counter-feeding approach (Stepanov (2007)):
Stepanov (2007) suggests that *late insertion* of adjuncts (see the previous subsection) provides the ultimate explanation: At the point where extraction takes place, the adjunct is not yet part of the structure. The effect is similar to the one in Uriagereka's and Johnson's approaches: XPs are islands because they are not present as syntactic objects at the relevant stage of the derivation where movement takes place – either not anymore (Uriagereka and Nunes; and Johnson: *bleeding*), or not yet (Stepanov: *counter-feeding*).

5. Deriving Opacity Effects from Enriched Representations

Observation:
In a derivational approach to syntax, opacity effects follow in an a very simple, natural way.

Question:
How can opacity effects be derived in a strictly *representational* approach where rule order plays no (or at least not a big) role?

Standard strategy:
Representations are enriched with abstract material that encodes (what would otherwise qualify as) earlier derivational steps.

- Phonological opacity: *turbid phonology* (Goldrick (2000)), *virtual phonology* (Bye (2001)), *coloured containment* (Oostendorp (2006; 2007), Trommer (2011)).
- Syntactic opacity:
  - *traces*, including intermediate traces (Chomsky (1977; 1981; 1986), Fiengo (1977), Lasnik & Saito (1984) Gazdar (1981), Gazdar et al. (1985), Pollard & Sag (1994), Levine & Sag (2003), Grimshaw (1997), Legendre et al. (1998)
  - *copies* (Chomsky (1995b))
  - *empty pronominal elements* (*pro*, Chomsky (1982), Rizzi (1986); PRO (Chomsky (1981))

Syntax vs. phonology:
These abstract items can sometimes independently be motivated in syntax, perhaps somewhat less so in phonology: *semantic interpretation* (as a variable).

5.1. Simple Cases

(28) *Counter-bleeding with reflexivization and imperative subject 'deletion'*:
pro Wash yourself!

(29) *Counter-feeding in wanna-contraction constructions: control vs. exceptional case marking*
a. Who$_1$ do you want PRO to meet t_1 ?
b. Who$_1$ do you wan-PRO-na meet t_1 ?
c. Who$_1$ do you want t_1 to meet Mary ?
d. *Who$_1$ do you wan-t_1-na meet Mary ?

Stipulation (Chomsky (1981)):
Traces block adjacency of *want* and *to*, PRO for some reason does not.

5.2. More Complex Cases

Note:
In other cases, deriving opacity effects in syntax by enriching representations is not as straightforward because it does not suffice to postulate abstract elements; there also have to be *special constraints* or *mechanisms* that refer to them, and these constraints do not qualify as good from a minimalist point of view.

(30) *A conceptual problem*:
The *effects* of constraint interaction are integrated into the definition of a single constraint, which makes this constraint extremely implausible.

5.2.1. First Case: Reconstruction

(31) *Principle A* (revised):
At S-structure, an anaphor is chain-bound in its binding domain.

(32) *Chain-Binding* (Barss (1984)): α chain-binds β iff (a), (b), and (c) hold:
a. α and β are co-indexed.
b. α occupies an A-position.
c. (i) α c-commands β, or
(ii) α c-commands a trace of γ, where $\gamma = \beta$ or γ dominates β.

Note:
The concept of *chain accessibility sequences* Barss (1986)) which extends the chain binding proposal is even more complex.

5.2.2. Second Case: Remnant Movement

Problem:
In output representations, a trace may or may not be included in a moved item (with its antecedent outside), depending on whether the trace is bound or unbound. This will have to be reflected in the representational constraint.

(33) *Freezing and anti-freezing*:
At S-structure, a bound trace t may not be included in a moved XP if the antecedent of t is excluded by XP; an unbound trace may be included in a moved XP even though the antecedent of t is excluded by XP.

(34) *Condition on Extraction Domain* (CED; representational version):
a. Two members of a movement chain $< \alpha, \beta >$ must not be separated by a barrier.
b. Two members of a movement chain $< \alpha, \beta >$ are not separated by a barrier iff for all XPs Γ such that Γ dominates β but does not dominate α:
(i) Γ is in a complement position, or
(ii) Γ binds a trace in a complement position, and Γ c-commands α.

Note:

As far as I am aware, a version of the CED along these lines has never been proposed in the literature.

5.3. Conclusions

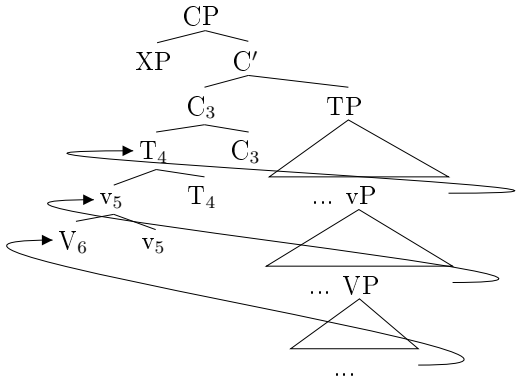
- First, empty categories are dubious from a minimalist perspective if they are conceived of as items that specific constraints refer to (see Chomsky's (1981) Empty Category Principle (ECP), or the licensing conditions for *pro* in Rizzi (1986) (vs. Holmberg (2005))).
- Second, constraints that explicitly model effects of the interaction with other constraints are even more dubious.
- Third, it turns out that there are instances of opacity in syntax which cannot be addressed by simply enriching output representations, and having more complex constraints refer to that:
  - counter-feeding effects involving anti-reconstruction, derived by late adjunct insertion;
  - counter-bleeding effects involving (i) CP-pied piping, (ii) relative operator movement and (iii) CP reconstruction, as analyzed in Lechner (2010) (a *Duke-of-York* derivation; Pullum (1976), McCarthy (2003));
  - counter-bleeding effects involving Merge and Agree on the vP and TP level (Müller (2009), Assmann et al. (2012))

6. The Case of Head Movement

Note:
This is the topic corresponding to the reading assignment. Here, we will focus on verb-second movement in Germanic.

Observation (Chomsky (1986; 1991; 1995a)):
Given standard assumptions about head movement as adjunction of X^0 to X^0, verb-second clauses in languages like German or Danish are opaque.
If verb-second movement is analyzed as movement ov V to T, followed by movement of the complex T+V head to C, the final output representation looks as though it should be ungrammatical: V is separated from its trace (t_V) by an intervening head (viz., the trace t_T of T). This should violate the Head Movement Constraint (Travis (1984)) or whatever derives this constraint (the Empty Category Principle (ECP) in Baker (1988), Relativized Minimality in Rizzi (1990), etc.). Problems get even worse if the predicate phrase is split up into vP and VP, and V must first move to v, which then moves to T. Thus, the Head Movement Constraint (HMC) should bleed V to C movement. However, as Chomksy notes, if the HMC (or minimality) is not checked in the final output representation, but is a constraint on the movement operation as such, then the existence of (two-step) verb-second movement is derived as a prototypical instance of counter-bleeding.

(35) *Verb-second under standard assumptions*



A representational reanalysis based on enriched representations:
Solving the locality problem with iterated head movement in a purely representational approach requires either additional abstract objects and mechanisms (like index percolation; Baker (1988), Brody (1995; 2002)), or a radically different approach to head movement (see Roberts (2010)).

7. Conjecture

All arguments for a derivational organization of syntax come from opaque interactions.

Note:
This is probably wrong. Try to find arguments for derivational syntax that do not involve counter-feeding or counter-bleeding!

Take-home message:
Counter-bleeding and counter-feeding phenomena are ubiquitous in syntax.

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