

Interfaces

Gereon Müller (Universität Leipzig), July 11, 2014

1. Background

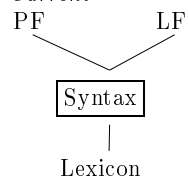
Recall:

If there are sequential syntactic levels L_i , L_{i+1} , then operations applying at L_i will invariably precede operations applying at L_{i+1} ; consequently, L_i -operations feed and bleed L_{i+1} -operations, whereas L_{i+1} -operations counter-feed and counter-bleed L_i -operations.

Observation:

Exactly the same kinds of effects will arise when operations applying in the syntactic component proper interact with operations applying in some pre-syntactic domain (e.g., the lexicon), and with operations in some post-syntactic domain (PF, LF).

(1) *Current minimalist model of grammar*



2. History

Pullum's (1979) generalizations:

Some operations apply in the syntax; other rules apply at *interfaces* (before or after syntax).

- *Precyclic* (pre-syntactic, lexicon-oriented) operations will never be fed or bled by syntactic operations, and will always feed and bleed these.
- *Postcyclic* (post-syntactic, phonology-oriented) operations will always be fed and bled by cyclic (genuinely syntactic) operations, and will always counter-feed and counter-bleed these.

2.1. Precyclic Operations

(2) *Precyclic Incorporation Hypothesis:*

- There exists a definable class of incorporation rules having the function of amalgamating separate pieces of initial structure material under a single derived lexical node; examples are predicate raising (McCawley 1968b), Nominalization (ibid.), Compound Formation (Newmeyer 1975), and various Noun Incorporation processes in agglutinative or polysynthetic languages.
- Incorporation rules are universally precyclic.

Note:

The domain of precyclic rules bears a distant resemblance to what is nowadays known as

a *numeration*. (So all of this is not necessarily about the lexicon, but about another pre-syntactic component.)

(3) *Predicate raising:*

- The brain surgeon made it possible for me to think again.
- The brain surgeon enabled me to think again.
- [_{S₀} The brain surgeon CAUSE [_{S₁} [_{S₂} for me to think again] POSSIBLE]]
- Assumption: *enable* replaces CAUSE+POSSIBLE (which is derived by predicate raising)

Observation (Newmeyer (1984)):

- Precyclic predicate raising bleeds extraposition.
- Extraposition is indeed unavailable in this context.
- Therefore, predicate raising is precyclic.

(4) *What would happen if extraposition were to apply before predicate raising:*

- *The brain surgeon enabled it for me to think again.
- S₁: it POSSIBLE for me to think again

However:

Ultimately, Pullum (1979) concludes that the Precyclic Incorporation Hypothesis is to be rejected, and that it is "likely that there are no precyclic rules in syntax at all."

2.2. Postcyclic Operations

Observation:

Postcyclic rules can circumvent the Strict Cycle Condition (i.e., they can target properly embedded positions).

2.2.1. Affix Hopping and VP Deletion

(5) Ernest wrote a novel and Claude did – too

Question:

Given that *do*-support applies only so as to provide a host for an otherwise unattached inflectional affix, how can (5) be derived from (6-a)?

- Ernest wrote a novel and Claude wrote a novel too
- Ernest PAST write a novel and Claude PAST write a novel too

Answer:

- (5) is derived from (6-b), with Affix Hopping applying *after* VP deletion.
- Affix Hopping cannot simply be ordered after VP deletion in the syntax proper because this would give rise to a Strict Cycle Condition violation (Affix Hopping affects an embedded structure).
- The problem vanishes if Affix Hopping applies postcyclically (in current terminology: at PF), whereas VP deletion applies cyclically, in the syntax.
- Thus, Affix Hopping counter-bleeds *do*-support (and VP deletion feeds *do*-support).

2.3. Preposition Deletion

(7) Deletion of P with CPs after certain predicates:

- a. I am absolutely sure [PP of it/that/what I told you]
- b. *I am absolutely sure [PP – it/that/what I told you]
- c. *I am absolutely sure [PP of that God exists]
- d. I am absolutely sure [PP – that God exists]

Observation:

Passive and tough-movement bleed preposition deletion.

(8) Passive:

- a. They didn't agree on it.
- b. They didn't agree (*on) that Jim should be the party leader.
- c. That Jim should be the party leader wasn't agreed on at the first ballot.

(9) Tough-Movement:

- a. It is never easy to be sure of it.
- b. It is never easy to be sure (*of) that Harold will do what he has promised.
- c. That Harold will do what he has promised is never easy to be sure of.

Assumption:

Preposition deletion is a postcyclic (in current terminology: PF-) operation.

(10) Hypothesis (Pullum (1979, 370)):

If any syntactic rule R is phonologically conditioned, then R is postcyclic.

3. Interface Levels: PF and LF

3.1. The Stylistic Component

Assumption:

Certain operations (like Heavy NP Shift, Extraposition, Scrambling, etc.) that do not seem to interact with well-established syntactic operations have been argued to apply in a separate (later) *stylistic component*.

“If [the ordering condition on post-verbal material in English] is to be put into the grammar of English, it should be segregated from the normal type of transformational rules, to whose output it applies, and placed in a component by itself, a component which I tentatively propose to call the stylistic component. [...] I can suggest two other rules that seem to be likely candidates for inclusion in it. The first is the Scrambling Rule in Latin and in other “free word order” languages [...] The second is the condition which must be imposed on prenominal adjectives with respect to their closeness to the noun they modify.

(Ross (1967, 3.1.1.3.3))

“Thus, among the PF-rules there may be rules of movement, rearrangement, etc., which are sometimes called “stylistic rules”.

(Chomsky (1981, 18))

(11) Extraposition and the CNPC:

- a. *[DP₁ Welches Buch] hat sie dort [DP einen Mann [CP₄ der₃ C [TP t₃ which book_{acc} has she_{nom} there a man_{acc} who_{nom} t₁ gelesen hatte]]] getroffen ?
read had met
'For which book is it the case that she met a man there who had read it?'
- b. *[DP₁ Welches Buch] hat sie [VP [VP dort [DP einen Mann t₄] which book_{acc} has she_{nom} there a man_{acc} getroffen] [CP₄ der₃ C [TP t₃ t₁ gelesen hatte]]] ?
met who_{nom} read had
'For which book is it the case that she met a man there who had read it?'

Historical note:

For most of the operations that were at one point classified as “stylistic”, evidence has emerged that they do interact with other syntactic operations after all. For instance, this holds for scrambling in free word order languages.

(12) Scrambling in German creates Freezing effects (i.e., bleeds extraction):

- a. Wo₁ meinst du [CP t'₁ dass keiner [PP t₁ mit]₂ gerechnet hat] ?
what think you that no-one with counted has
- b. *Wo₁ meinst du [CP t'₁ dass [PP t₁ mit]₂ keiner t₂ gerechnet hat] ?
what think you that with no-one counted has

(13) Freezing (Wexler & Culicover (1980)):

A moved item is a barrier for extraction.

(14) Scrambling in Hindi circumvents Weak Crossover effects (i.e., feeds bound variable pronoun licensing) (Mahajan (1994)):

- a. ?*Uske₁ maalik-ne kOn sii kitaab₁ pheNk dii
its author_{erg} which book threw away
'*Which book₁ did its₁ author throw away?'
- b. kOn sii kitaab₁ uske₁ maalik-ne t₁ pheNk dii
which book its author threw away
'*Which book₁ did its₁ author throw away?'
- c. ?*Uske₁ maalik-ne sab kitaaben₁ pheNk dii
its author_{erg} all books threw away
'*Its₁ author threw away all the books'
- d. sab kitaabeN₁ uske₁ maalik-ne t₁ pheNk dii
all books its author threw away
'*All the books₁, its₁ author threw away'

(15) Constraint on Bound Variable Pronouns (Heim & Kratzer (1998)):

A pronoun that is interpreted as a bound variable must have an A-binder in syntax.

3.2. Head Movement at PF

Assumption (Chomsky (2001, 37-38)):

Head movement is not a syntactic operation; it applies at PF.

Arguments for head movement at PF:

1. “The interpretive burden is reduced if, say, verbs are interpreted the same way whether they remain in situ or raise to T or C [...] More generally, semantic effects of head raising in the core inflectional system are slight or nonexistent.”
2. It is unclear how one and the same type of feature (a “strong” feature, e.g.) can effect two different operations, viz., XP movement and head movement. Why can, e.g., the trigger for V-to-T movement not be satisfied by VP-to-SpecT movement?
3. Head movement violates well-established syntactic constraints: The moved item does not c-command its trace, the Strict Cycle Condition is not respected, and it cannot apply iteratively (assuming excorporation to be excluded).

Note:

The assumption that head movement does not have semantic effects has been disputed (see, e.g., Grewendorf (2002), Lechner (2006), Haider (2010)), but it’s worth noting that Chomsky’s observation that syntactic head movement (conceived of as adjunction to some other head) is inherently counter-cyclic, and that this problem with the Strict Cycle Condition goes away if the operation takes place at PF: This is more or less exactly as in Pullum’s argumentation above. Furthermore, an inability to feed semantic interpretation is exactly what one would expect if head movement (as a PF operation) comes too late: By assumption, head movement counter-feeds interpretation.

3.3. PF Movement of XPs

Ref.: Sauerland & Elbourne (2002)

Assumption:

Certain kinds of movement can take place either in the syntax or at PF. The latter accounts for instances of *total reconstruction* – the movement is invisible to LF. Thus, PF movement counter-feeds scope-taking.

- (16) a. *Total reconstruction only:*
An austrian₁ is likely t₁ to win the gold medal
- b. *Partial reconstruction:*
Which relative of hers₁ did every student₁ invite t₁ ?

3.3.1. British English Plural Agreement

- (17) a. A northern team is likely to be in the final. $\exists > \text{likely}, \text{likely} > \exists$
- b. A northern team are likely to be in the final. $\exists > \text{likely}, * \text{likely} > \exists$
- c. There is likely to be a northern team in the final.
- d. *There are likely to be a northern team in the final.

Analysis:

1. This kind of special agreement is not triggered by a morphosyntactic [number] feature, but by a semantic [mereology] feature (parts and wholes).
2. Agreement of T and a subject DP can be effected by either movement of the subject DP to SpecT in the syntax, or by feature raising in the LF branch.

3. Feature raising in the LF branch is not an option for the [mereology] feature (cf. (17-d)).
4. Therefore, the only way for mereological plural agreement to take place is to have subject DP movement in the syntax (“in the stem”).
5. This precludes scope reversal (i.e., total reconstruction).

3.3.2. Barss’ Generalization

- (18) *Barss’s Generalization* (Barss (1986), Lechner (1998), Sauerland & Elbourne (2002), Bhatt & Dayal (2007), Neeleman & van de Koot (2010), Heck & Assmann (2012)):
A quantified item in a moved remnant XP α cannot take scope, via reconstruction, over an item β that has undergone movement from α .

- (19) *Remnant VP topicalization and scrambling in German:*

- a. Jedes Buch hat sie einem Studenten gegeben $\forall > \exists$
every book_{acc} has she_{nom} a student_{dat} given
- b. [VP₂ Jedem Studenten t₁ gegeben] hat sie [DP₁ ein Buch] t₂
every student_{dat} given has she_{nom} a book_{acc} $*\forall > \exists, \exists > \forall$

- (20) *Remnant wh-movement and A-movement in English:*

- [AP₂ How likely to t₁ win] is [DP₁ an Austrian] t₂ ?
an Austrian > likely, *likely > an Austrian

Analysis:

1. Wh-moved (more generally, A-bar moved) items permit partial reconstruction.
2. A-movement *can* take place in the syntax (‘stem’).
3. This derives the reading where DP₁ takes wide scope.
4. For the narrow scope reading of DP₁, total reconstruction would be required, i.e., A-movement at PF.
5. “At this point the standard assumption that movement in the stem precedes movement in the branches of the derivation becomes relevant”: XP₂ movement must precede DP₁ movement.
6. However, movement of DP₁ from a moved XP₂ is impossible (Freezing, plus violation of the c-command requirement on movement).
7. Therefore, PF movement of DP₁ is not an option; and consequently, there can be no narrow scope reading for DP₁ (given that only total reconstruction can achieve this).

3.3.3. Scrambling and Scope in Japanese

- (21) *Rigid scope with multiple scrambling* (Yatushiro (1996)):

- a. Dareka-ni daremo-o John-ga syookaisita
someone_{dat} everyone_{acc} John_{nom} introduced
someone > everyone, *everyone > someone

- b. Daremo-o dareka-ni John-ga syookaisita
 everyone_{acc} someone_{dat} John_{nom} introduced
 someone > everyone, everyone > someone
- c. Dareka-o daremo-ni John-ga syookaisita
 someone_{acc} everyone_{dat} John_{nom} introduced
 someone > everyone, everyone > someone

Analysis:

- Scrambling is feature-driven.
- In cases of multiple scrambling, the highest DP moves first (because of *Minimality*).
- A dative DP is initially higher than an accusative DP.
- Scope reversal with scrambling requires total reconstruction, i.e., PF movement of DP. (So scrambling can take place either in the stem, or at PF.)
- Option 1: Both DP_{dat} and DP_{acc} move in the syntax; DP_{dat} moves first: no total reconstruction available, DP_{dat} takes wide scope.
- Option 2: Both DP_{dat} and DP_{acc} move at PF; total reconstruction throughout, DP_{dat} takes wide scope.
- Option 3: DP_{dat} moves in the syntax, DP_{acc} moves at PF; total reconstruction of DP_{acc} (irrelevantly), DP_{dat} takes wide scope.
- Option 4: DP_{acc} moves in the syntax, DP_{dat} moves at PF; this would yield total reconstruction of DP_{dat}, and therefore scope reversal. However, such a derivation is impossible because stem movement precedes PF movement, and it must be the highest DP_{dat} that moves first.

3.4. Deponent Verbs at PF

Ref.: Embick (2000) on Latin deponents

(22) Regular and deponent verbs

	regere ('rule')		hortāri ('urge')	
	ACT	PASS	ACT	PASS
PRES IND	regit	regitur	hortātur	—
PRES INF	regere	regi	hortāri	—
PRF IND	rēxit	rēctus est	hortātus est	—
PTCP PERF	—	rēctus	hortātus	—
SUPINE	rēctum	—	hortātum	—
PART PRES	regēns	—	hortāns	—

Two approaches, each with two possible sources of [pass]:

- [pass] may be present in syntax, triggering passive morphology and interpretation, or may be inserted after syntax, where it still triggers passive morphology (by late insertion

of morphological exponents) but comes too late to trigger passive syntax (or interpretation → *counter-feeding*). (Problem: deponency realization feeds head movement, but there is no post-syntactic movement. Solution:)

- [pass] may show up in two *different positions*: With regular passivization, it is part of a functional head (triggering passive syntax and interpretation). With deponents, it shows up on a root, where subcategorization information and interpretation are not affected. Morphological realization of [pass] proceeds uniformly.

3.5. Slavic Numerals and Agreement at PF

Ref.: Watanabe (2012)

Question:

Why do subjects with a numeral of 5 or higher trigger default singular agreement in some Slavic languages?

Answer:

This is due to a counter-feeding relation between [singular] assignment and subject-predicate agreement.

- (23) *Default agreement in Czech:*
 Těch pět hezkých dívek jelo
 these_{gen.pl} five beautiful_{gen.pl} girls_{gen.pl} traveled_{neut.sg}

Analysis:

Assignment of [±singular] is assumed to be post-syntactic in this context, whereas agreement is assumed to be part of narrow syntax; so [±singular] assignment cannot feed agreement. Like other post-syntactic operations manipulating features, [singular] assignment takes place before morphological realization; this accounts for plural marking on the subject. However, [±singular] assignment, on this view, comes too late to value the number feature of the inflected verb via agreement; therefore we get default agreement.

References

- Barss, Andrew (1986): Chains and Anaphoric Dependence. Ph.d. thesis, MIT, Cambridge, Mass.
- Bhatt, Rajesh & Veneeta Dayal (2007): Rightward Scrambling as Rightward Remnant Movement, *Linguistic Inquiry* 38, 287–301.
- Chomsky, Noam (1981): *Lectures on Government and Binding*. Foris, Dordrecht.
- Chomsky, Noam (2001): Derivation by Phase. In: M. Kenstowicz, ed., *Ken Hale. A Life in Language*. MIT Press, Cambridge, Mass., pp. 1–52.
- Embick, David (2000): Features, Syntax, and Categories in the Latin Perfect, *Linguistic Inquiry* 31, 185–230.
- Grewendorf, Günther (2002): *Minimalistische Syntax*. Francke/UTB, Tübingen and Basel.
- Haider, Hubert (2010): *The Syntax of German*. Cambridge University Press, Cambridge.
- Heck, Fabian & Anke Assmann (2012): Barss' Generalization and the Strict Cycle at LF. Ms., Universität Leipzig.

- Heim, Irene & Angelika Kratzer (1998): *Semantics in Generative Grammar*. Blackwell, Oxford.
- Lechner, Winfried (1998): Two Kinds of Reconstruction, *Studia Linguistica* 52, 276–310.
- Lechner, Winfried (2006): An Interpretive Effect of Head Movement. In: M. Frascarelli, ed., *Phases of Interpretation*. Mouton de Gruyter, Berlin, pp. 45–69.
- Mahajan, Anoop (1994): Toward a Unified Theory of Scrambling. In: N. Corver & H. van Riemsdijk, eds., *Studies on Scrambling*. Mouton de Gruyter, pp. 301–330.
- Neeleman, Ad & Hans van de Koot (2010): A Local Encoding of Syntactic Dependencies and its Consequences for the Theory of Movement, *Syntax* 13, 331–372.
- Pullum, Geoffrey (1979): *Rule Interaction and the Organization of a Grammar*. Garland, New York.
- Ross, John (1967): Constraints on Variables in Syntax. PhD thesis, MIT, Cambridge, Mass.
- Sauerland, Uli & Paul Elbourne (2002): Total Reconstruction, PF Movement, and Derivational Order, *Linguistic Inquiry* 33, 283–319.
- Watanabe, Akira (2012): A Morphological Solution to Agreement Puzzles in Slavic. In: *Proceedings of the 7th Mediterranean Morphology Meeting*. University of Patras, pp. 112–122.
- Wexler, Ken & Peter Culicover (1980): *Formal Principles of Language Acquisition*. MIT Press, Cambridge, Mass.