

On Pied-Piping

1. Introduction

Claims:

- (i) Pied-piping has properties that hold across languages; it is less idiosyncratic than is often assumed (cf. Postal 1971, 99 & 200; Riemsdijk & Williams 1986, 68).
- (ii) Percolation of wh-features does not exist. Rather, the probe-goal relation in wh-constructions is mediated by Agree.

Background:

The derivational and feature-based theory of syntax proposed in Chomsky (1995), Chomsky (2000), Chomsky (2001).

Caveat:

- (i) Only embedded questions and restrictive relative clauses is considered.
- (ii) Pied-piping as it can occur in non-embedded questions and appositive relative clauses (massive pied-piping, see Safir 1986) is a different phenomenon (see Bresnan 1976, Emonds 1976, Cinque 1982, Sells 1985, Safir 1986, Borsley 1992, among others).

Structure of the talk:

- (i) The problem of pied-piping and its standard solution are introduced.
- (ii) I argue that feature percolation has no place in the minimalist program.
- (iii) I propose an alternative, based on (a) the concept of Agree, (b) the notions of a phase and the PIC, and a violable constraint LOCAL AGREE.
- (iv) Three properties of pied-piping are predicted: (a) recursive pied-piping, (b) secondary wh-movement, (c) last-resort effects. I show that all three properties are attested cross-linguistically.

2. The Problem

Descriptive Generalization on Wh-Movement:

A wh-clause begins with a wh-expression which is associated with a gap at some clause-internal position.

(1) *Interpretation:*

A wh-expression moves from the position where it is merged to SpecC in order to establish a local relationship between the wh-feature of the wh-expression and the wh-feature of the (interrogative or relative) C-head.

Remark:

In theory, (1) has been expressed by (i) or (ii):

- (i) the wh-Criterion (see Aoun, Hornstein & Sportiche 1981, Kayne 1983),
- (ii) a locality condition on feature-checking (see Chomsky 1995).

Terminology:

Chomsky (2001) calls the wh-feature of the C-head the probe and the wh-feature of the wh-expression the goal.

Observation (see Ross 1967/86):

There are cases where the category that occupies SpecC of the interrogative or relative clause is not a wh-element but rather contains a wh-element: pied-piping.

(2) *Regular Instances of Pied-Piping in English:*

- a. a man [_{DP} whose deckchair]₂ you spilled coffee on t₂
- b. the manner [_{PP} in which]₂ Dickens died t₂

Problem:

- (i) Probe and goal are not in a local configuration in (2), in disagreement with (1).
- (ii) It does not seem to be attractive to give up (1), because it derives wh-movement.

Consequence:

The gap in locality between probe and goal has to be bridged.

3. The Standard Approach

Idea (Chomsky 1973):

Non-locality between wh-goal and wh-probe is only apparent. The moved constituents in (2) actually do bear the wh-goal (see, e.g., Cowper 1987, Grimshaw 1991/2000, Webelhuth 1992, Kayne 1994 for implementations of this idea).

Generalization (Lieber 1980, Sciullo & Williams 1987):

Features of a head H project up to HP but not beyond HP.

Consequence:

The wh-moved phrases in (2) cannot have acquired the wh-goal by ordinary feature projection.

(3) *The Feature Percolation Hypothesis*

There exists a mechanism of feature percolation which enables features to spread across phrase boundaries.

Task:

Find restrictions on percolation that separate regular from irregular pied-piping.

(4) *Irregular Instances of Pied-Piping in English:*

- a. *a man [_{DP} the deckchair of whom]₂ you spilled coffee on t₂

- b. *a man $[_{AP}$ enamored by whom $]_2$ she found herself t_2
- c. *a man $[_{VP}$ to address whom $]_2$ she hesitated t_2
- d. *a man $[_{CP}$ that we trust whom $]_2$ you should not believe t_2

4. Against the Standard Approach

Assumption (Chomsky 1995, 2000, 2001b):

The only construal operations in syntax are Merge and Move.

Standard Argumentation:

- (i) Feature percolation should be reducible to Merge or Move.
- (ii) Otherwise, a new concept would have to be introduced.
- (iii) This should be avoided if there is a theory that does without feature percolation.

4.1. Percolation Reduced to Merge

Assumptions for (2-a):

- (i-a) [WH] is available on empty D as a lexical property, or
- (i-b) [WH] is merged onto D after D has been introduced into the derivation to save the structure.

Problem for (i-a):

There is no independent (e.g., morphological) motivation for the assumption that D bears [WH] (cf. *a man John's deckchair you spilled coffee on).

Problems for (i-b):

- (i) Merge must be able to manipulate feature structures ([WH] has to become a part of the feature set of D in order to get projected).
- (ii) Separate Merge of [WH] violates a strict version of the SCC (see (5); strict = Merge exclusively applies at the root, see Chomsky 1995, 327f.).
- (iii) Separate Merge of [WH] violates the IC ((5), see Chomsky 1995, 228).
- (5) STRICT CYCLE CONDITION (SCC)
No operation can apply to a cyclic domain α in such a way as to affect solely a proper subdomain of α which is also cyclic.
- (6) INCLUSIVENESS CONDITION (IC)
Material that is not part of the lexical array is not accessible throughout the derivation.

4.2. Percolation Reduced to Move

Assumptions for (2-a):

- (i) Movement can affect bare features (see Chomsky 1995).
- (ii) Feature Movement integrates the moved feature into the feature set of the target.

Prediction:

If percolation is an instance of Move, then it should show properties of Move.

Problem 1 :

- (i) Non-complements are islands for movement (see Cattell 1976, Huang 1982).
- (ii) Percolation in (2-a) must be able to leave an island.

Problem 2:

- (i) Movement from SpecH to H violates the SCC (see Baker 1988).
- (ii) If percolation in (2-a) targets the D-head, then it violates the SCC.

Problem 3:

- (i) Movement targets a c-commanding position (PROPER BINDING, see Fiengo 1977).
- (ii) If percolation in (2-a) targets DP, then it violates PROPER BINDING.

Conclusion:

- (i) Feature percolation is not reducible to Merge or Move.
- (ii) The concept of feature percolation should be eliminated if possible.

5. An Agree-Based Approach

Proposal:

- (i) The interpretation (1) is too strict.
- (ii) Wh-feature checking can in principle apply in a remote fashion.
- (7) Agree
Probe β can establish Agree with goal γ iff a. and b. hold.
 - a. β c-commands γ .
 - b. There is no goal α such that β c-commands α and α c-commands γ .

Questions to be answered:

- (i) Why there is wh-movement in the first place?
- (ii) Why are there illicit instances of pied-piping?

Convention:

From now on, Σ shall denote the current phrase marker of the derivation.

Chomsky (1995):

- (i) All movement is driven by feature-checking.
- (ii) Certain features (probes) have to be checked by other features (goals), see (8).
- (iii) Unmotivated movement is blocked, see (9).
- (iv) There is a locality requirement on checking, in the spirit of (1).
- (8) FEATURE CONDITION (FC)
If β is a probe in Σ , then β must be checked on the Σ -cycle.

- (9) LAST RESORT
If γ moves within Σ , then γ must check some probe on the Σ -cycle.

Chomsky (2000), Chomsky (2001):

- (i) Movement is detached from feature checking.
(ii) Movement is triggered by the need to fill a specifier position, expressed by a generalized EPP-feature on the specifier's head.
(iii) Feature checking can apply in a non-local fashion (via Agree).

Alternative:

- (i) Adopt the Agree-based approach (i.e., give up the absolute locality requirement).
(ii) But retain the idea that wh-movement is dependent on wh-feature checking.

Proposal:

There is a violable constraint which minimizes the distance between probe and goal in terms of intervening phrasal boundaries.

- (10) LOCAL AGREE (LA)
If goal γ in Σ matches active probe β , then no XP dominates γ but not β .

- (11) *Active Probe*
A probe β is active iff a. or b. hold.
a. β is part of Σ .
b. β is a single in the numeration.

Some Remarks:

- (i) LA must be violable: pied-piping.
(ii) Violability is expressed optimality theoretically (see Prince & Smolensky 2004).
(iii) When Σ extends to Σ' , a set of Σ' -variants is created. The set is optimized, the optimal Σ' -output is re-fed into the derivation (see Heck & Müller 2000).
(iv) LR can be violated, too, if violation is forced by a constraint which is more important than LR (for instance LA!). Consequence: non feature-driven movement.
(v) Motivation for the concept of *active* probes will become obvious when successive cyclic wh-movement is considered; until then ignore the concept of "activeness."

- (12) *Short Wh-Movement without Pied-Piping*
a. a person who adores you
b. $[\text{VP adores you}] \rightarrow$ (Merge v + verb raising)
c. $[\text{VP adores}_2+\text{v} [\text{VP t}_2 \text{ you}]] \rightarrow$ (Merge *who*)
d. $[\text{VP who}_3 \text{ adores}_2+\text{v} [\text{VP t}_2 \text{ you}]] \rightarrow$ (Merge T + Move *who*)
e. $[\text{TP who}_3 \text{ T} [\text{VP t}_3 \text{ adores}_2+\text{v} [\text{VP t}_2 \text{ you}]]] \rightarrow$ (Merge C + Move *who*)
f. $[\text{CP who}_3 \text{ C} [\text{TP t}'_3 \text{ T} [\text{VP t}_3 \text{ adores}_2+\text{v} [\text{VPt}_2 \text{ you}]]]] \rightarrow$...

Comments:

- (i) [EPP] on T seeks for a goal to establish Agree with and encounters *who*.
(ii) LA forces raising of *who* to SpecT, which eliminates the vP-induced LA-violation.
(iii) Agree between T and *who* eliminates [EPP] on T; neither LA nor LR are violated.
(iv) C is merged and seeks for a goal; it encounters [WH] on *who*.

- (v) Optimization with respect to LA on the CP-cycle triggers raising of *who* to SpecC.

- (13) *Short Wh-Movement with Pied-Piping*
a. a person whose son adores you
b. $[\text{VP adores you}] \rightarrow$ (Merge v + verb raising)
c. $[\text{VP adores}_2+\text{v} [\text{VP t}_2 \text{ you}]] \rightarrow$ (Merge *whose son*)
d. $[\text{vP} [\text{DP whose son}]_3 \text{ adores}_2+\text{v} [\text{VP t}_2 \text{ you}]] \rightarrow$ (Merge T + Move *whose son*)
e. $[\text{TP} [\text{DP whose son}]_3 \text{ T} [\text{vP t}_3 \text{ adores}_2+\text{v} [\text{VP t}_2 \text{ you}]]] \rightarrow$ (Merge C + Move *whose son*)
f. $[\text{CP} [\text{DP whose son}]_3 \text{ C} [\text{TP t}'_3 \text{ T} [\text{vP t}_3 \text{ adores}_2+\text{v} [\text{VPt}_2 \text{ you}]]]] \rightarrow$...

Comments:

- (i) Raising to subject applies as in (13).
(ii) C is merged and seeks for a goal; it encounters [WH] on *whose*.
(iii) Two phrase boundaries intervene between probe and goal: TP and DP₃.
(iv) Raising of *whose* would eliminate both violations; but it would also violate the LEFT BRANCH CONDITION (LBC, see Ross 1967/86).
(v) Assumption: LBC is more important than LA.
(vi) Pied-piping of DP₃ eliminates at least the TP-induced LA-violation.
(vii) The DP-induced LA-violation is not fatal due to lack of better alternatives.

Further Assumptions:

- (i) Chomsky (2000, 2001*b*) classifies CP and vP as special derivational units: "phases."
(ii) Phases create opaque domains, as expressed in (14).

- (14) PHASE IMPENETRABILITY CONDITION (PIC)
The domain of a head H of a phase HP is not accessible to operations at ZP (the next phase). Only H and its edge domain are accessible to such operations.

Conventions:

- (i) Ω is dominated by Σ , Σ a phase, and that there is no phase between Ω and Σ .
(ii) For the moment, conceive of the edge of a phase as its specifiers.

- (15) *Accessibility*
 γ is accessible in Ω iff a. or b. hold.
a. Ω is a phase and γ is in the edge domain of Ω .
b. Ω is not a phase and γ is in the domain of Ω .
(16) *Edge domain*
 γ is in the edge domain of a phase Ω iff a. or b. hold.
a. γ is a specifier of Ω .
b. (i) α is a specifier of Ω and
(ii) γ is accessible in α .

- (17) *Domain*
 γ is in the domain of Ω iff a. or b. hold.
a. γ is immediately dominated by Ω .

b. α is immediately dominated by Ω and γ is accessible in α .

(18) *Long Wh-Movement without Pied-Piping*

- a. John wonders why Dickens died
- b. $[_{VP} \text{died } \text{why}_4]_5 \rightarrow$ (Merge v + verb raising)
- c. $[_{VP} \text{died}_{2+v} [_{VP} \text{t}_2 \text{why}_4]_5] \rightarrow$ (Merge *Dickens*)
- d. $[_{VP} \text{Dickens died}_{2+v} [_{VP} \text{t}_2 \text{why}_4]_5] \rightarrow$ (Move *why*)
- e. $[_{VP} \text{why}_4 \text{Dickens died}_{2+v} [_{VP} \text{t}_2 \text{t}_4]_5] \rightarrow$ (Merge T + Move *Dickens, why*)
- f. $[_{TP} \text{why}_4 \text{Dickens}_6 [_{VP} \text{t}'_4 \text{t}_6 \text{died}_{2+v} [_{VP} \text{t}_2 \text{t}_4]_5]] \rightarrow$ (Merge C + Move *why*)
- g. $[_{CP} \text{why}_4 \text{C } [_{TP} \text{t}'_4 \text{Dickens}_6 [_{VP} \text{t}'_4 \text{t}_6 \text{died}_{2+v} [_{VP} \text{t}_2 \text{t}_4]_5]]] \rightarrow \dots$

Comments:

- (i) Goal *why* in (18-d) must raise to the edge of vP in order to be accessible at the CP-level and to ultimately check the wh-probe on C.
- (ii) (11-b) extends the domain of active probes to “singles” in the numeration N.
- (iii) A single probe β in N is a probe for which there is no matching goal in N.
- (iv) Recall: LA triggers movement of a goal γ to Spec Σ after a new head has been merged; this may violate LR, if γ does not check some probe on the Σ -cycle.
- (v) The same holds if a phasal head is merged: goal γ is placed at the phase edge.
- (vi) If another constraint blocks movement to the phase edge (in violation of LA), then a violation of the FC will cause the derivation to crash at some later point.

Side Remark:

Point (iii) above makes sure that a probe β triggers successive cyclic movement of a wh-phrase γ if β will ultimately be checked by another goal γ' (see **Who thinks what John bought*).

Consequence:

- (i) The derivation proceeds by raising *why* to Specv, thereby violating LR in favor of LA (*why* does not check any probe on the vP-cycle).
- (ii) This movement is triggered by the active wh-probe in N (which is not dominated by VP, in contrast to the goal; see (10)).

(19) *Long Wh-Movement with Pied-Piping*

- a. John wonders in what manner Dickens died
- b. $[_{VP} \text{died } [_{PP} \text{in what manner }]_4]_5 \rightarrow$ (Merge v + verb raising)
- c. $[_{VP} \text{died}_{2+v} [_{VP} \text{t}_2 [_{PP} \text{in what manner }]_4]_5] \rightarrow$ (Merge *Dickens*)
- d. $[_{VP} \text{Dickens died}_{2+v} [_{VP} \text{t}_2 [_{PP} \text{in what manner }]_4]_5] \rightarrow$ (Move PP₄)
- e. $[_{VP} [_{PP} \text{in what manner }]_4 \text{Dickens died}_{2+v} [_{VP} \text{t}_2 \text{t}_4]_5] \rightarrow \dots$

Comments:

- (i) Raising of PP₄ to Specv optimizes the number of LA-violations.
- (ii) Raising of *what matter* to Specv violates the CED, because PP₄ is an adjunct. Assumption: CED is more important than LA.
- (iii) Raising of VP₅ to Specv is blocked, because *ist* incurs an additional LA-violation.

(iv) The rest of the derivation proceeds along the lines already discussed.

Conclusion so far:

- (i) Pied-piping without feature percolation is possible, because wh-feature checking can apply in a remote fashion.
- (ii) Wh-movement and Agree coexist, because LA blocks remote application of Agree if movement can achieve a local application.

Still to discuss:

Why are there illicit instances of pied-piping?

6. Recursive Pied-Piping

(20) *Generalization on Recursive Pied-Piping*

If α can pied-pipe β , and β is in a canonical position to pied-pipe γ , then α can also pied-pipe γ .

Terminology:

A canonical pied-piping position within β is a position P such that if P is occupied by a wh-phrase α , then β can be pied-piped by α .

6.1. Recursive Specifiers

(21) *Recursive Specifiers in English (see, e.g., Sells 1985, Cowper 1987):*

- a. a man $[_{DP} \text{whose deckchair }]_2$ you spilled coffee on t_2
- b. a man $[_{DP} \text{whose sister's deckchair }]_2$ you spilled coffee on t_2
- c. a man $[_{DP} \text{whose sister's lawyer's deckchair }]_2$ you spilled coffee on t_2

(22) *Recursive Specifiers in German 1:*

- a. ein Mann, $[_{DP} \text{dessen Liegestuhl }]_2$ du t_2 ruiniert hast
a man whose deckchair you ruined have
- b. ein Mann, $[_{DP} \text{dessen Vaters Liegestuhl }]_2$ du t_2 ruiniert hast
a man whose father's deckchair you ruined have
- c. ?ein Mann, $[_{DP} \text{dessen Vaters Bruders Liegestuhl }]_2$ du t_2 ruiniert hast
a man whose father's brother's deckchair you ruined have

(23) *Recursive Specifiers in German 2:*

- a. jemand, $[_{DP} \text{dem seine Tochter }]_2$ du t_2 magst
someone who his daughter you like
- b. jemand, $[_{DP} \text{dem seiner Tochter ihren Sohn }]_2$ du t_2 magst
someone who his daughter her son you like
- c. jemand, $[_{DP} \text{dem seiner Tochter ihrem Sohn seine Art }]_2$ du t_2 magst
someone who his daughter her son his way you like

Note:

Recursive pied-piping is impossible, if the pied-piper is embedded in a complement cascade below DP.

(24) *No Recursive DP-Complements in English:*

- a. *a man [_{DP} the deckchair of whom]₂ you spilled coffee on t₂
- b. *a man [_{DP} the deckchair of the sister of whom]₂ you spilled coffee on t₂
- c. *a man [_{DP} the deckchair of the sister of the lawyer of whom]₂ you spilled coffee on t₂

(25) *No Recursive DP-Complements in German:*

- a. *jemand, [_{DP} den Liegestuhl von dem]₂ du t₂ ruiniert hast
 someone the deckchair of whom you ruined have
- b. *jemand, [_{DP} den Liegestuhl von dem Vater von dem]₂ du t₂ ruiniert
 someone the deckchair of the father of whom you ruined
 hast
 have
- c. *jemand, [_{DP} den Liegestuhl von dem Bruder von dem Vater von dem]₂
 someone the deckchair of the brother of the father of whom
 du t₂ ruiniert hast
 you ruined have

Assumption:

Alongside with vP and CP, DP constitutes a phase (see Svenonius 2003).

Derivation of (24-a):

- (i) When *the deckchair of whom* is constructed, *whom* must move to SpecD, otherwise the goal will not be accessible for further computation.
- (ii) Ultimately, this leads to a violation of the FC on the CP-cycle.
- (iii) The same holds for (24-b,c).

Derivation of (21-a):

The wh-goal occupies SpecD and hence remains accessible: pied-piping is possible.

Derivation of (21-b):

- (i) (21-a) showed: the goal is accessible in SpecD.
- (ii) In (21-b) *whose* does not occupy SpecD of *whose sister's deckchair*.
- (iii) Rather, this position is occupied by *whose sister*.
- (iv) But it follows from (21-a) in one recursive step (see (16-b)) that *whose* is accessible in *whose sister's deckchair*.

Derivation of (21-c):

(21-c) simply involves one more recursive step in the argument.

Remark:

Pied-piping of specifier cascades of the English type is not well-formed in Tzotzil (see Aissen 1996) or San Dionicio Zapotec (see Broadwell 2001). Later, I will offer an explanation for this fact.

6.2. Recursive Complements

illustrates that if the PP of (26-a) occupies the complement position of another preposition, then the matrix PP is also pied-piped.

(26) *Recursive PP-Complements in German*

- a. ein Punkt, [_{PP} zu dem]₂ man t₂ gehen kann
 a point to which one go can
- b. ein Punkt, [_{PP} bis zu dem]₃ man t₃ gehen kann
 a point until to which one go can

Derivation of (26-a):

PP₂ in (26-a) is not a phase and immediately dominates the wh-goal *dem*. Thus *dem* is accessible in PP₂ (see (17-a)).

Derivation of (26-b):

- (i) The wh-goal is not immediately dominated by PP₃, but PP₂ is.
- (ii) Thus, it follows by one recursive step (see (17-b)) that the wh-goal is also accessible in PP₃, too.

6.3. Hybrid Recursion

Observation:

The two types of recursive pied-piping can be mixed.

- (27) a. jemand [_{PP} über dessen Geschmack]₂ man t₂ streiten kann
 someone about whose taste one argue can
- b. jemand [_{PP} über dem seinen Geschmack]₂ man t₂ streiten kann
 someone about who his taste one argue can

Derivation of (27):

The argument proceeds along the same lines as above.

Summary:

- (i) Recursive pied-piping is derived by interaction of the recursive definition of accessibility, the notion of a phase, and Agree.
- (ii) Recursive pied-piping is attested in different languages (Danish, Russian might be other cases in point).
- (iii) Recursion is a core property of the syntax of human language. This suggests that pied-piping is determined by general principles, rather than by idiosyncrasies.

7. Secondary Wh-Movement

(28) *Edge generalization*

If α pied-pipes β , then α has to be at the edge of β .

Note:

The notion “edge of β ” is usually to be understood as “specifier of β ”. This is not to be

confused with the notion of “edge domain.”

7.1. Possessors in Tzotzil

Observations (Aissen 1996):

- (i) Possessors appear strictly postnominal (see (29)).
- (ii) Pied-piping by possessor requires obligatory inversion of the possessor wh-phrase and the head noun (see (30)).
- (iii) The same observation can be made if pied-piping affects a PP and if the pied piper is a genitive phrase that originates within the complement DP of P (see (31)).

(29) *Genitives in Tzotzil:*

- a. s-p'in li Maruch-e
A3-pot the Maruch-ENC
'Maruch's pot'
- b. *Maruch s-p'in
Maruch A3-pot

(30) *Pied-Piping DP by Genitives in Tzotzil:*

- a. [DP Buch'u₂ x-ch'amal t₂]₄ i-cham t₄?
who A3-child CP-died
'Whose child died?'
- b. *[DP X-ch'amal buch'u₂]₄ i-cham t₄?
A3-child who CP-died

(31) *Pied-Piping PP by Genitives in Tzotzil:*

- a. [PP Buch'u₂ ta [DP t₂ s-na t₂]₃]₄ ch-a-bat t₄?
who to A3-house ICP-B2-go
'To whose house are you going?'
- b. *[PP Ta [DP s-na buch'u₂]₃]₄ ch-a-bat t₄?
to A3-house who ICP-B2 go

Claim:

These cases of secondary wh-movement follow without further ado from the system proposed so far.

(32) *Secondary Wh-Movement within DP in Tzotzil:*

- a. Buch'u ta s-na ch-a-bat?
who to A3-house ICP-B2-go
- b. [NP s-na buch'u] → (Merge D + Move *buch'u*)
- c. [DP buch'u₂ D [NP s-na t₂]] → (Merge P + Move *buch'u*)
- d. [PP buch'u₂ ta [DP t₂ D [NP s-na t₂]]] → (Merge V)
- e. [VP ch-a-bat [PP buch'u₂ ta [DP t₂ D [NP s-na t₂]]]] → ...

Comments:

- (i) There is an active wh-probe in N at point (32-b). Consequence: LA is relevant.
- (ii) Raising of *buch'u* from SpecN to SpecD reduces the number of LA-violations from two to one (NP is skipped).

- (iii) The same holds at point (32-c), where raising from SpecD to SpecP is forced.
- (iv) The bare possessor cannot raise to SpecV, because PP is an island in Tzotzil.
- (v) The LA-violation due to the PP-boundary is not fatal due to lack of alternatives.

7.2. French Relatives with *dont*

Observations:

- (i) French nominals select their prepositional arguments to the right (see (33)).
- (ii) When DP is pied-piped by *dont*, then *dont* has to appear at the left edge of DP (see (34), adapted from Godard 1992).
- (iii) In older French, pied-piping of a PP by *dont* was only possible if *dont* appeared at the left edge of the matrix PP (see Kayne 1975, Kayne 1976); see (35).

(33) *Dont-Genitives in French:*

- a. la solidité de l'argument
the soundness of the argument
- b. *de l'argument la solidité
of the argument the soundness

(34) *Pied-Piping DP by dont in French:*

- a. un argument [DP dont₂ la solidité t₂]₃ t₃ est indiscutable
an argument of-which the reliability is not disputable
- b. *un argument [DP la solidité dont₂]₃ t₃ est indiscutable
an argument the reliability of-which is not disputable

(35) *Pied-Piping PP by dont in French:*

- a. la fille [PP dont₂ au frère t₂]₄ tu plais t₄
the girl of-whom to the brother you please
- b. *la fille [PP au frère dont₂]₄ tu plais t₄
the girl to the brother of-whom you please

Derivation of Secondary Wh-Movement in French:

- (i) Secondary wh-movement is equally derived by LA, just as in the case of Tzotzil.
- (ii) Only difference: Tzotzil genitives start off in SpecN (according to Aissen), *dont* starts off as the complement of N.

Other Potential Cases:

- (i) Genitives in Polish relative clauses (see Rappaport 1995).
- (ii) P-inversion in Irish (see McCloskey 1979, Noonan 1997).
- (iii) PP-raising in Spanish (see Ormazabal 1992).
- (iv) Clausal pied-piping in Basque (see Ortiz de Urbina 1989) and Quechua (see Hermon 1985).

Note:

- (i) There seems no alternative trigger for secondary wh-movement available.
- (ii) Rather, secondary wh-movement is contingent on pied-piping.

Final Remark:

Secondary Wh-Movement is often not attested.

(36) *Lack of Secondary Wh-Movement in German PPs:*

- a. eine Sache, [PP an die₃]₂ ich nicht t₂ glauben will
a thing on which I not believe want
- b. *eine Sache, [PP die₃ an t₃]₂ ich nicht t₂ glauben will
a thing which on I not believe want

Assumption:

There is no empty functional head above PP in German (but see Riemsdijk 1978) which secondary wh-movement could target.

Consequence:

It follows automatically that raising of the wh-goal in (36-b) is ungrammatical: it does not eliminate any LA-violations (movement is too short), but it still violates LR and is hence blocked.

8. Last Resort Effects

(37) *Repair generalization*

Pied-piping of β by α is possible only if movement of α from β is blocked.

Comment:

Evidence for (37) comes from cases where pied-piping is avoided in favor of moving the bare wh-phrase and cases where the amount of structure being pied-piped is minimized.

8.1. French *dont*-Relatives Again

Observation:

DPs in object position cannot become pied-piped by *dont*.

(38) *Pied-Piping of Object by dont blocked:*

- *la fille [DP dont₂ le frère t₂]₃ tu as rencontré t₃
the girl of-who the brother you have met

Explanation:

- (i) French subjects are islands (see (39-a) from Sportiche 1998), complements are not.
(ii) The DP-complement in (38) is transparent for extraction; see (39-b).
(iii) Thus, LA blocks (38) in favor of (39-b).

(39) *Extraction from Subject and Object in French:*

- a. *la ville [PP de laquelle]₂ [DP la destruction t₂] serait entreprise
the city of the-which the destruction would be undertaken
- b. la fille dont₂ tu as rencontré [DP le frère t₂]₃
the girl of-who you have met the brother

8.2. Possessors in Chamorro

Observation Chung (1998, 391f, footnote 5):

A wh-possessor in Chamorro cannot pied-pipe a DP if it can strand the DP (which is the case if the D-head is null; see also Chung 1991).

(40) *Pied-Piping by Possessor blocked in Chamorro:*

- a. *[DP Hayi₂ munika-ña t₂]₃ un-yulang t₃?
who? doll-AGR3S INFL2S-break
'Whose doll did you break?'
- b. Hayi₂ un-yulang [DP munika-ña t₂]₃?
who? INFL2S-break doll-AGR3S

Explanation:

- (i) As extraction of the possessor from DP is possible, it must apply, thereby optimizing the structure with respect to LA.
(ii) The alternative which involves pied-piping is blocked.

8.3. Predicates

Observation:

Predicates usually cannot be pied-piped.

(41) *Pied-Piping of Participle in German blocked:*

- a. *jemand, dem₄ Maria [VP [PP mit t₄]₂ getanzt]₃ hat
someone whom Maria with danced has
- b. jemand, [PP mit dem₄]₂ Maria [VP t₂ getanzt]₃ hat
someone with whom Maria danced has
- c. *jemand, [VP [PP mit dem₄]₂ getanzt]₃ Maria t₃ hat
someone with whom danced Maria has

Explanation:

- (i) Participles are transparent for extraction (see (41-b)).
(ii) Pied-piping of VP and PP incurs two LA-violations, pied-piping of PP only one.

Note:

The analysis thus directly rules out a whole class of illicit instances of pied-piping like the cases in (4), simply because they all involve pied-piping of categories that are transparent for extraction (except perhaps for the first case).

8.4. Possessors in Tzotzil Revisited

Recall:

I mentioned that pied-piping recursive specifiers of the English type is not possible in Tzotzil and San Dionicio Zapotec; see (42-b) for Tzotzil (from Aissen 1996, 481).

(42) *No Recursive DP-Specifiers in Tzotzil:*

- a. I-'ixtalaj [_{DP} s-kayijonal y-osil li j-tot-e]₂
 CP-ruin A3-firelane A3-land the A1-father
 ‘My father’s land’s firelane was ruined’
- b. *_{[DP} Buch’u y-osil s-kayijonal]₂ i-'ixtalaj t₂?
 who A3-land A3-firelane CP-ruin
 ‘Whose land’s firelane was ruined?’

But:

Movement of the possessor wh-phrase to the topmost SpecD-position without secondary wh-movement of embedded DP-layers is possible; see (43) (Aissen 1996, 485).

(43) *Wh-Possessor Extraction in Tzotzil:*

- a. [_{DP} Buch’u s-kayijonal y-osil]₂ i-'ixtalaj t₂?
 who A3-firelane A3-land CP-ruin
- b. [_{DP} Buch’u y-osil]₃ i-'ixtalaj [_{DP} s-kayijonal t₃]₂?
 who A3-land CP-ruin A3-firelane

Comments:

- (i) In (43-a) *buch’u* moves to the topmost SpecD-position with subsequent pied-piping.
 (ii) In (43-b) *buch’u* moves to SpecD of the embedded DP with subsequent pied-piping of the embedded DP, thereby stranding the topmost DP.

Note:

- (i) The contrast between (42) and (43) is expected: a pied-piper in the topmost SpecD-position incurs only one LA-violation and therefore blocks pied-piping of recursive specifiers, which incur one additional LA-violation per embedding.
 (ii) In English or German constructions like (43) are not available, because a possessor cannot leave its DP.

9. A Problem

Recall:

The present theory conceives of pied-piping as a “last resort” strategy, which can only apply in order to avoid an island violation.

Consequence:

One would therefore expect pied-piping and stranding to never exist simultaneously: the stranding variant should block the pied-piping variant.

Problem:

This expectation is not borne out.

(44) *Optional Pied-Piping by R-Pronouns in German:*

- a. Wo₂ stimmt Fritz immer [_{PP} t₂ gegen]₃?
 where votes Fritz always against
 ‘What does Fritz always vote against?’

- b. [_{PP} Wo₂ gegen]₃ stimmt Fritz immer t₃?
 where against votes Fritz always

9.1. Unattested Anti-Freezing

Another Problem:

- (i) The present system forces a goal to move into higher specifiers as soon as possible.
 (ii) This threatens to undermine the generalization that extraction out of moved (“frozen”) constituents is impossible (see Ross 1967/86, Wexler & Culicover 1980).

(45) *A Case of Freezing in German:*

- *Wo₂ stimmt Fritz [_{PP} t₂ gegen]₃ immer t₂?
 where votes Fritz against always

(46) *Anti-Freezing:*

- a. [_{PP} wo₂ gegen] → (Merge V + Move *wo*)
 b. [_{VP} wo₂ [_{PP} t₂ gegen]₃ stimmt] → (Merge *immer*)
 c. [_{VP} immer wo₂ [_{PP} t₂ gegen]₃ stimmt] → (Merge v, *Fritz*)
 d. [_{VP} Fritz [_{VP} immer wo₂ [_{PP} t₂ gegen]₃ stimmt] v] → (Move PP₃, *wo*)
 e. [_{VP} wo₂ [_{PP} t₂ gegen]₃ Fritz [_{VP} immer t₂ t₃ stimmt] v] → ...

Comment:

- (i) In (46-b) *wo* has left PP₃, which still occupies a complement position.
 (ii) Later the remnant PP undergoes scrambling to Specv.
 (iii) The rest of the derivation proceeds without problems, an unwanted result.

Note 1:

The same problem arises under the view that successive cyclic wh-movement targets intermediate phase edges (instead of phrase edges), assuming that PP₃-scrambling can target the edge of vP.

Note 2:

The derivation (46) involves “chain interleaving.” Collins (1994) offers a proposal how such derivations can be blocked. His account is incompatible with the present theory, however, because it invokes competition of complete derivations.

Description of the Problem:

- (i) Movement of a goal γ must not leave a category α if α is supposed to be moved at some later point, too, and if α ultimately targets a position that is lower than the ultimate position targeted by γ .
 (ii) The second conjunct in (i) is necessary due to the existence of remnant movement (see, Müller 1998, Hiraiwa 2003, and references therein).

(47) *Remnant VP-Topicalization in German:*

- [_{VP} t₂ Gelesen]₃ hat [_{DP} das Buch]₂ keiner t₃
 read has the book no-one

Idea:

Define a restriction that prohibits creation of the remnant in (46), but allows it in (47).

Look-Ahead Problem:

The remnant creating movement step must be blocked long before the ultimate configuration is reached.

Solution:

Read off from the features of the goal γ and the remnant α what type of positions γ and α will finally target.

(48) *A Hierarchy of Features (see Sternefeld 1992, Müller 1998):*

[TOP] \succ [WH] \succ [SCR]

(49) *Williams Cycle (see Williams 1974):*

Goal γ must not move to a position associated with probe β_i if a. and b. hold:

- a. γ has already moved to a position associated with β_j ,
- b. $\beta_j \succ \beta_i$.

(50) *Extended Williams Cycle, EWC (see Grewendorf 2004):*

An active goal γ' deactivates a goal γ iff a. and b. hold.

- a. γ' dominates γ ,
- b. $\gamma' \not\succeq \gamma$.

(51) *Active Goal*

A goal γ is active iff γ matches an active probe β .

Assumption:

A goal γ must be active if γ is to be affected by Move.

Remnant Movement in (47) is Possible:

- (i) At the VP₃-cycle, both VP₃ and DP₂ bear an active goal, [TOP] and [SCR].
- (ii) [TOP] dominates [SCR], but since [TOP] is ranked higher than [SCR], DP₂ remains active and can move out of VP₃.

Chain-Interleaving in (45) is Blocked:

- (i) When wo is supposed to move out of PP₃, PP₃ bears an active scr-goal.
- (ii) This scr-goal dominates the active wh-goal of wo .
- (iii) Moreover, [SCR] is ranked lower than [WH].
- (iv) Therefore the wh-goal of wo is deactivated and movement of wo out of PP₃ is blocked.

9.2. Freezing Induced Pied-Piping

Question:

How can the EWC help to solve problem of optional pied-piping?

Idea:

To reduce the optionality of pied-piping to another operation of the grammar that is optional, namely optional movement.

(52) *Optional Pied-Piping by R-Pronouns in German:*

- a. Wo₂ stimmt Fritz immer [PP t₂ gegen]₃?
where votes Fritz always against
- b. [PP Wo₂ gegen]₃ stimmt Fritz immer t₃?
where against votes Fritz always

Implementation:

- (i) If (52-a) and (52-b) would not compete, then it would follow automatically why the former cannot block the latter.
- (ii) Standard assumption in competition based frameworks: two objects can only compete if they are based on the same lexical array (see the notion of “reference set” in Chomsky 1995).
- (iii) Assume that (52-b) bears a scr-probe on v and a matching scr-goal on P₃, whereas (52-a) does not.

Consequences:

- (i) (52-a,b) do not compete (v and P₃ in (52-a) and (52-b) are not the same items).
- (ii) Pied-piping of PP₃ is forced in (52-b) but not in (52-a).

(53) *Derivation of (52-b):*

- a. [PP wo₂ gegen] \rightarrow (Merge V)
- b. [VP [PP wo₂ gegen]₃ stimmt] \rightarrow ...

Comment:

- (i) Usually the system forces raising of wo to SpecV at point (53-b), because this removes the PP-induced LA-violation.
- (ii) But recall: PP₃ in (53-b) bears a scr-goal, by assumption. This goal dominates the wh-goal of wo .
- (iii) Both goals are active, but as [SCR] is not ranked higher than [WH], EWC will deactivate the wh-goal.
- (iv) This blocks movement of the wh-phrase out of PP₃, at the costs of one LA-violation.

(53) *Derivation of (52-b) continued:*

- b. [VP [PP wo₂ gegen]₃ stimmt] \rightarrow (Merge immer)
- c. [VP immer [PP wo₂ gegen]₃ stimmt] \rightarrow (Merge v , Fritz + Move PP₃)
- d. [VP [PP wo₂ gegen]₃ Fritz [VP immer t₃ stimmt] v] \rightarrow ...

Comment:

- (i) PP₃ has moved to Specv, which avoids the VP-induced LA-violation with respect to the relation between the scr-probe on v and the scr-goal on P₃.
- (ii) Agree eliminates the scr-probe on v . This renders the scr-goal on P₃ inactive.
- (iii) The wh-goal is reactivated: it is no longer dominated by an active scr-goal.

- (iv) Movement of *wo* to an outer Specv-position would thus be possible. It would also optimize the structure with respect to LA.
- (v) But scrambling has turned PP₃ into an island. This forces pied-piping of PP₃.
- (vi) The intermediate scrambling step of PP₃ is undone by (successive cyclic) pied-piping of PP₃, which creates the illusion that the variants in (52) involve identical numerations.

A Prediction:

If a language L exhibits an optional movement operation which targets category α , then it exhibits optional pied-piping of α .

German:

- (i) Optional scrambling of PP and DP.
- (ii) Optional pied-piping of PP (see above) and DP (see (54)). (iii) Generally, no scrambling of predicates (see Stechow & Sternefeld 1988, Haider 1993). (iv) Generally, no (optional) pied-piping of predicates.

(54) *Optional Was-für-Split in German:*

- a. Was₂ hast du [DP t₂ für Leute]₃ eingeladen?
 what have you for people invited
- b. [DP Was₃ für Leute]₃ hast du t₃ eingeladen?
 what for people have you invited

(55) *No Optional Predicate Pied-Piping in German:*

- a. *Fritz will wissen [AP wen betrunken]₂ noch keiner t₂ gesehen hat
 Fritz wants know whom drunk yet no-one seen has
- b. *Fritz will wissen [VP wen küssen]₂ keiner t₂ wollte
 Fritz wants know whom kiss no-one wanted

English:

- (i) No scrambling in English.
- (ii) Virtually no optional pied-piping in English either.

Chamorro:

- (i) No optional scrambling of objects in Chamorro (see Chung 1990, 89).
- (ii) No optional pied-piping of objects by possessor in Chamorro.

Slavic:

- (i) Optional scrambling of DP is available.
- (ii) Both pied-piping or stranding of DP by possessor is possible (see, e.g., Ross 1967/86, 145, Corver 1990, 330).

(56) *Optional Pied-Piping in Russian:*

- a. Ja sprosil kakuju₂ ty čital [DP t₂ knigu]₃
 I asked whose you read book

- b. Ja sprosil [DP kakuju₂ knigu]₃ ty čital t₃
 I asked whose book you read

Problem:

Cases of optional pied-piping in languages that lack optional scrambling, like for instance French or some Scandinavian languages.

(57) *Optional Combien-Split in French (see Obenauer 1976):*

- a. Je me demande combien₂ Marie a décidé d'engager [DP t₂ de
 I REFL ask how-many Marie has decided to-employ of
 personnes]₃
 persons
- b. Je me demande [DP combien₂ de personnes]₃ Marie a décidé
 I REFL ask how-many of persons Marie has decided
 d'engager t₃
 to-employ

(58) *Optional hva-for-Split in Norwegian:*

- a. Jeg lurer på hva₁ du har bedt [DP t₁ for slags folk]₂
 I wonder on what you have invited for type people
- b. Jeg lurer på [DP hva₁ for slags folk]₂ du har bedt t₂
 I wonder on what for type people you have invited

Possible Interpretation:

Optional pied-piping has heterogeneous sources.

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