

Pied Piping without Feature Percolation

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1. Basic Idea

Pied Piping:

A syntactic transformation (e.g., *wh*-movement) moves more material than is normally required by the transformation.

- (1) a. [NP Who]₁ did you talk [PP to t₁]₂ ?
b. [PP To whom₁]₂ did you talk t₂ ?

In (1-b) not only the NP₁ *who* moves (as in (1-a)) but the whole PP *to whom*, which contains NP₁. Ross (1967/86) calls the phenomenon ‘pied piping’.

Traditional Analysis:

The PP in (1-b) somehow counts as an appropriate *wh*-item, since the relevant feature percolates from the *wh*-phrase up to the PP, although the *wh*-phrase is not the head of the PP.

Alternative Analysis:

There is no feature percolation. Hence, the PP in (1-b) does not count as an ‘normal’ *wh*-item. Under this view pied piping is a ‘marked’ (costly) strategy, that should be avoided if possible, i.e, one expects pied piping to apply only if it is absolutely necessary.

Consequence:

Since (1-b) is grammatical, the constraint on pied piping must be violable under certain circumstances. This suggests an optimality-theoretic approach.

2. Background

(2) *Basic tenets of Optimality Theory:*

- a. Constraints are violable
- b. Constraints are universal
- c. Constraints are hierarchically ranked

In General:

A structure C_i is grammatical if among a certain number of other structures C₁, ..., C_k (the so called candidate set) there is no structure C_j such that C_j satisfies the constraints better than C_i. Therefore C_i does not need to be perfect.

(3) *OT-architecture*

- a. Function GEN generates the candidate set {C₁, ..., C_k}
- b. Function H-EVAL computes the optimal candidate(s) C_i

T_1 : *An abstract example*

Candidates	P ₁	P ₂	P ₃
C ₁			*
C ₂			*!* [*]
C ₃		*!	
C ₄	*!		

(4) *Constraint profile*

A candidate C has a better constraint profile with respect to a constraint P than another candidate C' if a or b holds:

- a. C' violates P, but C does not
- b. Both, C and C' violate P, but C violates P less often than C'

(5) *Grammaticality*

A candidate C is grammatical if for every other candidate C' in the same competition C has a better constraint profile than C' with respect to the highest ranked constraint P, such that the constraint profiles of C and C' differ with respect to P.

Ranking:

$P_1 \gg P_2 \gg P_3$.

3. A Primal Sketch

Ingredients

- (i) A constraint P₁ that is violated if pied piping applies, i.e., a constraint that makes pied piping a costly operation.
- (ii) A constraint P₂ that forces pied piping to apply in certain syntactic contexts and that is ranked higher than P₁ ($P_2 \gg P_1$).

Potential Candidates for P₁ and P₂:

- (i) Since there is no feature percolation, feature checking can't apply locally. P₁ therefore will be a requirement that feature checking must apply locally.
- (ii) A node α pied pipes another node β if movement of α out of β would violate an island constraint (the cases of *obligatory* pied piping in Ross 1967/86). P₂ can be viewed as a family of island constraints.

Alternative Candidates for P₁:

- (i') There is feature percolation, but P₁ penalizes percolation.
 - (i'') There is no feature checking in the case of pied piping; hence the feature condition, which requires features to be checked, must be violable, (problematic, since this undermines the motivation for movement in the first place if movement is feature-driven).
- (6) LOCALITY OF FEATURE CHECKING (LFC; cf. Chomsky 1995)

A feature which is checked by a head X must be in the minimal residue (checking

domain) of X.

- (7) *VP Pied Piping blocked by LFC*
 a. Who₁ did John [_{VP} kiss t₁]₂ ?
 b. *_{VP} Kiss who₁]₂ did John t₂ ?

T₂: VP Pied Piping blocked by LFC

Candidates	LFC
C ₁ : [_{CP} who ₁ C _[+wh] [_{IP} ... [_{VP} kiss t ₁] ₂]]	
C ₂ : [_{CP} [_{VP} kiss who ₁] ₂ C _[+wh] [_{IP} ... t ₂]]	*!

Remark:

The notion of *minimal residue* or *checking domain* in (6) has to be defined such that it is violated by C₂ but not by C₁.

- (8) **LEFT BRANCH CONDITION (LBC; Ross 1986:127)**
 No NP which is the leftmost constituent of a larger NP can be reordered out of this NP by a transformational rule.
- (9) *LBC licenses Pied Piping (Ross 1967/86)*
 a. *_{NP} Whose]₁ did you read [_{NP} t₁ books]₂ ?
 b. [_{NP} Whose₁ books]₂ did you read t₂ ?

T₃: LBC licenses Pied Piping

Candidates	LBC	LFC
C ₁ : [_{CP} whose ₁ C _[+wh] [_{IP} ... [_{NP} t ₁ books] ₂]]	*!	
C ₂ : [_{CP} [_{NP} whose ₁ books] ₂ C _[+wh] [_{IP} ... t ₂]]		*

Ranking:

LBC ≫ LFC

4. Problems

4.1. Optionality

There are cases where pied piping is optional.

- (10) *Optional PP Pied Piping in English*
 a. [_{NP} Who]₁ did you talk [_{PP} to t₁]₂ ?
 b. [_{PP} To whom₁]₂ did you talk t₂ ?
- (11) *Optional CP Pied Piping in German*
 a. eine Frau [_{CP} [_{CP} die zu küssen]₂ er nicht t₂ wagte]
 a woman who to kiss he not dared
 ‘A woman that he did not dare to kiss’
 b. eine Frau [_{CP} die₁ er nicht [_{CP} t₁ zu küssen]₂ wagte]
 a woman who he not to kiss dared

(12) *Optional NP Pied Piping in English*

- a. Reports [CP which₁ the government prescribes [NP the covers of t₁]₂] are invariably boring
- b. Reports [CP [NP the covers of which₁]₂ the government prescribes t₂] almost always put me to sleep

Optionality is a problem for every competition-based framework. One would expect, for instance, (10-a) to block (10-b), because (10-b) violates LFC although extraction out of PP is possible in general in English.

T₄: Blocked PP Pied Piping

Candidates	LBC	LFC
C ₁ : [CP who ₁ C _[+wh] [IP ... [VP talk [PP to t ₁] ₂]]]		
C ₂ : [CP [PP to whom ₁] ₂ C _[+wh] [IP ... t ₂]]		*!

Standard Approaches to Optionality (cf. Müller 1999, Schmid 1999):

- (i) Global ties: Two constraints P₁ and P₂ are *tied*, i.e., there is no crucial ranking between P₁ and P₂. In other words: the speaker has acquired two different grammars. One with P₁ ≫ P₂ and one with P₂ ≫ P₁. Candidate C₁ is optimal under the first, C₂ under the second ranking.
- (ii) Identical constraint profiles: Both grammatical candidates C₁ and C₂ violate exactly the same constraints. Therefore both are optimal.
- (iii) Different competitions: The candidates C₁ and C₂ are not in the same competition (cf. ‘reference set’ in Chomsky 1995). Therefore C₁ cannot block C₂.

Remarks:

ad (i): As is clear from table T₄, a tie between LBC and LFC is useless. C₁ wins under both rankings. Hence, there must be another constraint P₃ which is violated by C₁ but not violated by C₂. The ranking P₃ ≫ LFC makes C₂ optimal.

Problems for (i):

1. What is a reasonable candidate for P₃?
2. Why doesn’t P₃ show its effects in the case of VP pied piping (cf. table T₂)?

ad (ii): Not a serious option, because it contradicts the basic idea of the present approach to pied piping.

ad (iii): Intuitively, C₁ and C₂ should not compete if their derivations differ drastically, e.g. if their derivations involve different movement operations. Both derivations involve *wh*-movement. Assume now that C₂ in addition to that involves PP-extrapolation, but C₁ does not:

(13) *Derivation of Candidate C₁*

- a. [VP you talk [PP to who₁]₂] + I, Subject raises →
- b. [IP you₃ [VP t₃ talk [PP to who₁]₂]] + C_[+wh], *wh*-movement of NP₁ →
- c. [CP who₁ C_[+wh] [IP you [VP talk [PP to t₁]]]]

(14) *Derivation of Candidate C₂*

- a. [VP you talk [PP to whom₁]₂] + I, Subject raises, PP₂-extraposition →
- b. [IP [IP you₃ [VP t₃ talk t₂]] [PP to whom₁]₂] + C_[+wh], *wh*-movement of PP₂
→
- c. [CP [PP to whom₁]₂ C_[+wh] [IP [IP you [VP talk t₂]] t'₂]]

The intermediary extraposition from (14-a) to (14-b) turns PP₂ into an island (*freezing effect*, cf. Ross 1967/86, Wexler & Culicover 1980). Therefore pied piping becomes necessary at that point of the derivation. Under this view, what is optional is extraposition, not pied piping. C₂ has an ‘extraposition feature’, C₁ has not. Therefore C₁ and C₂ are not comparable.

Problems for (iii):

1. For every case of optional pied piping one needs a correspondent case of optional movement that induces the freezing effect.
2. The derivation in (14) creates a case of so called *ambiguous binding* (cf. Müller & Sternefeld 1993). Ambiguous binding normally results in ungrammaticality (for instance long scrambling in German):

- (15) *weil niemand [VP Pudding₁ [VP sagt [CP t'₁ daß ich t₁ mag]]]
 because nobody Pudding says that I like
 ‘Because nobody says that I like Pudding’

- (16) PRINCIPLE OF UNAMBIGUOUS BINDING (PUB, Müller & Sternefeld 1993)
 A variable that is α -bound must be β -free in the domain of the head of its chain.

3. Danish has PP-extraposition:

- (17) Jeg læste en bog t₂ i går [PP om dansk syntaks]₂
 I read a book yesterday about Danish syntax
 ‘I read a book yesterday about Danish syntax’

Extrapolated PPs in Danish also exhibit the freezing effect (see (18-a)), whereas from in situ PPs extraction is possible (see (18-b))

- (18) a. *[NP Dansk syntaks]₁ læste jeg en bog t₂ i går [PP om t₁]₂
 Danish syntax read I a book yesterday about
 ‘I read a book about Danish syntax yesterday’
 b. [NP Dansk syntaks]₁ læste jeg [PP en bog about]₂ i går
 Danish syntax read I a book about yesterday

But pied piping of PP is nevertheless impossible in Danish (cf. Ross 1986:137, contra Weibelhuth 1992):

- (19) a. [NP Hvilken historie]₁ fandt han [PP på t₁]₂
 which story invented he in
 ‘Which story did he invent?’

- b. *_{[PP På hvilken historie]₂ fandt han t₂}
 in which story invented he

4.2. Locality

LFC in (6) seems to be a gradient constraint. Locality is violated in (20-a), but this violation is still optimal for some reason. But (20-b) violates LFC only a little more and the result is ungrammatical.

- (20) a. <sub>[PP About what]₁ did he read _{[NP a book t₁]₂ ?}
 b. *_{[NP A book _{[PP about what]₁]₂ did he read t₂ ?}}</sub>

But if this is the case, then why are all variants of (21) are equally fine (Ross 1986:121)?

- (21) a. Reports <sub>[CP which₁ the government prescribes _[NP the height of the lettering on the covers of t₁]₂] are invariably boring
 b. Reports <sub>[CP _[NP the covers of which₁]₂ the government prescribes the height of the lettering on t₂] almost always put me to sleep
 c. Reports <sub>[CP _[NP the lettering on the covers of which₁]₂ the government prescribes the height of t₂] are a shocking waste of public fund
 d. Reports _{[CP _[NP the height of the lettering on the covers of which₁]₂ the government prescribes t₂] should be abolished}</sub></sub></sub>

If LFC were gradient we would expect (21-d) to be worse than (21-c) to be worse than (21-b), etc.

5. Further Questions

What is the relation between pied piping and other strategies which can apply in order to repair island violations?

- (22) *Resumptive pronouns and wh-islands (Pesetsky 1998)*
 a. *<sub>[Which picture of John]₁ were you wondering _{[CP whether t₁ was going to win a price at the exposition] ?}
 b. ?_{[Which picture of John]₁ were you wondering _{[CP whether it₁ was going to win a price at the exposition] ?}}</sub>
- (23) *PF-Deletion and the coordinate structure constraint (Ross 1969)*
 a. *Irv and someone were dancing together, but I don't remember _[CP who₁ Irv and t₁ were dancing together]
 b. ?Irv and someone were dancing together, but I don't remember _[CP who₁ ~~Irv and t₁ were dancing together~~]
- (24) *PF-Deletion and the LBC (Ross 1969)*
 a. *John bought someone's car but I don't know _[CP whose₁ John bought t₁ car]
 b. John bought someone's car but I don't know _[CP whose₁ ~~John bought t₁ car~~]