Pied-piping (early 1990)
- plays a restricted role: in wh-movement constructions (covert or overt)
- pied-pipe if other strategies fail
- no general theory of pied-piping

I will show that:
- heavy pied-piping exists
- it occurs in many more environments; (in particular that-t and subject extraction)
- pied-piping plays a central role (you always pied-pipe)

(Overt) Pied-piping

(1) Overt pied-piping is structure dependent (Webelhauht, 1992 among others)
(cf. Moritz and Valois (1994) for covert pied-piping)

(2) a. [whose pictures] did you take
   b. [whose brother’s pictures] did you take
   c. *[pictures of which children] did you take

(3) XP pied-pipes if Spec of XP contain a phrase with the appropriate feature
(problems with usual constituent structure of PPs; problems with relative clauses)

(4) This configuration overlaps with the canonical configuration for extraction out of Spec:
(move to Spec, and then move on dependent on external configuration (XP is not a barrier).

(5) when do you extract from Spec, when do you pied-pipe?
(when are Left branch violations allowed, and when are they not)

(6) No theory of pied-piping.
“For the most part - perhaps completely - it is properties of the phonological component that require such pied-piping.” Chomsky (1995)

DP

3

who

3

s

This proposal predicts that when Left branch violations are permitted, they should only be permitted (by Economy).

For languages that have left branch extractions, the pied-piping alternative (?always) seems to exist:

(7) a. combien de gens tu as vu?
    how many of people you have seen

    b. combien tu as vu de gens
    how many you have seen of people

(8) a. wat voor boeken heb je gelezen
    what for books have you read

    b. wat heb je [e] voor boeken gelezen
    what have you for books read

(9) “Pied-piping might in principle depend as well on factors that constrain movement: barriers, ECP, the Minimal Link Condition.... Chomsky, 1995., p. 264)”

(10) Thus: pied-piping exist

    overt pied-piping when Spec contains relevant feature

    independent of phonology; last resort

(11) Question: when is extraction from Spec possible; when is pied-piping.

    I will suggest that extraction out of Spec should not be analyzed as extraction out of Spec, but rather as pied-piping of a remnant constituent.

(12) 1990: pied-piping is not a restricted phenomena.

    Big constituents can undergo pied-piping; (any constituent can undergo pied-piping)

    • French intonational questions (Sportiche (1992, 1995)

(13) tu va venir demain?

(14) [ [IP tu va venir demain [ Q [ [ e]

a. sentence final rising intonation:
b. negative polarity licensing.

Head initial yes/no questions license negative polarity items:
(15)  a. A-t-il-vu qui que ce soit?
      Has- he-seen anyone

intonational yes no questions do not (nor do statements):

b. *il a vu qui que ce soit?
He has seen anyone

(16)  IP pied-piping or head movement to Q --> QP must be activated: Q does not care if this is done by head movement or by XP movement

A projection must be activated by lexical material in the course of a derivation

(PPA= all functional projections have a strong feature)

(17)  String vacuous movement --> pied-piping could be all over the place, and the effects could be hidden.

  • Nkemnji (1995) (Nweh) argues for phrasal pied-piping of the complement of NegP to Spec, NegP in Nweh, a Grassfield Bantu language spoken in Cameroon.

(18)  Njikem a ke? te pfEt akendON bO
      N  Agr  P-1 Neg  eat  plantains Neg
      S  T  pas

bO is ne: V moves to bO

  te is pas:
(19)  Njikem a ke? te akendON pfEt
      N  Agr  P-1 Neg  banana  eat

Nkemnji convincingly argues for an analysis which treats bO as the head of NegP, with the complement marked by te moving to Spec, NegP:

(20)  [NegP [ XP te.. [ bO [ (pas) (ne) [e] ] ] ]]

The pied-piped complement is extremely “heavy”, containing clausal complements, and adjuncts.
(21) a.  n kEf?  [ te ju7 le njikem a  kw fia nkap ambo Atem Wjua] ] [ e ]
   ISA P1 te    hear that Njikem Agr P2 give money to Atem yesterday bO
   ‘I did not hear that Njikem gave money to Atem yesterday’

   b.  njikem a      kw [ te fia nkap  ambo Atem Wjua ] ] [ e ]
   Njikem 3Agr P2 te    money to Atem yesterday bO
   ‘Njikem did not give money to Atem yesterday’

• Kayne (1994), and work inspired by Kayne.

(22) [ [ a picture ] [ of [ John’s [ e ] ]

(23) pied-piping exist for all kinds of constituents
   overt pied-piping when Spec or head contains relevant feature;
   pied-piping not necessarily forced by phonology

Pied-piping in English: Subject object asymmetries

  English: that-t effect Perlmutter, 1978)

(24) a.  Who do you think (*that) [e] saw Marie
   b.  Who do you think (that) Bill saw [e]

Italian. Rizzi (1982)

(25) a. Chi credi che verrà
   Who believe-2 that come-will-3rd

   Extraction not possible from subject position, but from inverted position

(26) a. Chi credi che verrà [e]

   Extraction not possible from matrix subject position. External subjects (preverbal subjects, and
   inverted subjects of unergative Vs) can be bare quantifiers (tre PRO). Quante/ quanti PRO (how
   many) cannot be used; instead extraction must take place from inverted position.

(27) a. Quante *(ne) sono cadute

   b. *Quante hanno telefonato

(28) You can never extract a “subject” from the immediate c-command domain of that/C
(29)  
\* 3
     that 3
     who  XP

(30) Koopman, 1983. No do support with subject extraction in English matrix clauses; obligatory do-support with extraction of non subjects.

(31)  a. Who saw Marie  * Who did see Marie
    b. *Who Bill saw  Who did Bill see
    c. *Why Bill saw Marie  Why did Bill see Marie

do movement to C, would yield a that-t effect. Do-support is blocked with subject extraction for the same reason as that is forced to be silent:

(32)  a. * who, [c did] [e], [e], see Marie
    b. *Who do you think [ e, that [ ] e], saw Mary

ECP account for that-t effect (doesn’t work, cf. also Culicover, 1994)

<table>
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<tr>
<th>Problem:</th>
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<td>why can you extract from the subject position in English, but not from the subject position in Italian?</td>
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| There is no parameter distinguishing Italian from English: you cannot extract from the position immediately c-commanded by C in English either. |

- A pied-piping analysis of subject extraction in English.

Previous analyses: the subject moves; wh-questions are CPs; versus: the subject doesn’t move: subject wh-questions are IP/whPs.

String vacuous movement (Chomsky, 1986)

GPSG (no gap).

who came is IP and becomes CP[+wh] covertly (but how do you get wh-question interpretation, phonology knows that this is a wh-question; no link with that-t effect in embedded clauses)

All wh-questions are structurally identical.
Subject wh-phrase is in Spec, IP: this is a pied-piping configuration, and the entire IP pied-pipes.
Object wh-phrases extract to whP.

(Simplified)
(33) Subject extraction: 
   IP raising, no I to C 
   who came 
   
Object extraction 
   Wh extraction and I to C 
   who did you see [e] 

(34) that-
   think 
   who came that 
   who do you think came 
   who do you think Mary saw 
   *who Mary saw did you think 
   who did Mary see did you think 

In order to get subject extraction, the IP needs to undergo pied-piping to Spec, thatP. The wh-phrase no longer falls under the generalization in (28), and can be extracted: but Spec, thatP contains remnant IP (lexical material). By doubly filled C filter, (modified LCA, Koopman, 1986), 
*that is forced to be silent.

(35) Different categories are in Spec, whP: IP or DP.

- Support for derived constituency: coordination. (Williams, 1977)

(36) a. * I wonder who left and Bill saw t 
b. * I wonder what Bill saw and happened to Mary 
c. I wonder what Bill saw and you thought [e] happened to Mary 

(37) * wonder 
    IP 
    who left C [pe] 
    and IP 
    Bill [de] saw [pe]
IP pied-piping for subject extraction also accounts for a theoretical problem concerning the status of wh-traces.

(39) A wh-variable must be Case marked

Kayne (1984)

(40) a. Qui crois tu [t [t etre venu  
+Case -Case  
Who believe you be come  
Who do you believe to have come

b.* Je crois [ C [ Jean etre venu  
I believe John to be come  
I believe John to have come

(41) Pied-piping of IP, made possible by the wh-feature in Spec, IP, reduces the French case to the English believe.

This suggests that English believe allows IP to raise with [John to have left], (but: matrix adverbs can appear after John) but French does not.

It also raises additional questions:

* [qui etre venu] crois-tu  
* [who to have come] do you believe

and why: * qui crois qui etre venu

(42) An aside on que --> qui
Qui is an agreeing C with IP, (therefore insensitive to features of the wh-phrase.)
French cannot impose silence on C (no que deletion), (que in French obligatorily raises higher than IP) whereas English can.

A more accurate structure:

  A projection must be activated by lexical material in the course of a derivation
  \rightarrow In order to be interpreted as a wh-question, the wh-projection must be activated by lexical material.
  Disallows silent heads of chains (declarative CPs, imperative CPs: either activated by head movement or by phrasal movement))

(43) Left field: XP > Wh > Q > C ..

(44) Ik weet niet wie of dat dat gedaan heeft
I not know who if that that done has

(45) English Q:
  English yes-no questions: intonational questions (marginal) (IP to Q)
  I to Q (dominant)

Therefore: I to Q > IP to Q (English)

root vs. non root questions
 extraction of wh-word out of embedded complement

(46) Structure of wh-questions:
subject extraction: (Koopman, 1996): (abstracting from XP)

(47) a. who came
b. *who did come (who cannot be extracted from IP)
c. *who came did (I to C impossible because of remnant movement)

(48). One possibility (keeping close to structures we are used to):

(49). What I think is really going on:
CP raising to Spec, QP to licence Q;
QP raising to license to Spec WhP.

C= silent (spec is filled with who came)
Q is silent (Spec is filled with who came)
wh is silent (Spec is filled with who came)

All heads have filled Spec positions --> by doubly filled C (modified LCA, Koopman, 1996) no overt heads are possible. do-support impossible (if it could get out) because of generalized doubly filled C.

(50). Who did come: Violates (28)

*  

who  

wh  

Q  

did  

IP  

[\text{e}]  

come

(51). *who come did

This is out because of head trace in remnant.

*  

wh  

Q  

did  

who  

[\text{e}]  

come

QP to whP does not help (*did who leave). who is too far embedded in QP to trigger pied-piping: the wh-projection does not get activated.

(52). Situation concerning remnant movement of constituents with extracted heads unclear. Certain cases of remnant movement must be OK, but others are not. (cf. Nkemnji, 1996, Koopman, 1994).

*  

OK:  

X,  

Y,  

[\text{e}]  

Y,  

[\text{e}]

(53), (Mueller, 1996, p. 268):

**Generalization:**

Remnant XPs cannot undergo Y-movement if the antecedent of the unbound trace has also undergone Y-movement
(wh-movement stands for wh-movement, scrambling, topicalization, head movement, etc.)

-- you can mix wh-movement and head movement (head movement and any other type of XP movement)

**Unambiguous domination**

An alpha-trace must not be alpha dominated.

alpha-trace is a trace with an antecedent in a position alpha
alpha-dominated dominated by a category in position alpha.

**Object extraction:**

(54)

$$
\begin{array}{c}
3 \\
\text{what} & 3 \\
\text{wh} & 3 \\
\text{[o]did} & 3 \\
\text{IP} & 3 \\
\text{you} \ [e] \text{see} \ [e]
\end{array}
$$

**Diagram:**

- Wh phrase raises to scope position Spec, WhP
- I to Q activates QP
- IP to QP * because I to C > IP to QP

(55) * what you saw

Activation of QP: I to Q > IP to Spec QP.

**Did you see what:** At this stage of the derivation, wh-phrase must move to Spec, whP:
The IP/QP cannot move to the Wh-P: the wh-phrase is not in a pied-piping configuration,
and PPA is violated.

(56) * did you see what (QP to whP)

**Non-root questions:**

IP to QP > I to Q

Why? Embedded questions are selected.
One possibility: matrix clauses don’t have C (this doesn’t change anything to the story for
matrix clauses developed so far; embedded clauses have C.
CP raises to Spec, QP: this allows the selecting verb to check economically that it has a complement, which is both a question and a tensed CP.
(57) who do you think came
All clause types have the same hierarchical structure:

3     3     3
   think   IP  3
6   C  3
who came  that

(58) The existence of heavy pied-piping forces reanalyses of traditionally assumed analyses.
Substantial theoretical consequences.
Subject object asymmetries:
(a reanalysis of the distribution of verbal forms in English, in collaboration with Dominique
Sportiche, and the French/English distinction in terms of pied-piping. This undermines much of the
initial motivation for Procrastinate). Suggests no need for strong weak distinction: it is a question
of how a particular projection is activated (by head movement or by movement to Spec.)

Remaining questions: what is the status of (28) (that-t);
when is extraction from Spec possible; when is pied-piping
(what is extraction from Spec)

Suggestion: there is never extraction from Spec; instead it is always pied-piping; It looks like
extraction out of Spec, because some constituent has been moved out of the clause, and the
remnant only consist of the wh-phrase.
(i.e. you make the wh-phrase final by pulling out its complement, and then do wh-movement.
Historical antecedent: extraposition and extraction (On wh-movement), Internal S constraint
(Kuno, 1973))

(59) 
Think needs to check CP (this is what think takes): CP raises to LP(CP) (Licensing position for
tensed CPs (this will account for the distribution of tensed clauses)

(60)  [ think [ that [ John likes [e] ] ] [who [e]]
(61) [who [e]] do .... [ think [ that [ John likes [e] ] ]

This would have the advantage that it can build in the bridge V property etc: you can split up a
large structure if that structure contains a constituent that has a relation to some element outside
of it (this replaces the earlier notion of theta-marking)
Clauses are always XP (full structures), but different parts inside a clause cooccur with outside elements (complementation).

(62) What is the that-t effect: :

In order to extract the subject, the constituent must be split up.

\[ \text{VP} \quad \text{wh} \quad [ \]

But with the string \( Swh \ V \ldots \) splitting up is impossible: there is no higher licensing position for the predicate. Therefore you see pied-piping in this configuration. (CED effects)

This implies that for:

\[ \text{who} \quad \text{do you think} \quad [ \quad \text{e} \quad \text{came}] \]

who must be analyzed as occurring outside the constituent \( \text{came} \).

\( \text{Who} \) is in a different position from non-focused subjects in English, and has the same distribution as focused subjects:

(63) John soon will come \quad *who soon will come \quad *Only John soon will come