

Diagnosing Covert Pied-Piping


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The question

Pied-piping is visible in overt movement:

- (1) [_{PP} In *which* class] C did you get a good grade ___?



In-situ wh-phrases move covertly:

- (2) [*Which* student] ...*which*... C ___ got a good grade in *which* class?



👉 Does covert movement trigger pied-piping?

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- 1 We present new data on the distribution of **focus intervention effects in *wh*-questions**. We show that, assuming that intervention correlates with focus-alternatives computation (Beck, 2006), the data motivates the existence of **covert *wh*-pied-piping**.
- 2 Having established the use of focus intervention effects as a **diagnostic for alternative computation and pied-piping**, we discover **focus intervention effects in Association with Focus constructions**.

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- 2 Having established the use of focus intervention effects as a **diagnostic for alternative computation and pied-piping**, we discover **focus intervention effects in Association with Focus constructions**.

In *overt pied-piping*, the interrogative complementizer can attract different sized constituents containing the *wh*-word:

- (3) Jim owns a picture of *which* president
 - a. [*Which* president] does Jim own a picture of ___?
 - b. [*Of which* president] does Jim own a picture ___?
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Intervention in overt pied-piping

Sauerland and Heck (2003); Cable (2007) show that *intervention effects* occur inside pied-piped constituents:

(4) Cable (2007):

- a. [A picture of *which* president] ___ hangs in Jim's office?
- b. * [No picture of *which* president] ___ hangs in Jim's office?

If an *intervener* is placed between the *wh*-word and the edge of its pied-piping constituent, it results in ungrammaticality.

(5) Intervention in pied-piped constituents: (S&H; C)

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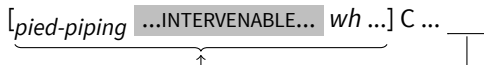
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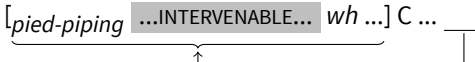
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[*pied-piping* ...INTERVENABLE... *wh* ...] C ... ____


No intervention when intervener is inside pied-piping, but below *wh*:

(6) [*Which* picture containing **no** presidents] ____ hangs behind Jim's desk?

Intervention can be avoided by choice of pied-piping size:

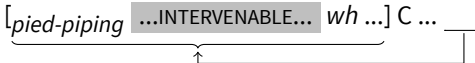
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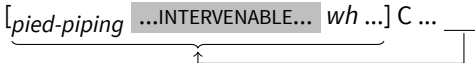
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Covert movement in *wh*-questions

Generally, all *wh*-words move to the complementizer (Karttunen, 1977; Huang, 1982; Pesetsky, 1987, 2000; Richards, 1997; Beck, 2006; Cable, 2007, a.o.):

(8) C *Who* owns a picture of *which* president?

Subsequent movements tuck-in. Only the highest *wh*-phrase is pronounced at the head of its chain; other *wh*-phrases are pronounced in their base positions. These *in-situ wh*-phrases move “covertly.”

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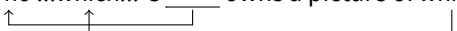
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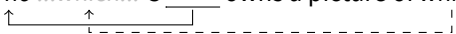
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(8) *Who ...which... C* _____ owns a picture of *which* president?
The diagram shows two horizontal arrows pointing to the right. The first arrow starts under the word 'Who' and ends under the blank space after 'C'. The second arrow starts under the word 'which' and also ends under the same blank space after 'C'. This illustrates that both *wh*-words have moved to the complementizer position.

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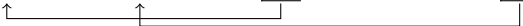
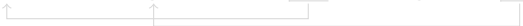
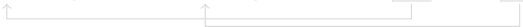
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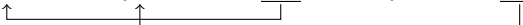
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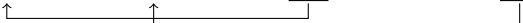
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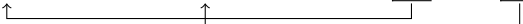
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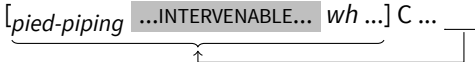
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Diagnosing covert pied-piping

Recall that *overt* pied-piping leads to intervention effects:

- (5) **Intervention in pied-piped constituents: (S&H; C)**


[*pied-piping* ...INTERVENABLE... *wh* ...] C ...



☞ Assuming intervention as in (5) is evaluated at LF (Beck, 2006),
intervention effects can diagnose the size of *covert* pied-piping.

- (9) **Intervention in covert pied-piping:**

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Different amounts of covert pied-piping predict different **...INTERVENABLE...** regions:

- (8) *Who owns a picture of which president?*
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Diagnosing covert pied-piping

- (10) Context: Over the break, every student read a book from a local library and submitted a book report. Each book report gave the title of the book and which library it was borrowed from.
- (11) ✓ I know [*which* student read a book from *which* library].
- (12) Context: Over the break, the students were assigned to go read one book each from every library in the area and submit a book report. No student completed the entire assignment; every student went to all but one of the libraries.
- (13) * I know [*which* student read **no** book from *which* library].

A ratings study was conducted on Mechanical Turk to confirm this contrast. A summary is in the appendix.

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The diagnosis

(11) ✓ I know [*which* student read a book from *which* library].

(13) * I know [*which* student read **no** book from *which* library].

Note that higher negation does not cause such a contrast:

(20) ✓ I know [*which* student **didn't** read a book from *which* library].

Thus (13) is not a general negative island effect.

The effect only occurs if the intervener c-commands the *wh*-word.

(21) ✓ I know [*which* s. read *which* book containing **no** princesses].

👉 The effect is limited to a particular region *above* and *near* the *in-situ wh*.

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This contrast teaches us that **no** in (13) is in an **...INTERVENABLE...** region.

Moreover, smaller pied-piping options were not available:

(8) *Which* student read no book from *which* library?

a. *Which* student read **no** book from [*pied-piping* *which* library]?

⇒ *predicts no intervention!* ☠

b. *Which* student read **no** book [*pied-piping* **from** *which* library]?

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- c. *Which* student read [*pied-piping* **no** book from *which* library]?
⇒ predicts *intervention!*

Covert movement triggers pied-piping
and chooses the *largest pied-piping
constituent possible*.

Pied-piping size and the interfaces

Recall that the size of *overt* pied-piping is variable, with a preference for *smaller* pied-piping:

- (3) Jim owns a picture of *which* president
- a. ✓ [*Which* president] does Jim own a picture of ___?
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...but we have shown that *covert* pied-piping chooses the *largest* among the options for overt pied-piping.

 The preference for smaller pied-piping in overt movement is an artifact of PF constraints on *wh*-movement, not a general preference of the pied-piping mechanism itself.

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Pied-piping size and the interfaces

Recall that the size of *overt* pied-piping is variable, with a preference for *smaller* pied-piping:

- (3) Jim owns a picture of *which* president
- a. ✓ [*Which* president] does Jim own a picture of ___?
 - b. ✓ [Of *which* president] does Jim own a picture ___?
 - c. ? [A picture of *which* president] does Jim own ___?

...but we have shown that *covert* pied-piping chooses the *largest* among the options for overt pied-piping.

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- ☞ *Wh*-phrases prefer to be near the left edge when pied-piped (Horvath, 2007; Heck, 2008, 2009; Cable, ms, a.o.). ⇒ *A PF constraint!*

Data from Cable (ms):

- (22) a. ✓ [[[*Whose* brother]'s friend]'s father] did you see ___?
b. * [The father of *whose* brother's friend] did you see ___?
- (23) a. ✓ [[*How* big] a ___ car] did Bill buy ___?
b. * [A [*how* big] car] did Bill buy ___? (cf Heck, 2008, 2009)

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Pied-piping size and the interfaces

Overt movement feeds PF and LF, while covert movement only feeds LF.

- ☞ The preference for pied-piping the *largest possible constituent* is the true preference of Core Syntax and LF.
- ☞ However, in cases where the movement feeds PF as well, the choice of pied-piping can be overridden by PF constraints.

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Theory of intervention and pied-piping

Focus intervention

A question can be computed through movement and/or Rooth-Hamblin alternative computation (Hamblin, 1973; Karttunen, 1977; Rooth, 1985):

(24) a. Interpretation through movement:

LF: $wh\ C \quad \dots$

A horizontal line is drawn above the text 'wh C ...'. A vertical line descends from the right end of this horizontal line to the 'C'. A second horizontal line is drawn below the 'wh' and 'C', with an upward-pointing arrow starting from the left end of this second line and ending under the 'C'.

b. Interpretation through alternative computation:

LF: $C_i \leftarrow \text{~~~~~} wh_i$

Beck (2006): Computation of Rooth-Hamblin alternatives can be interrupted by focus interveners *Op*, such as *only*, *even*, focus-sensitive negation, etc.

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A diagram showing a horizontal line above the text 'LF: wh C ...'. A vertical line goes down from the 'C', then a horizontal line goes left, and another vertical line goes up to the 'wh', forming a U-shape that indicates movement from C to wh.

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Interpreting pied-piping

Cable (2007): pied-piping is *QP-movement*

- A Q-particle adjoins to a position above the *wh*-phrase. The complementizer attracts the QP.

- (26) Jim owns [_{QP} Q a picture [_{QP} Q of [_{QP} Q *which* president]
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[QP Q ...INTERVENABLE... wh ...] C ...

(4b) **Intervention in overt pied-piping:** (Cable, 2007, cf S&H, 2003)

* [QP Q **No picture of** *which* president] hangs in Jim's office?

Intervention in overt pied-piping

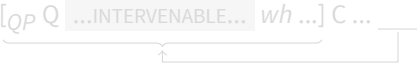
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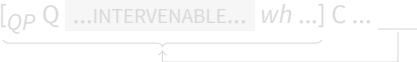
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Intervention in covert pied-piping

- ☞ Cable's (2007) application of Beck's (2006) theory to intervention within QPs predicts that, *if covert pied-piping exists*, it should be intervenable:

(9) **Intervention in covert pied-piping:**

... C ... [QP Q ...INTERVENABLE... wh ...]
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(13) * I know [*which* student read [QP Q no book from *which* library]].

(20) ✓ I know [*which* student didn't read [QP Q a book from *which* l.]].

This discussion theoretically grounds our use of focus intervention as a diagnostic for covert pied-piping.

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Pied-piping in focus constructions

Intervention outside of *wh*-questions

☞ The Beck (2006) theory of focus intervention predicts intervention not just between *wh* and C/Q, but *anywhere where Rooth-Hamblin alternatives are computed*.

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* LF: C/Q_{*i*} Op $\leftarrow \sim$ wh_{*i*}

(30) **Intervener blocks interpretation of focus alternatives:**

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☞ Beck (2006) discusses this prediction but fails to find concrete evidence for it. In this section, we will provide the missing data, by examining pied-piping in focus constructions.

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The pivot in English *it*-clefts can be considered to be a form of pied-piping movement (Krifka, 2006):

(31) **Pied-piping in *it*-clefts:**

John read a book from THIS_F library.

- a. It's [THIS_F library] that John read a book from ____.
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- (32) It's [*pied-piping* a book from THIS_F library] λx John read x .
Rooth-Hamblin alternatives *movement*

Viewing cleft pivots in this light, Beck (2006) expects focus intervention inside the pivot. We argue that such intervention does occur:

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Rooth (1985, 1992): F-marked constituents stay *in-situ* and are interpreted through focus alternative computation.

(34) ***In-situ* Association with Focus:**

I *only* read a book from THIS_F library.



Under this approach to Association with Focus, Beck (2006) predicts that the entire region between *only* and the F-marked constituent is intervenable. However this is not the case:

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✓ I *only* **didn't** read a book from THIS_F library.

In-situ association through covert movement

Another approach to Association with Focus argues that it involves *covert movement of the F-marked constituent with pied-piping* (Drubig, 1994; Krifka, 2006; Wagner, 2006, cf Chomsky 1976).

(36) **Focus association through covert movement:**

I ... *only* read a book from THIS_F library.
 ^-----|

Moreover, the F-marked constituent is then interpreted through Rooth-Hamblin alternatives, *inside* the pied-piped constituent (Horvath, 2000; Krifka, 2006; Wagner, 2006).

☞ Under this view, we predict an intervenable region right above the F-marked constituent. We argue that that is indeed the case.

(37) Intervention in *in-situ* focus:

* I *only* read [*covert pied-piping* no book from THIS_F library].

The contrast in (37) shows that, like with *wh*-movement, the largest possible constituent is covertly pied-piped.

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Intervention in *in-situ* association

We provide the missing data point for Beck's (2006) prediction that *all* regions of Rooth-Hamblin alternative computation are intervenable.

☞ We have shown that intervention does occur in Association with Focus constructions: *inside* the pied-piping of covert focus movement.

(37) * I *only* read [_{covert pied-piping} no book from THIS_F library].

(35) ✓ I *only* **didn't** read [_{covert pied-piping} a book from THIS_F library].

This parallels the pattern of intervention with covert *wh*-pied-piping:

(13) * I know [*which* s. read [_{covert pied-piping} no book from *which* library]].

(20) ✓ I know [*which* s. **didn't** read [_{covert pied-piping} a book from *which* l.]].

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 - by examining new patterns of **Beck's (2006) focus intervention effects**,
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 - We showed an **LF preference for larger pied-piping**.
- 2 We motivated the use of **focus intervention effects as a diagnostic for Rooth-Hamblin alternative computation and pied-piping**.
- 3 We presented evidence for **intervention in focus constructions**:
 - in overt pied-piping, i.e. the pivots of *it*-clefts;
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Thank you! Questions?

We thank David Pesetsky, Martin Hackl, Danny Fox, Irene Heim, Maziar Toosarvandani, Isaac Gould, Sasha Podobryaev, and Coppe van Urk for helpful comments and discussion. We thank Ivona Kučerova for an engaging conversation which led us down this path. All errors are each other's.

Slides: <http://mitcho.com/academic/slides-nels2012.pdf>

Handout: <http://mitcho.com/academic/handout-nels2012.pdf>

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Appendix: Intervention in Beck (2006); Pesetsky (2000)

Beck (2006) primarily discusses focus intervention effects between C and an LF-*in-situ* *wh*-word. This is observable in English in superiority-violating questions.

Pesetsky (2000); Beck (2006): Both movement and alternative computation strategies are used in English questions. In superiority-violating questions, *in-situ wh*-words stay *in-situ* at LF and are interpreted through alternatives.

- (38) a. Which boy ... C didn't ___ read which book?
 ⇒ no intervention
- b. * Which book C did which boy read ___?
 ⇒ intervention!

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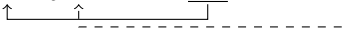

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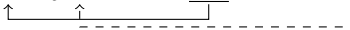

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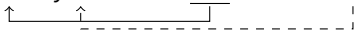
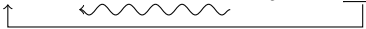
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Appendix: Ratings study

- 10 items run on Amazon Mechanical Turk with no contexts.
- 4 conditions each: crossed *a/no* with complement/adjunct PPs.

(39)	Except for John, I know which student read...	
a.	a book [<i>PP-comp</i> about which philosopher.	60%
b.	no book [<i>PP-comp</i> about which philosopher.	7%
c.	a book [<i>PP-adj</i> from which library.	56%
d.	no book [<i>PP-adj</i> from which library.	7%


- Embedded under exceptives to prefer pair-list readings.
- 160 participants, forced-choice task.

 **Main effect of intervener, no effect of complement vs. adjunct**

Appendix: clausal pied-piping

Some of the original motivation for proposing that covert focus movement pied-pipes comes from the observation that Association with Focus is apparently island-insensitive. Drubig (1994) and others thus propose that if the F-marking is inside an island, the pied-piping must be at least island size. As is, this predicts larger intervenable regions:

(40) I *only* read [the book that [Mary read at SCHOOL_F]].



But this does not seem to be the case:

(41) ✓ I *only* read [the book that [Mary **didn't** read at SCHOOL_F]].

Following Kotek (upcoming); Nishigauchi (1990), we propose that in clause-sized islands, the *in-situ* F-marked constituent (or *wh*-word) can move *inside* the island, thus predicting a smaller intervenable region.

(41') LF: I *only* read [the book that [SCHOOL_F Mary **didn't** read at ___]].

