Intervention effects and pied-piping[1]

☞ New language report deadline: Thursday, December 4, before class.

1 Introduction

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?**

2 Background: Intervention in overt pied-piping

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 ____?
   c. [A picture of *which* president] does Jim own ____?

Cable (2007): the pied-piped constituent is a *QP*.

- Different pied-piping sizes correspond to different positions of Q
- Interrogative C always attracts QP

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

[1]This handout borrows quite heavily from our handout for our presentation at NELS 43.

(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?
   c. * [**Only** [PICTURES of which president]] ____ hang 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.

☞ This effect is due to the following structural configuration:

(5) **Intervention in pied-piped constituents:** (S&H, 2003; Cable, 2007)
[*pied-piping* ...INTERVENABLE... *wh* ...] C ... ____

Definition: a region is ...INTERVENABLE... if, when a focus-sensitive operator occurs inside it, the structure becomes ungrammatical with the intended reading.

No intervention when intervener is inside pied-piping, but below *wh*: (Cable, 2007)

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

Intervention can be avoided by choice of pied-piping size: (Cable, 2007)

(7) a. * [**No** picture of *which* president] does Jim own ____?
   b. ✓ [*Which* president] does Jim own [**no** picture of ____]?

3 Covert pied-piping (Kotek and Erlewine, to appear)

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

(8) *Who...which...* C ____ 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."

☞ **Does covert movement trigger pied-piping?** And if so, how much?

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

a. [*Who*] [*which* president] C ____ owns a picture of ____?

b. [*Who*] [of *which* president] C ____ owns a picture ____?

c. [*Who*] [a picture of *which* president] C ____ owns ____?

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

(5) **Intervention in pied-piped constituents:** (S&H, 2003; Cable, 2007)
[*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:**
... C ... [*covert pied-piping* ...INTERVENABLE... *wh* ...]

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

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

a. *Who* owns a picture of [*covert pied-piping* *which* president]?

b. *Who* owns a picture [*covert pied-piping* of *which* president]?

c. *Who* owns [*covert pied-piping* a picture of *which* president]?

3.1 Core data

Contexts are provided to satisfy the presuppositions of multiple questions (Dayal, 1996).[2]

(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. (baseline)

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

(11) 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.

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

[2]Some speakers do not get intervention effects with single-pair readings of multiple questions (Pesetsky, 2000; Beck, 2006), so it is important that these examples have pair-list readings.

Here is additional data with other potential interveners.

(12) Context: In this course we cover five topics. Each student chooses a topic to specialize on; students must give more than one presentation on their specialty topic, and exactly one presentation each on all other topics. At the end of the semester...

✓ I know [*which* student gave **more than one** presentation about *which* topic].

(13) Context: Over the break, the students were assigned to go read three books each from every library in the area and submit a book report. No student completed the entire assignment; every student had one particular library, from which they failed to read three books.

✓ I know [*which* student read **less than three** books from *which* library].

(14) Context: At the flea market, a number of collectors are selling pictures and autographs of past presidents. For most presidents, they have successfully sold both pictures and autographs, but according to the records, every collector has one president for which they did not sell any autographs.

* I know [*which* collector sold **only** PICTURES of *which* president].

(15) Context: We at McDonald's are testing three new toppings for burgers: cranberries, jicama, and natto. As a pilot, they were offered at several branches around the world for one week only. At every branch, only two toppings sold thousands while the other sold about a hundred. Culinary tastes vary across the world, so there was no clear overall winner.

?? I know [*which* branch sold **very few** burgers with *which* topping].

We see that *more than n* and *less than n* are ok in these questions, but *no, only* and *very few* lead to ungrammaticality. This is the same pattern we saw Monday in the case of intervention effects with matrix questions in English.

3.2 Intervention effects in covert pied-piping

What does this contrast between (10) and (11) tell us?

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

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

Note that higher negation does not cause such a contrast:

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

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

(17) ✓ I know [*which* student read *which* book containing **no** princesses].

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

This contrast teaches us that **no** in (11) 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 [$_{\textit{pied-piping}}$ *which* library]?
⇒ *predicts no intervention!* ☠

b. *Which* student read **no** book [$_{\textit{pied-piping}}$ from *which* library]?
⇒ *predicts no intervention!* ☠

c. *Which* student read [$_{\textit{pied-piping}}$ **no** book from *which* library]?
⇒ *predicts* ***intervention!***

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

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 *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.

Wh-phrases prefer to be near the left edge when pied-piped (Horvath, 2007; Heck, 2008, 2009; Cable, 2012, a.o.). ⇒ ***A PF constraint!***

(18) **The Edge Generalization (Heck 2008: 88, Heck 2009: 89)**
If α pied-pipes β (and movement of α to the edge of β is grammatically possible), then α must be at the edge of β.

(19) Data from Cable (2012):
  a. ✓ [[[*Whose* brother]'s friend]'s father] did you see ___?
  b. * [The father of *whose* brother's friend] did you see ___?

(20) a. ✓ [[*How* big] a ___ car] did Bill buy ___?
  b. * [A [*how* big] car] did Bill buy ___? (cf Heck, 2008, 2009)

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.**

4 Intervention and pied-piping

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

(21) a. *Interpretation through movement:*
LF: *wh* C ⋯ ___

  b. *Interpretation through alternative computation:*
LF: C_i ⇜ wh_i

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

(22) **Intervener blocks interpretation of *wh*-alternatives by C:**
*LF: C_i ***Op*** ⇜ wh_i

Cable (2007) uses this mechanism to explain intervention inside *wh*-pied-piping constituents, within his theory of pied-piping as *QP-movement*. A Q-particle adjoins to a position above the *wh*-phrase. The complementizer attracts the QP.

(23) Jim owns (Q) a picture (Q) of (Q) *which* president
  a. [$_{QP}$ Q *Which* president] does Jim own a picture of ___?
  b. [$_{QP}$ Q Of *which* president] does Jim own a picture ___?
  c. [$_{QP}$ Q A picture of *which* president] does Jim own ___?

The *wh*-word inside the QP is interpreted through focus alternatives.

(24) [$_{QP}$ Q A picture of *which* president] λx does Jim own x?
Rooth-Hamblin alternatives *movement*

Following Beck's (2006) logic, we expect intervention effects inside pied-piping constituents:

(25) **Intervener blocks interpretation of *wh*-alt.'s by Q:** (Cable, 2007)
*LF: [$_{QP}$ Q ***Op*** wh_i

(5) **Intervention in pied-piped constituents:** (Cable, 2007)
[$_{QP}$ 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?

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

(9) **Intervention in covert pied-piping:**
... C ... [$_{QP}$ Q ...INTERVENABLE... *wh* ...]

(11) * I know [*which* student read [$_{QP}$ Q **no** book from *which* library]].

(16) ✓ I know [*which* student **didn't** read [$_{QP}$ Q a book from *which* library]].

This prediction is borne out. This motivates the use of intervention effects as a diagnostic for areas of Rooth-Hamblin alternatives computation.

5 Pied-piping in focus constructions (Erlewine&Kotek, 2014)

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

(26) **Intervener blocks interpretation of *wh*-alternatives:**
*LF: [$_{QP}$ C/Q$_i$ ***Op*** wh_i

(27) **Intervener blocks interpretation of focus alternatives:**
*LF: [$_{QP}$ Op$_i$ ***Op*** X_{Fi}

☞ Beck discusses this prediction but fails to find concrete evidence for it. However, we will see that this prediction is borne out *if covert focus movement is taken into account*.

5.1 Pied-piping in overt focus movement

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

(28) **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 ____.
b. It's [from THIS$_F$ library] that John read a book ____.
c. It's [a book from THIS$_F$ library] that John read ____.

The *it*-cleft associates with focus inside the pivot (Jackendoff, 1972; Krifka, 2006). Therefore *it*-clefts are interpreted using both movement and alternative computation, much like *wh*-pied-piping:

(29) It's [$_{\textit{pied-piping}}$ 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. Erlewine and Kotek (2014) argue that such intervention does occur:

(30) **Intervention in *it*-cleft pivots:**
a. * It's [**no** book from THIS$_F$ library] that John's read ____.
b. ✓ It's [from THIS$_F$ library] that John's read **no** book ____.
c. ✓ It's [THIS$_F$ library] that John's read **no** book from ____.

5.2 Pied-piping in *in-situ* Association with Focus

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

(31) ***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:

(32) **Lack of intervention in *in-situ* focus constructions:**
✓ I *only* **didn't** read a book from THIS$_F$ library.

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).

(33) **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.

(34) **Intervention in *in-situ* focus:**
* I *only* read [$_{\textit{covert pied-piping}}$ **no** book from THIS$_F$ library].

The contrast in (34) shows that, like with *wh*-movement, the largest possible constituent is covertly pied-piped.

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

This is also an argument in favor of the theory of covert focus movement with pied-piping and against the theory of in-situ Association with Focus.

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