Diagnosing Covert Pied-Piping

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Pied-piping is visible in overt movement:

1. \( [_{pp} \text{In } which \text{ class}] \ C \text{ did you get a good grade } \_\_\_? \)

\[ \]

In-situ wh-phrases move covertly:

2. \( [\text{Which student}] \ldots which \ldots \ C \_\_\_ \text{ got a good grade in } which \text{ class?} \)

\[ \]

Does covert movement trigger pied-piping?
The question

Pied-piping is visible in overt movement:

(1) \([_{pp} \text{In } which \text{ class}] \ C \text{ did you get a good grade } \underline{\_\_\_}\)?

In-situ wh-phrases move covertly:

(2) \([Which \text{ student}] \ ...which... \ C \underline{\_\_\_} \text{ got a good grade in which class?}\)

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The question

Pied-piping is visible in overt movement:

1. \([_{pp} \text{In which class}] \ C \ \text{did you get a good grade} \)\(\_\)\(\_\)?

\(\uparrow\)

In-situ \(wh\)-phrases move covertly:

2. \([\text{Which student}] \ldots \text{which} \ldots \ C \)\(\_\)_\(\_\) got a good grade in \(\text{which} \)\(\_\)_\(\_\) class?

\(\uparrow\) \(\_\) \(\_\) \(\_\)

Does covert movement trigger pied-piping?
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.

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.
Today:

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.
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 ___?
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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 intervenor 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)
   [pied-piping ...INTERVENABLE... wh ...] C ... ___
Sauerland and Heck (2003); Cable (2007) show that *intervention effects* occur inside pied-piped constituents:

\[(4) \text{ Cable (2007):} \]
\[\begin{align*}
a. & \text{ [A picture of *which* president] } \_\_ \text{ hangs in Jim’s office?} \\
b. & \text{ * [No picture of *which* president] } \_\_ \text{ hangs in Jim’s office?}
\end{align*}\]

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

\[(5) \text{ **Intervention in pied-piped constituents:** (S&H; C)} \]
\[
\begin{array}{c}
pied-piping \quad \text{...INTERVENABLE... } \quad wh \quad \ldots \quad C \quad \ldots \quad \_\_ \\
\end{array}
\]
This effect is due to the structural configuration in (5).

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

\[\text{pied-piping} \quad \text{...INTERVENABLE...} \quad \text{wh} \quad \ldots] \quad \text{C} \quad \ldots \quad \text{___}\]

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:

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

Data from Cable (2007)
Intervention in overt pied-piping

This effect is due to the structural configuration in (5).

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

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\text{[pied-piping \[ ...\text{INTERVENABLE...} \] \[ wh \ ... \]} \ C \ ... \ ___
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b. ✓ [Which president] does Jim own [no picture of [___]]?

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This effect is due to the structural configuration in (5).

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

\[ \text{[pied-piping ...INTERVENABLE... wh ...] C ... } \]

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:

(7) a. * *[No picture of which president] does Jim own ___?*

b. ✓ *[Which president] does Jim own [no picture of ___]?*

Data from Cable (2007)

\begin{equation}
C \textit{Who} owns a picture of \textit{which} president?
\end{equation}

Subsequent movements tuck-in. Only the highest \textit{wh}-phrase is pronounced at the head of its chain; other \textit{wh}-phrases are pronounced in their base positions. These \textit{in-situ} \textit{wh}-phrases move “covertly.”
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*  
\[\uparrow\]  
*owns a picture of which president?*

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Covert movement in *wh*-questions

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Covert pied-piping
Does covert movement trigger pied-piping?

(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 ___ ?

...and if so, how much?
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a. *[Who]* [**which** president] C ___ owns a picture of ___?

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...and if so, how much?
Recall that *overt* pied-piping leads to intervention effects:

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

\[
\text{[pied-piping \quad ...INTERVENABLE... \quad wh \quad ...]} \quad C \quad ...
\]

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:**

\[
\text{... C ... \quad [covert pied-piping \quad ...INTERVENABLE... \quad wh \quad ...]}
\]
Recall that overt pied-piping leads to intervention effects:

(5) **Intervention in pied-piped constituents:** (S&H; C) 
\[
\text{[pied-piping ...INTERVENABLE... wh ...] C ...}
\]

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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\text{... C ... [covert pied-piping ...INTERVENABLE... wh ...]}
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Recall that *overt* pied-piping leads to intervention effects:

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\text{[pied-piping} \quad \text{...INTERVENABLE...} \quad \text{wh ...}] \quad \text{C} \quad \text{...}
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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:**

\[
\ldots \quad \text{C} \quad \ldots \quad \text{[covert pied-piping} \quad \text{...INTERVENABLE...} \quad \text{wh ...]}
\]
Diagnosing covert pied-piping

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

(8) Who owns a picture of which president?

a. Who owns a picture of \([\text{covert pied-piping} \text{ which} \text{ president}]\)?

b. Who owns a picture \([\text{covert pied-piping} \text{ of} \text{ which} \text{ president}]\)?

c. Who owns \([\text{covert pied-piping} \text{ a picture of} \text{ which} \text{ president}]\)?
Diagnosing covert pied-piping

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]?
Diagnosing covert pied-piping

Different amounts of covert pied-piping predict different 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]?
Different amounts of covert pied-piping predict different regions:

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

a. *Who* owns a picture of \([\text{covert pied-piping} \text{ which president}]\)?)

b. *Who* owns a picture \([\text{covert pied-piping} \text{ of which president}]\)?

c. *Who* owns \([\text{covert pied-piping} \text{ a picture of which president}]\)?
(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.
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.

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(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.
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*. 
(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:

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

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The diagnosis

(11) ✓ I know \[\textit{which} \text{ student read a book from } \textit{which} \text{ library}.\]

(13) * I know \[\textit{which} \text{ student read } \textbf{no} \text{ book from } \textit{which} \text{ library}.\]

This contrast teaches us that \textbf{no} in (13) is in an \textbf{...INTERVENABLE...} region.

Moreover, smaller pied-piping options were not available:

(8) \textit{Which} student read no book from \textit{which} library?

a. \textit{Which} student read no book from \textcolor{red}{[\textit{pied-piping} \textit{which} library]}?
   \(\Rightarrow\) predicts no intervention!

b. \textit{Which} student read no book \textcolor{red}{[\textit{pied-piping} \textbf{from} \textit{which} library]}?
   \(\Rightarrow\) predicts no intervention!

c. \textit{Which} student read \textcolor{red}{[\textit{pied-piping} \textbf{no} \textbf{book from} \textit{which} library]}?
   \(\Rightarrow\) predicts \textit{intervention}!
The diagnosis

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

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

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

Moreover, smaller pied-piping options were not available:

(8) *\text{Which} \text{ student} \text{ read no} \text{ book} \text{ from} \text{ which} \text{ library}?

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⇒ predicts no intervention! 🎀

b. *\text{Which} \text{ student} \text{ read no} \text{ book} \text{ from} \text{ which} \text{ library}?

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c. *\text{Which} \text{ student} \text{ read no} \text{ book} \text{ from} \text{ which} \text{ library}?

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

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

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]?
   ⇒ predicts no intervention!*

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

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

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

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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]?
   => predicts no intervention! ☠

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

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**.
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.

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

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\[\underline{\text{__________________________}}\]

a. ✓ [Which president] does Jim own a picture of ___?
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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.
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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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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Pied-piping size and the interfaces

⚠️ *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. ✓ [[Who\(s\) brother]\’s friend]\’s father] did you see ___?
   b. * [The father of \(who\)se brother’s friend] did you see ___?

(23) a. ✓ [ [ \(Ho\)w big ] a ___ car ] did Bill buy ___?
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 ___?
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.
Overt movement feeds PF and LF, while covert movement only feeds LF.

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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.
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):

\begin{enumerate}
\item \textbf{Interpretation through movement:}
\begin{align*}
\text{LF: } & wh \ C \ \ldots \ \uparrow \\
\end{align*}
\item \textbf{Interpretation through alternative computation:}
\begin{align*}
\text{LF: } & C_i \ \rightsquigarrow \ \ldots \ \wh_i
\end{align*}
\end{enumerate}

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

\begin{enumerate}
\item \textbf{Intervener blocks interpretation of wh-alternatives by C:}
\begin{align*}
\text{LF: } & C_i \ \rightsquigarrow \ \wh_i
\end{align*}
\end{enumerate}

Cable (2007): this mechanism can explain intervention inside \textit{wh}-pied-piping constituents...
Focus intervention

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

(24)  
   a. \textit{Interpretation through movement:}  
   \begin{align*}
   \text{LF: } & \text{wh } C \cdots \\
   \uparrow &
   \end{align*}

   b. \textit{Interpretation through alternative computation:}  
   \begin{align*}
   \text{LF: } & C_i \leftrightarrow \ldots \text{ wh}_i
   \end{align*}

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

(25) Intervener blocks interpretation of \textit{wh}-alternatives by \textbf{C}:  
   \begin{align*}
   \text{LF: } & C_i \quad \text{wh}_i
   \end{align*}

\textbf{Cable (2007):} this mechanism can explain intervention inside \textit{wh}-pied-piping constituents...
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: \( wh \ C \cdots \)

      [_____________________

      b. **Interpretation through alternative computation:**
      LF: \( C_i \leftarrow \cdots \cdots \cdots \) \( wh_i \)

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

(25)  **Intervener blocks interpretation of \( wh \)-alternatives by \( C \):**
      LF: \( C_i \leftarrow \cdots \cdots \cdots \) \( wh_i \)

**Cable (2007):** this mechanism can explain intervention inside \( wh \)-pied-piping constituents...
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(24)  

  a. **Interpretation through movement:**
  
  \[
  \text{LF: } \textit{wh } C \quad \cdots \quad \text{\underline{\raisebox{0.5em}{\hspace{2em}}} \hfill}
  \]

  b. **Interpretation through alternative computation:**

  \[
  \text{LF: } C_i \leftarrow \cdots \cdots \textit{wh}_i
  \]

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(25) **Intervener blocks interpretation of wh-alternatives by C:**

\[
\text{\* LF: } C_i \quad \textit{Op} \leftarrow \textit{wh}_i
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**Cable (2007):** this mechanism can explain intervention inside *wh*-pied-piping constituents...
A question can be computed through movement and/or Rooth-Hamblin alternative computation (Hamblin, 1973; Karttunen, 1977; Rooth, 1985):

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a. *Interpretation through movement:*

LF: *wh C ⋯

\[\uparrow\]

b. *Interpretation through alternative computation:*

LF: *C_i \sim \sim \sim \sim \sim \sim wh_i*

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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 \([QP \text{ Q a picture of } QP \text{ Q which president }]\)

a. \([QP \text{ Q Which president}]\) does Jim own a picture of ____?

b. \([QP \text{ Q Of which president}]\) does Jim own a picture ____?

c. \([QP \text{ Q A picture of which president}]\) does Jim own ____?

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

(27)  \([QP \text{ Q A picture of which president}] \xleftarrow{\text{Rooth-Hamblin alternatives}} \lambda x \text{ does Jim own } x?\xrightarrow{\text{movement}}\)
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Rooth-Hamblin alternatives  

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

(27) \[QP \ Q \text{A picture of which president}] \xrightarrow{\text{Rooth-Hamblin alternatives}} \lambda x \text{ does Jim own } x\text{?} \xrightarrow{\text{movement}}
Intervention in overt pied-piping

(25) **Intervener blocks interpretation of wh-alt.’s by C:** (Beck, 2006)
* LF: \[ C_i \quad Op \leftrightarrow wh_i \]

(28) **Intervener blocks interpretation of wh-alt.’s by Q:** (Cable, 2007)
\[ LF: [QP \quad Qi \quad wh_i \quad ... ] \]

(5) **Intervention in pied-piped constituents:** (Cable, 2007)
\[ [QP \quad Q \quad ...INTERVENABLE... \quad wh \quad ...] \quad C \quad ... \]

(4b) **Intervention in overt pied-piping:** (Cable, 2007, cf S&H, 2003)
* \[ [QP \quad Q \quad No \quad picture \quad of \quad which \quad president] \quad ___ \quad hangs \quad in \quad Jim’s \quad office? \]
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* \([QP\ Q\ \text{No picture of which president}]\ ___\) hangs in Jim’s office?
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* $[QP \ Q \ No \ picture \ of \ which \ president] \ldots$ 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 intervenable:

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

... C ... \[QP \text{ Q ...INTERVENABLE... wh ...}\]

(13) * I know [which student read [QP Q \text{ no book from } \text{ which library}]].

(20) ✓ I know [which student didn’t read [QP Q \text{ a book from } \text{ which l.}]].

This discussion theoretically grounds our use of focus intervention as a diagnostic for covert pied-piping.
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*This discussion theoretically grounds our use of focus intervention as a diagnostic for covert pied-piping.*
Pied-piping in focus constructions
The Beck (2006) theory of focus intervention predicts intervention not just between *wh* and C/Q, but *anywhere where Rooth-Hamblin alternatives are computed*.

(29) **Intervener blocks interpretation of *wh*-alternatives:**
* LF: C/Q\(_i\) \(\leadsto\) *Op* \(\leadsto\) *wh*\(_i\)

(30) **Intervener blocks interpretation of focus alternatives:**
✓ LF: *Op*\(_i\) \(\leadsto\) *X*\(_{F,i}\)

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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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):

(31) **Pied-piping in *it*-clefts:**
John read a book from \(\text{THIS}_F\) library.

a. It’s [\(\text{THIS}_F\) library] that John read a book from ___.
b. It’s [from \(\text{THIS}_F\) library] that John read a book ___.
c. It’s [a book from \(\text{THIS}_F\) library] that John read ___.


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

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John read a book from **THIS$_F$ library**.

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b. It’s [from **THIS$_F$ library**] that John read a book ___.
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26
Pied-piping in overt focus movement

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John read a book from \(\text{THIS}_F\) library.

\[\begin{array}{c}
\text{a. It’s [\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{}}}}}}}}}}}]} library] that John read a book from ___}.
\text{b. It’s [from \text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{}}}}}}}}}}}]} library] that John read a book ___}.
\text{c. It’s [a book from \text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{}}}}}}}}}}}]} library] that John read ___}. \\
\end{array}\]
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:

\[(32) \quad \text{It’s } \left[ \text{pied-piping } \right. \text{ a book from THIS}_F \text{ library} \left. \right] \text{ } \lambda x \text{ John read } x.\]

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

\[(33) \quad \text{Intervention in *it*-cleft pivots:}\]

a. \* It’s [ **no book from** THIS\textsubscript{F} library] that John’s read ___.

b. ✓ It’s [ from THIS\textsubscript{F} library] that John’s read **no book** ___.

c. ✓ It’s [THIS\textsubscript{F} library] that John’s read **no book from** ___.
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Intervention in *it*-clefts

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27
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Rooth-Hamblin alternatives

\[\quad \text{movement}\]

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Intervention in *it*-clefts

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Rooth-Hamblin alternatives

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**In-situ Association with Focus**

**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:

(35) **Lack of intervention in in-situ focus constructions:**

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

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

\[ * \text{ I only read } [\text{covert pied-piping} \text{ no book from THIS}_F \text{ library}]. \]

The contrast in (37) shows that, like with *wh*-movement, the largest possible constituent is covertly pied-piped.
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 \([_{covert pied-piping} \text{no book from } \text{THIS}\_F \text{library}]\).

The contrast in (37) shows that, like with \(wh\)-movement, the largest possible constituent is covertly pied-piped.
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 \([\text{covert pied-piping } \text{no book from THIS}_F \text{ library}]\).

(35)  ✓ I only didn’t read \([\text{covert pied-piping a book from THIS}_F \text{ library}]\).

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

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

(20)  ✓ I know \([\text{which s. didn’t read } \text{covert pied-piping a book from which l.}]\).
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 \([\textit{covert pied-piping no book from {\text{THIS}}_F \text{ library}}]\).

(35)  
✓ I only didn’t read \([\textit{covert pied-piping a book from {\text{THIS}}_F \text{ library}}]\).

This parallels the pattern of intervention with covert \textit{wh}-pied-piping:

(13)  
* I know \([\textit{which s. read no book from {\text{which}} \text{ library}}]\).

(20)  
✓ I know \([\textit{which s. didn’t read a book from {\text{which l.}}}]\).
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 \([\text{covert pied-piping} \text{ no book from THIS}_F \text{ library}].\)

(35)  
✓ I only *didn’t* read \([\text{covert pied-piping} \text{ a book from THIS}_F \text{ library}].\)

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

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

(20)  
✓ I know \([\text{which s. didn’t read [covert pied-piping a book from which l.]}].\)
Today:

1. We argued for the existence of **pied-piping in covert wh-movement:**
   - by examining new patterns of Beck’s (2006) focus intervention effects,
   - following work on intervention in overt pied-piping (S&H; Cable).
   - 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;
   - in covert pied-piping, providing an argument for in-situ focus association through covert focus movement (Krifka; Wagner; a.o.).
   - This substantiates Beck’s (2006) conjecture that intervention effects occur not only in wh-questions, but also in focus constructions.
We argued for the existence of pied-piping in covert *wh*-movement:

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Acknowledgements

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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?*

\[\uparrow \quad \downarrow \quad \text{no intervention}\]

b. *Which book C did which boy read ___?*

\[\uparrow \quad \downarrow \quad \text{intervention!}\]
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.

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\[
\begin{align*}
\text{(38) a. } & \quad \text{Which boy ... } C \text{ didn’t } \underline{\text{read which book?}} \\
\text{⇒ no intervention} \\
\text{b. } & \quad \text{*Which book } C \text{ did which } \underline{\text{boy read}} \text{?} \\
\text{⇒ intervention!}
\end{align*}
\]
Beck (2006) primarily discusses focus intervention effects between C and an LF-\textit{in-situ} \textit{wh}-word. This is observable in English in superiority-violating questions.

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

\begin{enumerate}[label=(\arabic*)]
  \item \textit{Which} boy \ldots C didn’t \underline{___} read \textit{which} book?
    \begin{tikzpicture}
      \node (w1) at (0,0) {Which};
      \node (w2) at (1,0) {boy};
      \node (w3) at (2,0) {...};
      \node (w4) at (3,0) {C didn’t};
      \node (w5) at (4,0) {read};
      \node (w6) at (5,0) {which};
      \node (w7) at (6,0) {book};
      \node (w8) at (7,0) {?};
      \node (w9) at (8,0) {\text{\Rightarrow no intervention}};
      \draw[->] (w4) -- (w5);
    \end{tikzpicture}
  \item * Which book C did \textit{which} boy read \underline{___}?
    \begin{tikzpicture}
      \node (w1) at (0,0) {Which};
      \node (w2) at (1,0) {book};
      \node (w3) at (2,0) {C did};
      \node (w4) at (3,0) {which};
      \node (w5) at (4,0) {boy};
      \node (w6) at (5,0) {read};
      \node (w7) at (6,0) {\underline{___}};
      \node (w8) at (7,0) {?};
      \node (w9) at (8,0) {\Rightarrow intervention!};
      \draw[->] (w8) -- (w9);
    \end{tikzpicture}
\end{enumerate}
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?  
\[\uparrow\ldots\uparrow\]  
⇒ no intervention

b. *Which* book C did *which* boy read ___?  
\[\uparrow\leftarrow\ldots\]  
⇒ intervention!
Appendix: Intervention in Beck (2006); Pesetsky (2000)

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

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

(38) \begin{enumerate}
\item [a.] \textit{Which} boy ... C didn’t ___ read \textit{which} book?
\begin{center}
\begin{tikzpicture}
\node at (0,0) {\textit{Which}};
\node[anchor=base] at (1.5,0) {boy};
\node at (2.5,0) {...};
\node at (3.5,0) {C};
\node at (4.5,0) {didn’t};
\node at (5.5,0) {___};
\node at (6.5,0) {read};
\node at (7.5,0) {\textit{which}};
\node at (8.5,0) {book};
\end{tikzpicture}
\end{center}
\Rightarrow \textit{no intervention}
\item [b.] * \textit{Which} book C didn’t \textit{which} boy read ___?
\begin{center}
\begin{tikzpicture}
\node at (0,0) {\textit{Which}};
\node[anchor=base] at (1.5,0) {book};
\node at (2.5,0) {...};
\node at (3.5,0) {C};
\node at (4.5,0) {didn’t};
\node at (5.5,0) {\textit{which} boy};
\node at (6.5,0) {read};
\node at (7.5,0) {___};
\end{tikzpicture}
\end{center}
\Rightarrow \textit{intervention}!
\end{enumerate}
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 \([_{PP-comp}] \) about which philosopher. \(60\%\)
   b. no book \([_{PP-comp}] \) about which philosopher. \(7\%\)
   c. a book \([_{PP-adj}] \) from which library. \(56\%\)
   d. no book \([_{PP-adj}] \) 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 ___]].