# Intervention everywhere![1]

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GLOW Colloquium, Paris, April 2015

## 1 Introduction

### 1.1 The question

*Wh*-questions in English involve an **overt movement step**:

(1) *Who* did Mary introduce ____ to Fred?

In **multiple** *wh*-questions, only **one** *wh*-phrase moves overtly.

(2) *Who* did Mary introduce ____ to *whom* ?

☞ **How are in-situ *wh*-phrases interpreted?**

### 1.2 Two approaches to *wh*-in-situ

**The covert movement approach:**[2]
*Wh*-phrases **must move to C** by LF for interpretability (Karttunen, 1977, among others).

(3) LF: *Who whom* C did Mary introduce ____ to ____?

**The in-situ approach:** *Wh*-phrases **are interpreted in their base-positions**, through focus- alternative computation (Hamblin, 1973; Rooth, 1985, 1992, a.o.).

(4) LF: *Who* C did Mary introduce ____ to *whom* ?

### 1.3 *Wh*-in-situ and intervention effects

☞ *Wh*-in-situ is sensitive to **intervention effects**.

(5) **Japanese: Intervention effects avoided through scrambling**

a. ✓ Hanako-ga *nani-o* yon-da-no?
Hanako-NOM what-ACC read-PAST-Q
'What did Hanako read?'

b. ?* **Dare-mo** *nani-o* yom-ana-katta-no?
no-one what-ACC read-NEG-PAST-Q

c. ✓ *Nani-o* **dare-mo** ____ yom-ana-katta-no?
what-ACC no-one read-NEG-PAST-Q
'What did no one read?'

*data from Tomioka (2007)*

[1]I would like to thank Martin Hackl, David Pesetsky, Danny Fox, Irene Heim, Michael Yoshitaka Erlewine, Michael Wagner, Barbara Partee, audiences at MIT and McGill University, NSF Dissertation Improvement Grant #1251717, and the Mellon Foundation. All errors are mine.

[2]Throughout, solid arrows indicate overt movement, dashed arrows indicate covert movement, and curly arrows indicate areas of focus-alternatives computation. These arrows are used here as a notational convenience only.

**Intervention effects affect regions of alternative computation** but not (overt or covert) movement (Beck, 2006; Beck and Kim, 2006; Kotek, 2014a,b; Kotek and Erlewine, to appear)

(6) **The Beck (2006) intervention schema:**

a. * [$_{CP}$ C ... **intervener** ... *wh* ]

b. ✓ [$_{CP}$ C ... *wh* **intervener** ... *t* ]

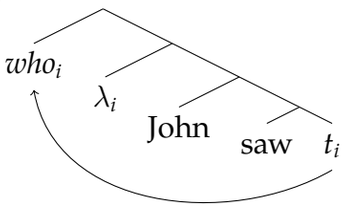
Different theories of what interveners/intervention are: **Focus** (Beck, 2006; Beck and Kim, 2006); **Quantification** (Beck, 1996; Mayr, to appear); **Topics** (Grohmann, 2006); **Prosody** (Tomioka, 2007).

## 1.4 Summary of the proposal

(7) **The new intervention schema**

* C ... λ ... *wh*

(8) **Predicate Abstraction:**




Heim and Kratzer (1998): **a λ-binder is introduced below the landing site of movement**, abstracting over the trace.

Shan (2004, cf Rooth 1985): semantics of Predicate Abstraction in region of alternative computation not well-defined (in simple semantic models).

**Movement can't target a region where focus alternatives are computed.**

- ☞ Predict **intervention in more places** than previously thought.
- ☞ Predict **more interveners** than previously thought.

**Today: Both of these predictions are correct.**

# 2 The state of the art

Pesetsky (2000): **intervention correlates with superiority**

(9) a. *Which student* ____ read *which book*? *obeying*

b. *Which book* did *which student* read ____? *violating*

c. *Which student* **didn't** ____ read *which book*? *obeying*

d. * *Which book* **didn't** *which student* read ____? *violating*

(cf *Which book* did *which student* **not** read ____?)

**Syntax** by Pesetsky (2000); **Semantics** by Beck (2006):

**Superiority-obeying questions:** *Wh*-in-situ covertly moves to C at LF.

(10) LF: *Which student which book* C ____ read ____?

**Predict: no intervention**

**Superiority-violating questions:** *Wh* is truly LF-in-situ, interpreted via focus-alternatives .

(11) LF: *Which book* C did *which student* read ____ ?

**Predict: intervention!**

**Note:** for many (perhaps all) speakers, intervention will be diagnosed by the loss of the pair-list reading of the question. A single-pair may survive.[3]

(12) *Who* ate *what*?

a. Fred ate the beans. *single-pair*

b. Fred ate the beans, Mary ate the eggplant, and John ate the broccoli. *pair-list*

**Today:**

1. **New patterns of intervention**
   - A-movement chains trigger intervention
   - Turning non-interveners into interveners
2. **Breaking the superiority correlation**
   - Intervention in superiority-obeying questions
   - Avoiding intervention in superiority-violating questions

☞ **Intervention** happens whenever **movement and focus-alternatives** are computed in the same part of structure

3. Some **implications**

# 3 New patterns of intervention

The literature has several different ways of defining what interveners are (Beck, 1996, 2006; Grohmann, 2006; Tomioka, 2007; Haida, 2007).

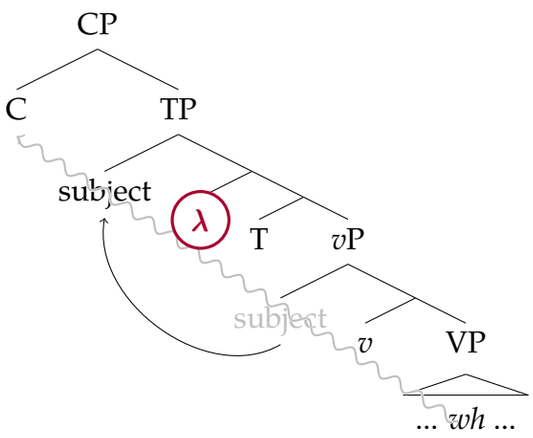
☞ Everyone agrees **indefinites, existentials, definite descriptions, do not act as interveners**.

However, they act as interveners if forced to take scope via movement.

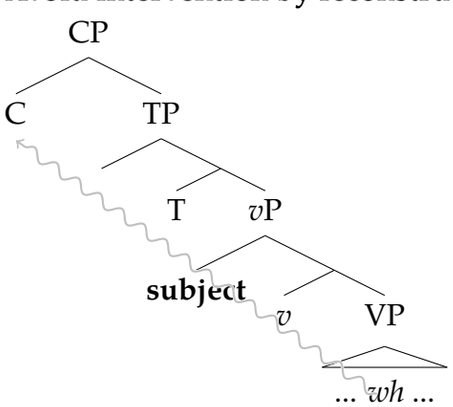
## 3.1 A-movement and reconstruction

English subjects normally undergo A-movement from a *v*P-internal position to Spec,TP.

(13) **This causes intervention at LF:**




(14) **Avoid intervention by reconstructing at LF:**




[3]This has been reported for superiority-violating questions in English and for German questions in footnotes in previous work (Beck, 2006; Pesetsky, 2000, cf also Beck 1996). See discussion in Kotek (2014a).

**Subjects of individual-level predicates must vacate *v*P** (Diesing, 1992). Hence, the subject can't reconstruct and we observe intervention:

(15) a. ✓ *Which* person are **counselors** available to discuss *which* issue with ____?
b. * *Which* person are **counselors** (λ) careful to discuss *which* issue with ____?

Reconstruction can also be prevented by **binding from the subject** into a pronoun or reflexive.

(16) Context: The lawyers seem to be likely to appeal different decisions to different courts.
a. ✓ *Which court* did **the lawyers** seem **to the reporters** to be likely to appeal *which decision* to ____?
a'. LF: *Which court* did __ seem **to the reporters** to be likely to **the lawyers** appeal *which decision* to ____?
b. * *Which court* did **the lawyers** (λ) seem **to each other** to be likely to appeal *which decision* to ____?

☞ A-movement chains intervene when the movement can't reconstruct.
**Bare plurals and definite descriptions** act as interveners.

## 3.2 Non-interveners turned into interveners

**Argument contained ellipsis (ACE)** (Kennedy, 1994, 2004) requires movement for its interpretation.

(17) a. The woman who said she would △ bought the tuna.
b. The woman who said she would ~~buy the tuna~~ [*t* did buy the tuna].

(18) **Baselines (*obeying* and *violating*):**
a. ✓ *Which boy* did you tell **someone** to introduce ____ to *which girl*?
b. ✓ *Which girl* did you tell **someone** to introduce *which boy* to ____?

(19) **More elaborate baselines:**
a. ✓ *Which boy* did you tell [**someone** who (really) shouldn't be here] to introduce ____ to *which girl*?
b. ✓ *Which girl* did you tell [**someone** who (really) shouldn't be here] to introduce *which boy* to ____?

(20) **ACE test case:**
a. ✓ *Which boy* did you tell [**someone** who (really) shouldn't △] to introduce ____ to *which girl*?
b. * *Which girl* did you tell [**someone** who (really) shouldn't △] to introduce *which boy* to ____?

(21) **This happens with other traditional non-interveners as well:**
a. ✓ *Which boy* did you tell [**{the, a, some} man** who (really) shouldn't be here] to introduce ____ to *which girl*?
b. ✓ *Which girl* did you tell [**{the, a, some} man** who (really) shouldn't be here] to introduce *which boy* to ____?

(22) a. ✓ *Which boy* did you tell [**{the, a, some} man** who (really) shouldn't △] to introduce ____ to *which girl*?
b. * *Which girl* did you tell [**{the, a, some} man** who (really) shouldn't △] to introduce *which boy* to ____?

☞ **ACE forces covert movement of an otherwise in-situ element.**

As a result, we observe intervention effects in superiority-violating questions.

### 3.3 Summary

☞ **Intervention caused by traditional non-interveners...**

- Bare plurals
- Definite descriptions
- Indefinites
- Existential quantifiers

... when **reconstruction is blocked** or **movement is forced**.

☞ **Intervention happens whenever a λ-binder must be used in a region where focus-alternatives are also used.**

(23) **The new intervention schema**
* C ... λ ... *wh*

**Previous theories** assume a **fixed set of interveners**, with different characterizations:

- **Focus** (Beck, 2006; Beck and Kim, 2006)
- **Quantification** (Beck, 1996; Mayr, to appear)
- **Topics** (Grohmann, 2006)
- **Prosody** (Tomioka, 2007)

☞ However: **anything moving into a region of focus alternatives computation is an intervener.**

This new characterization of interveners, is **incompatible with all existing approaches** to intervention effects.

## 4 Superiority, movement, and intervention effects

### 4.1 Background

Recall: **intervention correlates with superiority** (Pesetsky, 2000)

(24) a. *Which student which book* C **didn't** ____ read ____? *obeying*

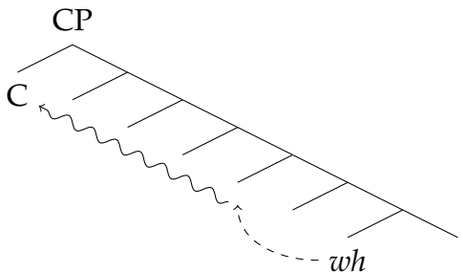
b. * *Which book* C **didn't** *which student* read ____? *violating*

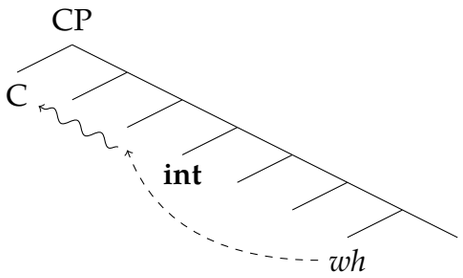
**Correlation:** Superiority-obeying questions are not susceptible to intervention, but superiority-violating questions are.

**Following Beck (2006)**, this is because superiority-violating questions must use focus-alternatives computation for the *wh*-in-situ.

☞ **Correlation can be broken in both directions**, in a way consistent with idea that **what matters is regions of alternative computation**.

Kotek (2014a): **covert movement in English superiority-obeying questions can be *partial*.**




**Prediction:** If covert movement is restricted, intervention happens when intervener occurs **above highest possible landing site of movement**.

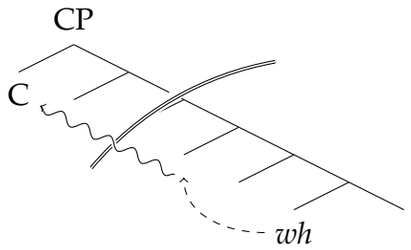
- *Wh* can move up to the barrier

☞ No intervention in region where movement happens

- *Wh* cannot move past barrier

☞ Intervention happens above the barrier, where focus alternatives must be used.

(25)




## 4.2 Movement and intervention effects: NPIs

NPIs are licensed in downward entailing contexts:

(26) a. Mary *(**didn't**) read any books.
b. *Which* boy {**didn't** give, *gave} *which* girl any flowers?

**Prediction:** NPI inside a *wh*-phrase can't move out of the scope of negation. Negation is an intervener. **Expect intervention effects.**

(27) a. ✓ *Which* boy **didn't** read *which* book about some president?
b. * *Which* boy **didn't** read *which* book about any president?

## 4.3 Movement and intervention effects: Focus association

A focused item cannot move out of the scope of its associated operator:

(28) a. * Mary$_F$, John **only** likes ____.
Intended: 'As for Mary, John only likes her$_F$ (he doesn't like anyone else).'
b. ✓ John **only** likes Mary$_F$.

(29) a. * *Who*$_F$ do you **only** like ____?
Intended: Who $x$ is such that you like only $x$?
b. ✓ You **only** like *who*$_F$?

**Prediction:** Focus inside a *wh*-phrase can't move out of the scope of ***only***. ***Only*** is an intervener. **Expect intervention effects.**

(30) a. Baseline: I can tell you [*which* student read *which* book].
b. Context: The students in the class were supposed to read one book *and* one article about syntax. However, everyone got confused and read one book *or* one article. I've been reading everyone's squibs. I've finished all the ones about books, so:

* I can tell you [*which* student **only** read *which* book$_F$ (about syntax)].

## 4.4 Multiple questions with islands

Movement is sensitive to **syntactic islands** (Ross, 1967). **Prediction:** No intervention inside the island, as the *wh* can move around the intervener, but **intervention predicted outside of the island**.

Baseline: Multiple *wh*-questions with islands are grammatical.[4]

(32) Context: The linguists at the conference are very picky about attending the conference dinner. However, each of them adores one philosopher and will certainly attend the dinner if that philosopher is invited. What I want to know is:

Q: *Which* linguist will come [if we invite *which* philosopher]?

A: ✓ Pair-list answer:
Chomsky will come if we invite Quine,
Kayne will come if we invite Lewis,
Labov will come if we invite Russell, ...

Add interveners: here, ***only***.

(33) Context: The linguists at the conference are looking forward to the conference dinner. However, each of them dislikes all but one philosopher and will attend the dinner just in case that philosopher alone is invited. What I want to know is:

Q: *Which* linguist will come [if we **only** invite *which* philosopher]?

A: ✓ Pair-list answer:
Chomsky will come if we only invite Quine,
Kayne will come if we only invite Lewis,
Labov will come if we only invite Russell, ...

☞ Intervener **inside** the island is **grammatical**.

(34) Context: The linguists at the conference don't really want to attend the conference dinner. However, each of them adores one philosopher and has said that they will come just in case that philosopher is invited. What I want to know is:

Q: *Which* linguist will **only** come [if we invite *which* philosopher]?

A: * Pair-list answer:
Chomsky will only come if we invite Quine,
Kayne will only come if we invite Lewis,
Labov will only come if we invite Russell, ...

☞ Intervener **above** the island causes an **intervention effect**.

## 4.5 Interim summary: breaking the superiority correlation

☞ We've seen **three cases of intervention in obeying questions**.

Recall the second half of the Pesetsky correlation: intervention happens in violating questions because *wh* is truly LF-in-situ.

(35) LF: *Which student* C did Mary give *which book* to ____ ?

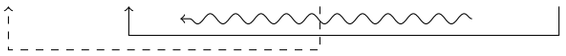
**Next:** Three ways to avoid intervention in superiority-violating questions.

[4] Based on Cheng and Demirdache 2010, citing Tancredi (p.c.).

## 4.6 No intervention if intervener scopes out of question

**Prediction:** Intervention can be avoided if the intervener is able to scope out of the question, so that it is no longer in the way.

(36) ✓**intervener** $wh_2$ C ... **intervener** ... $wh_1$ ... $t_2$



☞ This is a property of universal quantifiers.

(37) Tell me *which book* **each kid** will try to persuade *which adult* to read ____. (Pesetsky, 2000)

**Only one reading attested:**

a. 'For each kid, which adult will she try to persuade to read which book?'
$\forall >$ *book-adult pairs*

b. * 'What book-adult pairs are s.t. each kid will try to persuade the adult to read the book?'
*book-adult pairs* $> \forall$

☞ **Floating the quantifier fixes its scope**, preventing it from moving out of the way of the in-situ *wh*, leading to intervention.

(38) * Tell me *which book* the kids will **each** (λ) try to persuade *which adult* to read ____.
(Pesetsky, 2000)

## 4.7 No intervention if intervener reconstructs below *wh*

**Prediction:** Intervention can be avoided if the intervener is able to reconstruct below the in-situ *wh*.

(39) ✓$wh_2$ C ... **intervener** ... $wh_1$ ... $t_2$ **intervener**

**Prediction:** Intervention can be avoided if the intervener can reconstruct below the in-situ *wh*.

(40) Context: The first-year students took several classes this past semester, taught by different professors. Each professor thought that the students particularly enjoyed one topic that she taught. Tell me,

✓*Which topic* did it seem to *which professor* that **all** of the students enjoyed ____? *baseline*

✓*Which topic* did **all** of the students seem to *which professor* to have enjoyed ____?
*reconstructed reading possible*

* *Which topic* did the students **all** (λ) seem to *which professor* to have enjoyed ____?
*reconstructed reading blocked*

✓*Which topic* did the students seem to *which professor* to have **all** enjoyed ____?
*reconstructed reading possible*

Intervention avoided in superiority-violating questions if intervener scopes out of the question, or below *wh*-in-situ.

☞ **What matters is where the intervener scopes at LF**, not the pronounced word-order.

## 4.8 No intervention if *wh* scopes above intervener

**Prediction:** Intervention can be avoided if in-situ *wh* can be given wide scope above an intervener through non-interrogative movement.

**Right-Node Raising** can feed exceptional wide scope of a *wh* that is otherwise unavailable in questions (Bachrach and Katzir, 2009, a.o.):

(41) a. * *Which book* did John meet the man who wrote ____ ?
b. ✓ *Which book* did [John meet the man who wrote], and [Mary meet the man who published] ____?

This exceptional wide scope in RNR is also able to escape intervention effects in superiority-violating questions:

(42) a. * *Which book* did **only John** allow *which student* to read ____?
b. ✓ *Which book* did [**only John** allow], and [**only Mary** prohibit], *which student* to read ____?

## 4.9 Summary

☞ **No correlation between superiority and intervention:**

- Intervention in obeying questions with restricted covert *wh*-movement
- No intervention in violating questions, intervener scoped out of the question
- No intervention in violating questions, intervener reconstructed below *wh*-in-situ
- No intervention in violating questions, *wh*-in-situ given wide scope via RNR

However, **the general intervention schema still applies:**

(43) **The intervention schema**
* C ... λ ... *wh*

☞ **Intervention happens in regions where focus-alternatives are computed** (Beck, 2006; Kotek, 2014a,b; Kotek and Erlewine, to appear), when it includes a **λ**-binder.

# 5 Some implications and open questions

## 5.1 Modals

**Modals are not interveners:**

All known interveners, as well as the new ones shown here, quantify over individuals. Quantification over worlds does not lead to intervention.

(44) a. ✓ *Which abstract* **should** John assign ____ to *which reviewer*?
b. ✓ *Which reviewer* **should** John assign *which abstract* to ____?

(45) a. ✓ *Which paper* did John **have to** read ____ for *which class*?
b. ✓ *Which class* did John **have to** read *which paper* for ____?

(46) a. ✓ *Which abstract* were you **forced** to assign ____ to *which reviewer*?
b. ✓ *Which reviewer* were you **forced** to assign *which abstract* to ____?

(47) a. ✓ *Which paper* was it **necessary** for you to assign ____ to *which reviewer*?
b. ✓ *Which reviewer* was it **necessary** for you to assign *which paper* to ____?

(48) a. ✓ *Which paper* **may** John read ____ for *which class*?
b. ✓ *Which class* **may** John read *which paper* for ____?

(49) a. ✓ *Which paper* **must** John read ____ for *which class*?
b. ✓ *Which class* **must** John read *which paper* for ____?

☞ **Modality must be represented without the use of lambda binder**, e.g. though indices.

## 5.2 Successive cyclic movement

Notice that under this approach, intermediate landing sites of movement behave differently than the target position of movement.

☞ **Intermediate landing sites do not "count" for intervention!**

(50) *Which book* λ C did Jill think that [$_{CP}$ *t* (λ) *which kid* read *t* ]?

LF: ✓ *Which book* **λ** C did Jill think that [$_{CP}$ *which kid* read ***t*** ]?

## 5.3 Open questions

☞ **Why does adverb *only* intervene?**

- Association with focus possible without movement (Rooth, 1985, a.o.)
- Explained if there is covert focus movement (Drubig, 1994; Krifka, 2006; Wagner, 2006; Erlewine and Kotek, 2014)
- Or if Beck (2006) is correct for at least some cases of intervention

☞ **Why does sentential negation intervene?**

- Perhaps sentential negation moves and introduces a λ-binder
- Or we may need the Beck (2006) story again

# 6 Conclusion

- **The intervention generalization**: Movement cannot target a region where focus alternatives are computed

  (51) **The intervention schema**
  $^{*}$ C ... $\lambda$ ... *wh*

- **A logical consequence of standard assumptions about structure building, interpretation**:
  - Movement as in e.g. Heim and Kratzer (1998)
  - Focus alternatives computation (Rooth, 1985, 1992)
  - Intensional semantics with simple types

  $\lambda$-abstraction not well-defined when computed over alternatives.

- **Previous responses to this problem:**
  - Shan (2004): Adopt a **variable-free semantics** without movement
  - Rooth (1985); Poesio (1996); Novel and Romero (2009): Use a **higher-typed 'superintensional' semantic system**[5]

- **Today: Empirical evidence for the new intervention generalization**
- **Support for standard assumptions** (syntactic movement interpreted using $\lambda$-abstraction, with simple semantic types)
  - *Wh*-in-situ requires both covert movement and focus alternatives for its interpretation
  - ... but abstraction and alternative computation cannot overlap
- **Grammar does not solve the problem via higher semantic types or movement-less syntax, but via overt and covert movement.**

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