

Against a feature driven view of *wh*-movement

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Interpreting *wh*-in-situ

English multiple *wh*-questions involve overt movement of just **one** *wh*-phrase.

(1) *Who* did Mary introduce _____ to *whom* ?

The diagram shows the sentence "(1) Who did Mary introduce _____ to whom ?". A horizontal line is drawn under the blank space. From the right end of this line, a vertical line goes down, then a horizontal line goes left, and finally a vertical line goes up to the word "Who". This indicates that "Who" is the element that has moved from the blank position to the start of the sentence.

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

Two traditional approaches to *wh*-in-situ

The covert movement approach:

Wh-phrases **must move to C** by LF for interpretability (Karttunen, 1977, among others).

(2) LF: *Who whom* C did Mary introduce _____ to _____?

The in-situ approach:

Wh-phrases **are interpreted in their base-positions**, without movement (Hamblin, 1973; Rooth, 1985, 1992, among others).

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

Movement, *Wh*-in-situ, and intervention effects

Certain quantifiers (**interveners**) cannot precede *wh*-in-situ.

(4) Japanese: Intervention effects avoided through scrambling

- a. ✓ John-ga nani-o yon-da-no?
John-nom what-acc read-past-Q
'What did John 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)*

Movement, *Wh*-in-situ, and intervention effects

(5) **German: intervention above *wh*-in-situ, rescued by scrambling**

- a. ✓ *Wer* hat Luise wo angetroffen?
who has Luise where met
'Who met Luise where?'

(5) **German: intervention above *wh*-in-situ, rescued by scrambling**

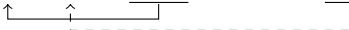
- a. ✓ *Wer* hat Luise wo angetroffen?
who has Luise where met
'Who met Luise where?'

Movement, *Wh*-in-situ, and intervention effects

Puzzle: no intervention effects in corresponding English questions.

- (7) a. ✓ *Who* didn't _____ meet anyone *where*?
b. ✓ *Who* met **no one** _____ *where*?

This is **explained by the covert movement approach** to *wh*-in-situ (Pesetsky, 2000; Beck, 2006; Cable, 2010):

- (8) LF: *Who where* C _____ met **no one** _____ ?


- ① Experimentally detecting covert movement
- ② **Experiment 1:** scrambling-like movement
- ③ **Experiment 2:** varying the size of movement
- ④ **Proposal:** covert *wh*-movement is covert scrambling
 - 👉 Cannot be accounted for using syntactic features

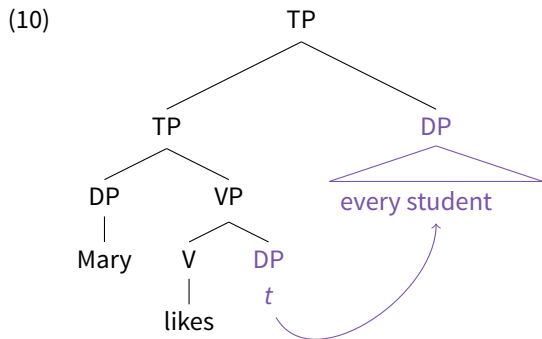
Experimentally detecting covert movement

Experimentally detecting covert movement

- Hackl et al. (2012) paradigm
- Self-paced reading
- Tests for covert movement using the interaction between
 - Quantifiers in object position
 - Antecedent Contained Deletion (ACD)

Quantifiers in object position

- For formal semantic reasons, **cannot directly combine with the verb.**
- One prominent solution: **Covert Movement (CM)** of the object.



(11) John likes flying planes. Bill doesn't _____.


- Missing VP requires **identical pronounced antecedent VP**.

Antecedent Contained Deletion (ACD)

(12) John read every book Mary did _____.

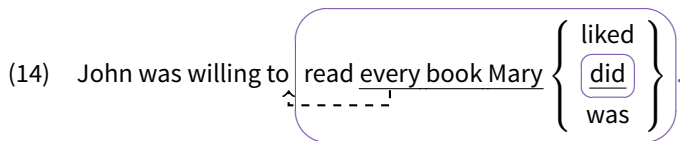
- **Missing VP** requires **identical pronounced antecedent VP**.
- A VP can never be identical to its antecedent if one is properly contained inside the other!
- The solution: **Covertly move** the object containing the ACD site

(13) John read t_k [_{DP} every book Mary did _____]_k.



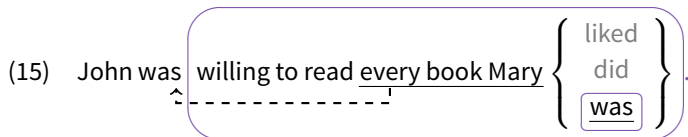
Ellipsis size and locality of movement

The size of the antecedent VP determines the **minimal** size of movement.



Ellipsis size and locality of movement

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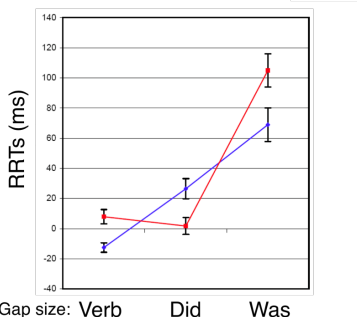
The Hackl et al. (2012) paradigm

(16) John was willing to read $\left\{ \begin{array}{c} \text{the} \\ \text{every} \end{array} \right\}$ book Mary $\left\{ \begin{array}{c} \text{liked} \\ \text{did} \\ \text{was} \end{array} \right\}$.

- Assumptions about online processing:

- **L → R:** parser encounters *the/every* before *Verb/Aux*.
 - **The does not require movement.**
→ Movement only if Aux is reached
 - **Every is moved when encountered**
→ *Small* movement step: above *read*
- 👉 **Prediction** Upstream *every* facilitates resolution *small ellipsis (did)*

Mean Residual Reading Times
Two words after the embedded verb




Online processing of multiple *wh*-questions

Predictions for real-time processing

(17) *Which boy was willing to read which book* Mary { did was }

The covert movement approach:

In-situ *wh*-phrases move to C by LF for interpretation.

(18) *Which boy which book ...* C _____ was willing to read _____?



- 👉 Antecedent containment preemptively undone, small ellipsis (*did*) and large ellipsis (*was*) facilitated.

Predictions for real-time processing

(19) *Which* boy was willing to read *which* book Mary $\left\{ \begin{array}{l} \text{did} \\ \text{was} \end{array} \right\}$

The in-situ approach:

In-situ *wh*-phrases are interpreted in their base-positions

(20) *Which* boy C was willing to read *which* book ... ?


- ☞ Antecedent containment not preemptively undone, small ellipsis (*did*) and large ellipsis (*was*) not facilitated.

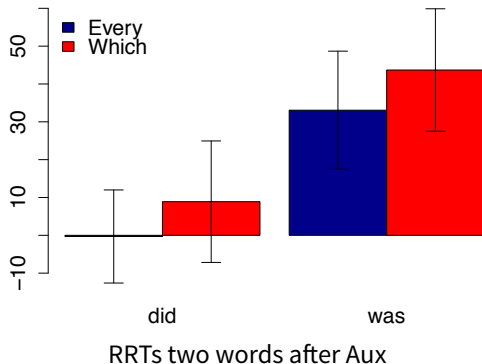
Experiment 1: Predictions

(21) *Which* boy was willing to read $\left\{ \begin{array}{l} \textit{which} \\ \textit{every} \end{array} \right\}$ book Mary $\left\{ \begin{array}{l} \textit{did} \\ \textit{was} \end{array} \right\}$

- *Every* conditions as in Hackl et al. (2012), provides baseline:
 - small ellipsis facilitated.
 - large ellipsis not facilitated.
- *Which* conditions should pattern with each other:
 - small ellipsis and large ellipsis facilitated (covert movement approach),
or
 - small ellipsis and large ellipsis not facilitated (in-situ approach)

Experiment 1: Residual reading times

(22) *Which* boy was willing to read $\left\{ \begin{array}{l} \textit{which} \\ \textit{every} \end{array} \right\}$ book Mary $\left\{ \begin{array}{l} \textit{did} \\ \textit{was} \end{array} \right\}$.



- **Main effect of ellipsis size** (small: *did* < large: *was*)
- *Every*: replicating Hackl et al. (2012)

Experiment 1: Results

- *Small ellipsis (did)* is faster than *large ellipsis (was)*.

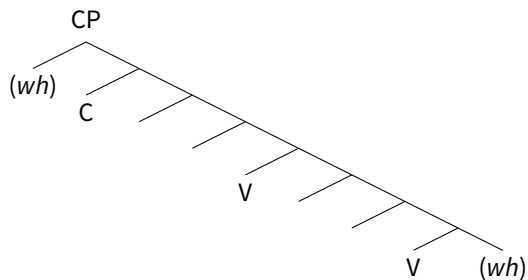


No difference between *every* and *which*.

- Not predicted by either traditional approach to *wh*-in-situ.
- Paradigm sensitive enough to detect differences between determiners: *Every* and *which* both facilitate more ACD than the non-quantificational determiner *the*.

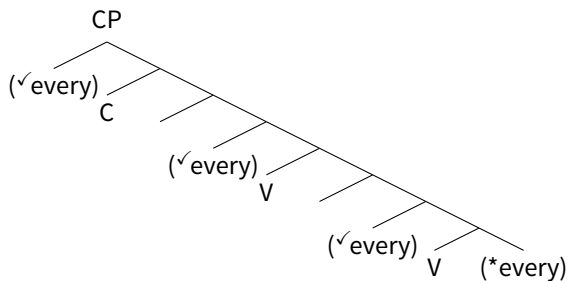
**Covert *wh*-movement behaves like scrambling,
not like unbounded movement.**

Previous approaches: two places where *wh*-phrases can be interpreted.



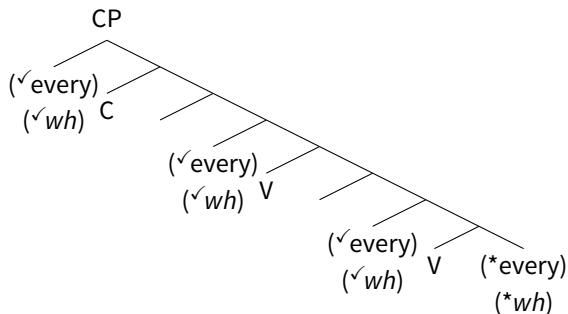
Proposal

In contrast, quantifiers can be interpreted in a variety of positions:



Proposal

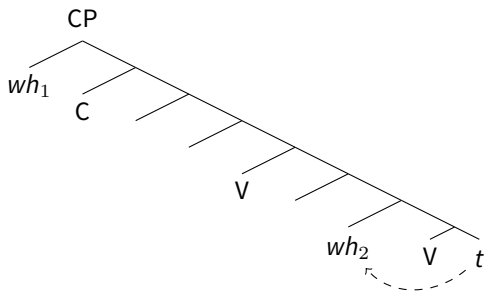
- 👉 A *wh*-phrase can be interpreted at any position with propositional type at LF (same as quantifiers, e.g. *every*).



Proposal

In-situ *whs* move locally immediately upon being integrated into the structure, like conventional quantifiers e.g. *every*.

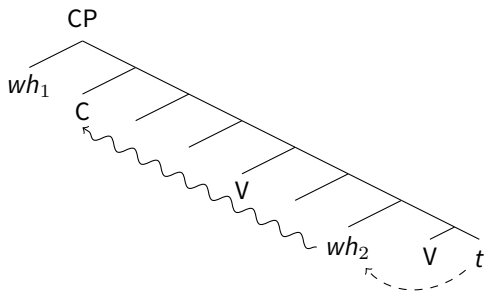
Small movement step is sufficient.



Proposal

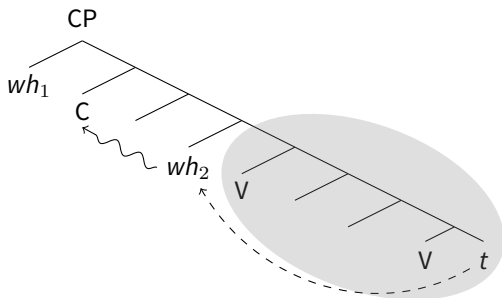
Following this movement step, the *wh* can but *need not* move any further:

It can be interpreted in its landing site using in situ computation (e.g. the projection of focus alternatives to C), without movement.



Prediction

If in-situ composition cannot be used in a certain region, expect *wh*-movement above the region of uninterpretability.



Intervention effects in online sentence processing

Experiment 2: Predictions

Also is an intervener. We can place it at different heights in Exp1 items:

- (24) *Which* boy was willing to **also** read $\left\{ \begin{array}{l} \textit{which} \\ \textit{every} \end{array} \right\}$ book Mary $\left\{ \begin{array}{l} \textit{did} \\ \textit{was} \end{array} \right\}$
- (25) *Which* boy was **also** willing to read $\left\{ \begin{array}{l} \textit{which} \\ \textit{every} \end{array} \right\}$ book Mary $\left\{ \begin{array}{l} \textit{did} \\ \textit{was} \end{array} \right\}$
-

Expect:

- **Wh-movement above *also*** → more movement with high intervener.
 - ***Every* (and other quantifiers) not affected.**
- 👉 Facilitation of ACD resolution in the entire domain of movement.

Experiment 2: Predictions

Also is an intervener. We can place it at different heights in Exp1 items:

- (24) *Which* boy was willing to **also** read $\left\{ \begin{array}{l} \textit{which} \\ \textit{every} \end{array} \right\}$ book Mary $\left\{ \begin{array}{l} \textit{did} \\ \textit{was} \end{array} \right\}$
- (25) *Which* boy was **also** willing to read $\left\{ \begin{array}{l} \textit{which} \\ \textit{every} \end{array} \right\}$ book Mary $\left\{ \begin{array}{l} \textit{did} \\ \textit{was} \end{array} \right\}$
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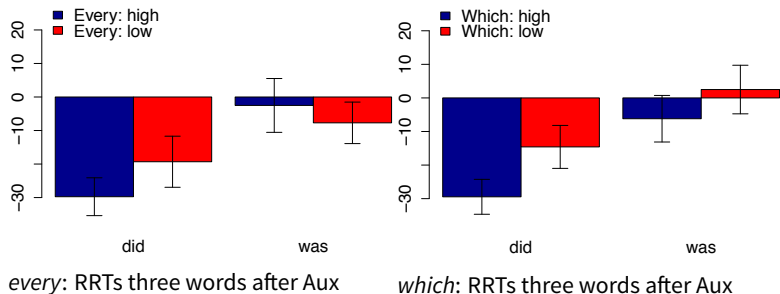
Low also (24) requires **small** *wh*-movement.

- *Which* and *every*: same effects as in Experiment 1 (no effect of *also*).

High also (25) forces **large** *wh*-movement.

- *Which*: Effect of *also*
- *Every*: No effect of *also*.

Experiment 2: Residual reading times



- *Every*: Main effect of ellipsis size (small: *did* < large: *was*)
No effect of *also*
- *Which*: Main effect of ellipsis size (small: *did* < large: *was*)
Main effect of *also* (high *also* < low *also*)

Experiment 2: Summary

- **The position of *also* affects *which* but not *every*.**
 - High *also* forces long-distance *wh*-movement, resulting an increased domain of ACD resolution facilitation effects.
 - *Every* is not affected by the manipulation.
- **Unpredicted** by the covert movement approach and by the in-situ approach to *wh*-in-situ.



Explained if *wh*-movement behaves as scrambling.

Conclusion

Take-home message

- 1 Two traditional approaches to *wh*-in-situ in the literature:
 - Covert movement approach: movement to C.
 - In-situ approach: no movement at all.
- 2 Both approaches are **partially correct**.
 - 👉 Covert *wh*-movement in English is **covert scrambling**.

Covert *wh*-movement is not feature driven.

Thank you! Questions?

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References I

- Beck, Sigrid. 1996. Quantified structures as barriers for LF movement. *Natural Language Semantics* 4:1–56.
- Beck, Sigrid. 2006. Intervention effects follow from focus interpretation. *Natural Language Semantics* 14:1–56.
- Cable, Seth. 2010. *The grammar of Q: Q-particles, wh-movement, and pied-piping*. Oxford University Press.
- Hackl, Martin, Jorie Koster-Hale, and Jason Varvoutis. 2012. Quantification and ACD: Evidence from real-time sentence processing. *Journal of Semantics* 29:145–206.
- Hamblin, Charles. 1973. Questions in Montague English. *Foundations of Language* 10:41–53.
- Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1:3–44.

References II

- Pesetsky, David. 2000. *Phrasal movement and its kin*. Cambridge, Mass.: MIT Press.
- Rooth, Mats. 1985. Association with focus. Doctoral Dissertation, University of Massachusetts, Amherst.
- Rooth, Mats. 1992. A theory of focus interpretation. *Natural Language Semantics* 1:75–116.
- Tomioka, Satoshi. 2007. Pragmatics of LF intervention effects: Japanese and Korean interrogatives. *Journal of Pragmatics* 39:1570–1590.