Intervention tracks scope-rigidity

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Approaches to *Wh*-Intervention, NUS, June 2019[1]

1 Introduction

(1) Hanako-ga *nani*-o kai-mashi-ta-ka?
Hanako-NOM what-ACC buy-POLITE-PAST-Q
'What did Hanako buy?'

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

(2) a. ?? **Da're-mo**-ga *nani*-o kai-mashi-ta-ka?
who-MO-NOM what-ACC buy-POLITE-PAST-Q

b. ✓ *Nani*-o **da're-mo**-ga ___ kai-mashi-ta-ka?
what-ACC who-MO-NOM buy-POLITE-PAST-Q
'What did everyone buy?' (Hoji 1985:270)

Intervention effects affect *wh*-phrases that are truly in-situ at LF but not ones that have undergone (overt or covert) movement (Beck 2006, Beck and Kim 2006, Kotek 2014, 2016, Kotek and Erlewine 2016)

(3) **Beck (2006) intervention schema:**

a. ✓ [$_{CP}$ C ... *wh*]

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

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

[1]For comments and questions on this work, we thank the participants of the NYU seminar on *wh*-constructions — in particular Lucas Champollion, Chris Collins, Paloma Jeretič, Haoze Li, Anna Szabolsci — and the NUS syntax/semantics reading group, as well as audiences at Recent Issues in the Syntax of Questions at the University of Konstanz, LENLS 2017 at Tsukuba University, the 2017 Amsterdam Colloquium, Stony Brook University, and the University of Pennsylvania, and also Satoshi Tomioka. For further discussion of judgments, we thank Daisuke Bekki, Minako Erlewine, Hiroki Nomoto, Yohei Oseki, Yosuke Sato, Yuta Tatsumi. Errors are each other's.

► **Two related questions:**

❶ What counts as an intervener?

(4) ***Subete* 'all' is not an intervener (cf 2a):**
✓ [**Subete**-no hito]-ga *nani*-o kai-mashi-ta-ka?
all-GEN person-NOM what-ACC buy-POLITE-PAST-Q
'What did everyone buy?'

❷ What causes intervention?
- Focus semantics (Beck 2006, Beck and Kim 2006)
- Quantification (Beck 1996, Mayr 2014)
- Anti-topic items (Grohmann 2006)
- Prosodic mismatch (Tomioka 2007, Branan 2018)

Today:

► We consider intervener-hood and scope properties of different quantifiers in Japanese and establish the generalization in (5):

(5) **Generalization: Intervention correlates with scope-taking**
Scope-rigid DP quantifiers above an in-situ *wh*-phrase cause intervention. DP quantifiers that allow scope ambiguities—i.e., those that can reconstruct below the *wh*-phrase or scope out of the question—do not.

The problem is with **movement** into a position between *wh* and C.

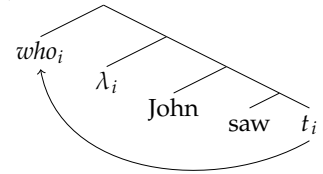
(6) **Intervention schema (Kotek 2017):**

* LF: [$_{CP}$ C ... **DP** λx ... *wh* ... x]

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

PA in regions of alternative computation (⇜⇝) is not well-defined (Rooth 1985, Poesio 1996, Shan 2004, Novel and Romero 2009). (See Appendix.)

(7) **Predicate Abstraction (PA):**



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

2 Intervention tracks scope-rigidity

Quantifiers in Japanese vary in their ability to take scope below negation:

- Q > Neg only ⇝ scope rigid
- Q > Neg or Neg > Q ⇝ not scope rigid

► Shibata (2015a) notes that the scope of different disjunctors correlates with their status as interveners.

Two disjunctions: *ka* and *naishi*

(8) ***ka*-disjunction is scope-rigid; *naishi* is not:**

a. [Taro **ka** Jiro]-ga ko-**nak**-atta.
Taro or Jiro-NOM come-NEG-PAST (Shibata 2015a:23)
'Taro or Jiro didn't come.' ✓or > not, *not > or

b. [Taro **naishi** Jiro]-ga ko-**nak**-atta.
Taro or Jiro-NOM come-NEG-PAST (Shibata 2015a:96)
'Taro or Jiro didn't come.' ✓or > not, ✓not > or

(9) ***ka*-disjunction is an intervener; *naishi* is not:**

a. ??? [Taro **ka** Jiro]-ga *nani*-o yon-da-no?
Taro or Jiro-NOM *what*-ACC read-PAST-Q (Hoji 1985:264)

b. ✓[Taro **naishi** Jiro]-ga *nani*-o yon-da-no?
Taro or Jiro-NOM what-ACC read-PAST-Q
'*What* did [Taro or Jiro] read?' (Shibata 2015a:98)

► We show that Shibata's correlation extends to other quantificational DPs as well, supporting (5), repeated here:

(5) **Generalization: Intervention correlates with scope-taking**
Scope-rigid DP quantifiers above an in-situ *wh*-phrase cause intervention. DP quantifiers that allow scope ambiguities—i.e., those that can reconstruct below the *wh*-phrase or scope out of the question—do not.

Two universal quantifiers: *wh-mo*[2] and *subete*

(10) ***wh-mo* universal quantifier is scope-rigid; *subete* is not:**

a. [**Dono** mondai]-o-**mo** toka-**nak**-atta.
which problem-ACC-MO solve-NEG-PAST
'*pro* did not solve every problem.' ✓every > not, *not > every

b. [**Subete**-no mondai]-o toka-**nak**-atta.
all-GEN problem-ACC solve-NEG-PAST (Mogi 2000:59)
'*pro* did not solve every problem.' ✓every > not, ✓not > every

(11) ***wh-mo* is an intervener; *subete* is not:** =(2a, 4)

a. ?? **Da're-mo**-ga *nani*-o kai-mashi-ta-ka?
who-MO-NOM what-ACC buy-POLITE-PAST-Q
Intended: 'What did everyone buy?' (Hoji 1985:270)

b. ✓[**Subete**-no hito]-ga *nani*-o kai-mashi-ta-ka?
all-GEN person-NOM what-ACC buy-POLITE-PAST-Q
'What did everyone buy?'

Focus particles: *-mo* 'also' and *-sae* 'even'

(12) **Focus particles are scope-rigid:** (Shibata 2015b:235)

Taro-**mo/sae** ko-**nak**-atta.
Taro-ALSO/EVEN come-NEG-PAST
'{Even} Taro {also} didn't come.' ✓EVEN/ALSO > not, *not > EVEN/ALSO

(13) ***-mo* 'also' is an intervener:** (Hasegawa 1995:119)

* Hanako-**mo** *nani*-o ka-tta-no?
Hanako-ALSO what-ACC buy-PAST-Q
Int.: 'What did Hanako$_F$ also buy?' (in addition to other people)

(14) ***-sae* 'even' is an intervener:** (Yanagida 1996:30)

?* John-wa Mary-ni-**sae** *nani*-o oku-tta-no?
John-TOP Mary-to-EVEN what-ACC send-PAST-Q
Intended: 'What did John send even to Mary?'

[2] *wh-mo* forms universal quantifiers and NPIs, but are distinguishable by their pitch accents and use of case markers; see e.g. Aoyagi and Ishii (1994a). The forms here are universals; see also (15).

Polarity items: *-shika* and *wh-mo*

Wh-mo and *-shika* 'only' are often called NPIs, but Shimoyama (2011) and Kataoka (2006) show they are (types of) universals which scope over local negation.

(15) ***wh-mo* "NPI" is an intervener:** (Aoyagi and Ishii 1994b:306)

* **Dare-mo** *nani-o* tabe-nak-atta-no?
who-MO what-ACC eat-NEG-PAST-Q
Intended: 'What did no one eat?'

(16) ***-shika* 'only' "NPI" is an intervener:** (Takahashi 1990:134)

?* John-**shika** *nani*-o tabe-**nak**-atta-no?
John-ONLY$_{NPI}$ what-ACC eat-NEG-PAST-Q
Intended: 'What did only John eat?'

Indefinites and numerals:

(17) **Indefinite *wh-ka* is scope-rigid:** (Mogi 2000:59)

[**Ikutsu-ka**-no mondai]-o toka-**nak**-atta
how.many-KA-GEN problem-ACC solve-NEG-PAST
'*pro* did not solve some problems.' ✓some > not, *not > some

(18) **Indefinite *wh-ka* is an intervener:** (Hoji 1985:269)

* **Dare-ka**-ga *nani*-o nomi-masi-ta-ka
who-KA-NOM what-ACC drink-POLITE-PAST-Q
'What did someone drink?'

(19) **Indefinite *suu-* is not scope-rigid:**

[**Suu**-nin-no gakusei]-ga ko-**nak**-atta.
some-CL-GEN student-NOM come-NEG-PAST
'Some number of students didn't come.' ✓some > not, ✓not > some

(20) **Indefinite *suu-* is not an intervener:**

✓[**Suu**-nin-no gakusei]-ga *dono-hon*-o yon-da-no?
some-CL-GEN student-NOM which-book-ACC read-PAST-Q
'Which book(s) did some number of students read?'

(21) **Modified numerals are not scope-rigid:** (Shibata 2015b:66)

[**Go-nin-ijyoo**-no gakusei]-ga ko-**nak**-atta
5-CL-or.more-GEN student-NOM come-NEG-PAST
'Five or more students didn't come.' ✓(≥ 5) > not, ✓not > (≥ 5)

(22) **Modified numerals are not interveners:**

✓[**Go-nin-ijyoo**-no gakusei]-ga *dono-hon*-o yon-da-no?
five-CL-or.more-GEN student-NOM which-book-ACC read-PAST-Q
'Which book(s) did five or more students read?'

Two positions for *-dake* 'only' with postpositions:

Novel supporting data comes from the position of 'only' *-dake*. *-dake* can occur outside or inside a postposition: DP-P-*dake* or DP-*dake*-P.

(23) **-P-*dake* is scope-rigid; *-dake*-P is not:**[3]

a. Taro-wa Hanako-to-**dake** hanashi-tei-**nai**.
Taro-TOP Hanako-with-only talk-PERF-NEG
lit. 'T. hasn't talked only with H.' ✓only > not, *not > only

b. Taro-wa Hanako-**dake**-to hanashi-tei-**nai**.
Taro-TOP Hanako-only-with talk-PERF-NEG
lit. 'T. hasn't talked with only H.' ✓only > not, ✓not > only

(24) **-P-*dake* is an intervener; *-dake*-P is not:**

a. ??? Taro-wa Hanako-to-**dake** *nani*-o tabe-ta-no?
Taro-TOP Hanako-with-only what-ACC eat-PAST-Q

b. ✓Taro-wa Hanako-**dake**-to *nani*-o tabe-ta-no?
Taro-TOP Hanako-only-with what-ACC eat-PAST-Q
'*What* did Taro eat (only) with (only) Hanako?'

Summary:

	disjunction		universal		also	even	NPI
	ka	*naishi*	*wh-mo*	*subete*	*-mo*	*-sae*	*wh-mo*
scope-rigid?	○ (8a)	× (8b)	○ (10a)	× (10b)	○ (12)	○ (12)	○*
intervener?	○ (9a)	× (9b)	○ (11a)	× (11b)	○ (13)	○ (14)	○ (15)

	NPI only	indefinite		modified	only	
	-shika	*wh-ka*	*suu*-CL	numerals	-P-*dake*	*-dake*-P
scope-rigid?	○*	○ (17)	× (19)	× (21)	○ (23a)	× (23b)
intervener?	○ (16)	○ (18)	× (20)	× (22)	○ (24a)	× (24b)

* See Kataoka (2006) and Shimoyama (2011) on the rigid wide scope of so-called "NPIs."

[3] Futagi (2004) shows this difference with respect to modals.

3 Analysis

❶ All arguments evacuate *v*P in Japanese (Shibata 2015a,b), moving out of NegP (if present). We adopt the *v*P-internal subject hypothesis for Japanese (see e.g. Fukui 1986, Kitagawa 1986, Kuroda 1988).

❷ Some (but not all) quantifiers can reconstruct into base positions.

❸ Intervention reflects the uninterpretability of (6) at LF:

(6) **Kotek (2017) intervention schema** (repeated)

* LF: [$_{CP}$ C … **DP** λx … *wh* … x]

(See Appendix.) A quantifier moved above *wh* could lead to (6), but quantifiers that can reconstruct into *v*P can avoid (6) at LF.

3.1 Shibata 2015a,b on Japanese quantifier scope

A notable feature of Japanese quantifier scope is the similarity of subject and object quantifiers in their scope-taking with respect to sentential operators.

(25) **Both subject and object disjunction takes scope over negation:** (Shibata 2015b:231–235)

a. [Taroo **ka** Jiro]-ga ko-**nak**-atta.
Taro or Jiro-NOM come-NEG-PAST
'Taro or Jiro didn't come.' ✓∨ > ¬, *¬ > ∨

b. Taroo-wa [pan **ka** kome]-o kawa-**nak**-atta.
Taro-TOP bread or rice-ACC buy-NEG-PAST
literally 'Taro didn't buy bread or rice.' ✓∨ > ¬, *¬ > ∨

This contrasts from many other languages, which exhibit an asymmetry in subject and object quantifier scope:

(26) **Asymmetry between subject and object quantifiers in English:**

a. **Every** boy **didn't** read the book. ✓∀ > ¬, ?¬ > ∀

b. Evan **didn't** read **every** book. *∀ > ¬, ✓¬ > ∀

There are, however, other quantifiers which exhibit scope ambiguities with respect to sentential operators:

(27) **Scope ambiguities with modified numerals in subject and object positions:** (Shibata 2015b:234–239)

a. [**Go-nin-ijyoo**-no gakusei]-ga ko-**nak**-atta
5-CL-or.more-GEN student-NOM come-NEG-PAST
'Five or more students didn't come.' ✓(≥ 5) > ¬, ✓¬ > (≥ 5)

b. Taroo-wa [**go-nin-ijyoo**-no gakusei]-o sikara-**nak**-atta.
Taro-TOP 5-CL-or.more-GEN student-ACC scold-NEG-PAST
'Taro didn't scold five or more students.' ✓(≥ 5) > ¬, ✓¬ > (≥ 5)

...but such quantifiers also behave equivalently in subject and object positions.

► All DP arguments are base-generated within the *v*P but evacuate the Japanese *v*P/NegP.

– T > (Neg) > *v*

– Some quantifiers can reconstruct. Some cannot. This is a property of individual quantifiers, not of their (subject vs object) position.

(28) a. All arguments move out of *v*P:
[$_{CP}$ … DP … [$_{vP}$ … *t* … V]]

b. Interpretation in surface position ⇒ wide scope over Neg:
LF: [$_{CP}$ … DP λx … [$_{NegP}$ [$_{vP}$ … x … V] Neg]] DP > Neg

c. Some (not all) quants. reconstruct into *v*P ⇒ narrow scope:
LF: [$_{CP}$ … [$_{NegP}$ [$_{vP}$ … DP … V] Neg]] Neg > DP

3.2 Deriving the correlation

(29) a. Potential intervener (DP) above *wh*:
[$_{CP}$ C … DP … *wh* … [$_{vP}$ … *t* … V]]

b. *LF interpretation in surface position leads to intervention!*
* LF: [$_{CP}$ C … DP λx … *wh* … [$_{vP}$ … x … V]]

c. Reconstruction avoids the intervention configuration:
✓ LF: [$_{CP}$ C … *wh* … [$_{vP}$ … DP … V]]

d. Scrambling *wh* above also avoids intervention:
✓ LF: [$_{CP}$ C … *wh* λy … DP λx … *y* … [$_{vP}$ … x … V]]

This analysis makes a number of predictions...

3.3 Non-intervention through reconstruction

► A "non-intervening" quantifier is interpreted as reconstructed in *v*P.

(30) Taro-wa Hanako-**dake**-to *nani*-o tabe-**nai**-no?
Taro-TOP Hanako-only-with what-ACC eat-NEG-Q

a. * 'What does Taro only not eat with Hanako$_F$?' only > not
Answer: Squid ink pasta (because he gets embarrassed)

b. ? 'What does Taro not eat with only Hanako$_F$?' not > only
Answer: Dimsum (because it's better with more people)

Consider the collective vs distributive interpretation of subjects:

(31) [Gakusei **zen'in**]-ga LGB-o ka-tta.
student all-NOM LGB-ACC buy-PAST

a. 'All the students together bought a copy of LGB.' collective

b. 'All the students each bought a copy of LGB.' distributive

Distributive interpretation requires scoping out of the event description (*v*P).

(32) [Gakusei **zen'in**]-ga *dono hon*-o ka-tta-no?
student all-NOM which book-ACC buy-PAST-Q

a. ✓ 'Which book(s) did the st's all buy together?' collective

b. * 'Which book(s) did the students all individually buy?'
(and they each bought other books too) distributive

3.4 Non-intervention by scoping out

► A "non-intervening" quantifier could "scope out" of the question.

(33) Sensei-wa [[gakusei **zen'in**]-ga *dono hon*-o ka-tta-ka] shiri-tai.
teacher-TOP student all-NOM which book-ACC buy-PAST-Q know-want
'The teacher wants to know...

a. ✓ [which book(s) the students bought all together].' collective

b. * [which book(s) the students bought individually].' distributive

c. ✓ [for each student$_i$, which book(s) they$_i$ bought].' pair-list

The pair-list reading can be derived by scoping the universal quantifier out of the question (see e.g. Karttunen and Peters 1980, Comorovski 1989, 1996).

3.5 Base-generated quantifiers are not interveners

What we have seen so far is compatible with the interpretation of *wh*-in-situ being interrupted by (a) *any* quantification or (b) λ-binders of quantifiers in *derived* positions.

► Quantifiers that are base-generated high and can be interpreted in their base positions are not interveners.

(34) **Temporal modifiers base-generated high do not cause intervention:**

✓ Taro-wa kayoubi-ni-**dake** *nani*-o tabe-ru-no?
Taro-TOP Tuesday-on-ONLY what-ACC eat-NONPAST-Q
'What does Taro eat only on Tuesdays?'

Recall that -P-*dake* was an intervener above (24). *-dake* in (34) is on a temporal modifier which is base-generated high and can be interpreted in-situ.

4 Intervention in English multiple *wh* questions

Intervention also affects *wh*-movement languages like English and German, in multiple *wh*-questions.

(35) **German: intervention above *wh*-in-situ, avoided by scrambling**

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

b. * *Wer* hat **niemanden** *wo* angetroffen?
who has no one where met

c. *Wer* hat *wo* **niemanden** ____ angetroffen?
who has where no one met
'Who didn't meet anybody where'? (Beck 1996)

In English, intervention tracks superiority (Pesetsky 2000), affecting the pair-list reading.[4]

(36) **Intervention effect with *no one* only affects superiority-violating Qs:**
  a. *Which* book did **no one** give ____ to *which* student?
  b. * *Which* student did **no one** give *which* book to ____?

(37) **Intervention effect with *only* only affects superiority-violating Qs:**
  a. *Which* girl did **only Mary** introduce ____ to *which* boy?
  b. * *Which* boy did **only Mary** introduce *which* girl to ____?

► The idea: superiority-obeying and violating questions differ in their LFs (Pesetsky 2000, Beck 2006):

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

(38) LF: [$_{CP}$ *Which student which book* C [$_{TP}$ ____ read ____]]?

⇝ **Predict: no intervention**

Superiority-violating questions: *Wh* is truly LF-in-situ.

(39) LF: [$_{CP}$ *Which book* C did [$_{TP}$ *which student* read ____]]?

⇝ **Predict: intervention!**

► Like in Japanese, intervention in English and German has been tied to focus (Beck 2006, Kotek 2014).

However, we can show instead that here, too, intervention is about *movement*.

[4]More precisely, many speakers report that the question is ungrammatical while some others report that the question's single-pair reading is maintained but its pair-list reading is lost. See Pesetsky (2000), Butler (2001), Kotek (2014) for a discussion of the judgments, and Beck (1996) for a similar observation in German.

4.1 Intervention and A-chains

The literature has several different ways of defining what interveners are (Beck 1996, 2006, Grohmann 2006, Tomioka 2007, Haida 2007, Mayr 2014).

► Everyone agrees **indefinites, bare plurals, existentials, definite descriptions do not act as interveners**.

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

Q: Under the proposal sketched here, why don't *subjects* always intervene?

A: Subjects are normally able to **reconstruct**, avoiding intervention.

Prediction: if reconstruction is blocked, intervention effects should arise.

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

(40) a. ✓ *Which* person are **counselors** available to discuss *which* issue with ____? *stage-level*
  b. * *Which* person are **counselors** careful to discuss *which* issue with ____? *individual-level*

Cf plural *wh*-phrases lead to "plural" single-pair (Jane Grimshaw, p.c.):[5]

(41) ✓ *Which* people are **counselors** careful to discuss *which* issues with ____?

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

(42) 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** seem **to each other** to be likely to appeal *which decision* to ____?

[5]That is, we can construct one pair with multiple participants, e.g. "Grace, Sue, and Jess bought a book, a bike, and a cactus (respectively)" — which is syntactically a single-pair for relevant structure tests, but semantically is interpreted very similarly to a regular pair-list.

4.2 Intervention tracks movement, not superiority

► Use binding to restrict covert movement: bindee cannot move out of the scope of binder. **Predict intervention in superiority-obeying question**.

(43) **Baselines, with binder underlined:**
   a. *Which daughter* showed Obama *which picture of herself*?
   b. *Which daughter* showed Obama *which picture of himself*?

Adding an intervener:

(44) **Intervention in superiority-obeying question (Bob Frank, p.c.):**
   a. ? *Which daughter* showed **only** Obama *which picture of herself*?
   b. * *Which daughter* showed **only** Obama *which picture of himself*?

Other ways to restrict covert *wh*-movement:

- Focus association,
- NPI licensing,
- Islands

4.3 No intervention if *wh* scopes above intervener

► Give *wh*-in-situ wide scope above intervener through non-interrogative movement. **Predict no intervention in superiority-violating question.**

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

(45) **RNR allows exceptional extraction of *wh*-items out of islands:**
   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:

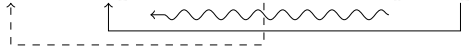
(46) **No intervention in superiority-violating question with RNR:**
   a. * *Which book* did **only Mary** allow *which student* to read ____?
   b. ✓ *Which book* did **[only Mary** allow], and **[only Sue** require], *which student* to read ____?

(See also Branan 2017: data from extraposition, parasitic gap licensing)

4.4 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.

(47) ✓ **intervener** wh_2 C ... **intervener** ... wh_1 ... t_2



► This is a property of universal quantifiers.

(48) **Baseline: superiority-obeying question**

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

Two possible readings:
   a. 'For each kid, which adult will she try to persuade to read which book?' ∀ > *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* > ∀

(49) **Test case: superiority-violating question**

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?' ∀ > *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* > ∀

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

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

4.5 No intervention if intervener reconstructs below *wh*

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

(51) ✓ wh_2 C ... **intervener** ... wh_1 ... t_2 intervener

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

(52) 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,

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

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

c. * *Which topic* did the students **all** seem to *which professor* to have enjoyed ____? *reconstructed reading blocked*

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

4.6 Summary

Intervention caused by traditional non-interveners, e.g. bare plurals, definite descriptions,existential quantifiers.

No correlation between superiority and intervention:

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

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

(6) **Kotek (2017) intervention schema** (repeated)

* LF: [$_{CP}$ C ... **DP** λx ... *wh* ... x]

► **Intervention happens when movement targets a part of structure where focus-alternatives are computed** (Beck 2006, Kotek 2014, 2016).

5 Conclusion

❶ Intervener-hood in Japanese tracks scope-taking:

(5) **Generalization: Intervention correlates with scope-taking**
Scope-rigid DP quantifiers above an in-situ *wh*-phrase cause intervention. DP quantifiers that allow scope ambiguities—i.e., those that can reconstruct below the *wh*-phrase or scope out of the question—do not.

❷ Intervener-hood is not predicted from a quantifier surface position nor from its semantics.

❸ Instead, everything that **moves** into a position above *wh*-in-situ and is interpreted there causes intervention.

❹ Intervention can be avoided by

- Moving the *wh* above the intervener.
- Reconstructing the intervener below *wh*.
- Scoping the intervener out of the question.

  . . . for items that allow reconstruction/quantifying-in.

❺ Problematic for all previous accounts of intervention effects, which assume a fixed set of interveners, but predicted by Kotek (2017).

Paper: https://ling.auf.net/lingbuzz/004136

Appendix: The problem with abstraction over alternatives

Adding Roothian alternatives to a Heim and Kratzer (1998) system:

(53) **A recursive definition for computing focus-semantic values:**

Terminal nodes (TN):

$$[\![\alpha_\tau]\!]^f = \begin{cases} \{[\![\alpha_\tau]\!]^o\} & \text{if } \alpha \text{ not F-marked} \\ \text{a subset of } D_\tau & \text{if } \alpha \text{ F-marked} \end{cases}$$

Pronouns and traces rule:

$$[\![\alpha_i]\!]^f = \begin{cases} g(i) & \text{if } \alpha \text{ not F-marked} \\ \{[\![\alpha_i]\!]^o\} & \text{if } \alpha \text{ F-marked} \end{cases}$$

Functional application (FA):

$$\left[\!\!\left[\begin{array}{c} \alpha_\tau \\ \beta_{\langle\sigma,\tau\rangle} \quad \gamma_\sigma \end{array} \right]\!\!\right]^f = \begin{cases} \{b(g) \mid b \in [\![\beta]\!]^f, g \in [\![\gamma]\!]^f\} & \text{if } \alpha \text{ not F-marked} \\ \text{a contextual subset of } D_\tau & \text{if } \alpha \text{ F-marked} \end{cases}$$

How should we define Predicate Abstraction? Let's start with simple PA:
(The discussion below based on Novel and Romero (2009).)

(54) a. Alice saw nobody
b. Nobody λ_i Alice saw t_i

λx. $[\![\beta]\!]^{M,g^{x/i}} :: \langle e, \tau\rangle$

λ_i $\quad$ $[\![\beta]\!]^{M,g} :: \tau$

(55) a. $[\![t_i]\!]^{M,g}$ = g(i)
b. $[\![\text{saw}]\!]^{M,g} = \lambda$x. λy. y saw x
c. $[\![\text{Alice}]\!]^{M,g}$ = Alice
d. $[\![\text{Alice saw } t_i]\!]^{M,g} = 1$ iff A saw g(i)
e. $[\![\lambda_i \text{ Alice saw } t_i]\!]^{M,g} = \lambda$x. A saw $g^{x/i}$(i)
$= \lambda$x. A saw x
f. $[\![\text{A saw nobody}]\!]^{M,g} = 1$ iff $\neg\exists$x [A saw x]

Now, in a *wh*-in-situ language, imagine the following:

(56) a. Who saw nobody
b. Nobody λ_i who saw t_i

We want to create an abstraction rule over *sets of alternatives*.

λ_i who saw t_i :: ???

λ_i $\quad$ who saw $t_i :: \langle t, t\rangle$

who $:: \langle e, t\rangle$ $\quad$ saw $t_i :: \langle et, t\rangle$

saw $:: \langle\langle et, t\rangle, t\rangle$ $\quad$ $t_i :: \langle e, t\rangle$

(57) a. $[\![t_i]\!]^{M,g} = \{$ g(i) $\}$
b. $[\![\text{saw}]\!]^{M,g} = \{ \lambda$x. λy. y saw x $\}$
c. $[\![\text{saw } t_i]\!]^{M,g} = \{ \lambda$y. y saw g(i) $\}$
d. $[\![\text{who}]\!]^{M,g} =$
$\{$ Alice, Barbara, Carol $\}$
e. $[\![\text{who saw } t_i]\!]^{M,g} =$
$\{$ A saw g(i), B saw g(i), C saw g(i) $\}$
f. $[\![\lambda_i \text{ Alice saw } t_i]\!]^{M,g}$ = ???

The simplest solution won't work: adding a λ-operator outside the abstracted-over expression.

λx. $[\![\beta]\!]^{M,g^{x/i}} :: \langle e, \langle\tau, t\rangle\rangle$

λ_i $\quad$ $[\![\beta]\!]^{M,g} :: \langle\tau, t\rangle$

(58) **What we get isn't what we want:**
λx. $\{$ A saw $g^{x/i}$(i), B saw $g^{x/i}$(i), C saw $g^{x/i}$(i) $\}$

(59) $[\![\text{Nobody}]\!]^{M,g} = \{ \lambda Q_{\langle e,t\rangle}. \neg\exists x_e[Q(x)] \}$

This gives us something of the wrong type to be the argument of *nobody*. *Nobody* (59) wants to take as sister a set of $\langle e, t\rangle$ expressions — type $\langle\langle e, t\rangle, t\rangle$. But the above expression (58) is not of that type. Specifically, we want something like (60):

(60) **What we want to get:**
$\{ \lambda$x. Alice saw $g^{x/i}$(i), λx. Barbara saw $g^{x/i}$(i), λx. Carol saw $g^{x/i}$(i) $\}$

We want a type-shifting rule from type $\langle e, \langle\tau, t\rangle\rangle$ into type $\langle\langle e, \tau\rangle, t\rangle$:

(61) **A procedure for converting [a function into a set of τ-alternatives] to [a set of functions into τ-alternatives]:**
$\lambda Q_{\langle e,\langle\tau,t\rangle\rangle}. \{ f_{\langle e,\tau\rangle} : \forall x_e . f(x) \in Q(x) \}$

But as Shan (2004) shows, a function into sets carries less information than a set of functions. If we transpose using (61), we end up with a set that contains both *constant* $\langle e, t\rangle$-functions (62) and non-constant $\langle e, t\rangle$-functions (63). The former describe properties like "to be seen by Alice/Barbara/Carol," which we want. The latter have no meaning in our system and should be excluded.

(62) **Constant $\langle e, t\rangle$-functions (desired):**

$$\left\{ \begin{bmatrix} x_1 \mapsto \text{Alice saw } x_1 \\ x_2 \mapsto \text{Alice saw } x_2 \\ x_3 \mapsto \text{Alice saw } x_3 \end{bmatrix}, \begin{bmatrix} x_1 \mapsto \text{Barbara saw } x_1 \\ x_2 \mapsto \text{Barbara saw } x_2 \\ x_3 \mapsto \text{Barbara saw } x_3 \end{bmatrix}, \begin{bmatrix} x_1 \mapsto \text{Carol saw } x_1 \\ x_2 \mapsto \text{Carol saw } x_2 \\ x_3 \mapsto \text{Carol saw } x_3 \end{bmatrix} \right\}$$

(63) **Non-constant $\langle e, t\rangle$-functions (undesireable):**

$$\left\{ \begin{bmatrix} x_1 \mapsto \text{Alice saw } x_1 \\ x_2 \mapsto \text{Carol saw } x_2 \\ x_3 \mapsto \text{Barbara saw } x_3 \end{bmatrix}, \begin{bmatrix} x_1 \mapsto \text{Alice saw } x_1 \\ x_2 \mapsto \text{Barbara saw } x_2 \\ x_3 \mapsto \text{Carol saw } x_3 \end{bmatrix}, \begin{bmatrix} x_1 \mapsto \text{Carol saw } x_1 \\ x_2 \mapsto \text{Barbara saw } x_2 \\ x_3 \mapsto \text{Alice saw } x_3 \end{bmatrix} \right\}$$

Hagstrom (1998), Kratzer and Shimoyama (2002) and Yatsushiro (2009) define rules along the lines of (61) above, and thus over-generate.[6] Poesio (1996) and later Novel and Romero (2009) type-lift the entire system, such that each expression is now a function from an assignment function to its original denotation.[7] This last solution *does* indeed fix the problem. See Novel and Romero (2009) for details. Shan (2004) uses this problem to motivate a move to a movement-free, variable-free semantics. Another solution, in Ciardelli et al. (2017), based on Inquisitive Semantics, takes propositions to have the basic type of sets. Through redefining the meanings of the basic elements composing up to propositions, the PA problem is avoided. (See also Charlow 2017.)

[6] Rooth (1985) proposes this too, but doesn't spell out the details.

[7] More specifically, Novel and Romero (2009) find a problem with Poesio's (1996) implementation, and fix it by assuming that *wh*-phrases are definite descriptions.

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