Case study: Japanese *wh*-quantification (Shimoyama, 2006)

☞ New homework assignment posted, due November 5 before class.

1 Japanese questions

Japanese is a *wh*-in-situ language. Questions involve one or more *wh*-phrase occurring in their base-generated positions[1] and a corresponding question particle -ʀᴀ, occurring at the edge of the clause in which the *wh*-phrases take scope.

(1) **Questions: indeterminate phrase associates with -ʀᴀ**

Taro-wa *nani*-o tazunemasita **ka**?
Taro-ᴛᴏᴘ what-ᴀᴄᴄ asked Q

'What did Taro ask?'

Wh-phrases in embedded clauses can be interpreted with matrix scope:

(2) **Embedded indeterminate phrases can take matrix scope:**

Taro-wa [Hanako-ga *nani*-o tabeta]-to iimashita **ka**
'Tato-ᴛᴏᴘ Hanako-ɴᴏᴍ what-ᴀᴄᴄ ate-that said Q

'What did Taro say that Hanako ate?'

Japanese questions exhibit *wh*-island effects. In (3), the question is most naturally interpreted as a matrix yes-no question (with the *wh*-phrases taking scope in the embedded clause). Interpretations that involve matrix scope for either *dare* 'who' and/or *nani* 'what' are difficult.
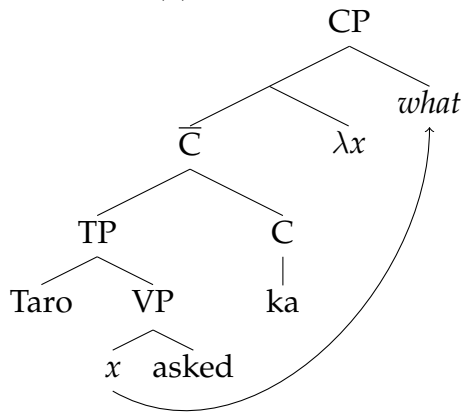
(3) **A *wh*-island effect:**

Taro-wa [Yamada-ga *dare*-ni *nani*-o okutta **ka**] tazunemasita **ka**?
Taro-ᴛᴏᴘ Yamada-ɴᴏᴍ who-ᴅᴀᴛ what-ᴀᴄᴄ sent Q asked Q

  a. 'Did Taro ask what Yamada sent to whom?'
  b. ?* 'Who$_x$ did Taro ask what Yamada sent to x?'
  c.   * 'What$_x$ did Taro ask to whom Yamada sent x?'
  d. ?* 'Who$_x$ did Taro ask whether Yamada sent what to x?'

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[1]With possible scrambling, which will not be relevant here.

The existence of the *wh*-island has led many researchers to argue for a (covert) movement account of Japanese questions. Movement is sensitive to islands, explaining why the *wh*s in (3) can't take matrix scope.

(4) An LF for (1):

```
                        CP
                      /    \
                    /        \  what
                  /           \   ↑
                _C_           λx   
               /   \               
             TP     C              
            /  \    |              
         Taro  VP   ka             
              /  \                 
             x   asked             
```

However, this movement is different from the more familiar English variety in that it is somehow not sensitive to CNP and Adjunct islands:

(5) **No CNP island:**

Taro-wa [[*dare*-ga katta] mochi]-o tabemasita **ka**?
Taro-TOP who-NOM bought rice.cake-ACC ate Q

'Who$_x$ did Taro eat rice cakes that x bought?'

(6) **No adjunct island:**

Taro-wa [*dare*-ga kita-kara] kaerimasita **ka**
Taro-TOP who-NOM came-because left Q

'Who$_x$ did Taro leave because x came?'

2   Indeterminate phrases and universal quantification

The phrases glossed as *wh*-phrases above are traditionally thought of by Japanese scholars as ''indeterminate phrases'' (Kuroda, 1965). These indeterminate phrases associate with different operators. Depending on the operator, they may take on existential, universal, interrogative, negative polarity, or free choice interpretations.

(7) **Indeterminate phrases can associate with different operators[2]** (Shimoyama, 2006):

Interrogative	Universal	Existential	NPI *any*	FC *any*/*wh-ever*
dare...ka 'who'	dare-mo	dare-ka	dare-mo	dare-de-mo
nani...ka 'what'	(nani-mo)	nani-ka	nani-mo	nani-de-mo
dore 'which (one)'	dore-mo	dore-ka	dore-mo	dore-de-mo
dono N...ka 'which$_{Det}$'	dono N-mo	dono N-ka	dono N-mo	dono N-de-mo
doko...ka 'where'	doko-mo	doko-ka	doko-mo	doko-de-mo
itu...ka 'when'	itu-mo	itu-ka		itu-de-mo
naze...ka 'why'		naze-ka		
doo...ka 'how'	(doo-mo)	(doo-ka)	(doo-mo)	doo-de-mo

Universal quantification involves association with the particle '-мо.' As in the case of association with кa, this association can happen long-distance, and across islands.

(8) **Universal quantification: indeterminate phrase associates with мо**

a. [*Dono* gakusei]-**mo** odotta.
   which student-мо danced

   'Every student danced.'

b. [*Dono* gakusei-no okaasan]-**mo** odotta.
   which student-ɢᴇɴ mother-мо danced

   'Every student's mother danced.'

c. [[*Dono* gakusei-ga syootaisita] sensei]-**mo** odotta.
   which student-ɴᴏᴍ invited teacher-мо danced

   'For every student x, the teacher(s) that x had invited danced.'

More than one indeterminate phrase can occur in the scope of мо.

(9) **Multiple indeterminate phrases can occur in the scope of мо**

[[*Dono* gakusei-ga *dono* ie-ni syootaisita] sensei]-**mo** odotta.
which student-ɴᴏᴍ which house-to invited teacher-мо danced

'For every student x and every house y, the teacher(s) that x had invited to y danced.'

In the absence of an indeterminate phrase to associate with, мо is interpreted as 'also' or 'even.'[3]

(10) **Indeterminate-less мо is interpreted as 'also' or 'even:'**

Sono syoonin-mo damatteita.
that witness-мо was.silent

'That witness was also silent./Even that witness was silent.'

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[2]The indeterminate phrase is unaccented in its uses as *any*, otherwise the second syllable is accented. Phrases in parenthesis are unproductive and only used in fixed expressions.
[3]There is no equivalent use of кa.

In the non-local universal construction in (11), *dare* 'who' or *nani* 'what' in the embedded interrogative clause cannot be associated with the universal particle MO across the *wh*-island, similar to the *wh*-island case in (3) above. The only available reading is one in which MO is interpreted as 'also' or 'even.'

(11) **Wh-island with MO:**

[[[Yamada-ga *dare*-ni   *nani*-o   okutta **ka**] sitteiru] syoonin]-**mo** damatteita.
Yamada-NOM who-DAT what-ACC sent   Q] know]   witness]-MO was.silent

    a.   'The witness who knew what Yamada sent to whom was also silent.'
           'Even the witness who knew what Yamada sent to whom was silent.'
    b.   * 'For every person x, the witness who knew what Yamada sent to x was silent.'
    c. ** 'For every thing y, the witness who knew to whom Yamada sent y was silent.'
    d.   * 'For every person x, for every thing y, the witness who knew whether Yamada sent y to x was silent.'

Association with MO is not sensitive to CNP and Adjunct islands (cf 5–6).

(12) **No CNP island with MO:**

[[[[*Dono* T.A.-ga   osieta] gakusei]-ga syootaisita] sensei]-**mo** kita.
which   T.A.-NOM taught student-NOM invited   teacher-MO came

'For every T.A. x, the teacher(s) that were invited by the student(s) that x had taught came.[4]

(13) **No adjunct island with MO:**

[[[Taro-ga *nani*-o   katta-kara]   okotta] hito]-**mo** heya-o   deteitta.
Taro-NOM what-ACC bought-because got.angry person-MO room-ACC left

'For every thing x, the people who got angry because Taro had bought x left the room.'

We also find a *mo*-island effect: association of a indeterminate phrase with KA is blocked by an intervening MO. As a result, the sentence in (14) can only be interpreted as a matrix *whether* question.

(14) **Association with KA is blocked by intervening MO:**

Yoko-wa [[[Taro-ga *nan*-nen-ni   *nani*-nituite kaita] ronbun]-**mo** yuu-datta **ka**]
Yoko-TOP Taro-NOM what-year-in what-about wrote paper-MO   A-was   Q
siritagatteiru.
want.to.know

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[4]Shimoyama (2006) has the translation: 'For every T.A. x, the teacher(s) that the student(s) that x had taught invited came.' We are not entirely sure that our paraphrase is equivalent to Shimoyama's, but it has the advantage that we can parse it. Discuss?

a. 'Yoko wonders whether for every topic x, every year y, the paper that Taro wrote on x in y got an A.'

b. ?* 'Yoko wonders for which year y, for every topic x, the paper that Taro wrote on x in y got an A.'

c. * 'Yoko wonders for which topic x, for every year y, the paper that Taro wrote on x in y got an A.'

d. (?) 'Yoko wonders for which topic x and for which year y, the paper that Taro wrote on x in y also got an A.'[5]

Similarly, association with a higher MO is blocked by the presence of a lower MO. The high MO is therefore interpreted as 'also.'

(15) **Association with a higher MO is blocked by a lower MO:**

[[[[Taro-ga *nan*-nen-ni   *nani*-nituite kaita] ronbun]-**mo** yonda] sensei]-**mo**
Taro-NOM   what-year-in what-about wrote paper-MO   read   teacher-MO
totemo tukareta.
very   got.tired

a. 'The teacher who read, for every topic x, every year y, the paper that Taro wrote on x in y also got very tired.'

b. * 'For every year y, the teacher who read, for every topic x, the paper that Taro wrote on x in y got very tired.'

c. ** 'For every topic x, the teacher who read, for every year y, the paper that Taro wrote on x in y got very tired.'

d. (?) 'For every topic x, every year y, the teacher who also read the paper that Taro wrote on x in y got very tired.'

To summarize the data, an indeterminate phrase must associate with the nearest KA/MO, and this can happen across CNP and adjunct islands:

(16) **IndeterminateP must associate with nearest KA/MO, possibly across islands:**
a. * [... [... indeterminate phrase ...]-KA/MO ...]-KA/MO

b. [... [... indeterminate phrase ...]$_{CNP/Adjunct}$ ...]-KA/MO

☞ KA and MO are patterning together, should receive a unified analysis.

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[5]This reading is apparently possible in an appropriate context, and suggests that 'also' MO and universal MO should be treated as distinct lexical items.

3 Two approaches to universal quantification

In previous literature: The indeterminate phrase provides the universal quantifier with its restrictor, (17a). 'indirect restrictor approach'

Shimoyama (2006): MO quantifies directly over its sister, (17b). 'direct restrictor approach'

(17) **Calculating MO's restrictor:**
[*Dono* gakusei-no okaasan]-**mo** odotta.
which student-GEN mother-MO danced

'Every student's mother danced.'
   a. $\forall x\,[student(x) \rightarrow dance(\iota y[mother(x)(y)])]$
   b. $\forall x\,[x \in \{\iota y[mother(z)(y)] : student(z)\} \rightarrow dance(x)]$

Note: These two formulas are equivalent (modulo presuppositions).
(17a): For every student, his/her mother danced.
(17b): Every mother of a student danced.

A possible advantage of the indirect restrictor view: it provides a more straightforward explanation of anaphora, as in (18a). The direct restrictor view needs to make use of E-type pronouns, (18b).

(18) **Anaphoric reference to indeterminate phrases:**
[[*Dono* hune-o eranda] hito]-**mo** <u>sono</u> nedan-ni odoroita.
which boat-ACC chose person-MO its price-at was.surprised

   a. 'For every boat x, the person who chose x was surprised at the price of x.'
   b. 'For every person y who chose some boat, y was surprised at the price of the boat y chose.'

However, the indirect restrictor approach breaks down for more complicated examples, for which the E-type pronoun solution still works. So, either way, we need to use the E-type pronoun analysis for at least some of these anaphora cases.

(19) **More complex anaphora with indeterminate phrases:**
[[[[*Dono* kaisya-ga tukutta] hune]-o eranda] hito]-mo <u>sono</u> nedan-ni
which company-NOM made boat-ACC chose person-MO its price-at
odoroita.
was.surprised

   a. 'For every company x, the person who chose a boat that x made was surprised at the price of x.'
   b. 'For every person y who chose a boat that some company made, y was surprised at the price of the boat y chose.'

4 A Rooth-Hamblin analysis of indeterminate phrases

We can use Hamblin semantics to interpret indeterminate phrases (following Hagstrom 1998). *Wh*-phrases denote sets of individuals. Elements which are not F-marked have the singleton set of their ordinary value as their focus semantic value.

(20) **A simple question:**

[*Dare*-ga odorimasu] **ka**?
who-NOM dance Q

'Who dances?'

(21) **The focus semantic values of *wh*s, predicates**
   a. $[\![who\,/\,dare]\!]^f = \{x_e \in D_e : x \text{ is a person}\}$
   b. $[\![dances\,/\,odorimasu]\!]^f = \{[\![dances\,/\,odorimasu]\!]^o\} = \{\lambda x.x \text{ dances}\}$

(22) **The semantics of interrogative C** (Beck and Kim 2006)[6]
   $[\![[C\ TP]]\!]^o = [\![TP]\!]^f$

Recall: pointwise functional application

(23)
$$\left[\!\left[\begin{array}{c} \alpha_\tau \\ \overbrace{\beta_{\langle\sigma,\tau\rangle}\quad\gamma_\sigma} \end{array} \right]\!\right]^f = \left\{ \begin{array}{ll} \left\{ b(g) \mid b \in [\![\beta]\!]^f, g \in [\![\gamma]\!]^f \right\} & \text{if } \alpha \text{ not F-marked} \\ \text{a contextually-determined subset of } D_\tau & \text{if } \alpha \text{ F-marked} \end{array} \right.$$

Applying this to a simple question, we get:

(24) **The meaning of (20):**
   a. $[\![\textbf{dare-ga odorimasu ka}]\!]^o = [\![\textbf{dare-ga odorimasu}]\!]^f$ \hfill rule (22)
   b. $[\![\textbf{dare-ga odorimasu}]\!]^f = \{x \text{ dances} : x \text{ a person}\}$ \hfill rule (23)

The same semantics can be extended to cases of universal quantification with MO.

(25) **A simple quantificational statement:**

[*Dono* gakusei]-**mo** odotta.
which student-MO danced

'Every student danced.'

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[6]Shimoyama (2006) doesn't use a bi-dimensional semantics. We have converted the denotations in the paper into the system we have been using. The denotation of C here is borrowed from previous handouts, and not discussed as such in Shimoyama (2006).

Which N-phrases denote the set of all individuals that satisfy N.

(26) **The semantics of *which* phrases:**
$[\![\text{which student / dono gakusei}]\!]^f = \{x_e \in D_e : x \text{ is a student}\}$

мо forms a generalized quantifier with its sister, then takes a $\langle e, t\rangle$ nuclear scope predicate.

(27) **The semantics of мо:**
$$\left[\!\!\left[\overbrace{\alpha_e \quad \text{MO}} \right]\!\!\right] = \lambda P_{\langle e,t\rangle}.\forall x \left(x \in [\![\alpha]\!]^f \rightarrow P(x) \text{ is true} \right)$$

(28) **The meaning of (25):**
  a. $[\![\textbf{[dono gakusei]-mo odotta}]\!]^o = [\![\textbf{[dono gakusei]-mo}]\!]^o ([\![\textbf{odotta}]\!])$ FA
  b. $[\![\textbf{[dono gakusei]-mo}]\!]^o = \lambda P \forall x\, [\, x \in [\![\textbf{dono gakusei}]\!]^f \rightarrow P(x) = 1]$
  $= \lambda P \forall x\, [\, x \in \{x_e \in D_e : x \text{ is a student}\} \rightarrow P(x) = 1]$ rule (27)
  c. $[\![\textbf{odotta}]\!]^o = \lambda x.x \text{ danced}$ TN
  d. $[\![(25)]\!]^o = \forall x\, [\, x \text{ is a student} \rightarrow x \text{ danced}]$ from b+c, FA
  $1 \iff$ every student danced.

This semantics can operate across islands, explaining мо's insensitivity to islands:

(29) **мо is not sensitive to islands:**

[[*Dono* gakusei-ga teisyutusita] syukudai]-**mo**　　　yuu-datta.
which student-NOM submitted　homework.assignment-мо A-was

'Every homework assignment that a student had handed in got an A.'

  a. $[\![[\lambda 1\ \textbf{[dono gakusei-ga } t_1 \textbf{ teisyutusita] syukudai}]\!]^f =$
  $\left\{ \begin{array}{l} \iota y\, [\, y \text{ is a homework assignment submitted by Taro }], \\ \iota y\, [\, y \text{ is a homework assignment submitted by Jiro }], \\ \iota y\, [\, y \text{ is a homework assignment submitted by Saburo }],... \end{array} \right\}$ relC:FA[7]

  b. $[\![\textbf{[dono gakusei-ga teisyutsushita shukudai]-mo}]\!]^o =$
  $\lambda P.\forall x \left[x \in \left\{ \begin{array}{l} \iota y\, [\, y \text{ is HW submitted by Taro }], \\ \iota y\, [\, y \text{ is HW submitted by Jiro }], \\ \iota y\, [\, y \text{ is HW submitted by Saburo }],... \end{array} \right\} \rightarrow P(x) \text{ is true} \right]$ (27)

  c. $[\![\textbf{yuu-datta}]\!]^o = \lambda x.\, x \text{ got an A}$ TN

  d. $[\![(29)]\!]^o = \forall x \left[x \in \left\{ \begin{array}{l} \iota y\, [\, y \text{ is HW submitted by Taro }], \\ \iota y\, [\, y \text{ is HW submitted by Jiro }], \\ \iota y\, [\, y \text{ is HW submitted by Saburo }],... \end{array} \right\} \rightarrow x \text{ got an A} \right]$
  from b+c, FA
  $1 \iff$ every homework assignment that some student or other has submitted got an A.

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[7]Assuming here a definite singular interpretation of the head noun syukudai 'hw assignment.' See the appendices of the paper for a discussion of other possible interpretations.
Also assuming that the relevant students in the context are Taro, Jiro, and Saburo.

This allows us to deal with sentences with multiple indeterminate phrases:

(30) **мо can handle multiple indeterminate phrases:**

[[*Dono* gakusei-ga   *dono*   T.A.-ni teisyutusita] syukudai]-**mo** yuu-datta.
which student-NOM which T.A.-to submitted   HW-мо   A-was

'Every homework assignment that a student had handed in to a T.A got an A.'

  a. $[\![[\lambda 1$ **[dono gakusei-ga dono T.A.-ni** t_1 **teisyutusita] syukudai]**$]\!]^f =$
     $\{\iota y\ [\ y$ is a homework assignment submitted by z to $v]$: z a student, v a T.A. $\}$

  b. $[\![$ **[dono gakusei-ga dono T.A.-ni teisyutusita syukudai]-mo**$]\!]^o =$
     $\lambda P.\forall x\ [x \in \{\iota y\ [y$ is a HW submitted by z to $v]$: z a student, v a T.A.$\} \rightarrow P(x)]$

  c. $[\![$ **yuu-datta**$]\!]^o = \lambda x.\ x$ got an A

  d. $[\![(30)]\!]^o = \forall x\ [x \in \{\iota y\ [y$ is a HW submitted by z to $v]$: z a student, v a T.A.$\} \rightarrow x$ got an A]
     $1 \iff$ every homework assignment that some student or other has submitted to some T.A. or other got an A.

Finally, we can understand why indeterminate phrases must associate with the nearest мо/ка: this is ensured by the architecture of the Hamblin system: sets will continue to 'expand' via pointwise functional application until they reach the first operator that takes these alternatives as input and operates on them. The system allows no way for the alternatives to 'skip' an operator!

(31) **IndeterminateP must associate with nearest ка/мо, possibly across islands:**
[... indeterminate phrase ... [... additional structure ...]]-ка/мо
              area of alternatives computation

  a. ✓ [... [... indeterminate phrase ...]-ка/мо ...]-ка/мо

  b. * [... [... indeterminate phrase ...]-ка/мо ...]-ка/мо

  c. ✓ [... [... indeterminate phrase ...]$_{CNP/Adjunct}$ ...]-ка/мо

Recall Rooth (1992) on the effect of focus operators (for him, $\sim$):

"in the expression $\alpha \sim v$, focus has been interpreted, so we want to neutralize the semantic effect of the foci in α. In alternative semantics, the focus semantic value of a phrase containing no foci is the unit set of its ordinary semantic value, so the way to state this closure clause is: $[\![\alpha \sim v]\!]^f = \{[\![\alpha]\!]^o\}$."   (p. 94–95)

References

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