Cross-linguistic variation in the ways of forming alternative questions: Japanese and beyond

Wataru Uegaki
MIT
wuegaki@mit.edu

SALT 24 @ NYU
May 31st

0. Introduction

Alternative questions (AltQs)

(1) Q: Do you drink coffee or tea?

Alternative questions (AltQs)

(1) Q: Do you drink coffee or tea?
A: I drink coffee/tea. AltQ reading

Alternative questions (AltQs)

(1) Q: Do you drink coffee or tea?

A: I drink coffee/tea. — AltQ reading

A': Yes, I drink coffee or tea. /
No, I don't drink coffee or tea.
— Polar Question (PolQ) reading

Compositional semantics of AltQs

(2) Do you drink coffee or tea?

(3) $[\![(2)]\!] = \{$you drink coffee, you drink tea$\}$

Compositional semantics of AltQs

(2) Do you drink coffee or tea?

(3) $[\![(2)]\!] = \{$you drink coffee, you drink tea$\}$

Goal: To analyze how the semantic value in (3) is compositionally derived from (2).

Compositional semantics of AltQs

(2) Do you drink coffee or tea?

(3) $[\![(2)]\!] = \{$you drink coffee, you drink tea$\}$

Goal: To analyze how the semantic value in (3) is compositionally derived from (2).

Additional goal: To analyze the ambiguity between the AltQ reading and the PolQ reading in (2).

Three kinds of analysis in the literature

Three kinds of analysis in the literature

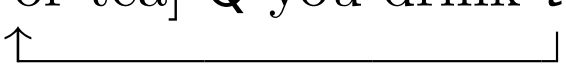
1. The disjuncts in AltQ are smaller than CPs. No deletion. The AltQ meaning is derived by a (overt or covert) scoping mechanism. (Larson 1985; Beck and Kim 2006; Nicolae 2013)

(4) [coffee or tea] Q you drink *t*

Three kinds of analysis in the literature

1. The disjuncts in AltQ are smaller than CPs. No deletion. The AltQ meaning is derived by a (overt or covert) scoping mechanism. (Larson 1985; Beck and Kim 2006; Nicolae 2013)

(4) [coffee or tea] Q you drink *t*



2. The disjuncts in AltQ are CPs, specifically PolQs. There may be a deletion in one of the disjuncts. The AltQ meaning is derived by the disjunction of PolQs. (Pruitt and Roelofsen 2011)

(5) [Do you drink coffee] or [~~do you drink~~ tea]?

Three kinds of analysis in the literature

1. The disjuncts in AltQ are smaller than CPs. No deletion. The AltQ meaning is derived by a (overt or covert) scoping mechanism. (Larson 1985; Beck and Kim 2006; Nicolae 2013)

(4) [coffee or tea] Q you drink *t*

2. The disjuncts in AltQ are CPs, specifically PolQs. There may be a deletion in one of the disjuncts. The AltQ meaning is derived by the disjunction of PolQs. (Pruitt and Roelofsen 2011)

(5) [Do you drink coffee] or [~~do you drink~~ tea]?

3. The disjuncts in AltQ are clausal but smaller than CPs. Possibly a deletion in one of the disjuncts. The AltQ meaning is derived by a scoping mechanism. (Han and Romero 2004a,b)

(6) [$_{\text{CP}}$ whether Q *t* [[you drink tea] or [~~you drink~~ coffee]]]

Two dimensions

1. Whether there is a (overt or covert) scope-shifting operation that makes disjunction take wider scope than the question-forming operator.
2. Whether there may be a deletion in one of the disjuncts.

Two dimensions

1. Whether there is a (overt or covert) scope-shifting operation that makes disjunction take wider scope than the question-forming operator.
2. Whether there may be a deletion in one of the disjuncts.

	scoping	potential deletion
i. Scoping	yes	no
ii. Disjoined PolQs	no	yes
iii. Scoping + Deletion	yes	yes

The claims to be made

Two ways of forming AltQs

Languages in principle have two ways to form AltQs: (i) by way of scoping and (ii) by way of disjoining two PolQs. Some languages only have the latter option.

The claims to be made

Two ways of forming AltQs

Languages in principle have two ways to form AltQs: (i) by way of scoping and (ii) by way of disjoining two PolQs. Some languages only have the latter option.

- Japanese AltQs are underlyingly disjunctions of two PolQs. There may be deletion, but no scope-shifting operation.

The claims to be made

Two ways of forming AltQs

Languages in principle have two ways to form AltQs: (i) by way of scoping and (ii) by way of disjoining two PolQs. Some languages only have the latter option.

- Japanese AltQs are underlyingly disjunctions of two PolQs. There may be deletion, but no scope-shifting operation.
- For other languages such as Basque and Finnish, however, evidence suggests that AltQs via scoping is available as well.

Roadmap

1. Review of the three approaches to the compositional semantics of AltQs
   - Scoping analysis
   - Deletion without scoping (Disjoined PolQs)
   - Scoping *and* deletion

Roadmap

1. Review of the three approaches to the compositional semantics of AltQs
   - Scoping analysis
   - Deletion without scoping (Disjoined PolQs)
   - Scoping *and* deletion
2. Japanese alternative questions
   - Data
   - Proposal in the deletion without scoping analysis

Roadmap

1. Review of the three approaches to the compositional semantics of AltQs
   - Scoping analysis
   - Deletion without scoping (Disjoined PolQs)
   - Scoping *and* deletion
2. Japanese alternative questions
   - Data
   - Proposal in the deletion without scoping analysis
3. Cross-linguistic variation
   - Languages with multiple disjunction markers
   - Hybrid picture

1. The three analyses

Scoping analysis

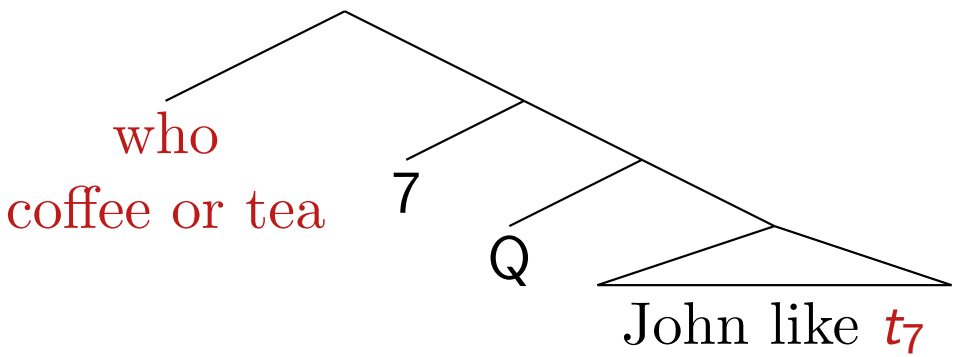
Implementation along the lines of Karttunen (1977):

- In Karttunen (1977), wh-phrases have the same denotations as existential quantifiers. Wh-phrases scope above the (proto-)question operator to derive the wh-question interpretation.

Scoping analysis

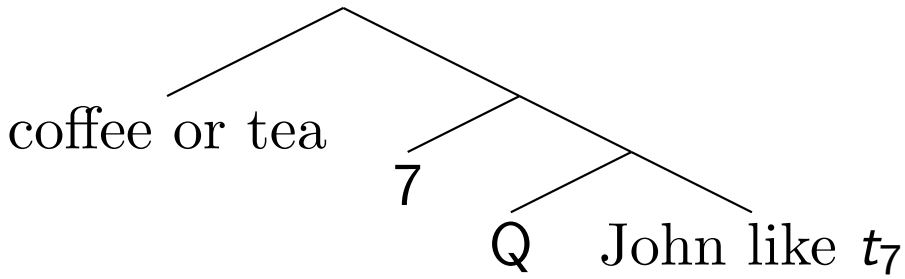
Implementation along the lines of Karttunen (1977):

- In Karttunen (1977), wh-phrases have the same denotations as existential quantifiers. Wh-phrases scope above the (proto-)question operator to derive the wh-question interpretation.
- We do the same thing with disjunction.



Scoping analysis (cont.)

(7)



(8) $[\![\text{Q}]\!] = \lambda p[\lambda q.\ p = q]$

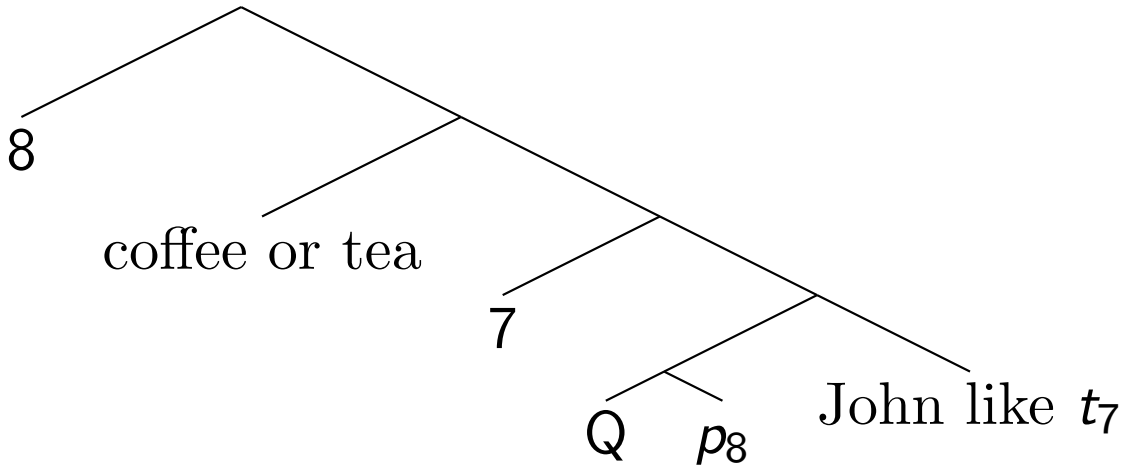
(9) $[\![\text{coffee or tea}]\!] = \lambda P_{\langle e,t\rangle}.P(\textbf{coffee}) \vee P(\textbf{tea})$

(10) $[\![(11)]\!]$
$= \lambda p.p = \lambda w.\textbf{like}(\textbf{j}, \textbf{coffee}, w) \vee p = \lambda w.\textbf{like}(\textbf{j}, \textbf{tea}, w)$
$= \{\text{John likes coffee, John likes tea}\}$

Wh-Quantification rule (cf. Karttunen 1977, adapted)
If $[\![\alpha]\!] \in D_{\langle et,t\rangle}$ and $[\![\beta]\!] \in D_{\langle e,\langle st,t\rangle\rangle}$,
then $[\![\alpha\ \beta]\!] = \lambda p.[\![\alpha]\!](\lambda x.[\![\beta]\!](x)(p))$

Scoping analysis (cont.)

(11)



(12) $[\![\text{Q}]\!] = \lambda p \lambda q.\ p = q$

(13) $[\![\text{coffee or tea}]\!] = \lambda P_{\langle e,t \rangle}.P(\textbf{coffee}) \vee P(\textbf{tea})$

(14) $[\![(11)]\!]$
$= \lambda p.p = \lambda w.\textbf{like}(\textbf{j}, \textbf{coffee}, w) \vee p = \lambda w.\textbf{like}(\textbf{j}, \textbf{tea}, w)$
$= \{\text{John likes coffee, John likes tea}\}$

Different implementations of scoping

Overt movement of 'whether' (Larson 1985; Romero & Han 2003) *whether* overtly moves to Spec CP. *whether* is a 'scope-marker' of the disjunction, which can be semantically analyzed as an existential quantifier over Choice Functions (Reinhart 1992).

Focus semantics (Beck and Kim 2006) Disjunction introduces focus alternatives, which are passed up via Point-wise FA until it meets the Q-operator.

QR (Nicolae 2013) The Disjunction Phrase itself undergoes QR. Equivalent to the above formulation.

- These analyses make different predictions about when an AltQ interpretation is blocked (island, intervention etc).

AltQs as disjunctions of PolQs

Pruitt & Roelofsen (2011):

- AltQs are derived by a disjunction of CP polar questions.

(15) [[$_{CP}$ TP_1 Q] Disj [$_{CP}$ TP_2 Q]]

(16) Does John drink coffee or ~~does John drink~~ tea?

AltQs as disjunctions of PolQs

Pruitt & Roelofsen (2011):

- AltQs are derived by a disjunction of CP polar questions.

(15) [[$_{CP}$ TP_1 Q] Disj [$_{CP}$ TP_2 Q]]

(16) Does John drink coffee or ~~does John drink~~ tea?

- What appears to be a coordination of smaller items on the surface involves a deletion in the second CP disjunct.

AltQs as disjunctions of PolQs

Pruitt & Roelofsen (2011):

- AltQs are derived by a disjunction of CP polar questions.

(15) [[$_{CP}$ TP_1 Q] Disj [$_{CP}$ TP_2 Q]]

(16) Does John drink coffee or ~~does John drink~~ tea?

- What appears to be a coordination of smaller items on the surface involves a deletion in the second CP disjunct.
- Scoping is unnecessary since *the disjunction already scopes above the Question operator in the underlying structure*.

There *exist* sentences in which PolQs are coordinated

(17) [Does John drink coffee] or [does John drink tea]?

(18) Sue knows [[whether John drinks coffee] or [whether he drinks tea.]]

There *exist* sentences in which PolQs are coordinated

(17) [Does John drink coffee] or [does John drink tea]?

(18) Sue knows [[whether John drinks coffee] or [whether he drinks tea.]]

- But, this of course does not tell us that *all* AltQs are derived from this structure.

Scoping *and* deletion

Han & Romero (2004a,b): Movement of $whether$ + deletion

- AltQ interpretation is derived by the movement of $whether$ (+ the choice function analysis).

Scoping *and* deletion

Han & Romero (2004a,b): Movement of $whether$ + deletion

- AltQ interpretation is derived by the movement of $whether$ (+ the choice function analysis).
- They also assume a deletion in AltQs.

Scoping *and* deletion

Han & Romero (2004a,b): Movement of *whether* + deletion

- AltQ interpretation is derived by the movement of *whether* (+ the choice function analysis).
- They also assume a deletion in AltQs.

H&R's structure for AltQs:

(19) $[_{\text{CP}}$ whether/Op ...Q... t [TP_1 Disj TP_2]]

(20) $[_{\text{CP}}$ whether/Op Q t [[you want tea] or [~~you want~~ coffee]]]

Scoping *and* deletion

Han & Romero (2004a,b): Movement of *whether* + deletion

- AltQ interpretation is derived by the movement of *whether* (+ the choice function analysis).
- They also assume a deletion in AltQs.

H&R's structure for AltQs:

(19) $[_{\text{CP}}$ whether/Op ...Q... t [TP_1 Disj TP_2]]

(20) $[_{\text{CP}}$ whether/Op Q t [[you want tea] or [~~you want~~ coffee]]]

- The disjuncts are at least as big as a VP but smaller than a CP.

H&R's reason for assuming a deletion: Cross-linguistic data

(21) Chandra-ne [**coffee yaa chai**] pii? [**Hindi**]
Chandra-Erg coffee Disj tea drink-Pfv
'Is it the case that Chandra drank coffee or tea?' (*AltQ; ✓PolQ)

(22) [Chandra-ne coffee pii] yaa [~~Chandra-ne~~ chai pii]?
Chandra-Erg coffee drink.Pfv Disj Chandra-Erg tea drink.Pfv
'Did Chandra drink coffee or tea?' (✓AltQ; ✓PolQ)

- In order for (21) to lack the AltQ reading, the following deletion has to be blocked:

(23) [Chandra-ne coffee ~~pii~~] yaa [~~Chandra-ne~~ chai pii]?
Chandra-Erg coffee drink.Pfv Disj Chandra-Erg tea drink.Pfv

H&R's reason for assuming a deletion: Cross-linguistic data

(21) Chandra-ne [**coffee yaa chai**] pii? [**Hindi**]
Chandra-Erg coffee Disj tea drink-Pfv
'Is it the case that Chandra drank coffee or tea?' (*AltQ; ✓PolQ)

(22) [Chandra-ne coffee pii] yaa [~~Chandra-ne~~ chai pii]?
Chandra-Erg coffee drink.Pfv Disj Chandra-Erg tea drink.Pfv
'Did Chandra drink coffee or tea?' (✓AltQ; ✓PolQ)

- In order for (21) to lack the AltQ reading, the following deletion has to be blocked:

(23) [Chandra-ne coffee ~~pii~~] yaa [~~Chandra-ne~~ chai pii]?
Chandra-Erg coffee drink.Pfv Disj Chandra-Erg tea drink.Pfv

- H&R argue that the deletion in the first disjunct is impossible, *assuming that there is no backward gapping in Hindi*.

H&R's reason for assuming a deletion: Cross-linguistic data

(21) Chandra-ne [**coffee yaa chai**] pii? [**Hindi**]
Chandra-Erg coffee Disj tea drink-Pfv
'Is it the case that Chandra drank coffee or tea?' (*AltQ; ✓PolQ)

(22) [Chandra-ne coffee pii] yaa [~~Chandra-ne~~ chai pii]?
Chandra-Erg coffee drink.Pfv Disj Chandra-Erg tea drink.Pfv
'Did Chandra drink coffee or tea?' (✓AltQ; ✓PolQ)

- In order for (21) to lack the AltQ reading, the following deletion has to be blocked:

(23) [Chandra-ne coffee ~~pii~~] yaa [~~Chandra-ne~~ chai pii]?
Chandra-Erg coffee drink.Pfv Disj Chandra-Erg tea drink.Pfv

- H&R argue that the deletion in the first disjunct is impossible, *assuming that there is no backward gapping in Hindi*.
- Thus, the data in (21) is explained if we assume deletion, but the fact is mysterious if an AltQ is derived by just scoping.

2. Japanese AltQs

The basic data

Japanese AltQs are syntactically constrained in the same way as Hindi AltQs: Object DP disjunction does not induce AltQ reading.

(24) [Taro-ga [koohii ka ocha]-o non-da-ka] (-ga mondai-da)
Taro-Nom coffee Disj tea-Acc drink-Past-Q (-Nom question-Cop)
'(It is a question) whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

The basic data

Japanese AltQs are syntactically constrained in the same way as Hindi AltQs: Object DP disjunction does not induce AltQ reading.

(24) [Taro-ga [koohii ka ocha]-o non-da-ka] (-ga mondai-da)
Taro-Nom coffee Disj tea-Acc drink-Past-Q (-Nom question-Cop)
'(It is a question) whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

When a disjunct is as big as a VP, the AltQ reading is available:

(25) [Taro-ga [koohii-o **non-da**-ka ocha-o non-da-ka]].
Taro-Nom coffee-Acc drink-Past-KA tea-Acc drink-Past-Q
'Whether Taro drank coffee or Tea.' (✓AltQ; ?✓PolQ)

The basic data

Japanese AltQs are syntactically constrained in the same way as Hindi AltQs: Object DP disjunction does not induce AltQ reading.

(24) [Taro-ga [koohii ka ocha]-o non-da-ka] (-ga mondai-da)
Taro-Nom coffee Disj tea-Acc drink-Past-Q (-Nom question-Cop)
'(It is a question) whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

When a disjunct is as big as a VP, the AltQ reading is available:

(25) [Taro-ga [koohii-o **non-da**-ka ocha-o non-da-ka]].
Taro-Nom coffee-Acc drink-Past-KA tea-Acc drink-Past-Q
'Whether Taro drank coffee or Tea.' (✓AltQ; ?✓PolQ)

Note: The disjunction marker ka is homophonous with the question particle ka. Neutral gloss: KA.

Problem for H&R: Backward gapping

In order to account for the lack of an AltQ reading with an obj disjunction, H&R have to assume that the backward gapping in (26) is impossible.

(26) [[Taro-ga koohii~~-o~~ ~~non-da~~] ka, [~~Taro-ga~~ ocha-o non-da]]-ka
Taro-Nom coffee-Acc drink-Past Disj Taro-Nom tea-Acc
drink-Past-Q

Problem for H&R: Backward gapping

In order to account for the lack of an AltQ reading with an obj disjunction, H&R have to assume that the backward gapping in (26) is impossible.

(26) [[Taro-ga koohii~~-o~~ ~~non-da~~] ka, [~~Taro-ga~~ ocha-o non-da]]-ka
Taro-Nom coffee-Acc drink-Past Disj Taro-Nom tea-Acc
drink-Past-Q

However, backward gapping *is* possible, with an AltQ reading.

(27) [Taro-ga koohii-o ~~non-da-ka~~] (soretomo) [~~Taro-ga~~ ocha-o non-da-ka]
Taro-Nom coffee-Acc drink-Past-KA Disj Taro-Nom tea-Acc drink-Past-Q
'Which of these is true: Taro drank coffee or Taro drank tea.'

Problem for H&R: Backward gapping

In order to account for the lack of an AltQ reading with an obj disjunction, H&R have to assume that the backward gapping in (26) is impossible.

(26) [[Taro-ga koohii~~-o~~ ~~non-da~~] ka, [~~Taro-ga~~ ocha-o non-da]]-ka
Taro-Nom coffee-Acc drink-Past Disj Taro-Nom tea-Acc
drink-Past-Q

However, backward gapping *is* possible, with an AltQ reading.

(27) [Taro-ga koohii-o ~~non-da-ka~~] (soretomo) [~~Taro-ga~~ Taro-Nom
Taro-Nom coffee-Acc drink-Past-KA Disj
ocha-o non-da-ka]
tea-Acc drink-Past-Q
'Which of these is true: Taro drank coffee or Taro drank tea.'

- The ellipsis/gapping in (26) is structurally the same as in (27).

Problem for H&R: Backward gapping

In order to account for the lack of an AltQ reading with an obj disjunction, H&R have to assume that the backward gapping in (26) is impossible.

(26) [[Taro-ga koohii~~-o~~ ~~non-da~~] ka, [~~Taro-ga~~ ocha-o non-da]]-ka
Taro-Nom coffee-Acc drink-Past Disj Taro-Nom tea-Acc
drink-Past-Q

However, backward gapping *is* possible, with an AltQ reading.

(27) [Taro-ga koohii-o ~~non-da-ka~~] (soretomo) [~~Taro-ga~~ Taro-Nom
coffee-Acc drink-Past-KA Disj
ocha-o non-da-ka]
tea-Acc drink-Past-Q
'Which of these is true: Taro drank coffee or Taro drank tea.'

- The ellipsis/gapping in (26) is structurally the same as in (27).
- The contrast between (26) and (27) is mysterious for H&R.

Problem for scoping: No shared reading of operators

If scoping is possible, it should be possible for some operator to be in a position above the disjunction in an AltQ:

(28) [[TP disj TP] *t* operator Q Op]$_{\mathrm{CP}}$

Problem for scoping: No shared reading of operators

If scoping is possible, it should be possible for some operator to be in a position above the disjunction in an AltQ:

(28) [[TP disj TP] *t* operator Q Op]$_{\text{CP}}$

Scoping would predict that (29) and (30) have AltQ readings where the politeness/modal operates on both disjuncts, but they don't:

(29) Taro-wa koohii-o non-da ka ~~Taro-wa~~ ocha-o
Taro-Top coffee-Acc drink-Past KA tea-Acc
non-da-no-**desu**-ka?
drink-Past-Nmnl-Polite-Q

**'Did Taro drink coffee or did he drink tea (polite)?'*
✓'Is it true that Taro drank coffee or Tea (polite)?

Problem for scoping: No shared reading of operators

If scoping is possible, it should be possible for some operator to be in a position above the disjunction in an AltQ:

(28) [[TP disj TP] *t* operator Q Op]$_{\text{CP}}$

Scoping would predict that (29) and (30) have AltQ readings where the politeness/modal operates on both disjuncts, but they don't:

(29) Taro-wa koohii-o non-da ka ~~Taro-wa~~ ocha-o
Taro-Top coffee-Acc drink-Past KA tea-Acc
non-da-no-**desu**-ka?
drink-Past-Nmnl-Polite-Q

**'Did Taro drink coffee or did he drink tea (polite)?'*
✓'Is it true that Taro drank coffee or Tea (polite)?

(30) Taro-ga koohii-o nomu ka ~~Taro-wa~~ ocha-o nomu-**hazu**-ka
Taro-Nom coffee-Acc drink KA tea-Acc drink-must-Q

**'Which is true: Taro must drink coffee or he must drink tea?'*
✓'Is it true that Taro must drink coffee or tea?'
✓'Which is true: Taro drinks coffee or he must drink tea?'

Problem for scoping: No shared reading of operators

In fact, the relevant modal and politeness operators *desu* and *hazu* do operate on both TP *conjuncts*:

(31) [[Taro-wa koohii-mo non-da] shi [~~T.-wa~~ ocha-mo non-da]]-no-**desu**.
Taro-Top coffee-Acc.even drink-Past Conj tea-Acc.even drink-Past-Nmnl-Polite
'Taro drank coffee and he drank tea (polite)?'

(32) [[Taro-wa koohii-mo non-da] shi [~~T.-wa~~ ocha-mo non-da]]-**hazu**-da
Taro-Nom coffee-Acc.even drink-Past Conj tea-Acc.even drink-Past-must-Cop
'It must be the case that Taro drank coffee and he drank tea.'

- Thus, the AltQ structure with these operators positioned outside the TP disjunction is syntactically possible.

2.1 Syntactic Proposal

Japanese AltQs are disjunctions of two CPs

Proposal: Japanese AltQs are disjunctions of CP PolQs.
(cf. Pruitt and Roelofsen 2011)

Japanese AltQs are disjunctions of two CPs

Proposal: Japanese AltQs are disjunctions of CP PolQs.
(cf. Pruitt and Roelofsen 2011)

(33) a. [[$_{CP}$ TP$_1$ Q] Disj [$_{CP}$ TP$_2$ Q]]

b. [[$_{CP}$ TP$_1$-ka] (soretomo) [$_{CP}$ TP$_2$-ka]]

Japanese AltQs are disjunctions of two CPs

Proposal: Japanese AltQs are disjunctions of CP PolQs.
(cf. Pruitt and Roelofsen 2011)

(33) a. [[$_{CP}$ TP$_1$ Q] Disj [$_{CP}$ TP$_2$ Q]]
b. [[$_{CP}$ TP$_1$-ka] (soretomo) [$_{CP}$ TP$_2$-ka]]

(34) [Taro-ga koohii-o non-da-ka] (soretomo) [~~Taro-ga~~
Taro-Nom coffee-Acc drink-Past-Q Disj
ocha-o non-da-ka]
tea-Acc drink-Past-Q
'Did Taro drink coffee or did he drink tea?'

Accounting for the data (i): Backward gapping

(24) [Taro-ga [koohii ka ocha]-o non-da-ka]
Taro-Nom coffee Disj tea-Acc drink-Past-Q
'whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

Accounting for the data (i): Backward gapping

(24) [Taro-ga [koohii ka ocha]-o non-da-ka]
Taro-Nom coffee Disj tea-Acc drink-Past-Q
'whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

The problem for H&R: (27) is good while (26) isn't.

(27) [koohii-o ~~non-da-ka~~] soretomo [~~Taro-wa~~ ocha-o non-da-ka]
coffee-Acc drink-Past-KA Disj tea-Acc
'Which of these is true: Taro drank coffee or Taro drank tea.'

(26) *Taro-wa koohii~~-o~~ ~~non-da~~ ka, ~~Taro-wa~~ ocha-o non-da-ka
Taro-Top coffee-Acc drink-Past KA tea-Acc -Q

Accounting for the data (i): Backward gapping

(24) [Taro-ga [koohii ka ocha]-o non-da-ka]
Taro-Nom coffee Disj tea-Acc drink-Past-Q
'whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

The problem for H&R: (27) is good while (26) isn't.

(27) [koohii-o ~~non-da-ka~~] soretomo [~~Taro-wa~~ ocha-o non-da-ka]
coffee-Acc drink-Past-KA Disj tea-Acc
'Which of these is true: Taro drank coffee or Taro drank tea.'

(26) *Taro-wa koohii~~-o~~ ~~non-da~~ ka, ~~Taro-wa~~ ocha-o non-da-ka
Taro-Top coffee-Acc drink-Past KA tea-Acc -Q

- In the current analysis, the first *ka* in (26) would have to be a Q-particle rather than a Disj marker for (26) to be an AltQ.

Accounting for the data (i): Backward gapping

(24) [Taro-ga [koohii ka ocha]-o non-da-ka]
Taro-Nom coffee Disj tea-Acc drink-Past-Q
'whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

The problem for H&R: (27) is good while (26) isn't.

(27) [koohii-o ~~non-da-ka~~] soretomo [~~Taro-wa~~ ocha-o non-da-ka]
coffee-Acc drink-Past-KA Disj tea-Acc
'Which of these is true: Taro drank coffee or Taro drank tea.'

(26) *Taro-wa koohii-~~o~~ ~~non-da~~ ka, ~~Taro-wa~~ ocha-o non-da-ka
Taro-Top coffee-Acc drink-Past KA tea-Acc -Q

- In the current analysis, the first *ka* in (26) would have to be a Q-particle rather than a Disj marker for (26) to be an AltQ.
- Thus, in (26), something in the non-right-edge of the first disjunct would have to be gapped in an AltQ structure.

Accounting for the data (i): Backward gapping

(24) [Taro-ga [koohii ka ocha]-o non-da-ka]
Taro-Nom coffee Disj tea-Acc drink-Past-Q
'whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

The problem for H&R: (27) is good while (26) isn't.

(27) [koohii-o ~~non-da-ka~~] soretomo [~~Taro-wa~~ ocha-o non-da-ka]
coffee-Acc drink-Past-KA Disj tea-Acc
'Which of these is true: Taro drank coffee or Taro drank tea.'

(26) *Taro-wa koohii~~-o~~ ~~non-da~~ ka, ~~Taro-wa~~ ocha-o non-da-ka
Taro-Top coffee-Acc drink-Past KA tea-Acc -Q

- In the current analysis, the first *ka* in (26) would have to be a Q-particle rather than a Disj marker for (26) to be an AltQ.
- Thus, in (26), something in the non-right-edge of the first disjunct would have to be gapped in an AltQ structure.
- This is not the case with the gapping in (27).

Non-right-edge gapping is impossible

We can independently show that gapping in Japanese cannot target a constituent that is not in the right edge of the coordinate.

(35) [Taro-ga doko-e ~~it-ta-ka~~], sosite [~~Taro-wa~~ dare-to itta-ka]
where-to go-Past-Q, Conj who-with go-Past-Q

(36) *[Taro-ga doko-e ~~it-ta~~-ka], sosite [~~Taro-wa~~ dare-to itta-ka]
where-to go-Past-Q, Conj who-with go-Past-Q
'Where Taro went and with whom he went'

Non-right-edge gapping is impossible

We can independently show that gapping in Japanese cannot target a constituent that is not in the right edge of the coordinate.

(35) [Taro-ga doko-e ~~it-ta-ka~~], sosite [~~Taro-wa~~ dare-to itta-ka]
where-to go-Past-Q, Conj who-with go-Past-Q

(36) *[Taro-ga doko-e ~~it-ta~~-ka], sosite [~~Taro-wa~~ dare-to itta-ka]
where-to go-Past-Q, Conj who-with go-Past-Q
'Where Taro went and with whom he went'

- This restriction can be naturally accounted for in the RNR analysis of Japanese gapping (Saito 1987; Koizumi 2000).

Accounting for the data (ii): No shared reading of operators

(30) Taro-ga koohii-o nomu ka ~~T.-wa~~ ocha-o nomu-**hazu**-ka
Taro-Nom coffee-Acc drink KA tea-Acc drink-must-Q

*'*Which is true: Taro must drink coffee or he must drink tea?'*

✓'Is it true that Taro must drink coffee or tea?'

✓'Which is true: Taro drinks coffee or he must drink tea?'

Accounting for the data (ii): No shared reading of operators

(30) Taro-ga koohii-o nomu ka ~~T.-wa~~ ocha-o nomu-**hazu**-ka
Taro-Nom coffee-Acc drink KA tea-Acc drink-must-Q

*'*Which is true: Taro must drink coffee or he must drink tea?'*
✓'Is it true that Taro must drink coffee or tea?'
✓'Which is true: Taro drinks coffee or he must drink tea?'

- Since each disjunct in an AltQ is underlyingly as big as a CP, it has to include a modal/politeness projection.

Accounting for the data (ii): No shared reading of operators

(30) Taro-ga koohii-o nomu ka ~~T.-wa~~ ocha-o nomu-**hazu**-ka
Taro-Nom coffee-Acc drink KA tea-Acc drink-must-Q

*'*Which is true: Taro must drink coffee or he must drink tea?'*
✓'Is it true that Taro must drink coffee or tea?'
✓'Which is true: Taro drinks coffee or he must drink tea?'

- Since each disjunct in an AltQ is underlyingly as big as a CP, it has to include a modal/politeness projection.
- In order for the modal or the politeness to be interpreted in both disjuncts, they have to be underlyingly present within each of the disjuncts.

Accounting for the data (ii): No shared reading of operators

(30) Taro-ga koohii-o nomu ka ~~T.-wa~~ ocha-o nomu-**hazu**-ka
Taro-Nom coffee-Acc drink KA tea-Acc drink-must-Q

*'*Which is true: Taro must drink coffee or he must drink tea?'*
✓'Is it true that Taro must drink coffee or tea?'
✓'Which is true: Taro drinks coffee or he must drink tea?'

- Since each disjunct in an AltQ is underlyingly as big as a CP, it has to include a modal/politeness projection.
- In order for the modal or the politeness to be interpreted in both disjuncts, they have to be underlyingly present within each of the disjuncts.
- But then, for (30) to be derived from such a structure, non-right-edge gapping has to occur.

2.2 Semantics

Compositional semantics

AltQ structure:

(37) [[$_{CP}$ TP_1 Q] Disj [$_{CP}$ TP_2 Q]]

(38) [[$_{CP}$ Taro drank coffee$_1$-ka] (soretomo) [$_{CP}$ Taro drank tea$_2$-ka]]

Compositional semantics

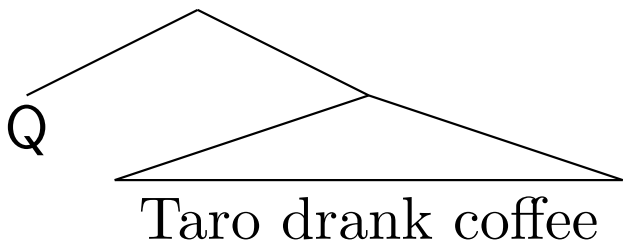
AltQ structure:

(37) [[$_{CP}$ TP$_1$ Q] Disj [$_{CP}$ TP$_2$ Q]]

(38) [[$_{CP}$ Taro drank coffee$_1$-ka] (soretomo) [$_{CP}$ Taro drank tea$_2$-ka]]

Compositional semantics of PolQs:

(39)



(12) $[\![\text{Q}]\!] := \lambda p[\lambda q.p = q]$

(40) $[\![(39)]\!] = \{\lambda w.\text{Taro drank coffee in } w\}$

Compositional semantics

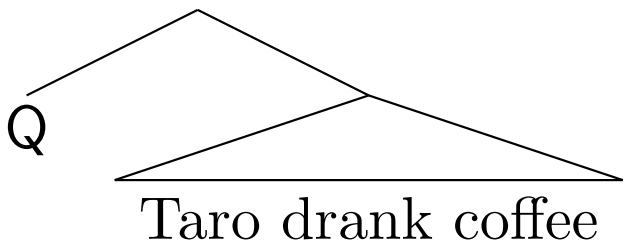
AltQ structure:

(37) [[$_{CP}$ TP$_1$ Q] Disj [$_{CP}$ TP$_2$ Q]]

(38) [[$_{CP}$ Taro drank coffee$_1$-ka] (soretomo) [$_{CP}$ Taro drank tea$_2$-ka]]

Compositional semantics of PolQs:

(39)



(12) $[\![\text{Q}]\!] := \lambda p[\lambda q.p = q]$

(40) $[\![(39)]\!] = \{\lambda w.\text{Taro drank coffee in } w\}$

soretomo as set union:

(41) $[\![\text{soretomo}]\!] = \lambda Q_1 \lambda Q_2 . Q_1 \cup Q_2$

(42) $[\![(38)]\!] = \{\lambda w.\text{Taro drank coffee in } w, \lambda w.\text{Taro drank tea in } w\}$

Why singleton for PolQs?: How it works

We assume an operator that operates on the question-denotation and returns a *partition* (cf. George 2011, Egre and Spector, to appear).

(43) $[\![\textbf{Part}]\!] := \lambda Q_{\langle st,t\rangle}.\{\, p \mid p = \lambda w \exists w'[\forall p' \in Q[p'(w) = p'(w')]]\}$

(44) $[\![\textbf{Part}]\!](\{p\}) = \{p, \neg p\}$

Why singleton for PolQs?: How it works

We assume an operator that operates on the question-denotation and returns a *partition* (cf. George 2011, Egre and Spector, to appear).

(43) $[\![\textbf{Part}]\!] := \lambda Q_{\langle st,t\rangle}.\{\, p \mid p = \lambda w \exists w'[\forall p' \in Q[p'(w) = p'(w')]]\}$

(44) $[\![\textbf{Part}]\!](\{p\}) = \{p, \neg p\}$

Part only applies to matrix questions; it doesn't apply to questions that serve as constituents of matrix questions.

(45) [**Part** [Taro drink coffee Q]]

(46) [**Part** [[Taro drink coffee Q] Disj [Taro drink tea Q]]]

Why singleton for PolQs?: Uniqueness Presupposition

Uniqueness Presupposition of AltQs AltQs presuppose that one only one of the alternative propositions is true.

Why singleton for PolQs?: Uniqueness Presupposition

Uniqueness Presupposition of AltQs AltQs presuppose that one only one of the alternative propositions is true.

(47) Q: Did John drink coffee or tea?

A: John drank {coffee/tea/#both/#neither}.

Why singleton for PolQs?: Uniqueness Presupposition

Uniqueness Presupposition of AltQs AltQs presuppose that one only one of the alternative propositions is true.

(47) Q: Did John drink coffee or tea?

A: John drank {coffee/tea/#both/#neither}.

(48) #Taro-wa koohii-mo ocha-mo non-da, soshite Jiro-wa
Taro-Top coffee-too tea-too drink-Past and Jiro-Top
[Taro-ga koohii-o non-da-ka ocha-o non-da-ka] shitteiru.
coffee-Acc drink-Past-Q tea-Acc drink-Past-Q know

'Taro drank both coffee and tea, and Jiro knows whether Taro drank coffee or Tea.'

Why singleton for PolQs?: Uniqueness Presupposition

Uniqueness Presupposition of AltQs AltQs presuppose that one only one of the alternative propositions is true.

(47) Q: Did John drink coffee or tea?

A: John drank {coffee/tea/#both/#neither}.

(48) #Taro-wa koohii-mo ocha-mo non-da, soshite Jiro-wa
Taro-Top coffee-too tea-too drink-Past and Jiro-Top
[Taro-ga koohii-o non-da-ka ocha-o non-da-ka] shitteiru.
coffee-Acc drink-Past-Q tea-Acc drink-Past-Q know

'Taro drank both coffee and tea, and Jiro knows whether Taro drank coffee or Tea.'

- UP is captured by Dayal's (1996) presupposition that Q-denotations contain a *most informative true answer*.

Why singleton for PolQs?: Uniqueness Presupposition

Uniqueness Presupposition of AltQs AltQs presuppose that one only one of the alternative propositions is true.

(47) Q: Did John drink coffee or tea?

A: John drank {coffee/tea/#both/#neither}.

(48) #Taro-wa koohii-mo ocha-mo non-da, soshite Jiro-wa
Taro-Top coffee-too tea-too drink-Past and Jiro-Top
[Taro-ga koohii-o non-da-ka ocha-o non-da-ka] shitteiru.
coffee-Acc drink-Past-Q tea-Acc drink-Past-Q know

'Taro drank both coffee and tea, and Jiro knows whether Taro drank coffee or Tea.'

- UP is captured by Dayal's (1996) presupposition that Q-denotations contain a *most informative true answer*.
- We can encode this presupposition to **Part**.

Why singleton for PolQs?: Why not bipolar denotations?

Suppose the denotation of PolQs are bipolar:

(49) $[\![\text{Taro drank coffee-Q}]\!] = \{\text{COF}, \neg\text{COF}\}$

Why singleton for PolQs?: Why not bipolar denotations?

Suppose the denotation of PolQs are bipolar:

(49) $[\![\text{Taro drank coffee-Q}]\!] = \{\text{COF}, \neg\text{COF}\}$

What we would get as the semantic value of Japanese AltQs:

(50) $[\![\text{soretomo}]\!] = \lambda Q_{\langle st,t\rangle} \lambda Q'_{\langle st,t\rangle} . Q \cup Q'$

(51) $[\![\text{Taro drank coffee-Q soretomo Taro drank tea-Q}]\!] =$
$\{\text{COF}, \neg\text{COF}, \text{TEA}, \neg\text{TEA}\}$

Why singleton for PolQs?: Why not bipolar denotations?

Suppose the denotation of PolQs are bipolar:

(49) $[\![\text{Taro drank coffee-Q}]\!] = \{\text{COF}, \neg\text{COF}\}$

What we would get as the semantic value of Japanese AltQs:

(50) $[\![\text{soretomo}]\!] = \lambda Q_{\langle st,t\rangle} \lambda Q'_{\langle st,t\rangle} . Q \cup Q'$

(51) $[\![\text{Taro drank coffee-Q soretomo Taro drank tea-Q}]\!] = \{\text{COF}, \neg\text{COF}, \text{TEA}, \neg\text{TEA}\}$

- The Dayal presupposition is unsatisfiable wrt (51): there is no proposition that can be true and most informative.

Why singleton for PolQs?: Why not bipolar denotations?

Suppose the denotation of PolQs are bipolar:

(49) $[\![\text{Taro drank coffee-Q}]\!] = \{\text{COF}, \neg\text{COF}\}$

What we would get as the semantic value of Japanese AltQs:

(50) $[\![\text{soretomo}]\!] = \lambda Q_{\langle st,t\rangle} \lambda Q'_{\langle st,t\rangle} . Q \cup Q'$

(51) $[\![\text{Taro drank coffee-Q soretomo Taro drank tea-Q}]\!] = \{\text{COF}, \neg\text{COF}, \text{TEA}, \neg\text{TEA}\}$

- The Dayal presupposition is unsatisfiable wrt (51): there is no proposition that can be true and most informative.

Upshot: We want **Part** to be sensitive to the 'prejacent' of the polar question for the correct Uniqueness presup to arise. Bipolar denotations for PolQs don't guarantee this.

3. Cross-linguistic variation

Languages with multiple disjunction-markers

- Some languages have multiple disjunctions which disambiguate AltQs and PolQs.

Languages with multiple disjunction-markers

- Some languages have multiple disjunctions which disambiguate AltQs and PolQs.
- Basque (Saltarelli 1988), Egyptian Arabic (George 2011; Winans 2013) and Mandarin Chinese have distinct disjunction markers, one forcing an PolQ reading, and the other forcing an AltQ reading as the only interpretation in a question.

Languages with multiple disjunction-markers

- Some languages have multiple disjunctions which disambiguate AltQs and PolQs.
- Basque (Saltarelli 1988), Egyptian Arabic (George 2011; Winans 2013) and Mandarin Chinese have distinct disjunction markers, one forcing an PolQ reading, and the other forcing an AltQ reading as the only interpretation in a question.
- The AltQ disjunction only appears in interrogatives.

Languages with multiple disjunction-markers

- Some languages have multiple disjunctions which disambiguate AltQs and PolQs.
- Basque (Saltarelli 1988), Egyptian Arabic (George 2011; Winans 2013) and Mandarin Chinese have distinct disjunction markers, one forcing an PolQ reading, and the other forcing an AltQ reading as the only interpretation in a question.
- The AltQ disjunction only appears in interrogatives.

(52) **Basque**

a. Te-a **ala** kafe-a nahi duzu?
tea-Art or coffee-Art want you.it
'Which is true: you want tea or you want coffee?' AltQ

b. Te-a **edo** kafe-a nahi duzu?
tea-Art or coffee-Art want you.it
'It is true that you want tea or coffee?' PolQ

Languages with multiple disjunction-markers

- In other languages including Finnish (Karttunen 1977; Kaiser 2004), one of the two disjunction markers can be used both in an AltQ or PolQ while the other can be used only in AltQ.

Languages with multiple disjunction-markers

- In other languages including Finnish (Karttunen 1977; Kaiser 2004), one of the two disjunction markers can be used both in an AltQ or PolQ while the other can be used only in AltQ.

(53) **Finnish**

a. Huomasiko Pekka miehen **tai** naisen?
Noticed-Q Pekka-Nom man-Acc or woman-Acc
'Did Pekka notice man or woman?' YNQ or AltQ

b. Huomasiko Pekka miehen **vai** naisen?
Noticed-Q Pekka-Nom man-Acc or woman-Acc
'Did Pekka notice man or woman?' AltQ only

Prediction of Pruitt & Roelofsen (2011)

If AltQs are universally derived from disjunction of two PolQs, we predict the following (assuming that the choice of disjunction markers is not affected by ellipsis):

Prediction of Pruitt & Roelofsen (2011) A disjunction marker α can be used in an AltQ iff α can be used to coordinate two PolQs.

Prediction of Pruitt & Roelofsen (2011)

If AltQs are universally derived from disjunction of two PolQs, we predict the following (assuming that the choice of disjunction markers is not affected by ellipsis):

Prediction of Pruitt & Roelofsen (2011) A disjunction marker α can be used in an AltQ iff α can be used to coordinate two PolQs.

This prediction is *not* borne out:

(54) Kafe-a nahi duzu, **ala**/**edo** te-a nahi duzu? [**Basque**]
coffee-Abs want Aux.2ps Disj tea-Abs want Aux.2ps

(55) haluatko kahvia **vai**/***tai** haluatko teetä? [**Finnish**]
want-Q coffee Disj want-Q tea

Prediction of Pruitt & Roelofsen (2011) (cont.)

- Basque *edo* induces an PolQ reading in a non-CP coordination structure, but can participate in the CP-coordination structure (and licenses an AltQ reading).

Prediction of Pruitt & Roelofsen (2011) (cont.)

- Basque *edo* induces an PolQ reading in a non-CP coordination structure, but can participate in the CP-coordination structure (and licenses an AltQ reading).
- Finnish *tai* allows an AltQ reading in a non-CP coordination structure, but cannot participate in the CP-coordination structure.

Prediction of Pruitt & Roelofsen (2011) (cont.)

- Basque *edo* induces an PolQ reading in a non-CP coordination structure, but can participate in the CP-coordination structure (and licenses an AltQ reading).
- Finnish *tai* allows an AltQ reading in a non-CP coordination structure, but cannot participate in the CP-coordination structure.

These facts are problematic for a position that universally analyzes AltQs as coordination of two PolQs.

A Hybrid picture

- Languages in principle allow two strategies to form AltQs:
  1. Scoping the disjunction above the Q-operator
  2. Coordinating two PolQs with a disjunction

A Hybrid picture

- Languages in principle allow two strategies to form AltQs:
  1. Scoping the disjunction above the Q-operator
  2. Coordinating two PolQs with a disjunction
- Some languages like Japanese and Turkish (Gračanin-Yuksek 2014) only have the latter option.

Three kinds of disjunctions

We distinguish questions and non-questions in their types

- **Non-questions:** basic types and functional types
- **Questions:** sets (distinguished from characteristic functions)

Three kinds of disjunctions

We distinguish questions and non-questions in their types

- **Non-questions:** basic types and functional types
- **Questions:** sets (distinguished from characteristic functions)

Three kinds of disjunctions:

	coordinates	scopal property
Disj[+Q]	non-questions	out-scopes the Q-operator
Disj[–Q]	non-questions	doesn't out-scope the Q-operator
SORETOMO	questions	(underlyingly wider scope than Q)

Three kinds of disjunctions

We distinguish questions and non-questions in their types

- **Non-questions:** basic types and functional types
- **Questions:** sets (distinguished from characteristic functions)

Three kinds of disjunctions:

	coordinates	scopal property
Disj[+Q]	non-questions	out-scopes the Q-operator
Disj[–Q]	non-questions	doesn't out-scope the Q-operator
SORETOMO	questions	(underlyingly wider scope than Q)

(56) $[\![\text{Disj[+Q]}]\!] = [\![\text{Disj[–Q]}]\!] = \lambda x \lambda y \lambda P.P(x) \vee P(y)$

- Cf. *who* vs. *someone* in Karttunen (1977)

Three kinds of disjunctions

We distinguish questions and non-questions in their types

- **Non-questions:** basic types and functional types
- **Questions:** sets (distinguished from characteristic functions)

Three kinds of disjunctions:

	coordinates	scopal property
Disj[+Q]	non-questions	out-scopes the Q-operator
Disj[–Q]	non-questions	doesn't out-scope the Q-operator
SORETOMO	questions	(underlyingly wider scope than Q)

(56) $[\![\text{Disj[+Q]}]\!] = [\![\text{Disj[–Q]}]\!] = \lambda x \lambda y \lambda P.P(x) \vee P(y)$

- Cf. *who* vs. *someone* in Karttunen (1977)

(57) $[\![\text{SORETOMO}]\!] = \lambda Q_1 \lambda Q_2.Q_1 \cup Q_2$

Lexicalization of disjunctions

Languages can lexicalize different disjunctions from this inventory into one item.

- English lexicalizes everything with *or*.
- Japanese lexicalizes Disj[–Q] with *ka*, and SORETOMO with *soretomo*. No Disj[+Q].

Lexicalization of disjunctions

Languages can lexicalize different disjunctions from this inventory into one item.

- English lexicalizes everything with *or*.
- Japanese lexicalizes Disj[–Q] with *ka*, and SORETOMO with *soretomo*. No Disj[+Q].

Basque

- *ala*: Disj[+Q] + SORETOMO
- *edo*: Disj[–Q] + SORETOMO

Finnish

- *tai*: Disj[±Q]
- *vai*: Disj[+Q] + SORETOMO

Lexicalization of disjunctions

Languages can lexicalize different disjunctions from this inventory into one item.

- English lexicalizes everything with *or*.
- Japanese lexicalizes Disj[–Q] with *ka*, and SORETOMO with *soretomo*. No Disj[+Q].

Basque

- *ala*: Disj[+Q] + SORETOMO
- *edo*: Disj[–Q] + SORETOMO

Finnish

- *tai*: Disj[±Q]
- *vai*: Disj[+Q] + SORETOMO

It is a future task to find out whether there is a non-trivial *universal constraint* on the lexicalization patterns.

4. Conclusions

Conclusions

- Languages in principle allow two strategies to form AltQs:
  1. Scoping the disjunction above the Q-operator
  2. Coordinating two PolQs with a disjunction

Conclusions

- Languages in principle allow two strategies to form AltQs:
  1. Scoping the disjunction above the Q-operator
  2. Coordinating two PolQs with a disjunction
- Japanese only has the latter option.

Conclusions

- Languages in principle allow two strategies to form AltQs:
  1. Scoping the disjunction above the Q-operator
  2. Coordinating two PolQs with a disjunction
- Japanese only has the latter option.
- The picture allows three kinds of disjunction: Disj[+Q], Disj[–Q] and SORETOMO.

Conclusions

- Languages in principle allow two strategies to form AltQs:
  1. Scoping the disjunction above the Q-operator
  2. Coordinating two PolQs with a disjunction
- Japanese only has the latter option.
- The picture allows three kinds of disjunction: Disj[+Q], Disj[–Q] and SORETOMO.
- It is a future task to find out if there is a non-trivial constraints on their lexicalizations patterns.

References

- Beck, Sigrid, and Shin-Sook Kim. 2006. Intervention effects in alternative questions. *Journal of Comparative Germanic Linguistics* 9:165—208.
- Dayal, Veneeta. 1996. *Locality in wh quantification: Questions and relative clauses in Hindi*. Dordrecht: Kluwer Academic Publishers.
- George, Benjamin. 2011. *Question embedding and the semantics of answers*. Doctoral Dissertation, UCLA.
- Han, Chung-Hye, and Maribel Romero. 2004a. The syntax of *whether*/Q. . . or questions: Ellipsis combined with movement. *Natural Language and Linguistic Theory* 22:527–564.
- Han, C-H. & Romero, M. 2004b. Disjunction, Focus, and Scope. *Linguistic Inquiry* 35:2, 179–217.
- Kaiser, Elsi. 2004. A question of case. In *Proceedings of the Workshop on Generative Approaches to Finnic Languages*, eds. A. Dahl, K. Bentzen, and P. Svenonius, 694–707.
- Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1:3–44.
- Koizumi, Masatoshi. 2000. String vacuous overt verb raising. *Journal of East Asian Linguistics* 9:227–285.
- Larson, Richard K. 1985. On the syntax of disjunction scope. *Natural Language and Linguistic Theory* 3:217–164.

References (cont.)

- Nicolae, Andreea. 2013. *Any Questions?: Polarity as a Window into the Structure of Questions*, PhD dissertation, Harvard University.
- Pruitt, Kathryn, and Floris Roelofsen. 2011. *Disjunctive questions: Prosody, syntax, and semantics*. Ms., University of Massachusetts, Amherst and ILLC, University of Amsterdam.
- Romero, Maribel and Chung-Hye Han. 2003. Focus, Ellipsis and the Semantics of Alternative Questions. In *Empirical Issues in Formal Syntax and Semantics 4*. eds. C. Beyssade, O. Bonami, P. Cabredo Hofherr and F. Corblin, Presses Universitaires de Paris-Sorbonne, Paris, 291–307.
- Saito, Mamoru. 1987. Three notes on syntactic movement in Japanese. In *Issues in Japanese linguistics*, ed. Takashi Imai and Mamoru Saito. Dordrecht Reidel.
- Saltarelli, Mario. 1988. *Basque*. Croom Helm.
- Slade, Benjamin. *Formal and Philological Inquiries into the Nature of Interrogatives, Indefinites, Disjunction, and Focus in Sinhala and other languages*, PhD dissertation, UIUC.
- Winans, Lauren. 2012. *Alternative Disjunctions in Egyptian Arabic*. MA thesis, UCLA.

Appendix A: Hamblin-semantic implementation

Types:

- e and t are types.
- If σ and τ are types then $\langle \sigma, \tau \rangle$ is a type.
- If τ is a type, then $\{\tau\}$ is a type. (Hamblin types)

Domains:

- $D_e := D$
- $D_t := \{0, 1\}$
- $D_{\langle \sigma, \tau \rangle} := D_\tau^{D_\sigma}$
- $D_{\{\tau\}} := Pow(D_\tau)$

Appendix A: Hamblin-semantic implementation (cont.)

Subscripts h and o to a variable indicate that its domain is restricted to Hamblin and Ordinary (i.e., non-Hamblin) types.

Three disjunctions:

(58) $[\![\text{Disj}[+\text{Q}]]\!] = \lambda x_o \lambda y_o . \{x, y\}$

(59) $[\![\text{Disj}[-\text{Q}]]\!] = \lambda x_o \lambda y_o . x \sqcup y$
(⊔ is a generalized disjunction from Partee and Rooth 1982)

(60) $[\![\text{SORETOMO}]\!] = \lambda x_h \lambda y_h . x \cup y$

Compositional rules: If $[\![\beta]\!] \in dom([\![\alpha]\!])$, then $[\![\alpha\ \beta]\!] = [\![\alpha]\!]([\![\beta]\!])$. Otherwise, use flexible Point-wise Functional Application if applicable. (cf. Hagstrom 1998, Slade 2012)

Q-Operator:

(61) $[\![\text{Q}]\!] = \lambda p_h . p$ (cf. Kratzer & Shimoyama 2002)