Topics are conditionals

and questions are immediate issues

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Workshop on Altaic Formal Linguistics 13

Conditionals and topics

Conditionals and topics are similar.
(Haiman, 1978, 1993; Collins, 1998; Bittner, 2001; Bhatt & Pancheva, 2006; Ebert et al., 2008)

(1) a. Taro-ga kuru nara, paatii-wa tanosiku naru.
Taro-NOM come if party-TOP fun become
'If Taro comes, the party will be fun.'
b. Taro-nara kaeri-mas-ita.
Taro-if go.home-POL-PAST
'As for Taro, he went home.'

- Martin (1975) argues that *wa* is etymologically related to Old Japanese *ba* 'place, situation'.

Goal

Thesis

Topics are conditionals.

Proposal

Topics and conditional antecedents both serve as context-shifters.

Outline

"Dogs must be carried"

An English Ambiguous Sign

(2) Dogs must be carried. (ambiguous)

a. Only people carrying dogs are allowed in that location.

b. Dogs are forbidden there except when they are carried.
≈If there is a dog, it must be carried. (Wasow et al., 2005)

Unambiguous Japanese Signs

(3) a. inu-**o** kakae tekudasai.
dog-ACC carry please
'Please carry dogs.' (unambiguous)

b. inu-**wa** kakae tekudasai.
dog-TOP carry please
'If there is a dog, please carry it.' (unambiguous)

- The phrase *inu-wa* restricts the context of the assertion to the cases where there is a dog.

Japanese topic *wa*

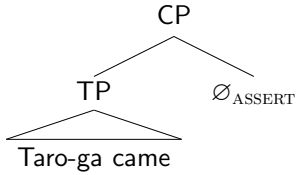
The Japanese topic-marker *wa* marks Austinian topics.

- The topic-marked element denotes what utterances are about. (Austin, 1950)

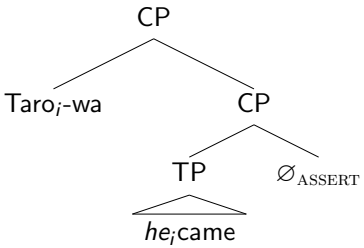
Both *if*-clauses and *wa*-phrases restrict the context for the speech act of the utterances.

Topics as context-setters

(4)

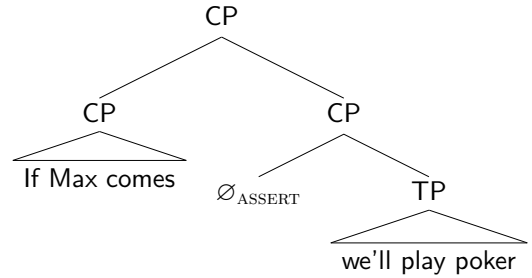


(5)



Conditional antecedents as context-setters

(6) a. If Max comes, we'll play poker.
b. If you're hungry, there's food in the fridge.



Outline

dake-wa construction

- *dake*: exhaustive focus particle, 'only'

(7) a. Taro-dake-ga kita.
Taro-only-NOM came.
'Only Taro came.'
(Others didn't come) (assertion>only)
b. Taro-dake-wa kita.
Taro-only-TOP came.
'Only as for Taro, he came.'
'At least Taro came.'
(I don't make assertions about other individuals)
(only>assertion)

- *dake-ga*: exhaustification over alternative propositions
- *dake-wa*: exhaustification over alternative assertion acts

- *dake-ga*: exhaustification over alternative propositions
  - {Taro came, Mary came, Bill came, ...}{Taro came, ~~Mary came, Bill came, ...~~}
- *dake-wa*: exhaustification over alternative assertion acts
  - {As for Taro, I assert he came, As for Mary, I assert she came, As for Bill, I assert he came, ...}{As for Taro, I assert he came, ~~As for Mary, I assert she came, As for Bill, I assert he came, ...~~}

(8) a. #Taro-dake-ga ki-ta kedo Hanako-wa wakara-nai.
Taro-only-NOM come-PAST but Hanako-TOP know-NEG
'Only Taro came, but I don't know about Hanako'
(assertion>only)

b. Taro-dake-wa ki-ta kedo Hanako-wa wakara-nai.
Taro-only-TOP come-PAST but Hanako-TOP know-NEG
'Only as for Taro, he came, but I don't know about Hanako'
(only>assertion)

dake-wa requests

(9) a. denki-dake-o kesite kudasai.
electricity-only-ACC turn.off please
'Please turn off only the electricity.' (request>only)

b. denki-dake-wa kesite kudasai.
electricity-only-TOP turn.off please
'Only as for the electricity, I ask you to turn it off.'
(only>request)
(I don't make any other requests.)

dake-wa questions

(10) a. TARO-dake-ga nani-o kai-mashi-ta-ka?
Taro-only-TOP what-ACC buy-HON-PAST-Q
'What is the thing x such that only Taro buy x?'
(Others didn't buy x) (question > only)

b. *TARO-dake-wa nani-o kai-mashi-ta-ka?
Taro-only-TOP what-ACC buy-HON-PAST-Q
Intended: 'What did at least Taro buy?'
(I don't ask questions about other individuals)
(only>question)

Puzzle

Exhaustification over alternative question acts is illicit.

Puzzle: the asymmetry between assertions and questions

(11) a. ASSERT $[P(d)]$
b. d is the x such that [ASSERT $P(x)$]
c. ASSERT [d is the only x such that $P(x)$]
d. d is the only x such that, [ASSERT $P(x)$]

(12) a. QUEST $[P(d)]$
b. d is the x such that [QUEST $P(x)$]
c. QUEST [d is the only x such that $P(x)$]
d. *d is the only x such that [QUEST $P(x)$]

Naturalness Rating Study

以下の文は日本語としてどれくらい自然ですか？ How natural do you the following

「研修生だけは何を使いましたか？」 Japanese sentence is?

What did the intern-dake-wa use?

7： すごく自然

very natural

6

5

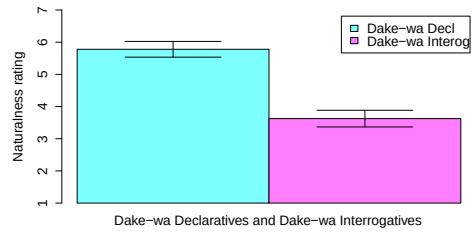
4

3

2

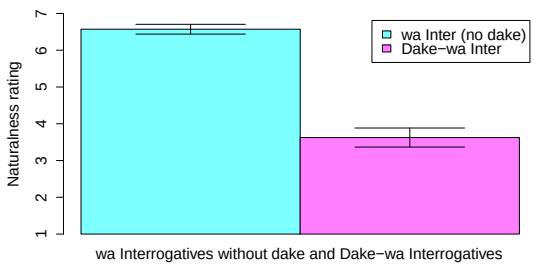
1： すごく不自然 very unnatural

Dake-wa declaratives vs. Dake-wa interrogatives



- (Linear mixed model: $t = -14.13, p < 0.001$)

Wa interrogatives vs. Dake-wa interrogatives



- (Linear mixed model: $t = -23.04, p < 0.001$)

Dake-wa Interrogatives are judged most unnatural

(13) a. ASSERT $[P(d)]$
b. d is the x such that [ASSERT $P(x)$]
c. ASSERT [d is the only x such that $P(x)$]
d. d is the only x such that, [ASSERT $P(x)$]

(14) a. QUEST $[P(d)]$
b. d is the x such that [QUEST $P(x)$]
c. QUEST [d is the only x such that $P(x)$]
d. *d is the only x such that [QUEST $P(x)$]]

Research Questions

1. How do we process *dake-wa* sentences like (13-d)?
2. Why is there such an asymmetry? I.e., why are questions special?

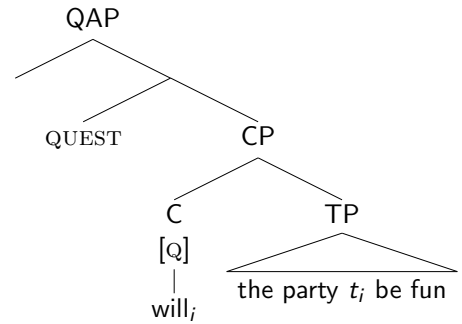
Outline

Proposal 1: Syntax of Questions

Cross-linguistically, many languages derive interrogatives from declaratives. (Haspelmath, 2001; Shopen, 1985)

(15) Will$_i$ the party t_i be fun?

(16)



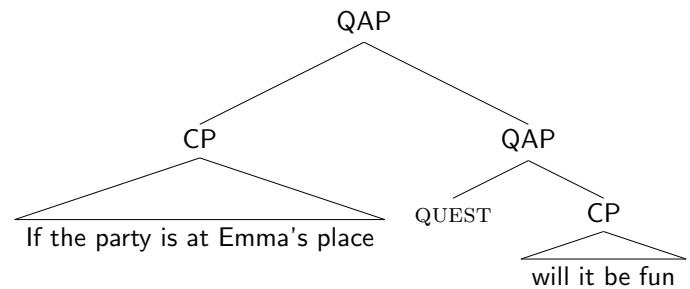
Proposal 1

Syntactically, a root-level interrogative clause is headed by a QUEST operator which projects Question Act Phrase (QAP).

Syntax of Conditional Questions

(17) If the party is at Emma's place, will it be fun?

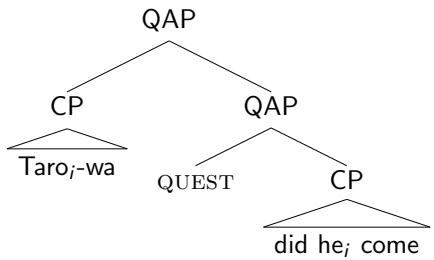
(18)



Syntax of Topic-marked Questions

(19) Taro-wa kimashita ka?
Taro-TOP come-POL-PAST Q
'Did Taro come?'

(20)



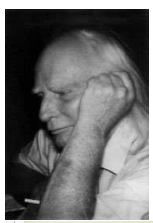
Proposal 2: Lexical Presupposition of QUEST

Sincere Question

Questions must be answerable.

Lexical Presupposition of QUEST (informal)

The addressee has an answer to the question.
(c.f., Groenendijk & Stokhof, 1989)



1

- Gricean Cooperativity
  - Make your contribution such as it is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.
- Searlean Felicity Conditions
  - S sincerely wants the missing information from H.

[1] http://www.philosophy.ox.ac.uk/the_faculty/philosophy_centre/ryle_room

Presuppositions of a question act

Lexical Presupposition of QUEST (informal)

The addressee has an answer to the question.
(c.f., Groenendijk & Stokhof, 1989)

INQUISITIVE CONSTRAINT (informal)

A question has to be resolved first before the discourse proceeds.

Proposal 2

A question act lexically presupposes that the issue is immediately answerable by the addressee, i.e., denotes a HAMBLIN-ISSUE.

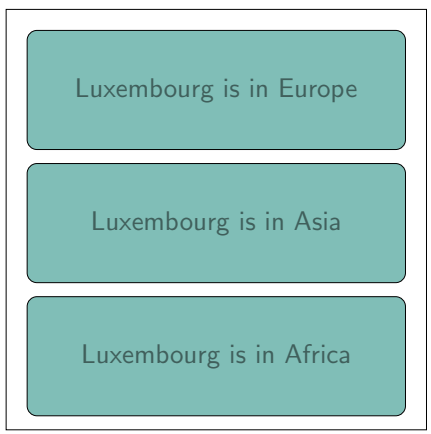
Proposal 3: Hamblin's picture

(21) a. An answer to a question is a statement.
b. Knowing what counts as an answer is equivalent to knowing the question.
c. The possible answers to a question are an exhaustive set of mutually exclusive possibilities. (Hamblin, 1958, 162-163)

To see that the possible answers to a question must be mutually exclusive, consider the following example: Suppose on being asked "In which continent is Luxembourg?" I were to reply "Either Europe, or Asia, or Africa". It might easily be objected that I had not given a proper answer in the sense that I had not given a complete answer. This objection might now be put another way: The answer "Either Europe, or Asia, or Africa" cannot be a proper answer, because it does not exclude and is not excluded by other proper answers, e.g. the answer "Europe". Complete answers are mutually exclusive, and this is simply one of the things we mean by "completeness". (Hamblin, 1958, 164)

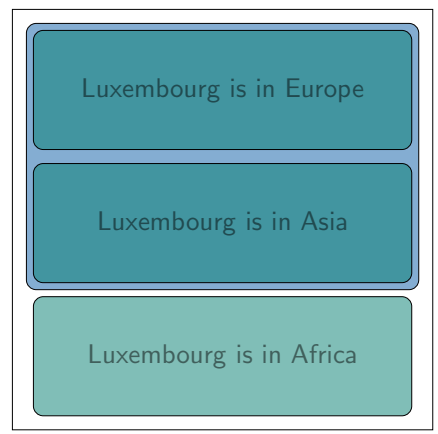
Mutually exclusive

- In which continent is Luxembourg?



Overlapping

- In which continent is Luxembourg?



Luxembourg is in Europe or Asia

Hamblin-issue

The issue raised by a (root-level) question must be a partition,
i.e., a collectively exhaustive and mutually exclusive set of possible answers.

Proposal 3

Semantically, a root-level interrogative clause denotes a Hamblin-issue,
an exhaustive set of mutually exclusive possible answers.

Lexical Presupposition of quest (formal)

The argument of quest must be a Hamblin-issue
(an exhaustive set of mutually exclusive possible answers, i.e., a partition).

Syntax and Semantics of Questions—Summary

Proposals

1. Syntactically, a root-level interrogative clause is headed by a quest operator.
2. quest lexically presupposes that the issue is immediately answerable by the addressee.
3. Semantically, a root-level interrogative clause denotes a Hamblin-issue, an exhaustive set of mutually exclusive possible answers.

Questions are immediate issues!

Outline

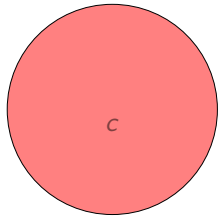
Dynamic approach to conditionals

(22) If it's windy, bucket-makers make money.

Two-step procedure

1. A temporary context is created by updating the speech context with the antecedent of the conditional. $(c \cap P)$
2. The temporary context is updated with the consequent. $(c \cap P \cap Q)$

Initial context

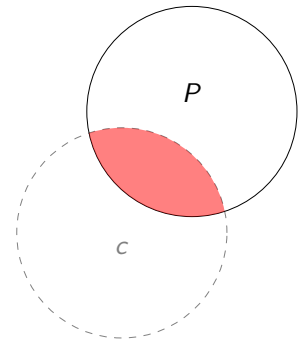


- c: initial ignorant context
- a set of possible worlds.

Antecedent: A hypothetical context created

(22) If it is windy (P), bucket-makers make money (Q).

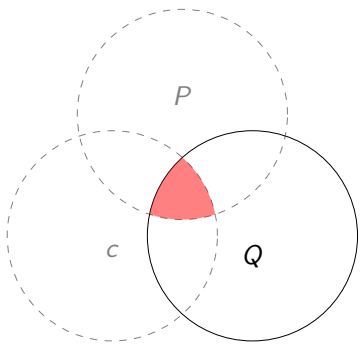
- If P, Q.
- $c \cap P$



Consequent: The temporary context updated

(22) If it is windy (P), bucket-makers make money (Q).

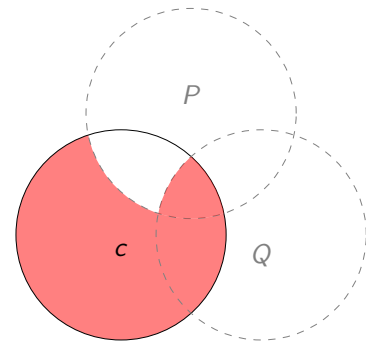
- $c \cap P \cap Q$



Post-update context

(22) If it is windy (P), bucket-makers make money (Q).
(If it is not windy, they may or may not make money ($c \cap \overline{P}$).)

- $(c \cap P \cap Q) \cup (c \cap \overline{P})$



Conditional Questions

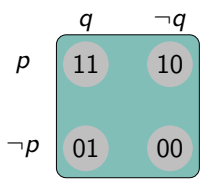
(23) If it's windy, will bucket-makers make money?

1. Two-step procedure of conditionals
   ⇒ Kaufmann's (2000) stack-based model of temporary/derived contexts.
2. Assertions and Questions
   ⇒ Inquisitive Semantics (Ciardelli et al., 2013, a.o.)

See also Isaacs & Rawlins (2008)

Ignorant and indifferent context

- c: initial ignorant and indifferent context
- a set of sets of possible worlds



$\tau = \langle c, \langle\rangle\rangle =$

τ_0:	$\{\{w_{11}, w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}, w_{01}\}, \{w_{11}, w_{10}, w_{00}\}, \{w_{11}, w_{01}, w_{00}\}, \{w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}\}, \{w_{11}, w_{01}\}, \{w_{11}, w_{00}\}, \{w_{10}, w_{01}\}, \{w_{10}, w_{00}\}, \{w_{01}, w_{00}\}, \{w_{11}\}, \{w_{10}\}, \{w_{01}\}, \{w_{00}\}\}$

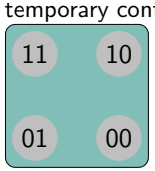
- p: It's windy.
- q: Bucket-makers make money.

A temporary/hypothetical context created

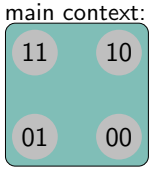
(23) If it's windy, will bucket-makers make money?

- make a copy of c
- push it on top of the stack.

temporary context:



main context:



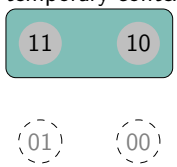
τ_0:	$\{\{w_{11}, w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}, w_{01}\}, \{w_{11}, w_{10}, w_{00}\}, \{w_{11}, w_{01}, w_{00}\}, \{w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}\}, \{w_{11}, w_{01}\}, \{w_{11}, w_{00}\}, \{w_{10}, w_{01}\}, \{w_{10}, w_{00}\}, \{w_{01}, w_{00}\}, \{w_{11}\}, \{w_{10}\}, \{w_{01}\}, \{w_{00}\}\}$
τ_1:	$\{\{w_{11}, w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}, w_{01}\}, \{w_{11}, w_{10}, w_{00}\}, \{w_{11}, w_{01}, w_{00}\}, \{w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}\}, \{w_{11}, w_{01}\}, \{w_{11}, w_{00}\}, \{w_{10}, w_{01}\}, \{w_{10}, w_{00}\}, \{w_{01}, w_{00}\}, \{w_{11}\}, \{w_{10}\}, \{w_{01}\}, \{w_{00}\}\}$

An update by the *if*-clause

(23) If it's windy, will bucket-makers make money?

- The temporary context assertive-updated.
- All the worlds that make p false are removed.

temporary context:



$\tau' = \tau +$ (if p)=

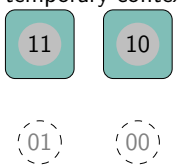
τ'_0:	$\{\{w_{11}, w_{10}\}, \{w_{11}\}, \{w_{10}\}\}$
τ'_1	c

QUEST partitions the hypothetical context

(23) If it's windy, will the bucket-makers make money?

- The temporary context partitioned

temporary context:



$\tau'' = \tau' + (\text{QUEST } ?q) =$

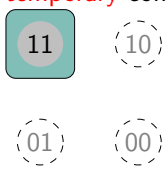
τ_0'':	$\{\ \{w_{11}, w_{10}\}, \{w_{11}\}, \{w_{10}\}\ \}$
τ_1''	c

Answer: An assertive update

(23) a. If it's windy, will the bucket-makers make money?
b. Yes. (if it's windy, the bucket-makers will make money.)

- The temporary context updated

temporary context:



$\tau''' = \tau'' + \text{yes} =$

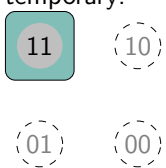
τ_0''':	$\{\ \{w_{11}\}, \{w_{10}\}\ \}$
τ_1''	c

Percolation

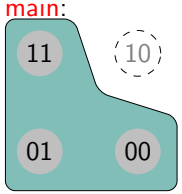
(23) a. If it's windy, will the bucket-makers make money?
b. Yes. (if it's windy, the bucket-makers will make money.)

- The information percolates down the stack.

temporary:



main:



$\tau'' = \tau' + q =$

τ_0'':	$\{\ \{w_{11}\}, \{w_{10}\}\ \}$
τ_1'':	$\{\ \{w_{11}, w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}, w_{01}\}, \{w_{11}, w_{10}, w_{00}\}, \{w_{11}, w_{01}, w_{00}\}, \{w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}\}, \{w_{11}, w_{01}\}, \{w_{11}, w_{00}\}, \{w_{10}, w_{01}\}, \{w_{10}, w_{00}\}, \{w_{01}, w_{00}\}, \{w_{11}\}, \{w_{10}\}, \{w_{01}\}, \{w_{00}\}\ \}$

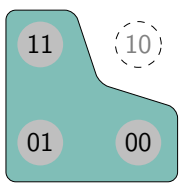
Removal of the temporary context

- The next update might not use the temporary context any more.

(23) a. If it's windy, will the bucket-makers make money?
b. Yes.
c. By the way, my sister is in England.

- The temporary context is removed (popped).

main context:



$\tau''' = \text{pop}(\tau'') =$

τ_0''':	$\{\ \{w_{11}, w_{01}, w_{00}\}, \{w_{11}, w_{01}\}, \{w_{11}, w_{00}\}, \{w_{01}, w_{00}\}, \{w_{11}\}, \{w_{01}\}, \{w_{00}\}\ \}$

Percolation and Popping

- The information brought by an assertion percolates down the stack.
  → the temporary context can be removed if it's no longer necessary.
- The issue brought by a question cannot percolate down the stack.
  → the temporary context cannot be removed yet.

Inquisitive Constraint (informal)

A question has to be resolved first before the discourse proceeds.

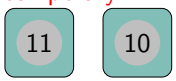
Inquisitive Constraint (formal)

A macro-context may not be popped if the top element is inquisitive.
(Isaacs & Rawlins, 2008)

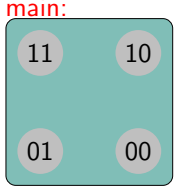
Why do issues not percolate?

The temporary context partitioned

temporary:



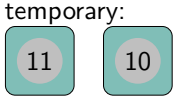
main:



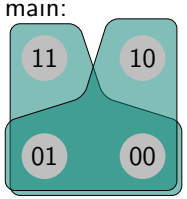
τ_0:	$\{\{w_{11}, w_{10}\}, \{w_{11}\}, \{w_{10}\}\}$
τ_1:	$\{\{w_{11}, w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}, w_{01}\}, \{w_{11}, w_{10}, w_{00}\}, \{w_{11}, w_{01}, w_{00}\}, \{w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}\}, \{w_{11}, w_{01}\}, \{w_{11}, w_{00}\}, \{w_{10}, w_{01}\}, \{w_{10}, w_{00}\}, \{w_{01}, w_{00}\}, \{w_{11}\}, \{w_{10}\}, \{w_{01}\}, \{w_{00}\}\}$

Percolation of the issue

temporary:



main:



τ_0'':	$\{\{w_{11}\}, \{w_{10}\}\}$
τ_1'':	$\{\{w_{11}, w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}, w_{01}\}, \{w_{11}, w_{10}, w_{00}\}, \{w_{11}, w_{01}, w_{00}\}, \{w_{10}, w_{01}, w_{00}\}, \{w_{11}, w_{10}\}, \{w_{11}, w_{01}\}, \{w_{11}, w_{00}\}, \{w_{10}, w_{01}\}, \{w_{10}, w_{00}\}, \{w_{01}, w_{00}\}, \{w_{11}\}, \{w_{10}\}, \{w_{01}\}, \{w_{00}\}\}$

- Abandoning mutual exclusivity

Questions are immediate issues

Hamblin-issue

The issue raised by a (root-level) question must be a partition,
i.e., a collectively exhaustive and mutually exclusive set of possible answers.

- Once a question is asked in a temporary context, the question has to be resolved first.
- Why? Because in order for the conversation to proceed, we have to pop the temporary context off the stack.
- Popping the temporary inquisitive context off the stack would nullify the information/discourse effect.
- Then how about percolating issues?
- Percolation of issues would result in abandoning mutual exclusivity
  → Violation of Hamblin-issue.
- Issues should not percolate.

Inquisitive Constraint (formal)

A temporary context may not be popped off the stack if it is inquisitive.

Outline

Situation semantics

The topic NP marks the Austinian topic situation.

- The topic NP restricts the context with respect to which situation involves the entity
- a context c is defined as a set of sets of situations.

$\tau = \langle c, \langle\rangle\rangle =$

τ_0:	c =
τ_0:	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\}, \\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$

NP-*wa* assertions

(24) Taro-wa goukaku-shita.
Taro-TOP passed
'Taro passed.'

- NP-*wa* is a context-shifter just like a conditional antecedent.
  1. Make a copy of the main context.
  2. Remove situations which do not contain TARO.

(25)

τ_0:	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\}, \\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$
τ_1	c

NP-*wa*: A temporary context

(24) Taro-wa goukaku-shita.
Taro-TOP passed
'Taro passed.'

(26) $\tau' = \tau +$ (Taro-TOP)=

τ'_0:	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}\}, \\ \{s_{T1}\}, \{s_{T0}\} \end{array} \right\}$
τ'_1	c

Update and Percolation

- All situations which make *Taro passed* false are removed.
- The information percolates down the stack.

(27) $\tau'' = \tau' +$ (he passed)=

τ''_0:	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}\}, \\ \{s_{T1}\}, \{s_{T0}\} \end{array} \right\}$
τ''_1:	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\}, \\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$

After percolation

- pop pops the temporary context off the stack.

(28) $\tau''' = \mathrm{pop}(\tau'')$=

τ'''_0:	$\left\{ \begin{array}{l} \{s_{T1}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$

Creating the temporary context

(29) Taro-wa goukaku-shita ka?
Taro-top passed Q
'As for Taro, did he pass?'

- NP-*wa* ≈ *if*-clause
- The topic phrase creates a temporary context.

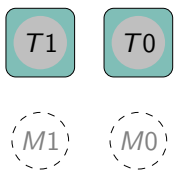
(30) $\tau' = \tau +$ (Taro-TOP)=

τ'_0:	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}\}, \\ \{s_{T1}\}, \{s_{T0}\} \end{array} \right\}$
τ'_1	c

Partitioning the temporary context

(29) Taro-wa goukaku-shita ka?
Taro-top passed Q
'As for Taro, did he pass?'

- The QUEST operator partitions the temporary context.



$\tau'' = \tau' +$(QUEST ?q)=

τ''_0:	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}\}, \\ \{s_{T1}\}, \{s_{T0}\} \end{array} \right\}$
τ''_1	c

- Once an answer is given, the situations that make the answer false are removed.
- Percolation
- Popping the temporary context off the stack

Outline

(31) TARO-dake-wa goukaku-shita.
I only assert about Taro: he passed
(I don't make assertions about other individuals; only>assertion)

- Focus: generates alternatives
  - {Taro, Mary, etc.}
- Topic: conditional antecedents ≈ context-restrictors
- Focus + Topic: alternative assertion acts
- {As for Taro, I assert he passed, As for Mary, I assert she passed}
- multiple temporary contexts for each assertion act

2-copy(τ)=

	$\tau^{(0)}$	$\tau^{(1)}$
τ_0 :	$\left\{\begin{array}{l}\{s_{T1}, s_{T0}, s_{M1}, s_{M0}\},\\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\},\\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\},\\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\},\\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\},\\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\}\end{array}\right\}$	$\left\{\begin{array}{l}\{s_{T1}, s_{T0}, s_{M1}, s_{M0}\},\\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\},\\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\},\\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\},\\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\},\\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\}\end{array}\right\}$

Focus + Topic: Multiple updates

(32) TARO-dake-wa goukaku-shita.
I only assert about Taro: he passed
(I don't make assertions about other individuals; only>assertion)

$\langle \tau'^{(0)} + \text{(he passed)}, \tau'^{(1)} + \text{(she passed)} \rangle =$

	$\tau''^{(0)}$	$\tau''^{(1)}$
τ''_1 :	$\left\{\begin{array}{l}\cancel{\{s_{T1}, s_{T0}\}},\\ \{s_{T1}\}, \cancel{\{s_{T0}\}}\end{array}\right\}$	$\left\{\begin{array}{l}\cancel{\{s_{M1}, s_{M0}\}},\\ \{s_{M1}\}, \cancel{\{s_{M0}\}}\end{array}\right\}$
τ''_0 :	$\left\{\begin{array}{l}\cancel{\{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}},\\ \cancel{\{s_{T1}, s_{T0}, s_{M1}\}}, \cancel{\{s_{T1}, s_{T0}, s_{M0}\}},\\ \{s_{T1}, s_{M1}, s_{M0}\}, \cancel{\{s_{T0}, s_{M1}, s_{M0}\}},\\ \cancel{\{s_{T1}, s_{T0}\}}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\},\\ \cancel{\{s_{T0}, s_{M1}\}}, \cancel{\{s_{T0}, s_{M0}\}}, \{s_{M1}, s_{M0}\},\\ \{s_{T1}\}, \cancel{\{s_{T0}\}}, \{s_{M1}\}, \{s_{M0}\}\end{array}\right\}$	$\left\{\begin{array}{l}\cancel{\{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}},\\ \{s_{T1}, s_{T0}, s_{M1}\}, \cancel{\{s_{T1}, s_{T0}, s_{M0}\}},\\ \cancel{\{s_{T1}, s_{M1}, s_{M0}\}}, \cancel{\{s_{T0}, s_{M1}, s_{M0}\}},\\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \cancel{\{s_{T1}, s_{M0}\}},\\ \{s_{T0}, s_{M1}\}, \cancel{\{s_{T0}, s_{M0}\}}, \cancel{\{s_{M1}, s_{M0}\}},\\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \cancel{\{s_{M0}\}}\end{array}\right\}$

MSpop: Popping the multi-stack

- After the percolation of information, multiple contexts can be popped off the stack.

$\text{MSpop}(\langle \tau''^{(0)}, \tau''^{(1)} \rangle) = \langle \text{pop}(\tau''^{(0)}), \text{pop}(\tau''^{(1)}) \rangle =$

	$\tau'''^{(0)}$	$\tau'''^{(1)}$
τ'''_0 :	$\left\{\begin{array}{l}\{s_{T1}, s_{M1}, s_{M0}\},\\ \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\},\\ \{s_{M1}, s_{M0}\},\\ \{s_{T1}\}, \{s_{M1}\}, \{s_{M0}\}\end{array}\right\}$	$\left\{\begin{array}{l}\{s_{T1}, s_{T0}, s_{M1}\},\\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\},\\ \{s_{T0}, s_{M1}\},\\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}\end{array}\right\}$

Dake + Topic: cancel operator

- Exhaustive *dake* 'only': cancels all the alternative assertion acts except for the foreground one
- {As for Taro, I assert he passed, ~~As for Mary, I assert she passed, ...~~}

(33) **Definition:** cancel operator
For a multi-stack $\mathcal{T}$: $\text{cancel}(\mathcal{T})$ is defined if $\forall\tau \in \mathcal{T}.|\tau| = 1$.
If defined, $\text{cancel}(\mathcal{T}) =_{\text{def}} \tau^{(0)}$

(34) $\mathcal{T}''' = \text{cancel}(\mathcal{T}'') =$

τ'''_0 :	$\left\{ \begin{array}{l} \{s_{T1}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$

- cancel can be executed only when there is no hypothetical context.
- I.e., after MSpop is executed.

Questions with *dake-wa*

(35) *TARO-dake-wa goukaku-shita-ka?
I only ask about Taro: Did he pass?
(I don't ask questions about other individuals; only>question)

- *dake-wa*: creates multiple hypothetical contexts
- QUEST: multiple question acts
- {As for Taro, I ask if he passed, As for Mary, I ask if she passed}

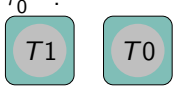
	$\tau''^{(0)}$	$\tau''^{(1)}$
τ'_1 :	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}\}, \\ \{s_{T1}\}, \{s_{T0}\} \end{array} \right\}$	$\left\{ \begin{array}{l} \{s_{M1}, s_{M0}\}, \\ \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$
τ'_0 :	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\}, \\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\}, \\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$

Multiple inquisitive contexts

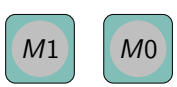
	$\tau''^{(0)}$	$\tau''^{(1)}$
τ'_1 :	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}\}, \\ \{s_{T1}\}, \{s_{T0}\} \end{array} \right\}$	$\left\{ \begin{array}{l} \{s_{M1}, s_{M0}\}, \\ \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$
τ'_0 :	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\}, \\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$	$\left\{ \begin{array}{l} \{s_{T1}, s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}, s_{M1}\}, \{s_{T1}, s_{T0}, s_{M0}\}, \\ \{s_{T1}, s_{M1}, s_{M0}\}, \{s_{T0}, s_{M1}, s_{M0}\}, \\ \{s_{T1}, s_{T0}\}, \{s_{T1}, s_{M1}\}, \{s_{T1}, s_{M0}\}, \\ \{s_{T0}, s_{M1}\}, \{s_{T0}, s_{M0}\}, \{s_{M1}, s_{M0}\}, \\ \{s_{T1}\}, \{s_{T0}\}, \{s_{M1}\}, \{s_{M0}\} \end{array} \right\}$

The temporary contexts partitioned:

$\tau'^{(0)}_0$:



$\tau'^{(1)}_0$:



Cancelling questions

- *dake*: attempts to cancel the alternative questions acts.
- {As for Taro, I ask if he passed, ~~As for Mary, I ask if she passed, ...~~}
- cancel requires MSpop to be performed beforehand.

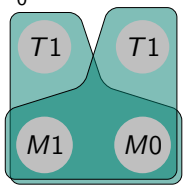
(36) **Definition:** cancel operator
For a multi-stack $\mathcal{T}$: $\text{cancel}(\mathcal{T})$ is defined if $\forall\tau \in \mathcal{T}.|\tau| = 1$.
If defined, $\text{cancel}(\mathcal{T}) =_{\text{def}} \tau^{(0)}$

INQUISITIVE CONSTRAINT (formal)

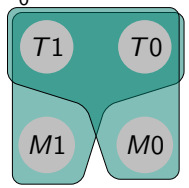
A macro-context may not be popped if the top element is inquisitive.

If issues were percolated,...

$\tau_0''^{(0)}$:



$\tau_0''^{(1)}$:



- Percolating issues → abandoning mutual exclusivity.
- violating HAMBLIN-ISSUE

HAMBLIN-ISSUE

The issue raised by a (root-level) question must be a partition,
i.e., a collectively exhaustive and mutually exclusive set of possible answers.

- cancel cannot be performed if there is any hypothetical context left.
- INQUISITIVE CONSTRAINT prohibits inquisitive contexts from being popped off the stack.
- Percolating inquisitive contexts results in violating HAMBLIN-ISSUE.
- The discourse fails to proceed.
- A question modified by the *dake-wa* construction is illicit.

(37) *TARO-dake-wa ki-mashi-ta-ka?
I only ask about Taro: Did he come?
(I don't ask questions about other individuals; only>question)

Outline

Today's key points

- Topics are conditionals.
  - Both serve as context restrictions for the upcoming speech acts.
  - An interrogative with a topic ≈ a conditional question
- Questions are immediate issues
  - HAMBLIN-ISSUE
  - INQUISITIVE CONSTRAINT
- *Dake-wa*
  - focus + context-restrictor
    - ★ alternative/multiple temporary contexts for alternative/multiple speech acts
- Exhaustification over speech acts
  - *dake-wa* ASSERT: alternative assertive acts cancelled.
  - *dake-wa* QUEST: illicit
    - ★ cancelling alternative question acts violates HAMBLIN-ISSUE/INQUISITIVE CONSTRAINT

Take-home messages

Topics are conditionals!

Questions are immediate issues!

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Definitions I

(38) **Definition**: MCCP of an *if*-clause
For any macro-context τ and *if*-clause 'if φ':
$\tau + (\text{if } \varphi) =_{\text{def}} \text{push}(\tau, \tau_0 \cap [\varphi]_M)$
Admittance condition: 'If φ' is admissible in a macro-context τ iff $\tau_0 \cap [\varphi]_M \neq \emptyset$ (modified from Isaacs & Rawlins, 2008, (54), p. 297)

(39) **Definition** (Default) MCCP
For any macro-context τ and clause φ
$\tau + \varphi =_{\text{def}} \tau'$ where $|\tau'| = |\tau| = \tau$
and $\tau'_i = \downarrow(\tau_i, \tau_0, \tau_0 \cap [\varphi]_M)$ for all i, $0 \leq i < n$

(40) **Definition:** Issue

a. An information state s is a set of possible worlds, i.e., $s \subseteq \mathcal{W}$.

Definitions II

b. An *issue* $I \subseteq \wp(\mathcal{W})$ is a non-empty, downward closed set of information states. We say that an information state t *settles* an issue I in case $t \in I$. (adapted from Ciardelli & Roelofsen, 2015, 1649)

(41) **Definition:** Hamblin-issue:
Let Max be a maximality function, which returns a set of maximal elements: $\text{Max}(S) := \{X |$ for all $Y \in S, X \subseteq Y$ implies $X = Y\}$.
An issue I_H is a *Hamblin-issue* of a state s iff

a. $\emptyset \notin P$.
b. $\bigcup I_H = s$. (exhaustivity)
c. $[X \in \text{Max}(s) \,\&\, Y \in \text{Max}(s) \,\&\, X \neq Y] \rightarrow X \cap Y = \emptyset$(mutual exclusivity).

(42) **Definition:** Inquisitive Model
An inquisitive model for a set $\mathcal{P}$ of atomic sentences and a set Π of issues is a tuple $M = \langle \mathcal{W}, V, \Sigma \rangle$ where:

Definitions III

a. $\mathcal{W}$ is a set, whose elements are called *possible worlds*.
b. $V : \mathcal{W} \rightarrow \wp(\mathcal{P})$ is a *valuation map* that specifies for every world w which atomic sentences are true at w.
c. Σ is a set of *state maps* $\Sigma : \mathcal{W} \rightarrow \Pi$, each of which assigns to any world w an issue $\Sigma(w)$.

(43) **Definition:** *Information state* in w
$\sigma(w) := \bigcup \Sigma(w)$.

(44) **Definition:** Semantics
Let M be an inquisitive model, and s an information state in M.

a. $\langle M, s \rangle \models p \iff p \in V(w)$ for all worlds $w \in s$.
b. $\langle M, s \rangle \models \neg\varphi \iff$ for all non-empty $t \subseteq s$, $\langle M, t \rangle \not\models \varphi$.
c. $\langle M, s \rangle \models \alpha \vee \beta \iff \langle M, s \rangle \models \alpha$ or $\langle M, s \rangle \models \beta$.

(45) **Definition:** Propositions
$[\varphi]_M := \{s \subseteq \mathcal{W} | s \models \varphi\}$
(Ciardelli & Roelofsen, 2015, 1656)

Definitions IV

(46) **Definition:** Support condition for polar interrogatives
$\langle M, s\rangle \models ?\alpha \Longleftrightarrow \langle M, s\rangle \models \alpha$ or $\langle M, s\rangle \models \neg\alpha$

(47) **Definition:** macro-context

a. $\langle\rangle$ is a macro-context.
b. If c is an inquisitive state and τ is a macro-context, then $\langle c, \tau\rangle$ is a macro-context.
c. Nothing else is a macro-context.
d. If τ is a macro-context, then τ_n is the nth context (counting from 0 at the top) and $|\tau|$ is its size (excluding its final empty element).

(modified from Isaacs & Rawlins, 2008, (43), p. 291)

(48) **Definition:** push operator
For any macro-context τ and context c:
$\mathrm{push}(\tau, c) =_{\mathrm{def}} \langle c, \tau\rangle$

(Isaacs & Rawlins, 2008, (44), p. 292)

Definitions V

(49) **Definition:** Percolation $\downarrow$
For a context c, and a declarative α and a sentence φ:
A context $\downarrow(c, c\cap[\alpha]_M, c\cap[\alpha]_M\cap[\varphi]_M)$ is defined as:
$\downarrow(c, c\cap[\alpha]_M, c\cap[\alpha]_M\cap[\varphi]_M) =_{\mathrm{def}}$
$\{s \in c |$ for all non-empty $t \subseteq s$, if $\langle M, t\rangle \models \alpha$, then $\langle M, t\rangle \models \varphi\}$

(50) **Definition:** pop operator
For any macro-context $\langle c, \tau'\rangle$:
$\mathrm{pop}(\langle c, \tau'\rangle) =_{\mathrm{def}} \langle c, \tau'\rangle$ if $s' = \langle\rangle$, τ' otherwise

(Isaacs & Rawlins, 2008, (45), p. 292)

(51) **Definition:** Semantics of $\textsc{quest}$ (Inquisitive MCCP)
For any macro-context $\langle c, \tau'\rangle$ where c is the top member, and τ' is a stack, and interrogative μ:
$\langle c, \tau'\rangle + (\textsc{quest}\ \mu) =_{\mathrm{def}} \langle c\cap[\mu]_M, \tau'\rangle$.

Definitions VI

(52) **Definition:** multi-stack
$\mathcal{T} := \langle\tau^{(0)}, \tau^{(1)}, \tau^{(2)}, ...\tau^{(n)}\rangle$ is a multi-stack, where $\tau^{(i)}$ is a macro-context and $|\tau^{(0)}| = ... = |\tau^{(n)}|$.

(53) **Definition:** n-copy operator
For any macro-context τ:
$n\text{-}\mathrm{copy}(\tau) =_{\mathrm{def}} \langle\tau^{(0)}, ..., \tau^{(n-1)}\rangle$, where $\tau = \tau^{(0)} = ... = \tau^{(n-1)}$.

(54) **Definition:** MSpop (multi-stack pop)
For any multi-stack $\mathcal{T}$:
$\mathrm{MSpop}(\mathcal{T}) =_{\mathrm{def}} \langle\mathrm{pop}(\tau^{(0)}), ..., \mathrm{pop}(\tau^{(n)})\rangle$.