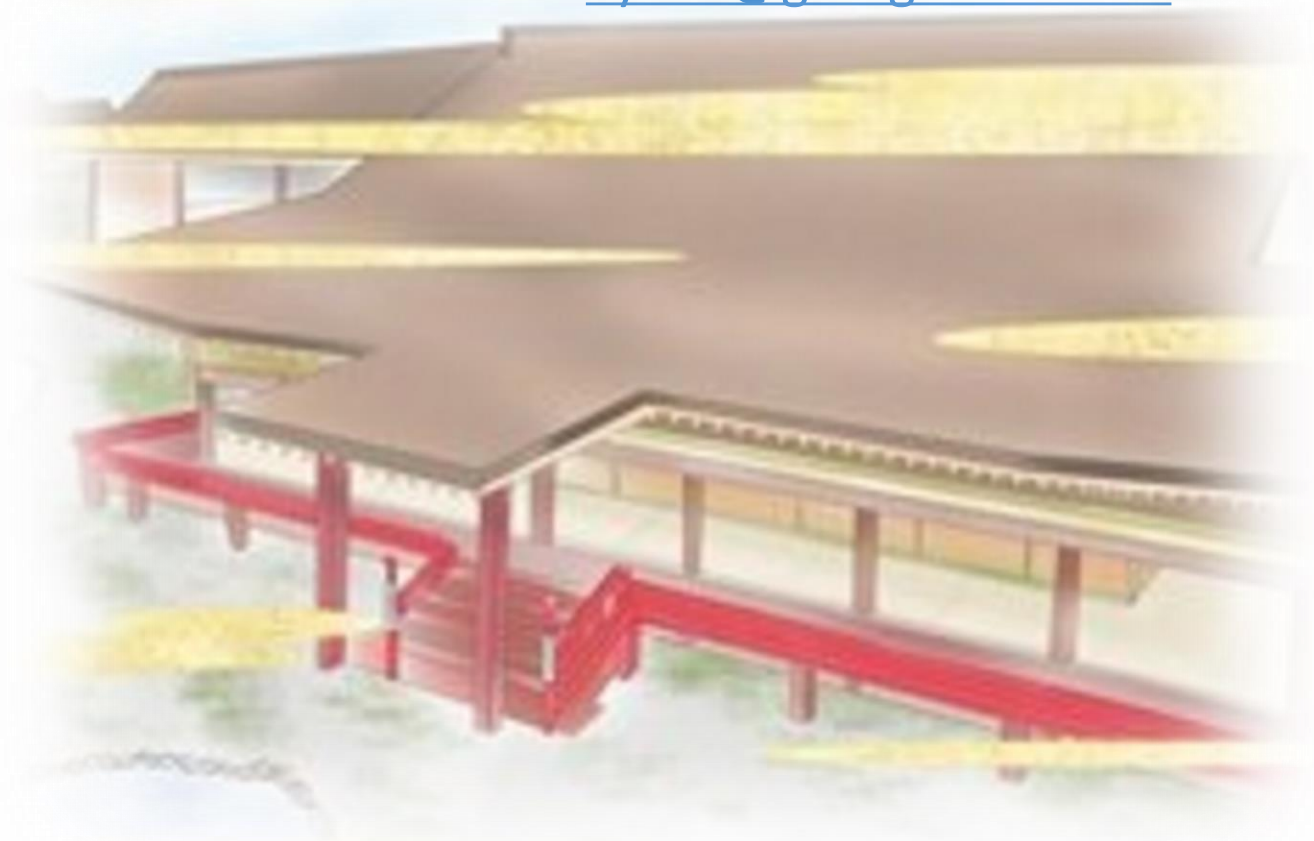# An Account from the Formal Semantics on the Change from the Polar-interrogative to the *Wh*-interrogative

GURT 2017 Mar. 11th

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1 Introduction

Introduction

- Topic:
  Change in form-meaning mapping

- Language data:
  Development of interrogative
  clauses in Japanese

- Goal:
  Compare the observation in Formal
  Semantics with the discussion in
  Diachronic Syntax

  a. Domino effect
  b. Parameter (E-language based) vs. I-language driven
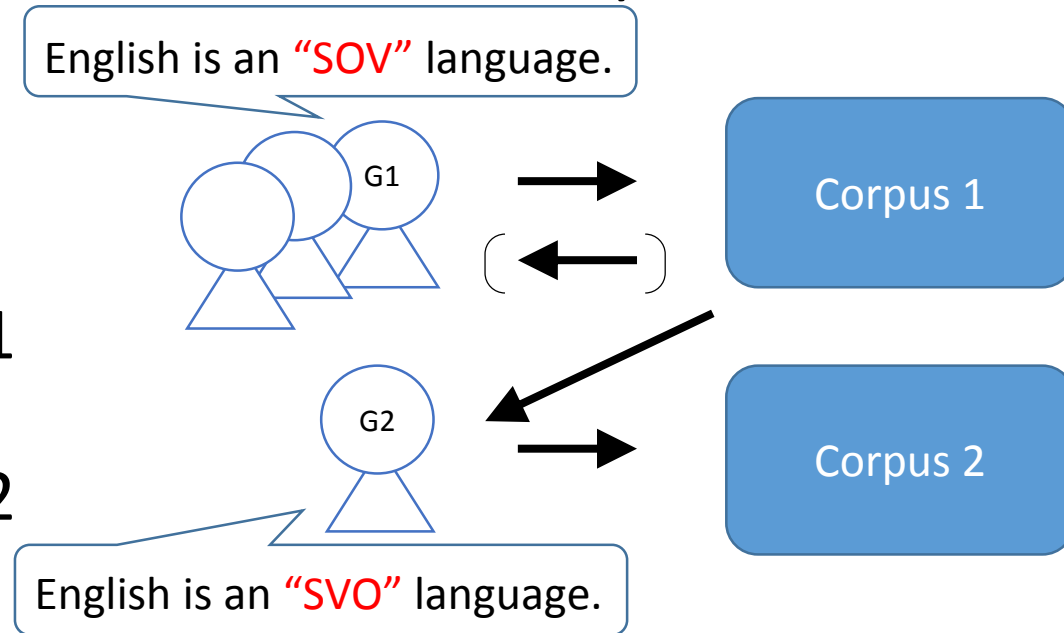
2 Concerns in previous studies

Regress Problem (Roberts 2007)

English is an "SOV" language.

G1

Corpus 1

Corpus 2

G2

English is an "SVO" language.

- Regress Problem

Generation 1: G1 -> Corpus1

Generation 2: G2 -> Corpus2

Diachronic Semantics

1 Contribution from Cognitive/functional researchers
- Subjectification w.r.t. Grammaticalization
- Intersubjectification
- Metaphor
- Metonymy
- Construction Schemata

2 Contribution from Formal Semantics (Eckardt 2006; Deo 2015)
- Role of pragmatics
- Surface-match
- Semantic universal
- communicative characteristics

Two main tasks: Deo (2015)

1 Synchronic aspect (static/structural): Give a *precise* analysis (description) of the data.

2 Diachronic aspect: model the language change

3 Case study: Japanese interrogatives

Language data: interrogatives (21st century)

(1) a. polar (yes/no) interrogatives

| S O V | | Interrogative Particle |

John-wa   *k-imas-u*   **-ka.**
John-TOP   come-HON_A-PRS   **-Q**
'Will John come?'

b. content (wh-) interrogatives

| S O V | | Interrogative Particle |

Dare-*wa* *k-imas-u*   **-ka.**
who-TOP come-HON_A-PRS **-Q**
'Who will come?'

(2) a. polar (yes/no) interrogatives

CP [| S O V | | Interrogative Particle |] | Embedding Verb |

John-ga   *kur-u*   **-ka**   *sir-anai.*
John-NOM   come-PRS **-Q**   Know-NEG
'I do not know whether John will come.'

b. content (wh-) interrogatives

CP [| S O V | | Interrogative Particle |] | Embedding Verb |

Dare-*ga*   *kur-u*   **-ka**   *sir-anai.*
who-NOM   come-PRS **-Q**   Know-NEG
'I do not know who will come.'

Direct interrogatives (11th century)

(1) a. polar (yes/no) interrogatives

S O V	Interrogative Particle

John-wa *k-imas-u* **-ka.**
John-TOP come-HON$_A$-PRS **-Q**
'Will John come?'

b. content (wh-) interrogatives

S O V	Interrogative Particle

Dare-wa k-imas-u **-ka.**
who-TOP come-HON$_A$-PRS **-Q**
Who will come?'

(crossed out)

(2) a. polar (yes/no) interrogatives

	S O V	Interrogative Particle	Embedding Verb
CP			

John-ga *kur-u* **-ka** *sir-anai.*
John-NOM come-PRS **-Q** Know-NEG
'I do not know whether John will come.'

(crossed out)

b. content (wh-) interrogatives

	S O V	Interrogative Particle	Embedding Verb
CP			

Dare-ga *kur-u* **-ka** *sir-anai.*
who-NOM come-PRS **-Q** Know-NEG
'I do not know who will come.'

(crossed out)

Direct interrogatives (11th century)

(3) *-ka* in the Heian Period

Shoukun: "*Monoketamaharu. Iduku-ni ohasimas-u-zo.*"
hello.   where-at be.HON$_S$-PRS-PRT

> Interrogative particle which triggers Question Move.

Utsusemi: "*Koko-ni-zo hus-itar-u.* [*Marouto-wa ne-tamah-inur-u-**ka**.*] [...]"
Question here-at-FOC lie-PRF-PRS guest-TOP   fall_into_sleep-HON$_S$-PRF-PRS-PRT

Shoukun: "*Hisashi-ni-zo ohotonogomor-inur-u.* [...]"
Reply   Hisashi-at-FOC sleep.HON$_S$-PRF-PRS

'S: "Hey, Where are you?' U: "It is here that I am lying. Has the guest fallen asleep?" S: "He has fallen asleep in the hisashi (place)." ' (Hahakigi; Abe et al. 1998: 136)

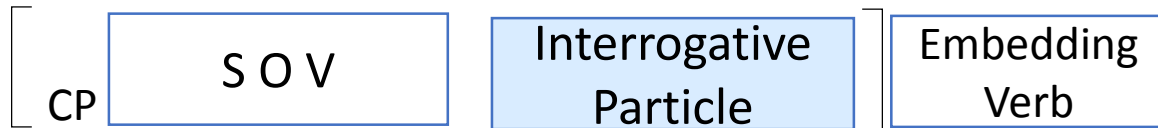# Direct interrogatives (11th century)

(1) a. polar (yes/no) interrogatives

| S O V | | Interrogative Particle |

John-wa   *k-imas-u*   **-ka.**
John-TOP   come-HON$_A$-PRS   **-Q**
'Will John come?'

b. content (wh-) interrogatives

| S O V | | Interrogative Particle |

Dare-*wa k-imas-u*   **-ka.**
who-TOP come-HON$_A$-PRS **-Q**
'Who will come?'

(2) a. polar (yes/no) interrogatives

$_{CP}$[S O V | Interrogative Particle] | Embedding Verb

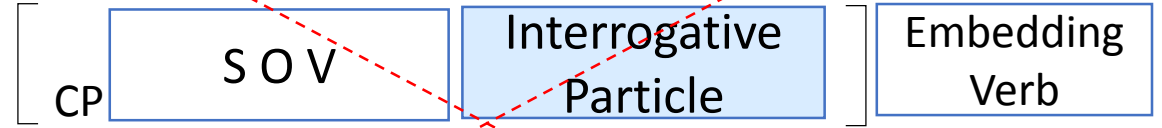*John-ga*   *kur-u*   **-ka**   *sir-anai.*
John-NOM   come-PRS **-Q**   Know-NEG
'I do not know whether John will come.'

b. content (wh-) interrogatives

$_{CP}$[S O V | Interrogative Particle] | Embedding Verb
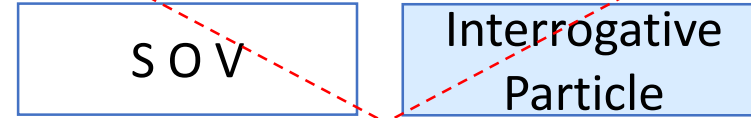
Dare-*ga*   *kur-u*   **-ka**   *sir-anai.*
who-NOM   come-PRS **-Q**   Know-NEG
'I do not know who will come.'

From direct to indirect interrogatives (14ᵗʰ century)

(1) a. polar (yes/no) interrogatives

S O V		Interrogative Particle

John-wa   *k-imas-u*   *-ka.*

John-TOP   come-HON$_A$-PRS   -Q

'Will John come?'   15ᵗʰ century

(2) a. polar (yes/no) interrogatives

[CP [S O V | Interrogative Particle] | Embedding Verb]

John-ga   *kur-u*   *-ka*   *sir-anai.*

John-NOM   come-PRS -Q   Know-NEG

'I do not know whether John will come.'

Cf. AOAI is found in 14ᵗʰ century.

---

(2) Embedded polar interrogatives

The earliest examples in Shiba-shoo all include **NEG** in the main clause. *Cf.* "uncertainty" expressed by the direct interr. 15ᵗʰ century

This environment serves as a <u>catalyst</u> for the embedded polar interrogative.

(8) [*Kurogane-no kina-mo*   *ar-u-ka*]   *iza*   *sir-az-u.*

     iron-GEN   yellow-also be-PRS-ka at_all know-NEG-PRS

'I do not know whether there is a yellow iron.'
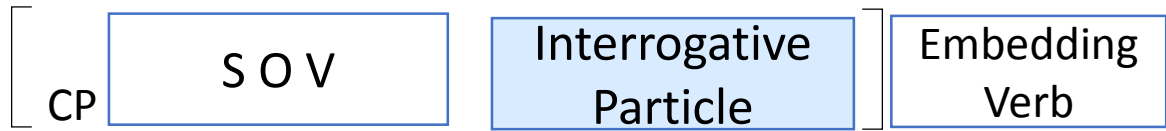
Analysis

(1) a. polar (yes/no) interrogatives

S O V	Interrogative Particle

John-wa   *k-imas-u*   ***-ka.***

John-TOP   come-HON$_A$-PRS   ***-Q***

'Will John come?'

(2) a. polar (yes/no) interrogatives

CP: | S O V | Interrogative Particle | | Embedding Verb |

John-ga   *kur-u*   ***-ka***   *sir-anai.*

John-NOM   come-PRS ***-Q***   Know-NEG

'I do not know whether John will come.'

(1) Main clause interrogative

$$[\![-\mathbf{ka_{11th}}]\!]^s = \lambda p. [\![+\boldsymbol{update_{inq}}]\!]^s([\![+\mathbf{int}]\!]^s(p))$$

$[\![+\boldsymbol{update_{inq}}]\!]^s \equiv$ *inquisitive update of* $c(s)$ *w.r.t:*

$[\![+\mathbf{int}]\!]^s = \lambda p \in D_{<s,t>}. \nexists v \in D_t. \forall w \in \cap m(s). p(w) = v.$

type-mismatch with *content interrs.*

1) Arguments: the context and proposition
2) Management of the context

Opacity from "Today-or-tomorrow -ka-GEN" construction

(2) Embedded polar interrogatives + NEG

$$[\![-\mathbf{ka_{14th}}]\!]^s = \lambda p. \lambda q \in D_{<s,t>}. [\![+\mathbf{int}]\!]^s(p)$$
$$= \lambda p \in D_{<s,t>}. \lambda q \in D_{<s,t>}. \nexists v \in D_t.$$
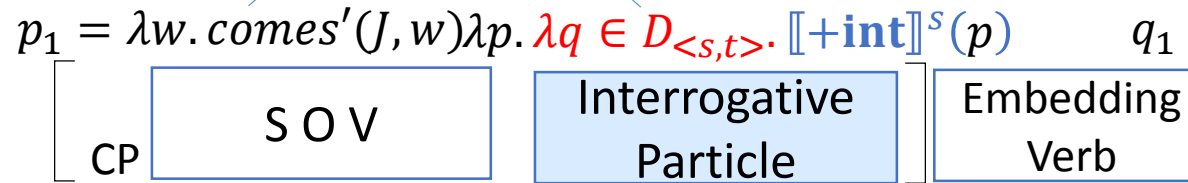$$\forall w \in (\cap m(s) \cap q(s)). p(w) = v.$$

1) Arguments: the main clause and proposition
2) Management of the propositions

Analysis

uncertainty

restriction by the context and the main predicate

$1 \text{ iff } \nexists v \in D_t. \forall w \in \left(\cap m(s) \cap q_1(s) \right). p_1(w) = v.$

$\lambda q \in D_{<s,t>}. [\![+\mathbf{int}]\!]^s(p_1)$

$p_1 = \lambda w. comes'(J, w) \lambda p. \lambda q \in D_{<s,t>}. [\![+\mathbf{int}]\!]^s(p)$ q_1

CP	S O V	Interrogative Particle	Embedding Verb

John-ga   *kur-u*   ***-ka***   *sir-anai.*

John-NOM   come-PRS   **-Q**   Know-NEG

'I do not know whether John will come.'

(2) Embedded polar interrogatives + NEG

$[\![-\mathbf{ka}_{14th}]\!]^s = \lambda p. \lambda q \in D_{<s,t>}. [\![+\mathbf{int}]\!]^s(p)$

$\quad = \lambda p \in D_{<s,t>}. \lambda q \in D_{<s,t>}. \nexists v \in D_t.$

$\quad \forall w \in \left(\cap m(s) \cap q(s) \right). p(w) = v.$

1) **Arguments: the main clause and proposition**
2) **Management of the propositions**

From direct to indirect interrogatives (Triggers)

(1) a. polar (yes/no) interrogatives

S O V	Interrogative Particle

John-wa   *k-imas-u*   **-ka.**
John-TOP   come-HON$_A$-PRS   **-Q**
'Will John come?'

11th century

(2) a. polar (yes/no) interrogatives

CP [| S O V | Interrogative Particle |] | Embedding Verb |
|---|---|---|

John-ga   *kur-u*   **-ka**   *sir-anai.*
John-NOM   come-PRS **-Q**   Know-NEG
'I do not know whether John will come.'

(B) Quoted speech: interrogatives in sequence

(4)   *Kyoo-**ka***   *asu-**ka**.*
     today-PRT   tomorrow-PRT
     'Is it today (or) is it tomorrow?'

(5)   [*Kyoo-**ka***   *asu-**ka**]-no*   *kokoti-s-ite*
     today-PRT   tomorrow-PRT-GEN   feeling-do-and
     'I had a feeling of "is_it_today_or_is_it_tomorrow" and '

Kinuhata and Iwata (2010)

In 11th century, only a set of fixed expressions can appear in the genitive construction:

(6) a. "today or tomorrow"
     b. "dream or real"
     c. "be or not be"

Increase of the opacity in the Corpus.

From direct to indirect interrogatives (Triggers)

(1) a. polar (yes/no) interrogatives

S O V	Interrogative Particle

John-wa   *k-imas-u*   **-ka.**

John-TOP   come-HON$_A$-PRS   **-Q**

'Will John come?'

(2) a. polar (yes/no) interrogatives

CP [| S O V | Interrogative Particle |] | Embedding Verb |

John-ga   *kur-u*   **-ka**   *sir-anai.*

John-NOM   come-PRS   **-Q**   Know-NEG

'I do not know whether John will come.'

First change: generalization through bleaching

(1) Change:
Direct polar interrogatives to indirect polar interrogatives

(2) Trigger (> domino effect):
opacity caused by the "is-it-today-is-it-tomorrow" construction

(3) Nature of the change:
- generalization through bleaching (cf. generalization ; Deo 2015)
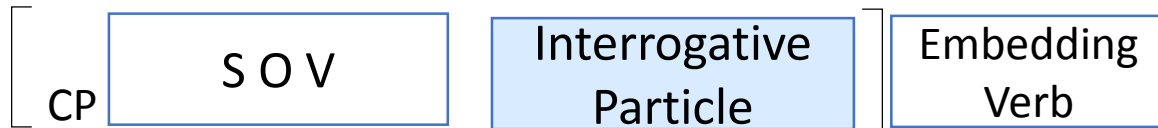- the inquisitive updating function is **detached** from the morpheme.

From direct to indirect interrogatives (14th century)
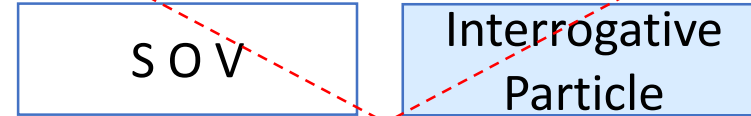
(1) a. polar (yes/no) interrogatives

| S O V | Interrogative Particle |

John-wa   *k-imas-u*   **-ka.**
John-TOP   come-HON$_A$-PRS   **-Q**
'Will John come?'

b. content (wh-) interrogatives

| S O V | Interrogative Particle |

***Dare**-wa k-imas-u*   **-ka.**
who-TOP come-HON$_A$-PRS **-Q**
'Who will come?'

(2) a. polar (yes/no) interrogatives

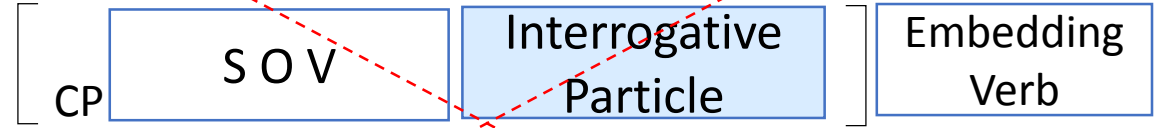| CP [| S O V | Interrogative Particle |] | Embedding Verb |

John-ga   *kur-u*   **-ka**   *sir-anai.*
John-NOM   come-PRS **-Q**   Know-NEG
'I do not know whether John will come.'

b. content (wh-) interrogatives

| CP [| S O V | Interrogative Particle |] | Embedding Verb |

***Dare**-ga*   *kur-u*   **-ka**   *sir-anai.*
who-NOM   come-PRS **-Q**   Know-NEG
'I do not know who will come.'

From polar to content interrogatives (17th century)
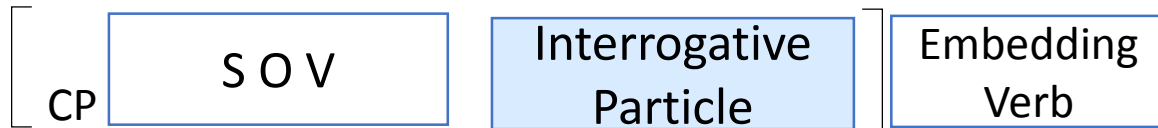
(1) a. polar (yes/no) interrogatives

S O V	Interrogative Particle

John-wa *k-imas-u* **-ka.**
John-TOP come-HON_A-PRS **-Q**
'Will John come?'

b. content (wh-) interrogatives

S O V	Interrogative Particle

Dare-*wa* *k-imas-u* **-ka.**
who-TOP come-HON_A-PRS **-Q**
'Who will come?'

(2) a. polar (yes/no) interrogatives

	S O V	Interrogative Particle	Embedding Verb
CP			

John-ga *kur-u* **-ka** *sir-anai.*
John-NOM come-PRS **-Q** Know-NEG
'I do not know whether John will come.'

b. content (wh-) interrogatives

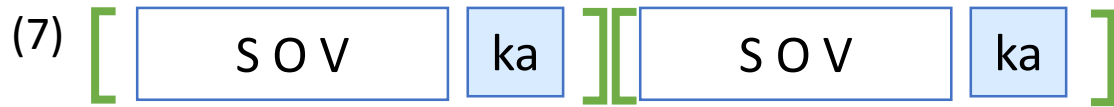|	S O V	Interrogative Particle	Embedding Verb
CP			

Dare-*ga* *kur-u* **-ka** *sir-anai.*
who-NOM come-PRS **-Q** Know-NEG
'I do not know who will come.'
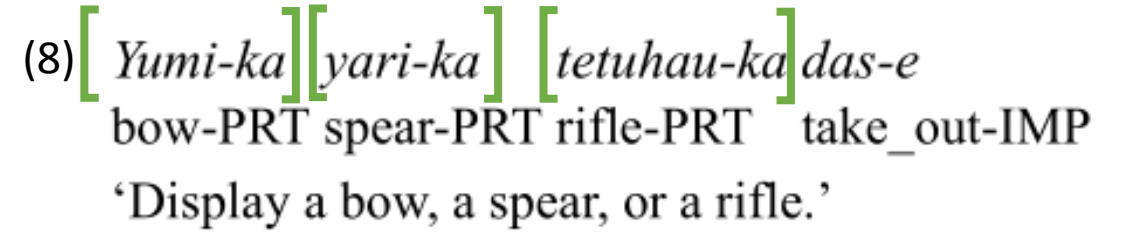
From polar to content interrogatives (17ᵗʰ century)

(3) Disjunct: trigger
The particle *-ka* was reanalyzed as a disjunct marker.
-ka could not productively connect DPs in 11ᵗʰ century.

(7)

```
[ [ S O V  ka ] [ S O V  ka ] ]
```

17ᵗʰ century: DP's and other categories are combined.
(not only TP's), combining multiple elements.

(8)
$$[Yumi\text{-}ka][yari\text{-}ka][tetuhau\text{-}ka\ das\text{-}e$$
bow-PRT spear-PRT rifle-PRT   take_out-IMP
'Display a bow, a spear, or a rifle.'

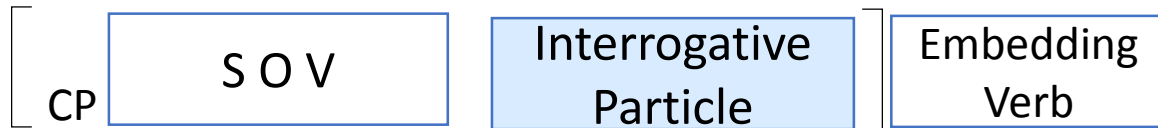Reanalysis:
The central role of *-ka* is to make a set of multiple elements
(in the case of interrogatives, it is a set of propositions).

17ᵗʰ century

(2) a. polar (yes/no) interrogatives ⟶ **b. content (wh-) interrogatives**

CP [S O V] [Interrogative Particle] Embedding Verb

John-ga	*kur-u*	**-ka**	*sir-anai.*
John-NOM	come-PRS	**-Q**	Know-NEG

'I do not know whether John will come.'

CP [S O V] [Interrogative Particle] Embedding Verb

***Dare**-ga*	*kur-u*	**-ka**	*sir-anai.*
who-NOM	come-PRS	**-Q**	Know-NEG

'I do not know who will come.'

Analysis

14th century $\xrightarrow{\text{Multiplicity of the propositions}}$ 17th century

Multiplicity of the propositions

14th century

17th century

Quantification part

$$[\![-\mathbf{ka_{14th}}]\!]^s = \lambda p \in D_{<s,t>}.\, \lambda q \in D_{<s,t>}.\, [\![+\mathbf{int}]\!]^s(p)$$

$$[\![\boldsymbol{\phi}]\!]^s = \lambda P \in D_{<st,t>}.\, \forall p \in P.\, \lambda q.\, [\![+\mathbf{int}]\!]^s(p)$$

$$[\![-\boldsymbol{ka_{17th}}]\!]^s$$
$$= \begin{cases} \lambda p.\, \lambda Q.\, Q \cup \{p\}, \text{iff it is not the first conjunct} \\ \qquad\qquad \lambda p.\, \{p\}, \text{otherwise} \end{cases}$$

Set creation part

Restriction on the p (a set of worlds) disappeared.
People in later generation started analyzing the denotation-assignment in a different way.

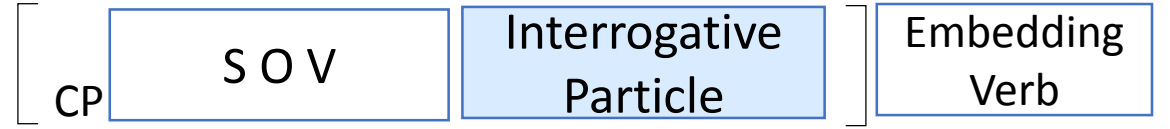(2) a. polar (yes/no) interrogatives $\rightsquigarrow$ b. content (wh-) interrogatives

[CP [S O V] [Interrogative Particle]] [Embedding Verb]

John-ga	kur-u	**-ka**	sir-anai.
John-NOM	come-PRS	**-Q**	Know-NEG

'I do not know whether John will come.'

[CP [S O V] [Interrogative Particle]] [Embedding Verb]

Dare-ga	kur-u	**-ka**	sir-anai.
who-NOM	come-PRS	**-Q**	Know-NEG

'I do not know who will come.'

20

From polar to content interrogatives (17ᵗʰ century)

17ᵗʰ century

Second change: preference for compositionality
(1) Change:
From polar interrogatives to content interrogatives
(2) Trigger (> domino effect):
Development of the disjunct use
(3) Nature of the change
'Re'-distribution (across generations) of the semantic feature (preference for compositionality)

ϕ

$\{p\} \ or \ \{p_1, \dots, p_n\}$

CP | S O V | Interrogative Particle | Embedding Verb

CP | S O V | Interrogative Particle | Embedding Verb

Quantification part

Quantification part

Set creation part

Quantification part
Take a set of worlds
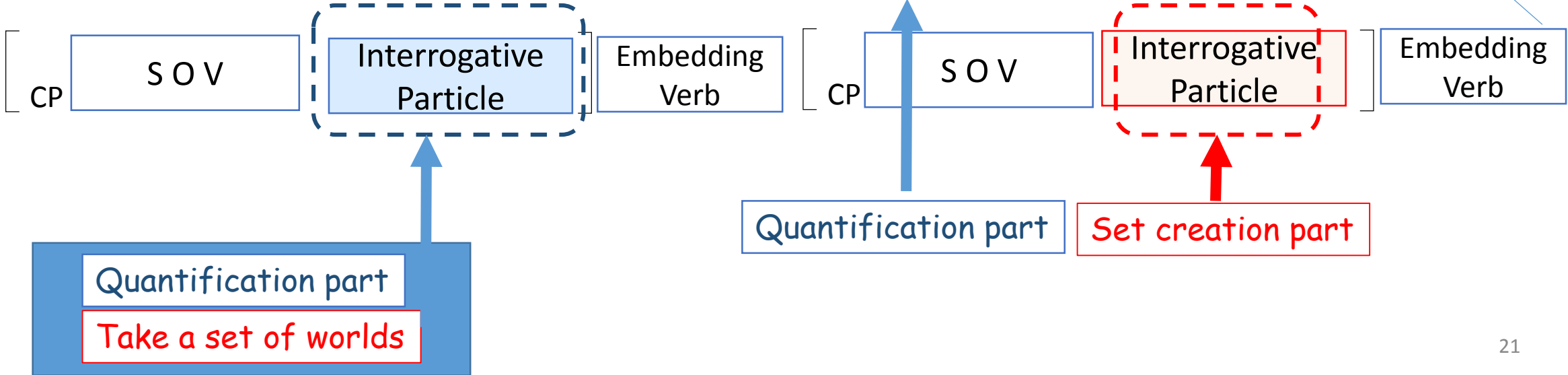
4 Discussion

What are the nature of these changes?

- Contribution from Cognitive/functional researchers
    - *Subjectification w.r.t. Grammaticalization
    - *Intersubjectification
    - *Metaphor
    - *Metonymy
    - Schema-building

    What is this?

First change: generalization through bleaching

(1) Change:
from direct interrogatives to indirect polar interrogatives

(2) Trigger (> domino effect):
opacity caused by the "is-it-today-is-it-tomorrow" construction

(3) Nature of the change:
generalization through bleaching (cf. generalization ; Deo 2015)
The inquisitive updating function is **detached** from the morpheme.

Second change: preference for compositionality

(1) Change:
From polar interrogatives to content interrogatives

(2) Trigger (> domino effect):
Development of the disjunct use

(3) Nature of the change
'Re'-distribution (across generations) of the semantic feature (preference for compositionality)

"Reanalysis is driven by hearers (language learners) who attempt to assign meanings to linguistic expressions that can allow the whole meaning of the complex expression to be derived compositionally (Deo 2015: 185-186)." (cf. Eckardt 2006)

Discussion

Common to those changes:

Just an assignment of denotation to each morpheme.

Comparison with studies in diachronic syntax

- I-language based approaches
  - Cue: predetermined menu
  - Discovery: find a structure allowed by the derivation in meaning. (cf. Lightfoot 2016)

- E-language based approaches
  - No global evaluation of grammars
  - "parameters"? (apocryphal)

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Parameter?

- These changes are **construction-specific changes**.

- It is adhoc to "coin" such a parameter as:
Can this language use content-interrogative in the embedded environment? Y/N

- The change is, rather, considered to be an *abduction* from a proposition to a singleton set of propositions (*cf.* the alternative/partition semantics, Hamblin 1973; Groenendijk and Stokhof 1984), because of the strong ambiguity of polar interrogatives (Roberts 2007:133).

- This fits well with the recent view of Lightfoot (2016) in that a change is hypothesized to appear in a new generation when they discover/accept a pattern **as long as** the pattern is coherent to the language system that they have.

- The study suggests that the basic syntactic/semantic learning mechanism/changes are driven by similar principles.-

Thank you very much for listening!!

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- *professor-david-lightfoot*

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