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

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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)

• Regress Problem
Generation 1: G1 -> Corpus1
Generation 2: G2 -> Corpus2

English is an “SOV” language.

English is an “SVO” language.
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

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‘Will John come?’

#### b. content (wh-) interrogatives

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‘Who will come?’

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

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‘I do not know whether John will come.’

#### b. content (wh-) interrogatives

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‘I do not know who will come.’
Direct interrogatives (11th century)

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‘I do not know who will come.’
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

    here-at-FOC lie-PRF-PRS guest-TOP    fall_into_sleep-HON$_S$-PRF-PRS-PRT

Shoukun: “Hisashi-ni-ko ohotonomomor-inur-u. [...]”
    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)

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‘I do not know who will come.’
From direct to indirect interrogatives (14th century)

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

```
S O V

John-wa k-imas-u -ka.
John-TOP come-HON-PRS -Q
'

Will John come?’
```

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

```
S O V

CP

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

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 catalyst for the embedded polar interrogative.

```
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.’
```

Cf. AOAI is found in 14th century.
Analysis

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

John-wa k-imas-u -ka.
John-TOP come-HONA-PRS -Q
‘Will John come?’

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

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

\[
[-ka_{11th}]^s = \lambda p. [\text{+update}_{\text{inq}}]^s ([\text{+int}]^s (p))
\]

\{ \quad [\text{+update}_{\text{inq}}]^s \equiv \text{inquisitive update of } c(s) \text{ w.r.t:} \]

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

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

Opacity from “Today-or-tomorrow -ka-GEN” construction

(2) Embedded polar interrogatives + NEG

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

\[
= \lambda p \in D_{<s,t>} . \lambda q \in D_{<s,t>} . \exists v \in D_t. \quad \forall w \in (\cap m(s) \cap q(s)). p(w) = v.
\]

1) Arguments: the main clause and proposition
2) Management of the propositions
‘I do not know whether John will come.’

1) Arguments: the main clause and proposition
2) Management of the propositions
From direct to indirect interrogatives (Triggers)

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

\[ \text{S O V} \]

Interrogative Particle

\[ \text{John-wa} \]
John-TOP

‘Will John come?’

\[ k-\text{imas-u} \quad -\text{ka}. \]
come-HONa-PRS -Q

11\textsuperscript{th} century

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

\[ \text{CP} \quad \text{S O V} \quad \text{Interrogative Particle} \quad \text{Embedding Verb} \]

\[ \text{John-ga} \]
John-NOM

‘I do not know whether John will come.’

\[ \text{kur-u} \quad -\text{ka} \quad \text{si-r-anai}. \]
come-PRS -Q Know-NEG

( B ) Quoted speech: interrogatives in sequence

(4) \text{Kyoo-ka} \quad \text{asu-ka}.
\ today-PRT \ tomorrow-PRT
‘Is it today (or) is it tomorrow?’

(5) \text{[Kyoo-ka \ asu-ka]-no} \quad \text{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 11\textsuperscript{th} 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. Polar (yes/no) interrogatives

   (1) a. Direct polar interrogatives
   
   **SOV**
   
   John-wa \( k-imas-u \) -ka. 
   John-TOP come-HONa-PRS -Q
   ‘Will John come?’

   (2) a. Indirect polar interrogatives
   
   **CP SOV**
   
   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 (14\textsuperscript{th} century)

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

\[
\begin{array}{c|c|c}
\text{S O V} & \text{Interrogative Particle} \\
\hline
John-wa & k-imas-u & -ka. \\
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\end{array}
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‘Will John come?’

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

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‘I do not know whether John will come.’

b. content (wh-) interrogatives

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\begin{array}{c|c|c|c}
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‘Who will come?’

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\text{CP} & \text{S O V} & \text{Interrogative Particle} & \text{Embedding Verb} \\
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Dare-ga & kur-u & -ka & sir-anai. \\
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‘I do not know who will come.’
From polar to content interrogatives (17th century)

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**From polar to content interrogatives (17th century)**
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.

b. content (wh-) interrogatives
-ka

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).

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

John-ga kur-u -ka sir-anai.
John-NOM come-PRS -Q Know-NEG
‘I do not know whether John will come.’
(2) a. polar (yes/no) interrogatives

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

\[ [-\text{ka}_{17\text{th}}]^S = \begin{cases} \lambda p \cdot \lambda q. Q \cup \{p\}, & \text{iff it is not the first conjunct} \\ \lambda p. \{p\}, & \text{otherwise} \end{cases} \]

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

b. content (wh-) interrogatives

\[ \phi^S = \lambda P \in D_{s,t}^< \cdot \forall p \in P \cdot \lambda q. [\text{+int}]^S(p) \]

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‘I do not know whether John will come.’

Dare-ga kur-u -ka sir-anai.
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‘I do not know who will come.’
From polar to content interrogatives (17th century)

14th 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)
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)
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!!
Reference


- [professor-david-lightfoot](http://www.ncl.ac.uk/linguistics/news/seminars/item/triggers-and-dominoes-)
