Japanese Q-Particles & Predictive Parsing

1 A Motivating Question

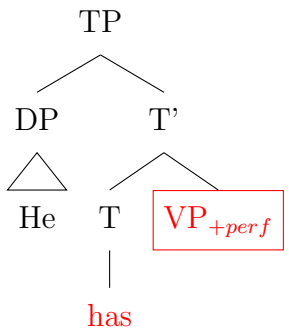
Consider the following sentence:

"He has (really) (never) (...) gone/*go/*went to Europe."

¡¡¡¡¡¡¡ HEAD Let's say you observe reading speedup at *gone*.
Why?
======= It may be unsurprising to see "gone" after the occurrence of "has".
But, when you see "has", do you predict something upcoming?
The claim of some (and myself): **Yes**. ¿¿¿¿¿¿¿ 523a8adeef16338cd278070b3a32ae1957c05f24

One possibility = You predicted it

- What = VP_{+perf}
- When = Reaching "has"
- How = TBD



Implications: You have to know **a lot** to make good predictions

- Parser is defined on categorical constituents (VP, DP, etc.) (a *knowledge* claim)
- Parser has access to relations between those constituents (X controls Y) (a *knowledge* claim)
- When seeing one part of a relation, it has a subprocess to predict the unseen part (a *behaviour* claim)
- And more...

Is the above (or something like it) the case?

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2 Some Japanese Data

In Japanese, whs must be c-commanded by -ka or -no (a question particle) in the C position.

(1) a. No c-commanding QP → BAD

*Dare-ga [Hanako-ga ringo-o tabeta-ka] tazuneta.
Who-nom Hanako-nom apple-acc ate-Q asked

Intended: Who asked if Hanako ate an apple?

b. (Matrix Wh) Wh is c-commanded by QP → GOOD

Dare-ga [Hanako-ga ringo-o tabeta-ka] tazuneta-no.
Who-nom Hanako-nom apple-acc ate-Q asked-Q

Who asked if Hanako ate an apple?

c. (Embedded Wh) Wh is c-commanded by QP → GOOD

Hanako-ga [Keiko-ga nani-o tabeta-to] itta-no.
Hanako-nom Keiko-nom what-acc ate-Q said-Q

What did Hanako say that Keiko ate?

Two wh-questions (matrix and embedded) can be licensed by a single matrix QP!

(2) Dono gakusei-ga [kyoushi-ga nani-o chuumon-shita-to] kuwashi-ku tazunemashita-ka
Which student-nom teacher-nom what-acc order-did-dec in-detail asked-Q
Which student asked what the teacher ordered in detail?

Example 2 presents an ambiguity to the parser.

"Dono gakusei-ga kyoushi-ga nani-o..." → is it 1 or 2 QPs coming?

chuumon-shita-to kuwashi-ku tazunemashita-ka"
(Just matrix QP)

chuumon-shita-ka kuwashi-ku tazunemashita-ka"
(Both matrix and embedded QP)

We can use this ambiguity to test for prediction.

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3 An Experiment

Using the data from above we can make an experiment to test for predictive effects. Assume the following conditions and an example item. Wh quetions and QPs are highlighted red.

		# QP	
		1QP	2QP
Wh	Dono (Which)	Cond. A	Cond. B
	Sono (That)	Cond. C	Cond. D

Table 1: Conditions for Experiment

(3) a. Dono gakusei-ga [kyoushi-ga nani-o chuumon-shita-to] kuwashi-ku tazunemashita-ka
Which student-nom teacher-nom what-acc order-did-dec in-detail asked-Q
Which student asked what the teacher ordered in detail?

b. Dono gakusei-ga [kyoushi-ga nani-o chuumon-shita-ka] kuwashi-ku tazunemashita-ka
Which student-nom teacher-nom what-acc order-did-Q in-detail asked-Q
Which student asked what the teacher ordered in detail?

c. Sono gakusei-ga [kyoushi-ga nani-o chuumon-shita-to] kuwashi-ku tazunemashita-ka
That student-nom teacher-nom what-acc order-did-dec in-detail asked-Q
What did that student ask in detail that the teacher ate?

d. Sono gakusei-ga [kyoushi-ga nani-o chuumon-shita-ka] kuwashi-ku tazunemashita-ka
That student-nom teacher-nom what-acc order-did-Q in-detail asked-Q
What did that student ask in detail that the teacher ate?

Hypothesis:

- When? → Upon reaching each Wh (dono, nani-o)
- What? → An upcoming QP in the first possible C position

4 Expected Results

Under the predictive hypothesis, we expect some things to happen for conditions A and B.

1. Matrix "Dono" triggers prediction of upcoming QP in Matrix C position.

   $[_{CP}$ Dono ...-ka]

2. Embedded "nani-o" triggers prediction of upcoming QP in (some) C position.

   $[_{CP}$ Dono gakusei-ga$[_{CP}$ kyoushi-ga nani-o...]... -ka]

3. Given the QP predicted by "Dono", the least effort is to assume nani-o "covered" by matrix QP. This is the case of **condition A**.

   $[_{CP}$ Dono gakusei-ga$[_{CP}$ kyoushi-ga nani-o...] ...-ka]

4. If an embedded QP appears, we should observe slowdown at that point. This is the case of **condition B**.

   $[_{CP}$ Dono gakusei-ga$[_{CP}$ kyoushi-ga nani-o chuumon-shita-ka] ...-ka]

In condition B, a second (embedded) QP shows up.
We should observe a significant slowdown at that point compared to A.

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5 Concluding Thoughts

Showing significant slowdown at the embedded QP in Condition B is in support of a structurally predictive parsing model.

¡¡¡¡¡¡¡ HEAD **More Questions:**

- What other hypotheses could claim slowdown at embedded QP in Condition B?
- What about the *how*?
  - Hypothesis generation method?
  - Stopping point?
- Other Knowledge: Integrating frequency-based knowledge too?
- Limitations: Assuming what relations do we *not* see predictive behavior?
- Acquisition: Learning to predict and predicting to learn?

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1. No slowdown is anticipated since the embedded QP should fit very well into the context of a nearby Wh which it can license.
2. Others? ***

This experiment can successfully separate the predictions of these differing hypotheses. This also has implications for theoretical space of possible parsers (i.e., what capabilities the parser should have).
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