Message Formulation is multi-factorial and competitive: Evidence from real-time production of wh-questions in two languages

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Why did we start with ‘the nurses?’

The nurses tickled the chefs.

Linearly first
Needs to be said first

Subject
Subjects known to hold special status [2]

Agent
Agents highly salient concepts [3]
Agenthood not defining reason [3]
• Passives: Subjects planned first whether they’re the agent or patient

Why did we start with ‘the nurses?’

The nurses tickled the chefs.

Linear Hypothesis [1]
• It’s the linearly first phrase
• Start with most conceptually accessible item
• Build syntactic representations from those conceptual items

Structural Hypothesis [2]
• It’s the subject
• Start with a structural representation of the event
• Slot conceptual items into the syntactic structure after

These hypotheses are not mutually exclusive: Speakers can vary message formulation strategies depending on multiple factors. [3]


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**How do those factors interact?**

- **Teasing apart** the linear and structural hypotheses is difficult
  - Declaratives not super helpful
- Looked at languages where **subject is not linearly first**
  - **Free word order** languages (Russian, Finnish)\(^1\) or **verb-initial languages** (Tzeltal, Tagalog)\(^2\)
  - But, results potentially complicated by discourse-pragmatic and/or morphological factors

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**The Current Study**

- A first look into real-time production of questions
- **Research Question:** How do **linear word order** and **subjecthood** – two factor(s) that can inform the starting point of message formulation – interact?

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**Hypothesis & Predictions**

<table>
<thead>
<tr>
<th>What do we plan first?</th>
<th>Subject</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>In <strong>Declarative Sentences</strong></td>
<td>The nurses</td>
<td>chefs</td>
</tr>
<tr>
<td>In <strong>Object Wh-Questions</strong></td>
<td>chefs</td>
<td>nurses</td>
</tr>
</tbody>
</table>

**Linear Hypothesis:** Linearly first word
- **Subject**
  - The nurses
- **Object**
  - The nurses

**Structural Hypothesis:** Subject
- **Subject**
  - The nurses
- **Subject**
  - The nurses

**Multi-Factorial**
- Both things are important
- **Subject**
  - ?????

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**Experiment 1: Methods & Design**

- **Visual World Eye-Tracking**
  - Speakers gaze correlates tightly with attention
- **2 Sentence Types**
  - S → **Declarative**
  - Q → **Object wh-question**
- **Critical Image**
  - 2 sets of characters
  - Verb denoted by instrument
  - Verb’s location indicated subject character
- **Participants** (n=30) familiarized with characters and verb names prior to experiment
Experiment 1: Eye Movements at Image Onset

**D:** The nurses tickled the chefs.
**Q:** Which chefs did the nurses tickle?

- Competition between subject and linearly first object emerges in object wh-questions.

### Experiment 2: Information Focus

- **Research Question:** To what extent did information focus drive competitive looks to the object in Exp 1?
- **Mandarin Chinese (n=35)**
  - Wh-questions and declaratives have the same linear word order.
    - Declarative: 护士们枪毙了厨师。
    - Object Wh-Question: 护士们枪毙了哪个厨师?
  - Differences in eye-movements cannot be due to surface word order.

### Experiment 1 Discussion: wh-Questions in English

- How do linear word order versus subjecthood affect the starting point of message formulation?
  - Through a hierarchy of factors: Subjecthood is privileged over linear word order during message formulation.
  - But, linear word order is not ruled out: It competes simultaneously with subjecthood.
- Linear Word Order or Information Focus?
  - wh-words are informationally focused elements.
  - Alternative Account: Information focus drove competitive looks to object wh-phrase in English questions.

### Experiment 2: Eye Movements at Image Onset

- No eye-movement differences between declaratives and object wh-questions.
Exp 2 Discussion: wh-Questions in Mandarin

• Did information focus confound results in Exp 1?
  • No: When linear word order and structure are held constant, we find no differences in eye-movements when speakers plan object wh-questions vs declaratives
  • In line with prior work showing late emergence of discourse-pragmatic effects in production[1]


How do we go from thoughts to sentences?

• Through a hierarchy of factors:
  - Subjecthood is privileged
  - Subject
  - Some other factors can still play a role
    - Agent
    - Linear word order
    - Information focus?
  - But not all in the same way
• Planning is structurally incremental
• Syntactic structure plays a (surprisingly) important role
  - Speakers build syntactic representations even when it’s not necessary to do so.

References