1. Introduction

- Language production, like comprehension, is incremental\(^1\).
- When describing an image, speakers: (1) Apprehend Scene → (2) Formulate Message → (3) Grammatically Assemble Message/Select Lexical Items → (4) Phonologically Encode Message → (5) Begin Articulation
- What factors determine where we start incrementally formulating messages?
  - Linear Accounts: Start with most accessible lexical concept; mention that first (e.g. as the subject in English)\(^2\)
  - Structural Accounts: Start with subject of the sentence; insert relevant lexical concept into the ‘subject slot’\(^3\)
  - Multi-factorial Accounts: Production varies due to accessibility and structure\(^4\)
- How do we tease apart these accounts if subjects are often the first arguments in a sentence?
  - Active vs Passives: Grammatical (not thematic) roles drive message formulation, but still subject-initial\(^5\)
  - Free word order: Russian, Finnish\(^6\) | Verb-initial: Tzeltal, Tagalog\(^7\)
  - But, results complicated by discourse and/or morphological factors

2. Current Study

- Research Question: How do linear word order and subjudice interact to inform the starting point of message formulation?
- English object wh-questions can tease apart linearity & subjudice

3. Hypotheses & Predictions

<table>
<thead>
<tr>
<th>Linear Account: Linearly first word</th>
<th>Subject</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Account: Subject</td>
<td>Subject</td>
<td></td>
</tr>
<tr>
<td>Multi-factorial: Both interact</td>
<td>Subject</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Declaratives</th>
<th>Object Wh-Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The nurses tickled the chefs.</td>
<td>Which chefs did the nurses tickle?</td>
</tr>
<tr>
<td>Subject</td>
<td>Object</td>
</tr>
</tbody>
</table>

4. Experiment Design

- Participants first saw sentence type cue, then saw image; produced the cued sentence type

<table>
<thead>
<tr>
<th>Statement (S)</th>
<th>Object Wh-Question (Q)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S: The nurses tickled the chefs.</td>
<td>Q: Which chefs did the nurses tickle?</td>
</tr>
<tr>
<td>S: The nurses shot the chefs.</td>
<td>Q: Which chefs did the nurses tickle?</td>
</tr>
</tbody>
</table>

- Verbs indicated by instruments (e.g. feather), instrument location indicated subject character
- 33 targets; 30 fillers. Familiarization session before experiment
- Measured Proportion of fixations to subject, object and verb, & Sub-Obj Difference Scores

5. Exp 1: English, Linear Word Order vs SubjJudgement

- Key Pattern: Speakers look to the subject before object in decl & ques (~400ms), but consider the object more in ques than in decl
- Message formulation modulated by syntactic structure
  - Decl: Rapid rise in looks to subject only ~400ms
  - Ques: Rise in looks to subject & object ~400ms
- How do linear word order and subjectjudgement interact?
  - They are separable, competitive effects
  - Subjectjudgement is privileged over linear word order during message formulation
  - But, linear word order is not ruled out: It competes with subjectjudgement
  - But, Linear Word Order or Information Focus?
    - wh-words are informationally focused elements
    - Possible Alternative Account: Information focus drove competitive looks to object wh-phrase in English questions.

6. Exp 2: Mandarin, Linear Word Order vs Information Focus

- Research Questions:
  1. To what extent did information focus drive competitive looks to the object in Exp 1 (English)?
  2. Is planning different for overt vs covert dependencies?
- Mandarin Chinese (Subject-Verb-Object)
  - Wh-questions and declaratives have the same linear word order
  - Object Wh-Questions: The nurses shot the chefs.
  - Eye-movements’ differences cannot be due to surface word order
  - Native Mandarin speakers (n=35)
  - Exp 2 conducted in Mandarin; Items differed to account for lexical differences

- Speakers look to verb first to determine Subj/Obj characters
- Decl and ques do not differ 200-1000ms after image onset
- Sub-Obj difference scores do not differ (|z| < 1.4)
- Key Pattern: Speakers fixate subject in both decl & ques; do not consider object in either

7. Discussion & Conclusion

Message Formulation is Multi-Factorial

- Subjecthood is privileged
- Subject
- Linear word order
- Information focus
- But not all in the same way
