



MESSAGE AND SENTENCE PLANNING
 STRATEGIES AFFECT SCALING OF
 PHRASE-INITIAL F₀: EVIDENCE FROM
 EYE-TRACKING WITH ESTONIAN SPEAKERS

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Question:

How does the breadth of message planning influence the advance planning of phrasal F0 (F0 declination)?

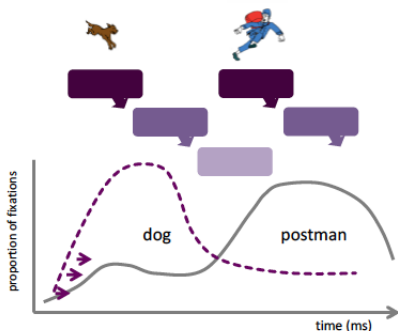
Sentence planning:

- Sentence planning = (a) conceptualisation of a preverbal *message* and (b) *linguistic encoding* of this message (e.g., Bock and Ferreira, 2014).
- Speakers plan their utterances in small units (i.e., *incrementally*), so how are these stages interleaved?
 - *Linear Incrementality* (Gleitman et al., 2007)
 - *Hierarchical Incrementality* (Brown-Schmidt and Konopka, 2014; Griffin and Bock, 2000; Konopka and Meyer, 2014)

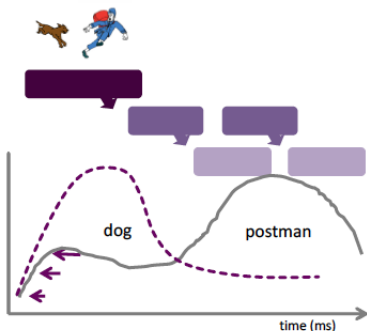
The time-course of sentence planning:

Gleitman et al. (2007) vs. Bock & Ferreira (2014)

1 planning character by character
(**linear** incrementality)



2 planning a larger message first
(**hierarchical** incrementality)



Case-morphological languages:

- Breadth of message planning is wider in case-morphological than in non-case-morphological languages (Hwang and Kaiser, 2015; Myachykov and Garrod, 2008; Sauppe et al., 2013).
 - Perceptual saliency did not affect the choice of word order in Korean (Hwang and Kaiser, 2015).
 - While describing pictures, speakers of Tagalog looked more at the character who was mentioned as second and whose name agreed with the verb (Sauppe et al., 2013).

Advance planning of phrasal F0:

- Phonetic studies of declination have indicated that speakers are able to anticipate the length of their upcoming utterances and scale the height of the phrase-initial pitch peak higher in longer than in shorter utterances (Asu et al., 2016; Prieto et al., 2006; Yuan and Liberman, 2014).

Advance planning of phrasal F0:

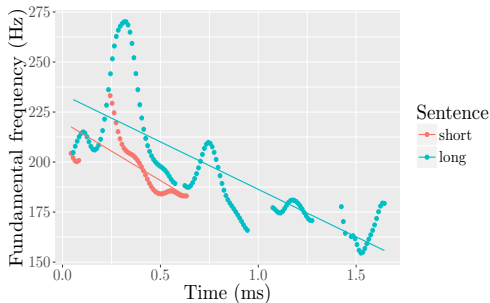


Figure 1. F0 extracted from a long sentence “*Aga ladinakeelseid nimesid ta mäletab mul*” (‘But he remembers Latin names’) and from a short sentence “*Nad kuulavad*” (‘They’re listening’).

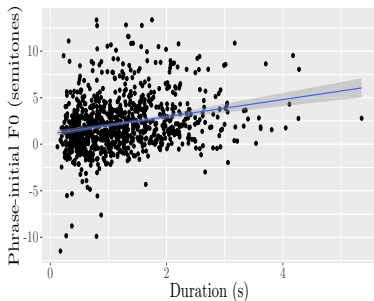


Figure 2. Phrase-initial F0 in relation to duration of intonational phrases (Asu et al., 2016) .

Phrase-initial F0 and sentence planning

- How speakers are able to anticipate the length of their utterances?
 - Longer utterance means that a speaker has more information to plan at the conceptual and linguistic level.
 - So, the speaker knows this is a complex message (and potentially a complex utterance) and start off at a higher F0.
 - Broad message planning means that more conceptual information is activated.
 - Thus we propose that planning a larger message causes phrase-initial F0 to be high.

Methods:

- We are going to investigate the influence of the breadth of message planning on phrase-initial F0 by exploring
- ...varying degree of conceptual complexity
- ...case morphology

Varying conceptual complexity:

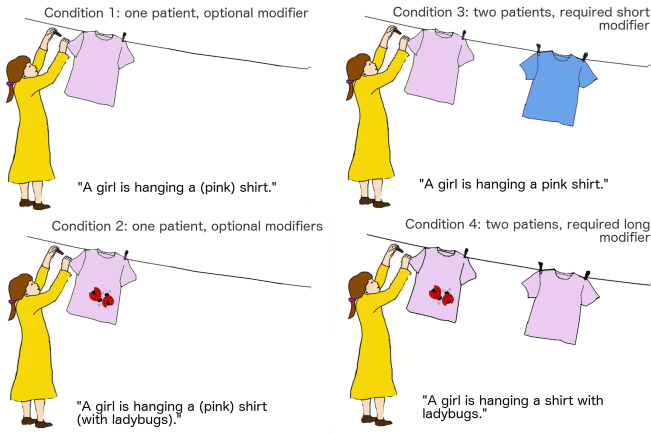


Figure: Design of the experiment. The complexity of patient increases from condition to condition.

Case-marking:

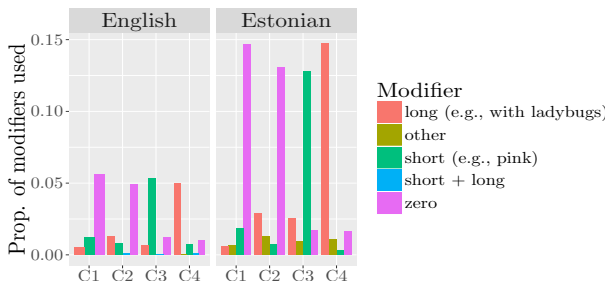
- We will compare message planning in Estonian and English.
 - English is non-case-morphological language.
 - Estonian has 14 cases, marked with the suffixes at the noun stem.

Predictions:

- 1 The breadth of message planning varies together with varying degree of conceptual complexity.
- 2 Phrase-initial F0 is high in the conditions of greater complexity (larger messages).
- 3 The breadth of message planning is greater in case-morphological languages than in non-case-morphological languages.
- 4 Phrase-initial F0 is higher in Estonian (case-morphological language) than in English (non-case-morphological language).

Data

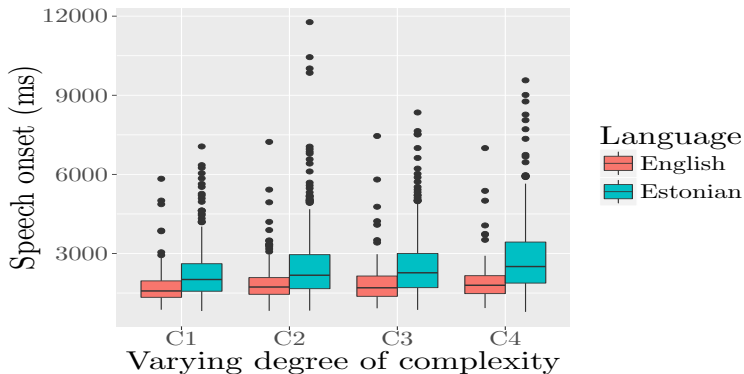
- We recorded eye-movements and speech from 30 native speakers of English and 53 native speakers of Estonian.
- 24 English speakers and 45 Estonian speakers were included in the analysis.
- 4354 utterances in total (1488 for English, 2866 for Estonian); 67% of English active sentences (1003) and 87% Estonian active sentences (2506) were included in the analysis.



Analysis:

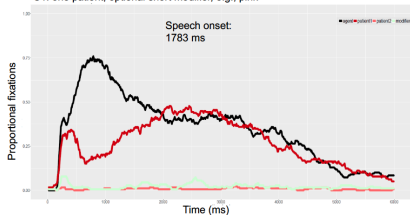
- Dependent variables:
 - ① The proportion of the fixations directed to the patient character in the early time window – 0-400 ms of picture presentation – *early patient fixations*: the greater the proportion of early patient fixations, the wider the breadth of message planning.
 - ② Phrase-initial F0: the 95th percentile of all the F0 samples from the initial 25% of the utterance.

Results: speech onsets:

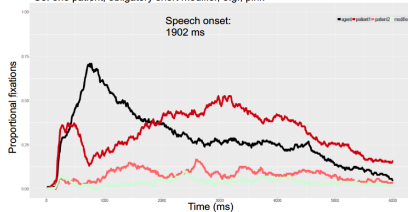


Results: time-course of sentence planning in English

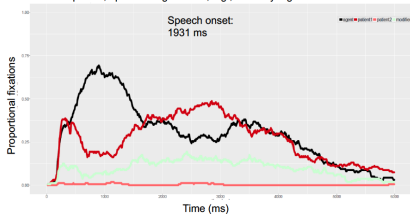
C1: one patient, optional short modifier, e.g., pink



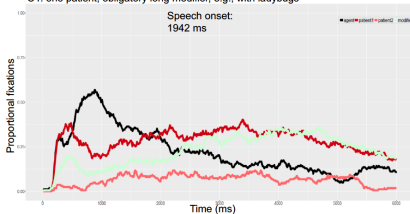
C3: one patient, obligatory short modifier, e.g., pink



C2: one patient, optional long modifier, e.g., with ladybugs

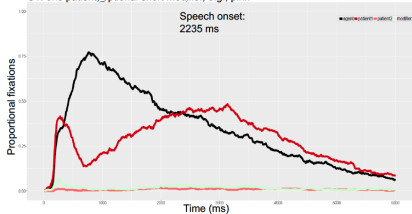


C4: one patient, obligatory long modifier, e.g., with ladybugs

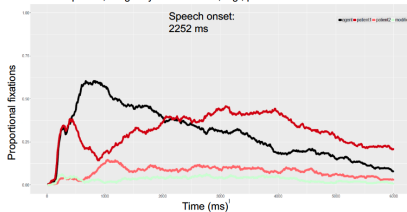


Results: time-course of sentence planning in Estonian

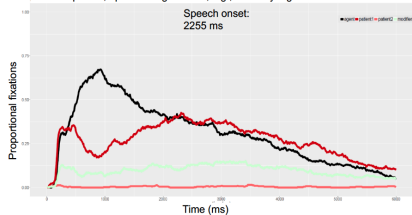
C1: one patient, optional short modifier, e.g., pink



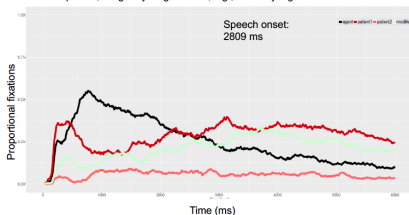
C3: one patient, obligatory short modifier, e.g., pink



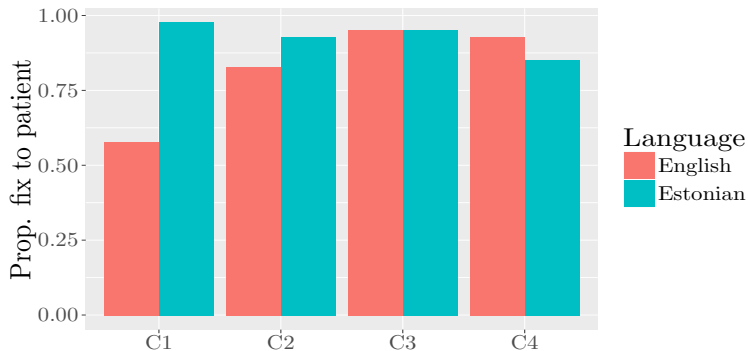
C2: one patient, optional long modifier, e.g., with ladybugs



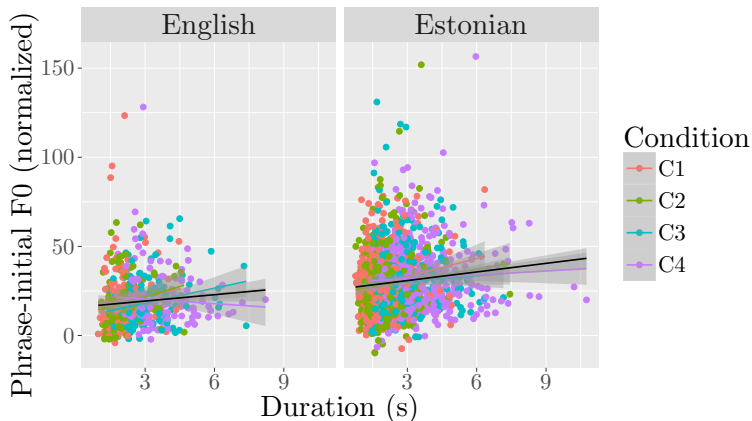
C4: one patient, obligatory long modifier, e.g., with ladybugs



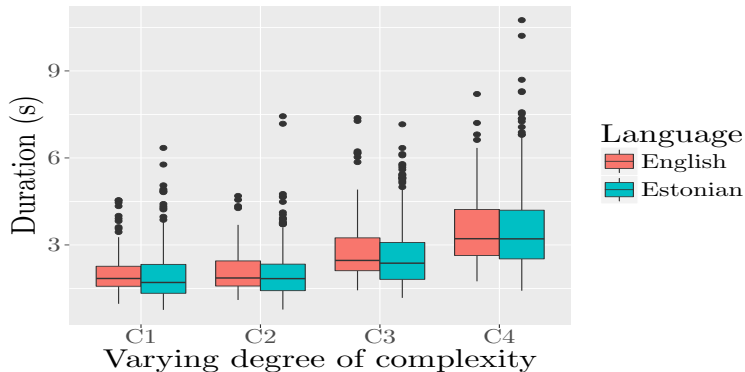
Results: proportions of early patient fixations as a function of varying degree of complexity



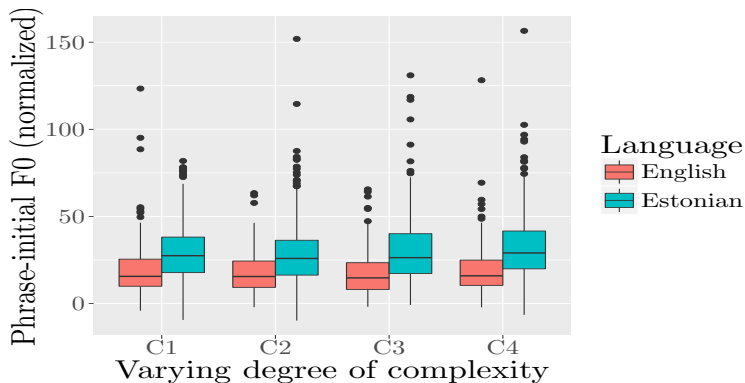
Results: phrase-initial F0 as a function of sentence length



Results: duration of utterances:



Results: phrase-initial F0 as a function of varying degree of complexity



Conclusions:

- Breadth of message planning varied together with the conceptual complexity in English: speakers of English used different message planning strategies.
- Breadth of message planning was wider in Estonian than in English: speakers of Estonian did not seem to use different message planning strategies.
- The phrase-initial F0 depended on the breadth of message planning: in Estonian (case-morphological language) where breadth of message planning was wider, the phrase-initial F0 was higher than in English (non-case-morphological language) where breadth of message planning was narrower.
- The phrase-initial F0 did not vary together with the conceptual complexity.

Thank you!
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