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Have a break: Aging effects on sentence production and structuring in French

BACKGROUND

- Physiological changes due to aging
- With increasing age :
 - Ribcage cannot expand and contract as well and diaphragm becomes weakened [1] ;
 - Larger lung volume to initiate speech, longer sentences split into smaller units [2, 3]

MOTIVATION

- Effects of aging on prosodic structuring are relatively sparse and limited to English ;
- Cover repair mechanisms and adaptations to the speech system

How does aging affect prosodic structuring in French?

METHOD

- Subjects :** 27 native French speakers (18 women/9 men)
- 14 'Younger' speakers (23-44y) and 13 'Older' speakers (68-88y)
- Material :** Read speech of 12 different French sentences (designed on the basis of [4]), differing in length (short vs long) and syntactic complexity (simple vs complex)
- 12 sentences x 3 repetitions x 27 speakers = 972 tokens
- Measurements :**
- (A) Pause duration in seconds
 - (B) Articulation rate (syllables/second)
 - (C) Sentence duration (total utterance time including pauses)
- Annotation :**
- Manually segmented as visual and audible breaks
 - Including inspiratory and physiological phenomena

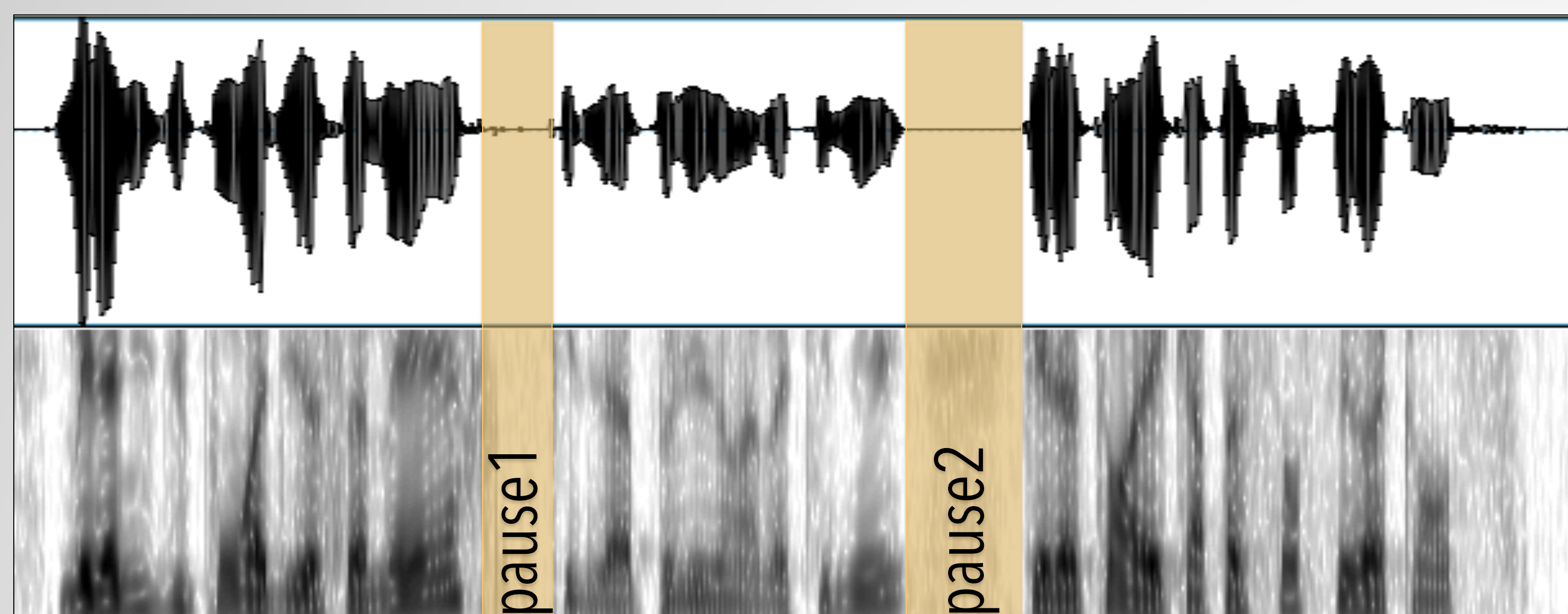
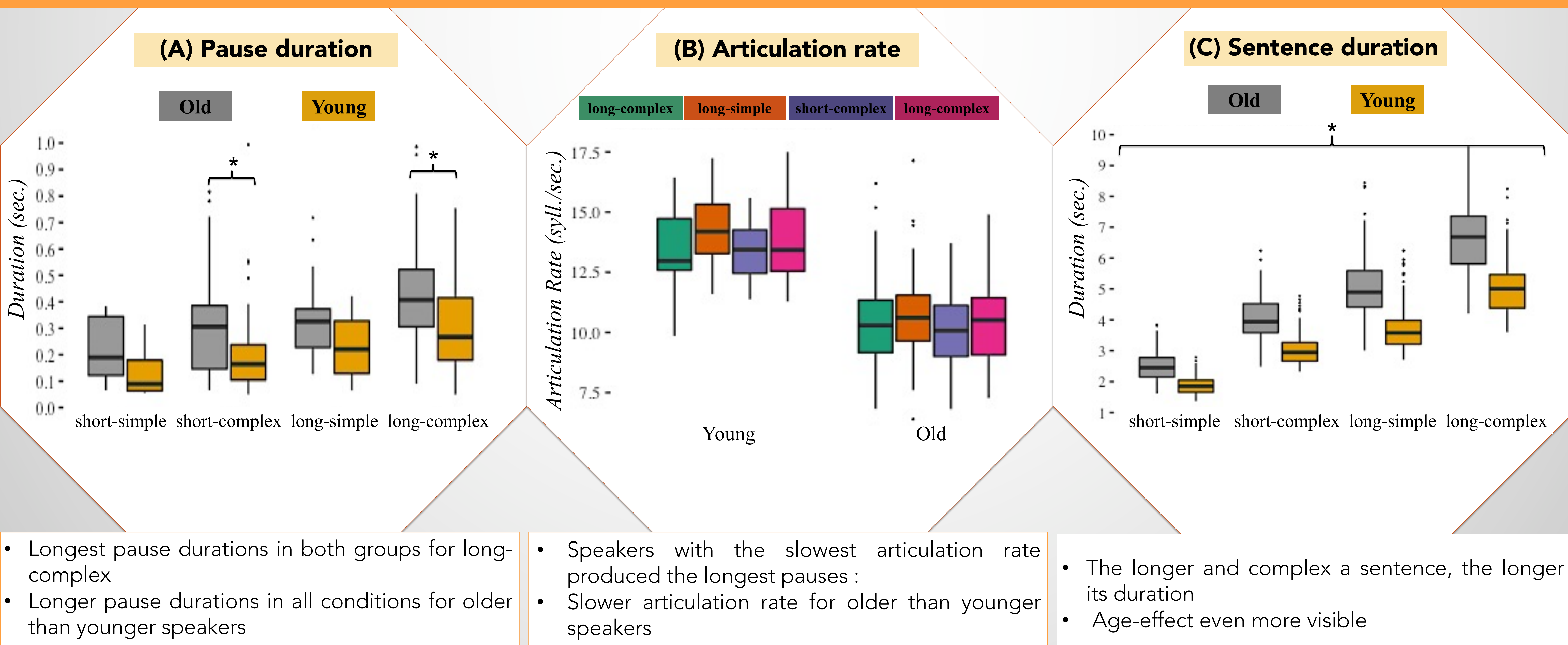


Fig.1 : Example of a 'long-complex' sentence produced by an older speaker.

Sentences	Structure
Mélanie Dupont a réservé ses vacances. (<i>Mélanie Dupont booked her holidays.</i>)	short-simple
Mélanie Dupont, qui adore le soleil, a réservé ses vacances. (<i>Mélanie Dupont, who loves the sun, booked her holidays.</i>)	short-complex
Mélanie Dupont a réservé lors d'un froid jour d'hiver ses vacances en Andalousie. (<i>Mélanie Dupont booked her holidays in Andalusia on a cold winter's day.</i>)	long-simple
Mélanie Dupont a dit à sa mère, qui l'a appelée dans la matinée, qu'elle attend avec impatience ses vacances. (<i>Mélanie Dupont told her mother, who called her in the morning, she's looking forward to her vacation.</i>)	long-complex

RESULTS



- Longest pause durations in both groups for long-complex
- Longer pause durations in all conditions for older than younger speakers

- Speakers with the slowest articulation rate produced the longest pauses :
- Slower articulation rate for older than younger speakers

- The longer and complex a sentence, the longer its duration
- Age-effect even more visible

DISCUSSION AND CONCLUSION

- ✧ Both length and complexity affect durational patterns in younger and older speakers
- ✧ Age entailed an additional increase in duration (of e.g. whole sentences, and even pauses)
 - Possible explanations:
 - (1) a mechanism to make sure to reach the targets properly [5]
 - (2) a slower speech rate for e.g. long-complex sentences can be explained by increased cognitive demands [6]
 - Link to breathing will be of main interest in future studies

This study shows that :

- ① All age groups produce phrasal breaks at expected syntactic boundaries
- ② Older speakers produced much longer pausal breaks, slower articulation rates and longer sentence durations than the younger ones

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