The influence of conceptual and visual factors on sentence production in younger and older adults

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Background

General background: Previous research has shown that extralinguistic factors such as time pressure, patient animacy and patient position can have an impact on sentence production. 

Time pressure: Under time pressure, the extent to which people speak incrementally increases (Ferreira & Swets, 2002).

Animacy: Animé nouns tend to be mentioned first in a sentence (Esaulova et al., 2019).

Position: Left-positioned agents lead to faster speech onset times than right-positioned agents (Esaulova et al., 2019).

Research gap: Most studies have been conducted with younger adults whereas literature on studies which have been conducted with older adults is sparse.

First evidence: There is first evidence showing that younger adults rather rely on patient animacy whereas older adults rather orient to patient position in making their syntactic choices (Altmann & Kemper, 2006).

Method

Participants: 60 German-speaking participants in two age groups:
- 30 young adults age range: 18-27 M = 22.5 SD = 2.33
- 30 older adults age range: 63-80 M = 72.37 SD = 5.28

- Matched for gender, handedness and educational level
- Normal or corrected vision and hearing
- No disorders of attention, language or speech

Procedures: 16 locative sentences

Materials:
- 32 Fillers
- 8 stimuli per condition
- 16 intransitive sentences
- patient left
- patient right

Design

Independent variables
- Patient animacy (animate/inanimate)
- Patient position (left/right)

Dependent variables
- Frequency of passive utterances
- Speech onset times

Design

Speech onset times

Speech onset times (ms)

Mixed three-way ANOVA:
Main effect of age group: F(1, 58) = 24.86, p < .001, f = 0.45

- Young adults: 1972
- Old adults: 2017

Significantly longer speech onset times for actives in younger adults than in older adults.

This indicates that sentence production is slowed down with aging.

Passives

Passivizations (%)

Mixed three-way ANOVA:
Main effect of age group: F(1, 58) = 9.76, p = .003, f = 0.41

- Young adults: 13.7
- Old adults: 10.2

Significantly higher number of passivizations in older adults than in younger adults.

This indicates that due to delayed sentence production older adults start speaking as soon as the first lemma is available whereas younger adults look up to the following sentence structure.

Results

Speech onset times

Speech onset times (ms)

Mixed three-way ANOVA:
Main effect of age group: F(1, 58) = 4.77, p = .033, f = 0.29

In both age groups longer speech onset times for active utterances in conditions with a left-positioned patient than in conditions with a right-positioned patient.

In conclusion, there are similarities and differences between younger and older adults’ sentence production. These new insights can serve as a tool to create age-appropriate material used in speech and language therapy and for marketing strategies.

Discussion

Time pressure

Due to delayed sentence production, older adults start speaking as soon as the first lemma is available without advanced grammatical planning (word-by-word incrementality) while in younger adults sentence planning is controlled by a larger linguistic unit, which allows them to look up to the upcoming structure (linear incrementality). This leads to a higher number of infrequent passivizations in elderly adults in comparison to younger adults.

Animacy

Contrary to previous research (Altmann & Kemper, 2006), older adults even show a higher sensitivity to animacy manipulations in making their syntactic choices than younger adults by using their knowledge that is more probable to start a sentence with an animate than with an inanimate patient.

Position

In both age groups, stimuli with left-positioned patients lead to slower speech onset times than stimuli with right-positioned patients. Thus, in the case of the elderly, the influence of reading habits apparently overrides the impact of the reduced dominance of the right hemisphere with aging.

In conclusion, there are similarities and differences between younger and older adults’ sentence production. These new insights can serve as a tool to create age-appropriate material used in speech and language therapy and for marketing strategies.

References:

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