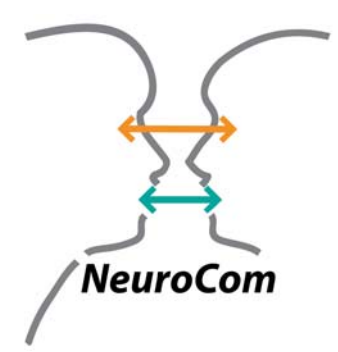


# The benefit of syntactic chunking for language comprehension in the aging brain

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## Introduction

- sentences are better remembered than word lists<sup>1</sup>
- syntactic boundaries determine chunks of words<sup>2</sup>
- **chunking** words into phrases reduces working memory load
- verbal working memory capacity **declines with age**<sup>3</sup>
- older adults have been indicated to make use of syntactic chunking to reduce memory load<sup>4</sup>
- older adults have been also indicated to compensate through enhanced semantic knowledge<sup>5</sup>

## Question

Do older adults benefit from syntactic chunking more than young adults?

## Methods

### Experiment 1

#### Participants

- 21 young adults (12 male, mean age = 26.52 years, SD age = .47 years)
- 20 older adults (10 male, mean age = 66.20 years, SD age = .59 years)
- healthy, right handed native speakers of German

#### Experimental Task

- 2 x 2 design crossing sentence structure x meaning
- **8 word sentences**
- serial recognition task: *grandad* before *with*? Yes - No

#### Memory Tasks

- digit span forward + digit span backward
- non-word repetition task

#### Analysis

- repANOVA: structure x meaning with group as between-variable (+ memory covariates)

	Structure +	Structure -
Meaning +	der Opa verdarb die Suppe mit dem Salz <i>the grandad ruined the soup with the salt</i>	der dem Suppe mit Opa Salz die verdarb <i>the the soup with grandad salt the ruined</i>
Meaning -	der Apo verwarf die Junne mit dem Sohr <i>the Apo ruined the Junne with the Sohr</i>	der dem Junne mit Apo Sohr die verwarf <i>the the Junne with Apo Sohr the ruined</i>

### Experiment 2

#### Participants

- 17 young adults (10 male, mean age = 25.06 years, SD age = .81 years)
- 19 older adults (10 male, mean age = 63.53 years, SD age = .56 years)
- healthy, right handed native speakers of German

#### Experimental Task + Memory Tasks + Analysis

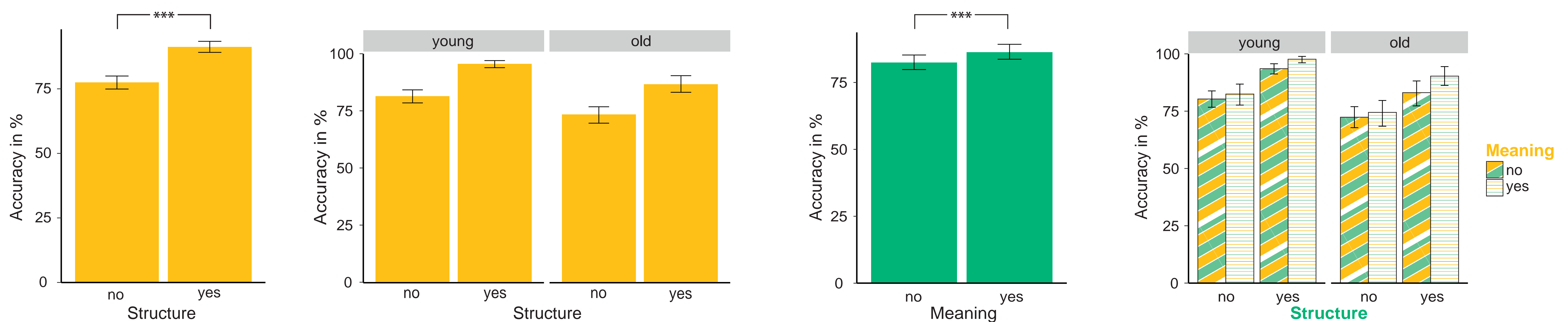
- same as in Experiment 1
- only difference = **11 word sentences**

*the grandad ruined the soup with the salt despite the recipe*

## Results

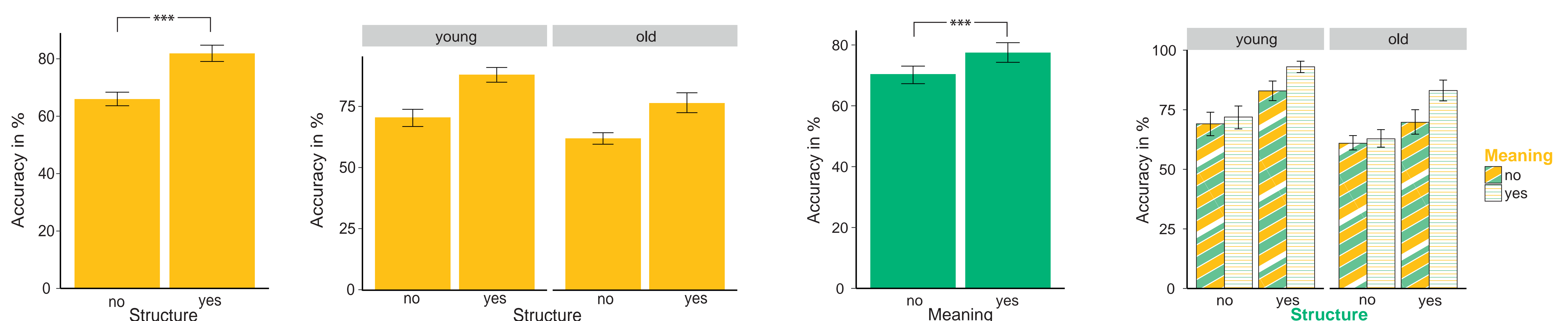
### Experiment 1

#### 8 word sentences



### Experiment 2

#### 11 word sentences



## Discussion

- sentence structure plays a great role in remembering multiple words → **sentence superiority effect**
- as chunking reduces the memory load, mnemonic strategies implemented by the syntax of the sentence plays a great role
- **contrary to our hypothesis**, syntactic chunking is as important for young adults as it is for older adults
- extending previous findings, this study shows that, across the lifespan, syntactic boundaries constitute a unique built-in basis for a mechanism reducing the memory costs during language comprehension

## Conclusion

all age groups benefit from syntactic chunking similarly

#### References

1. Bonhage et al. 2014 *NeuroImage*
2. Wingfield et al. 1985 *J Geront*
3. Dobbs and Rules 1989 *Psychol Aging*
4. Wingfield et al. 1995 *J Geront*
5. Antonenko et al. 2014 *NeuroImage*