

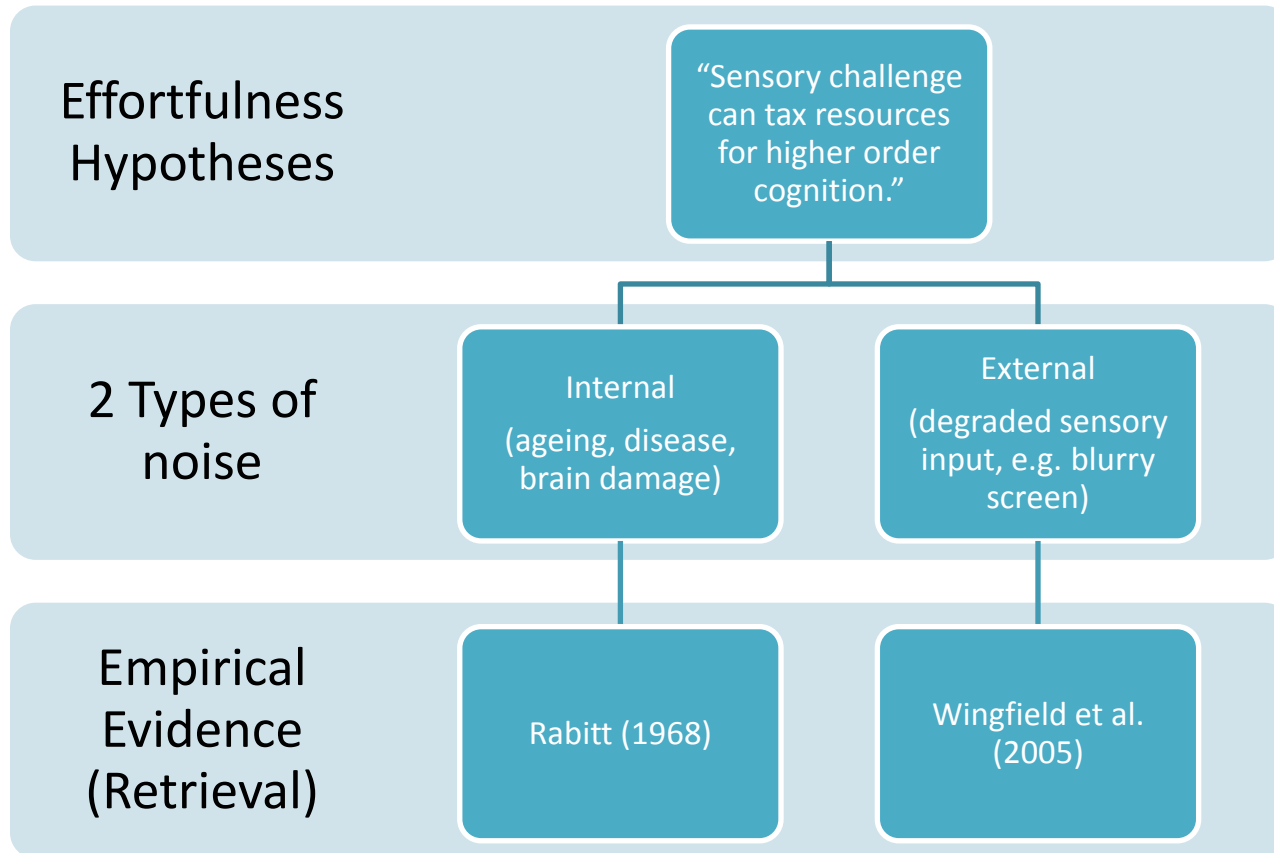
The Effects of Ageing and Visual Noise on Conceptual Integration during Sentence Reading

Aline Becker

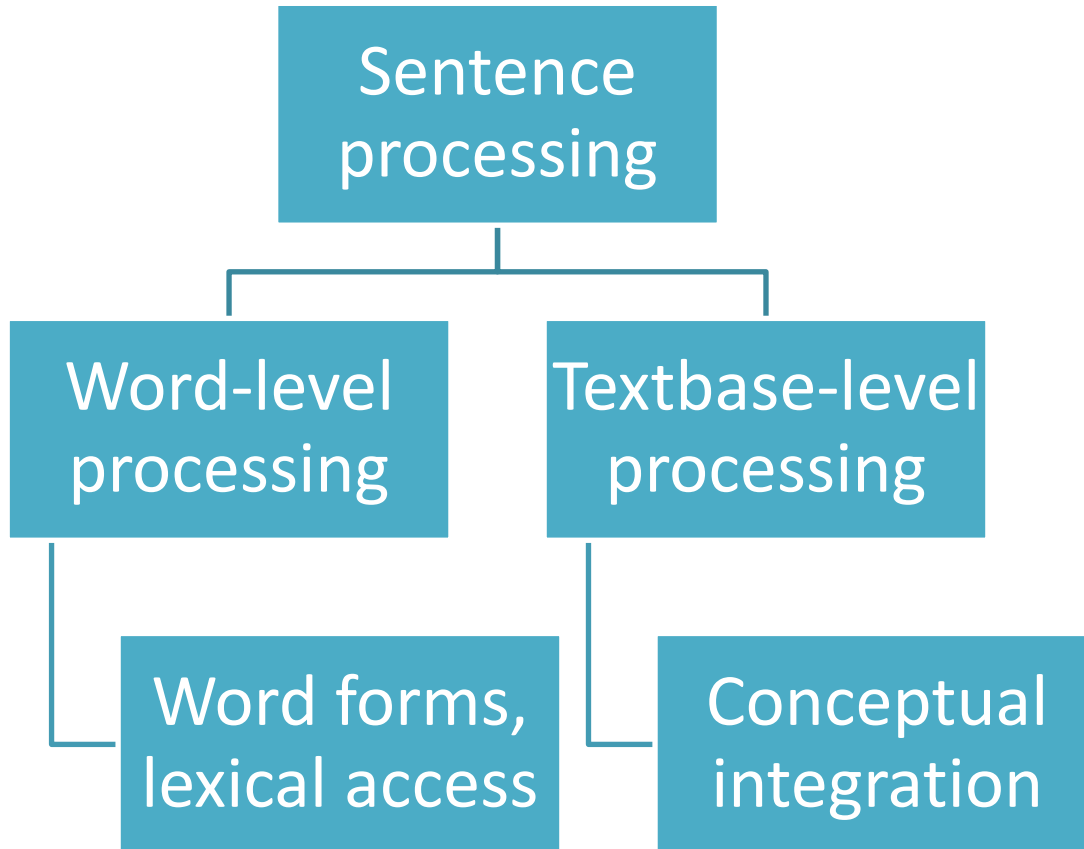
**Seminar: “Language Comprehension and
Aging“**

11.12.2014

The Effortfulness hypothesis



The Effortfulness hypothesis in sentence processing



The Effortfulness hypothesis in sentence processing



Word-level
processing

- Noise: Increase
Sensory
Challenge

Textbase-level
processing

- Conceptual
integration

Today's issue

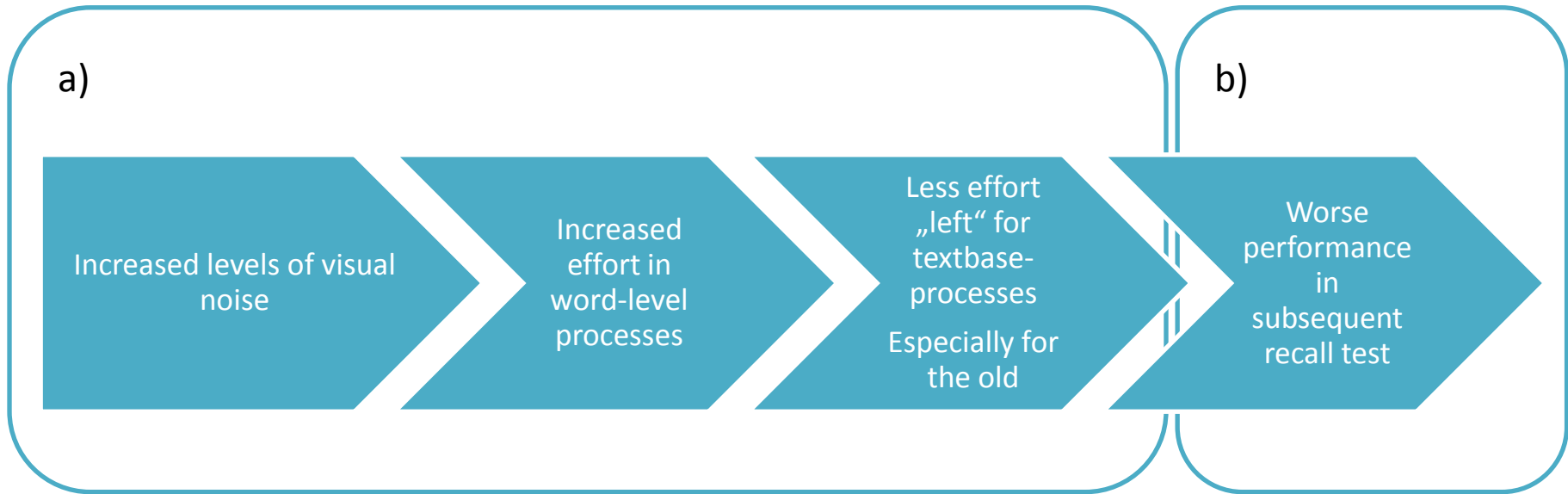
The effects of ageing and visual noise on conceptual integration during sentence reading

Xuefei Gao¹, Brian R. Levinthal², and Elizabeth A. L. Stine-Morrow¹

¹Beckman Institute & Department of Educational Psychology, University of Illinois at Urbana-Champaign, Urbana, IL, USA

²Department of Psychology, Northwestern University, Evanston, IL, USA

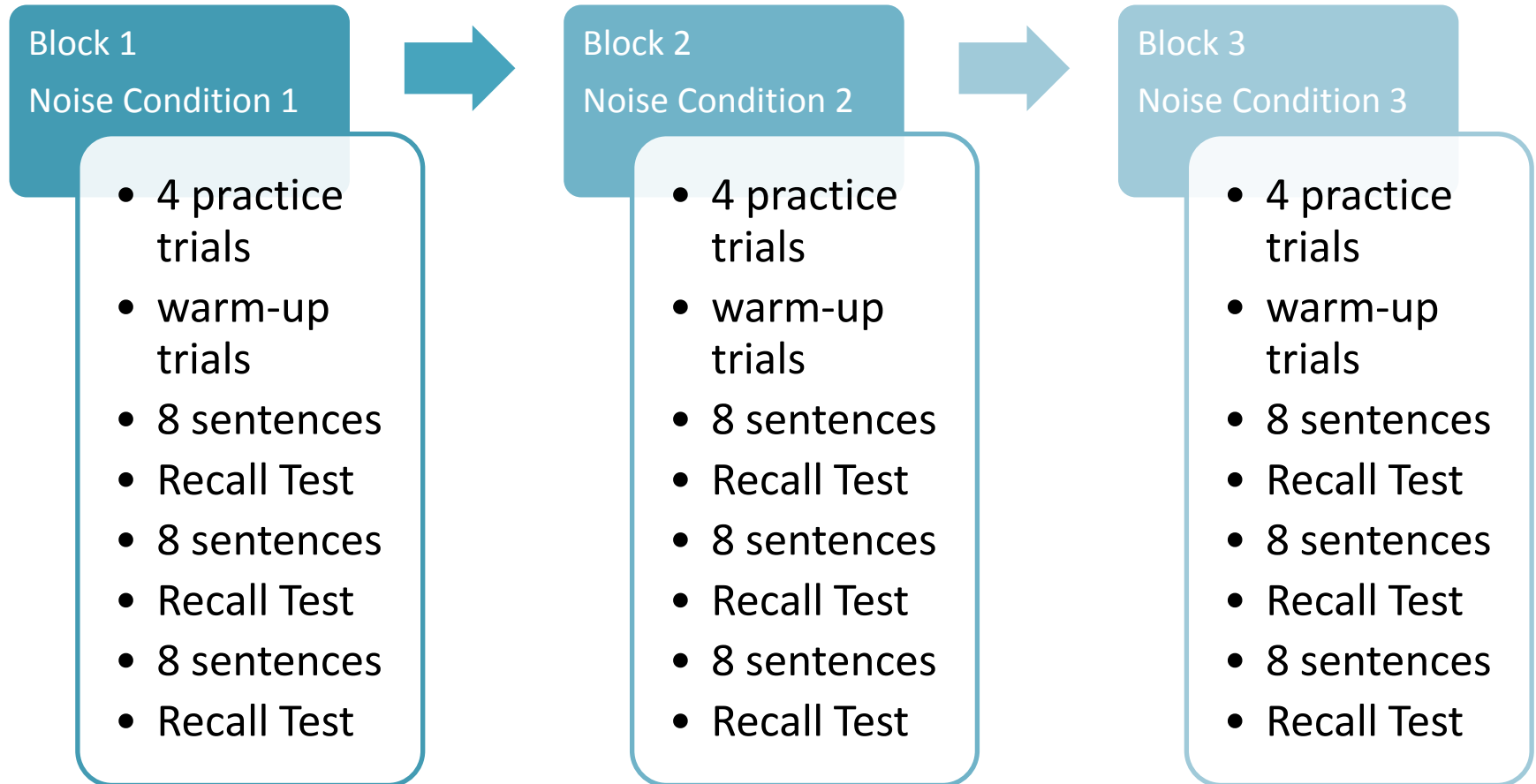
Hypotheses



Experiment 1: Participants

	Young		Older
n	32	↔	31
Mean age in yrs (SD)	23.8 (4.0)	←	69.5 (7.2)
Mean education in yrs (SD)	16.2 (1.9)	↔	16.0 (2.6)
Vocabulary knowledge WAIS-R (SD)	53.1 (8.1)	↔	51.3 (8.5)
Working memory span (SD)	5.7 (1.2)	→	4.3 (1.0)
Vision	Normal or corrected to normal	↔	Normal or corrected to normal
Visual Acuity		→	

Experiment 1: Methods



Experiment 1: Methods

Ready?

Experiment 1: Methods

+

Experiment 1: Methods

In

Experiment 1: Methods

many

Experiment 1: Methods

species

Experiment 1: Methods

In many species it is the females who shape evolution through their subtle exercise of choice in mating.

They often choose mates who are bolder bolder or brightly colored.

Word-level features:

- numbers of syllables
- word frequency

Text-level features:

- word as a newly introduced concept in the sentence
- cumulative conceptual load at sentence boundaries

Experiment 1: Results

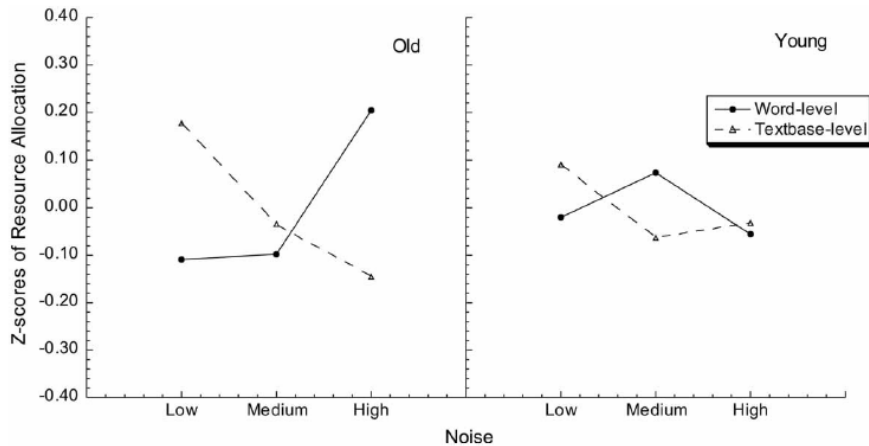


Figure 1. Resource allocated to word-level and textbase-level processing as a function of visual noise for older and younger adults in Experiment 1.

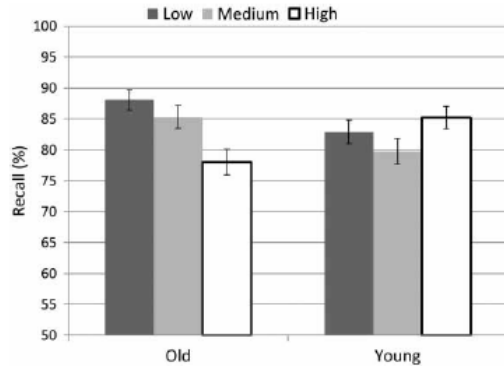


Figure 2. Mean recall (% and standard errors) of core ideas as a function of age and visual noise in Experiment 1.

Patterns of Resource Allocation

Three-way interaction of age, noise and level of sentence processing:
Noise produced dissociation of word and text based processing only in older adults

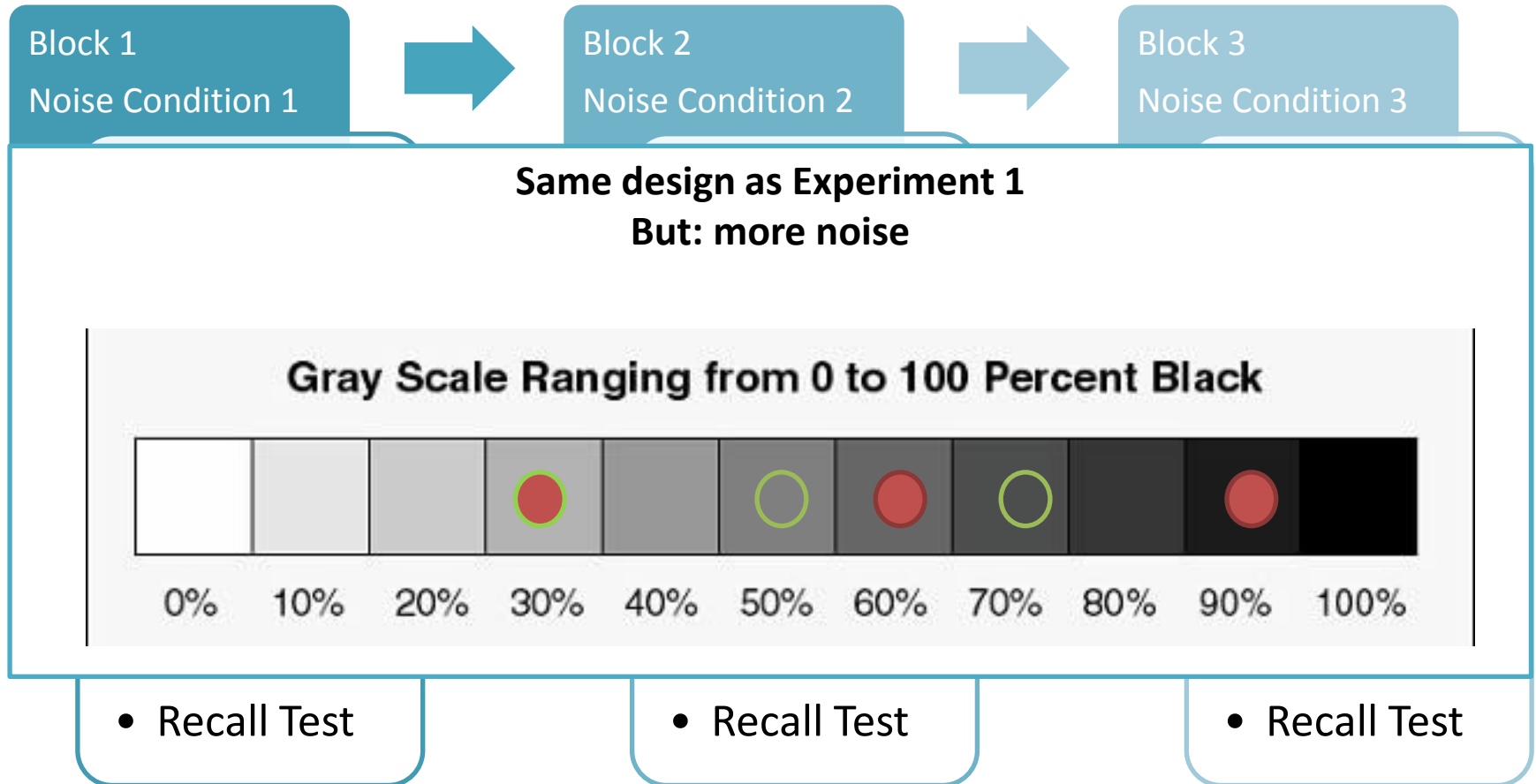
Recall Performance

Only post-Hoc analyses revealed
Age*Noise interaction:
Decrease in Recall performance for old adults

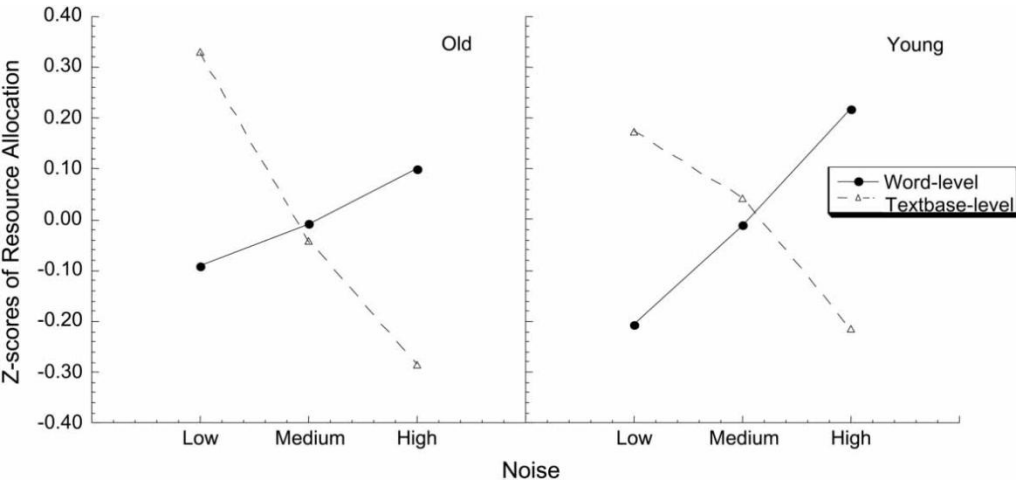
Experiment 2: Participants

	Young		Older
n	18	↔	18
Mean age in yrs (SD)	21.5 (4.4)	←	67.9 (4.9)
Mean education in yrs (SD)	14.7 (1.7)	↔	15.2 (2.7)
Vocabulary knowledge WAIS-R (SD)	45.3 (5.3)	↔	46.6 (6.9)
Working memory span (SD)	5.5 (1.2)	→	4.3 (0.9)
Vision	Normal or corrected to normal	↔	Normal or corrected to normal
Visual Acuity		→	

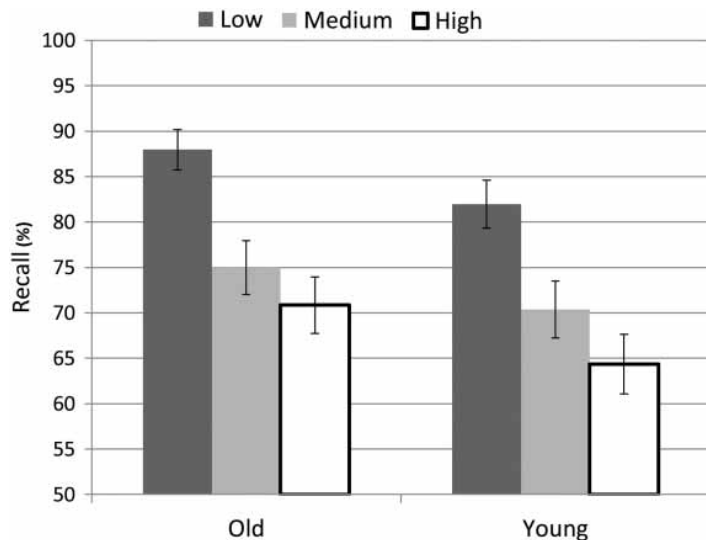
Experiment 2: Methods



Experiment 2: Results

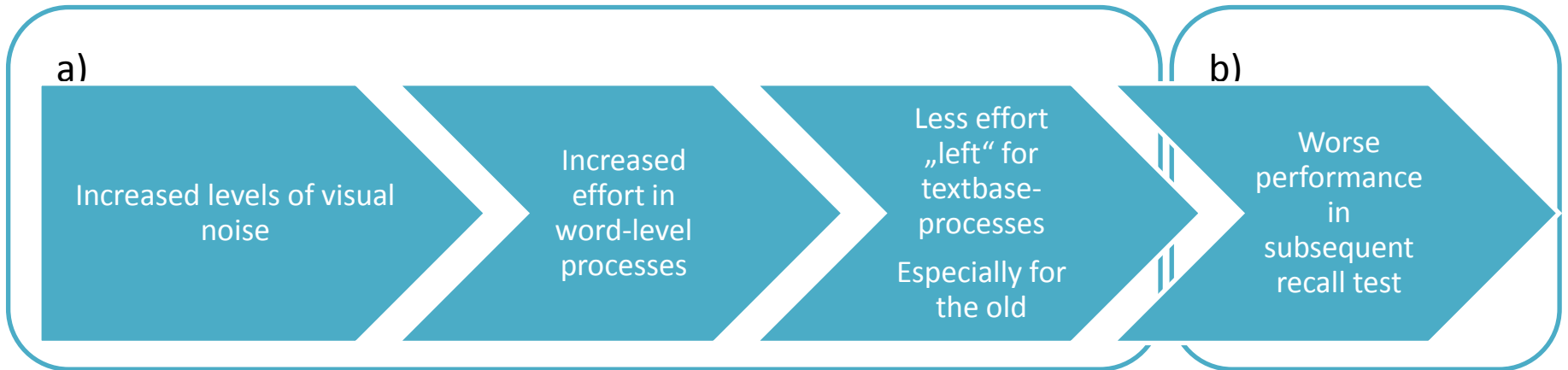


Patterns of Resource Allocation
Strong interaction of noise and level of sentence processing,
But did not vary with age



Recall Performance
No Age*Noise Interaction
Decreasing Recall with increasing
noise in both age groups

Summary



Effortfulness-Hypotheses

- External noise (Age)
- Internal noise (conditions)
- Cumulation (Interaction in Experiment 1)
- Impact on both textbase processes and Recall

But...

- What is the reason for this ageing effect?

	Young		Older
Vision	Normal or corrected to normal	↔	Normal or corrected to normal
Visual Acuity		→	

Thank you

References

- Gao, X., Levinthal, B.R., Stine-Morrow, E.A.L. (2012). The effects of ageing and visual noise on conceptual integration during sentence reading, *The Quarterly Journal of Experimental Psychology*, 65(9), 1833-1847.
- Rabbitt, P.M.A. (1968). Channel capacity, intelligibility and immediate memory. *Quarterly Journal of Experimental Psychology*, 20, 241-248.
- Wingfield, A., Tun, P.A., McCoy, S.L. (2005). Hearing loss in older adults: What it is and how it interacts with cognitive performance. *Current Directions in Psychological Science*, 14, 144-148.