



Metamemory and short-term memory across the lifespan

Bertrand J., Cerf C., León de la Rosa A., Guyenot M., Moulin C., Souchay C.
LEAD CNRS UMR 5022 – Université de Bourgogne, France

Background and Aims

- The metamemory literature so far tends to focus on long-term memory.
- Here we consider metamemory in a short term memory task.
- Working memory and short-term memory show a clear developmental trajectory (Gathercole and al., 2004) and deficits in older adults (Salthouse and al., 1988).
- When older children were asked to predict their span, their predictions were closer to their actual ability compared to younger children (Flavell et al., 1970)
- No age differences in span prediction accuracy between young and old adults (Murphy et al., 1982)

Our aim here was to measure metamemory on a short-term memory task across the lifespan

The novelty is to compare two types of predictions: those made **before** the span task and those made **after** the span task.

Prediction: the judgment following the task, should be more accurate, as a result of feedback from the span task itself.

EXPERIMENT 1 - Children

The paradigm was divided into three tasks:

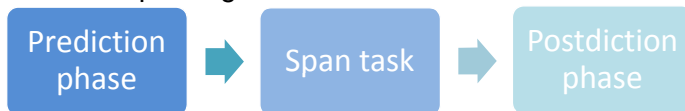


Figure 1 : Experimental design.

Example :

1) We asked if **s/he thought he could succeed** the task.
The child's answer : yes or no.

2) The child **carried out the task**.
The child's answer : He recalled the images he had seen.

3) We asked **again if he thought he could succeed** the task.
The child's answer : yes or no.

Participants : 19 children of 4 to 6 years old (M=5.6, SD=8 months) 20 children aged 7 to 9 years (M=8.3, SD=10 months), 22 children of 10 to 13years old (M=11.8, SD=11.8 months)

EXPERIMENT 2 – Older adults

Experiment 2 was the same as the first experiment, except for the participants.

Participants : 18 young adults (M=23.22, SD=3.39) and 18 older adults (M=77.11, SD=8.70).

Results

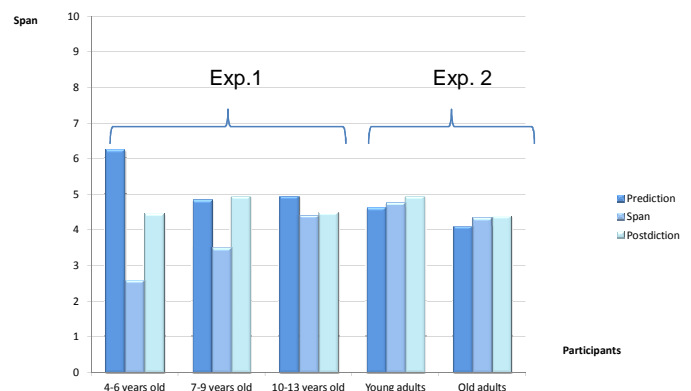


Figure 2 : Predictions, spans and postdictions according to groups of ages.

➤ **Span.** Increase with age across childhood, $F(2,58) = 39.75, p = 0$ (Exp. 1). A significant age effect when we comparing young and older adults, $t(34) = -2.00, p = 0.27$ (Exp. 2).

➤ **Predictions.** No age effect on pre-and postdiction in childhood nor any interaction between prediction phase and age (Exp. 1). An age effect, $F(1,34) = 4.32, p < .05$ and a prediction phase effect, $F(1,34) = 5.83, p < .05$ (and no interaction) were found when comparing young and old adults (Exp. 2)

➤ **Accuracy.** Accuracy was measured with non-directional discrepancies. In children, an age effect was found across childhood with clear improvement with age, $F(2,58) = 5.67, p = 0.02$ (Exp. 1). There was no difference between younger and older adults (Exp. 2).

Discussion

✓ From 4 years old, children have the capacity to monitor their short-term memory performance
✓ Are able to adjust their postdiction after being confronted with the span task.

• Older adults show a deficit in STM but can accurately estimate their performance.

• Accuracy still improves until adolescence.

• The pattern of predictions for the predictions made before completing the task suggests that *metacognitive knowledge* (Flavell, 1979) is acquired later in childhood. Moreover, such knowledge is updated into old age.

Reference

- ✓Flavell J.H., Friedrichs, A.G., Hoyt, J.D. (1970). Developmental changes in memorization processes, *Cognitive Psychology*, 1, 324-340.
- ✓Gathercole, S., E., Pickering, S., J., Ambridge, B., Wearing, H. (2004). The structure of working memory from 4 to 15 years of Age, *Developmental Psychology*, 40(2), 177-190.
- ✓Salthouse, T. A., Kausler, D. H., & Saults, J. S. (1988b). Utilization of path analytic procedures to investigate the role of processing resources in cognitive aging, *Psychology and Aging*, 158-166.
- ✓Murphy, D., Sanders, R.E., Gabrieski, A. S., Schmitt, F. A., (1981). Metamemory in the aged, *Journal of gerontology*, 36 (2), 185-193.
- ✓Flavell, J. H. (1979). Metacognition and cognitive monitoring : A new area of cognitive-developmental inquiry. *American Psychologist*, 34, 906-911.