

Do Preschool Children No

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ot Forget Over Time?

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# Introduction

## General View on Forgetting

- **Forgetting** is considered to entail the largest loss of items in the early period of the retention interval. This is because before consolidation of the memory trace, the trace is especially sensitive to interference of mental activity.
- **Forgetting curves** have traditionally been seen to have the same characteristics regardless of age of the participants. Younger subjects simply start out with a lower amount of recalled material than older ones with a more mature memory system.
- **Recall** is achieved through a synergistic effort of several neurological structures and cognitive mechanisms developed during life such as knowledge base, memory strategies and meta-memory. Level of development will therefore have an impact on the whole of the memory function by virtue of biological maturation and acquired resources.

## But Does It Hold for the Youngest?

- **Mental processing** is related to level of development. One developmental process that has been proposed is, for example, the change from similarity-based to category-based induction (Sloutsky and Fisher, 2004). If the shape of the forgetting curve is determined by interference of mental processing at the early staged of memory formation....
- .... **should not forgetting gradients be different between age-groups that process information differently?**
- Research in different kinds of memory studies seems to indicate the age of 4 as an important point in development. Autobiographical memory is considered to emerge around the age of 4. Also, from a neurological viewpoint, the prefrontal cortex and dentate gyrus, structures involved in the consolidation of experience into enduring memory traces and for retrieval of these, show a growth in synapses and then pruning to adult levels continuing until 4-5 years of age.

# Methods of 3 Recognition Experiments

## Common for all:

- $n = 20$  children aged 4 and  $n = 20$  aged 6, balanced for gender
- Presentation of animal pictures
- 2 recognition tests at short vs. longer time after presentation

## Experiments differed:

### ▪ Complexity

- **Exp. 1 tested for matching of animal & background:** “Was this animal here before, or was it in some other place before?”

Presented



Test item:  
Hit



Test item:  
False alarm



- Exp. 2 + 3 tested just recognition of animals

Presented



Test item:  
Hit



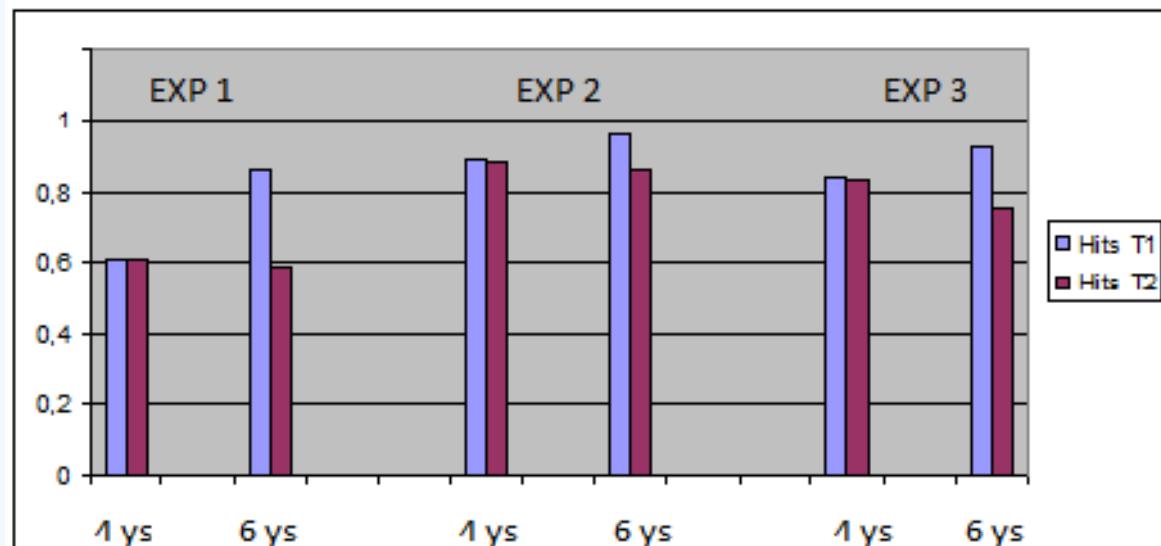
Test item:  
False alarm



- **Number of stimuli:** Presented items: 24 in Exp. 1, 30 in Exp. 2 + 3. Test items at each time: 12 in Exp. 1, 30 in Exp. 2 + 3 (50% old, 50% new in each experiment)
- **Retention intervals:** Time 1: immediate in Exp. 1 + 2, after 15 minutes in Exp. 3. Time 2: After 24 hours in Exp. 1 + 2, after 48 hours in Exp. 3.
- **Variation aimed at testing robustness of findings under various conditions**

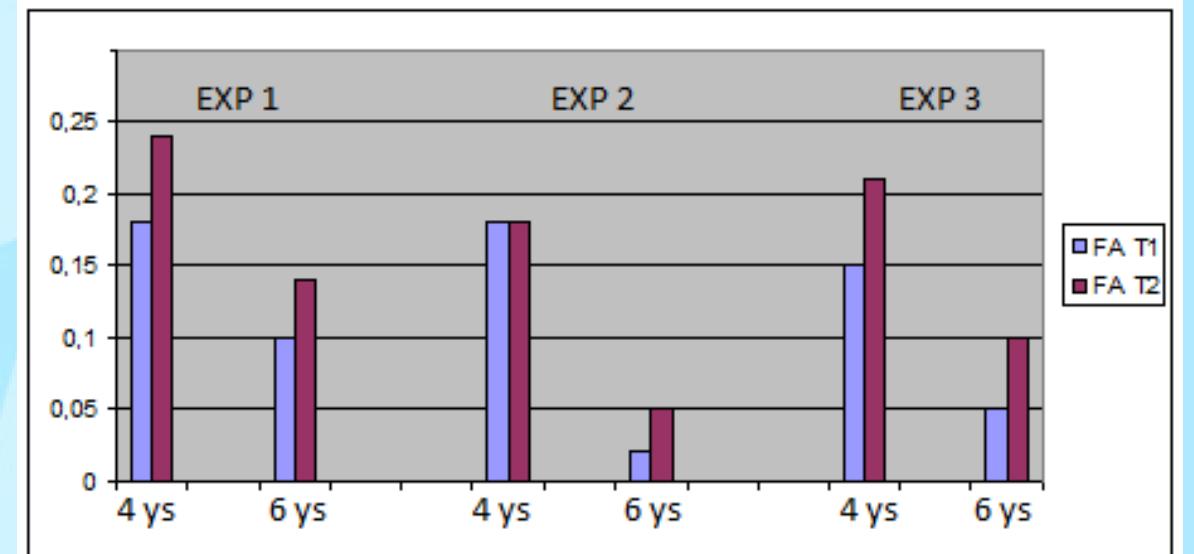
# Results

## Hits



For all three experiments, 6-year-olds outperformed the 4-year-olds at all short retention intervals. However, 4-year-olds performed at the same level *regardless* of retention interval

## False Alarms



Four-year-olds produced more False Alarms (FA) than 6-year-olds. However, older children doubled their amount of FA from the first to the second test in Exp 2 and 3, whereas the FA rates of the younger ones were more stable between Tests 1 and 2.

# Discussion

Several theorists (e.g. Estes, 1997; Brainerd and Reina, 1990) have proposed formation of different memory traces from the same event. In recognition, matching of a *perceptual representation* of previously presented material determines if the participant recognize the item or not. The second type of event representation may be called “*gist*” or “*reaction trace*”, and entails more cognitive processing. As the cognitive system matures with development, capacity increases. More cognitive processing, regardless of its specific nature, may result in more interference in the gist trace.

It may be that similarity-based induction is a characteristic of young children’s conceptions and category-based induction of more mature systems. If so, the younger children of this study may retain individual characteristics of the stimuli (animal) without much further processing, resulting in their stable performance over time. The older children, however, may process the material to a much greater degree in categorizing the animals. Thereby, the 6-year-olds may lose some of the specificity of the perceptual traces over time, making presented and distraction animals less distinct from one another.

Any type of processes, not only categorization, that is more active in 6-year-olds than in 4-year-olds may of course account for the effect of greater disruption of recognition in the older group. The main idea is that a greater processing activity causes more interference over time for the older children than for the younger ones.

# Conclusions

- A likely cause for the absence of the expected decline in recognition performance for 4-year-olds between two tests at 24 or 48 hours interval is that they do not process the material much, thus avoiding interference in the memory traces.
- 6-year olds show the expected decline between Test 1 and Test 2. This likely indicates processing of memory traces in a more adult-like manner.
- It is important to take both age and retention interval into consideration when researching young children's memory. Only one test at a short retention interval would just have revealed a superiority of older versus younger children. Only one test after at a longer retention interval would have revealed an insignificant difference between the age-groups.
- The use of a two-phased test permits speculation about differences in the nature of the respective functional memory systems of various age-groups.