Procedural memory in the gifted child

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Procedural Memory
- Opposed to declarative memory
- Learning of rules and habits (Ullman 2004)
- Related to grammatical knowledge (Misyak et al. 2010)

Giftedness
- Potential to achieve more than their age mates
- Abstract and creative thinking, recognition of patterns & problem solving (Sternberg 1985)
- Little research in cognitive development (Hettinger-Steiner & Carr 2003)

Research Question
Do gifted children excel in their grammatical skills because of a better developed procedural memory?

Participants
25 Dutch speaking gifted children (16 females, $M = 10.6, SD = 1.2$)
25 Dutch speaking typically developing children (15 females, $M = 10.9, SD = 1.2$)

Serial Reaction Time
- 10-item sequence in block 1-4 and 6
- (6 repetitions per block)
- Random presentation in block 5

Relative Clause Comprehension
- Picture matching task
- Auditorily presented sentences (Duinmeijer 2016)

Object Relative Clause:
Dit is de piraat die de clowns slaat.
'This is the pirate who hits the clowns.'

Subject Relative Clause:
Dit is de piraat die de clowns slaat.
'This is the pirate who the clowns hit.'

Main effect of block (Est = 54.43 ms., 95% CI = 42.76-70.10 ms., $t = 8.257$)
No effect of group (Est = 10.28 ms., 95% CI = -64.15-84.70 ms., $t = 0.276$)
No interaction (Est = 2.70 ms., 95% CI = -24.64-30.04 ms., $t = 0.198$)

No differences in procedural memory

Object relative clauses
M: 6.08, SD: 4.42, Range: 0-12
Subject relative clauses
M: 11.72, SD: 0.46, Range: 11-12
Double singular relative clauses
M: 5.68, SD: 0.56, Range: 4-6
Passive relative clauses
M: 5.76, SD: 0.44, Range: 5-6

Gifted children perform better than non-gifted children ($OR = 7.12, 95% CI = 1.78-31.88, z = 2.762, p = 0.006$)
Differences in comprehension of relative clauses

No correlation between the two tasks ($r = 0.316, p = 0.084$).
Object relative clauses are used more by higher educated people (Hulstijn 2017)
Correlation between clause comprehension and socioeconomic status ($r = 0.392, p = 0.020$)

Conclusion
Gifted children do not differ from typically developing children in their procedural memory capacities. Their advantage with relative clause comprehension might be caused by socioeconomic differences

References