

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

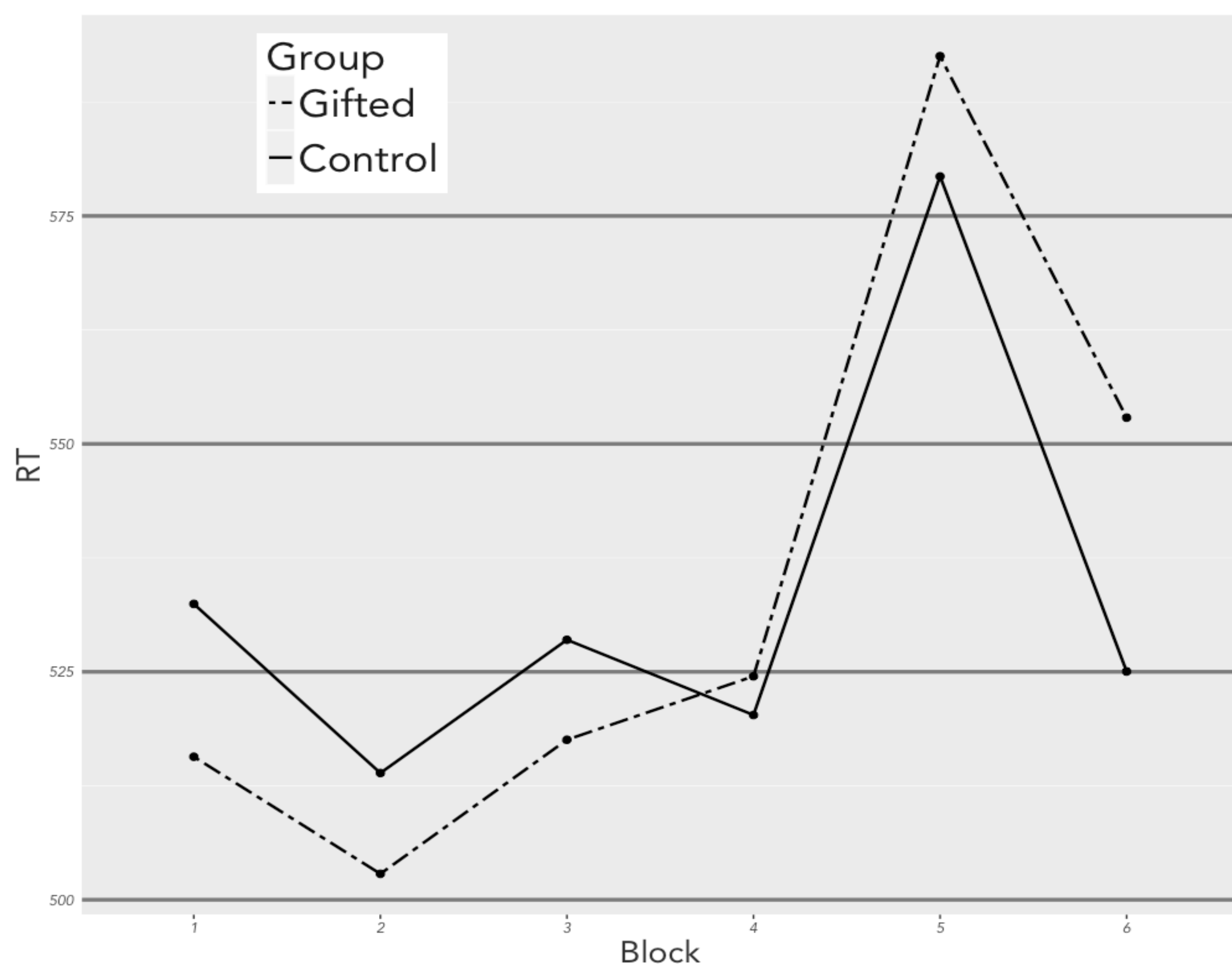
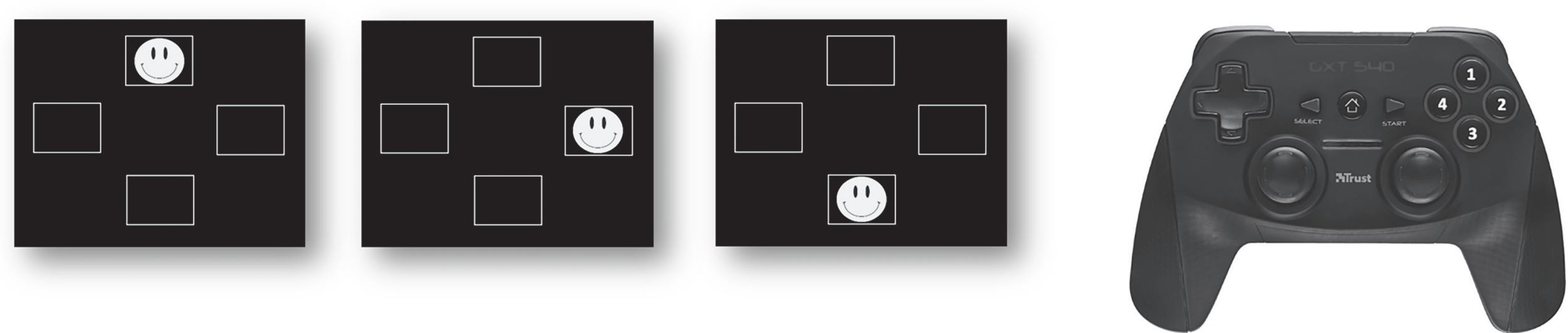
Do gifted children excel in their grammatical skills because of a better developed procedural memory?

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

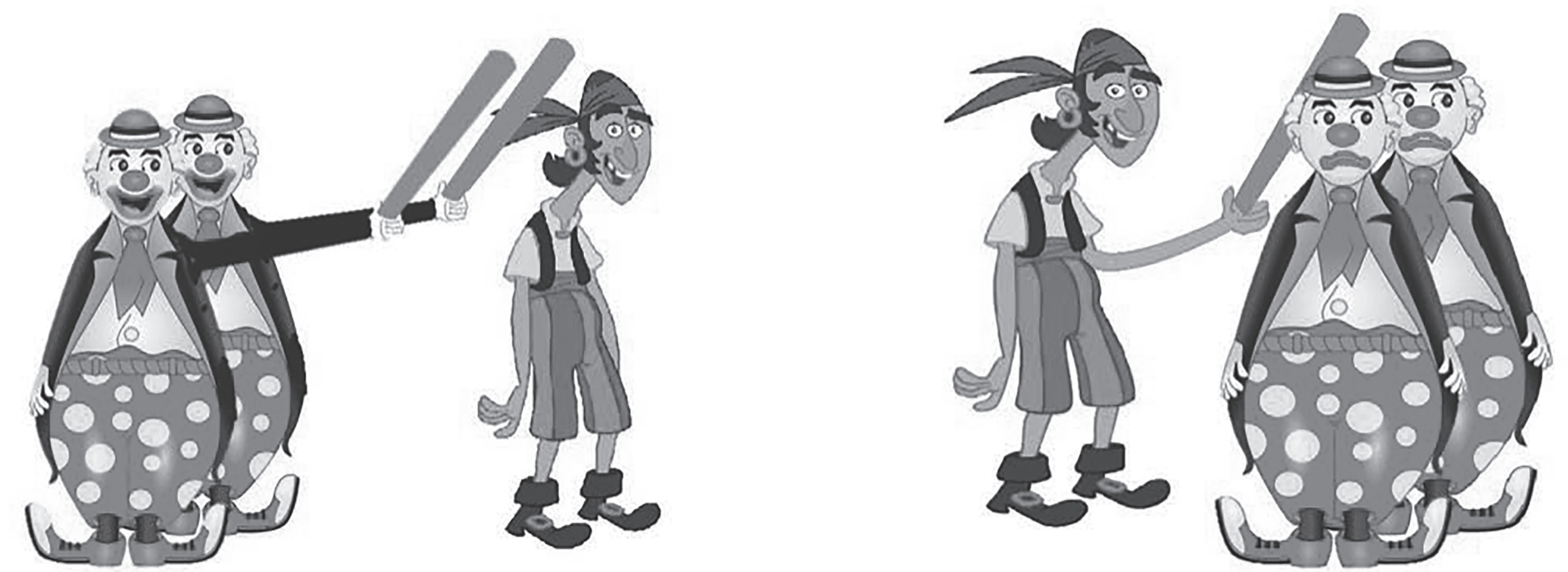


Main effect of block (Est = 56.43 ms., 95% CI = 42.76...70.10 ms., $t = 8.257$)
No effect of group (Est = 10.28 ms., 95% CI = -64.15...84.70 ms., $t = 0.276$)
No interaction (Est = 2.70 ms., 95% CI = -24.64...30.04 ms., $t = 0.198$)

No differences in procedural memory

Relative Clause Comprehension

Picture matching task
Auditorily presented sentences
(Duinmeijer 2016)



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

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

Task	Gifted			Control		
	M	SD	Range	M	SD	Range
Object relative clauses	6.08	4.42	0-12	2.92	3.01	0-10
Subject relative clauses	11.72	0.46	11-12	11.40	0.87	9-12
Double singular relative clauses	5.68	0.56	4-6	5.60	0.58	4-6
Passive relative clauses	5.76	0.44	5-6	5.44	0.47	4-6

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

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