

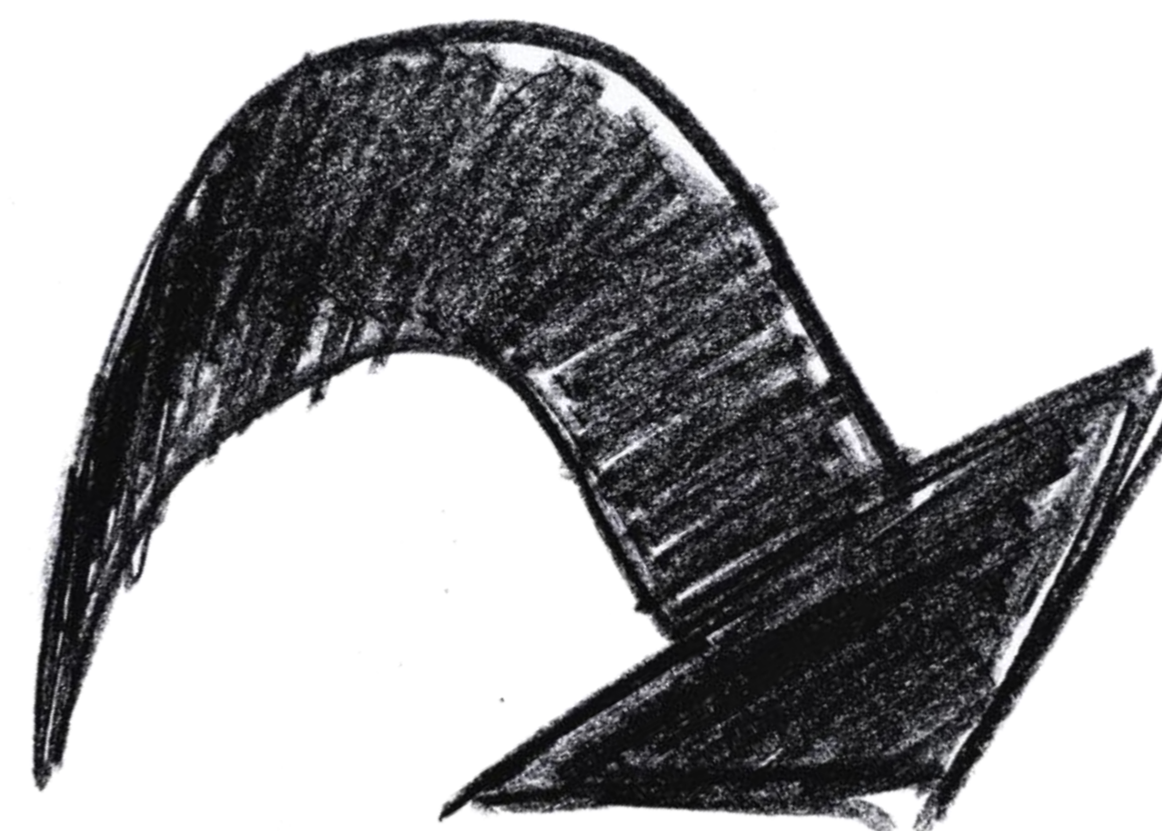
The role of the serial order short-term memory neural network in calculation abilities in children



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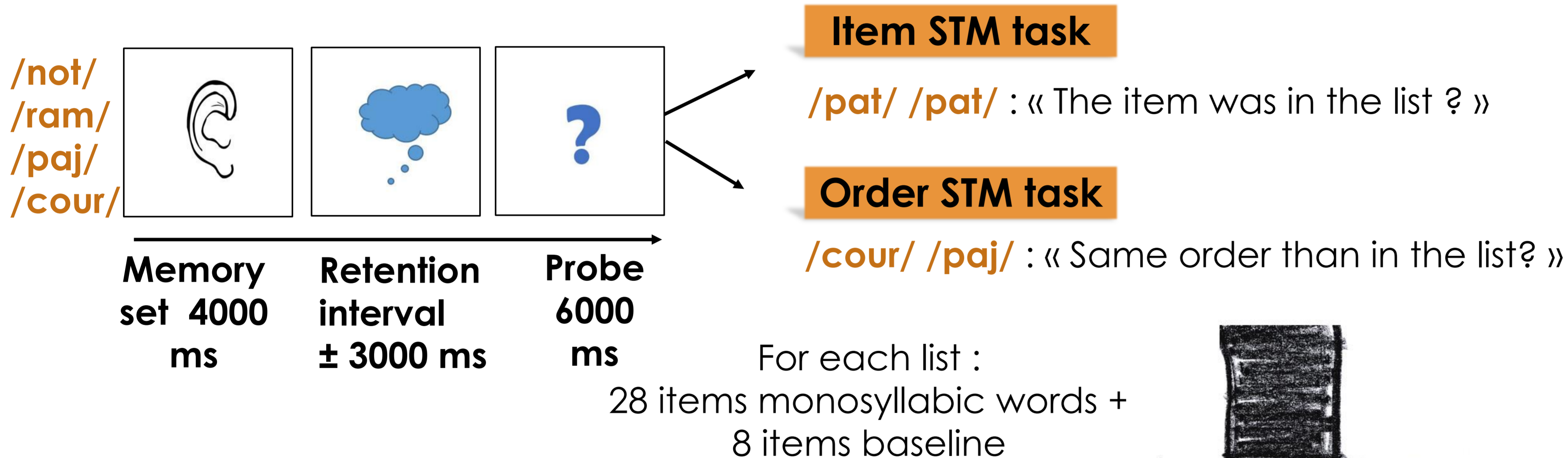


Behavioral studies have highlighted the importance of distinguishing item and serial order short-term memory (STM) components for studying the role of verbal STM in numerical development (Attout et al., 2014; 2015). These studies demonstrated that the serial order STM predicted calculation abilities one and two years later in kindergarten children but also that a deficit to process serial order information in STM was observed in children and adults with dyscalculia and this, in contrast to item STM. These data are in favor of a specific implication of serial order STM in calculation abilities.



The aim of this study is to explore the relationship between the serial order STM neural network and calculation abilities in children.

Participants : 37 typically developing children (21 girls) aged from 7 to 12 years old (mean age = 8.93 yrs)



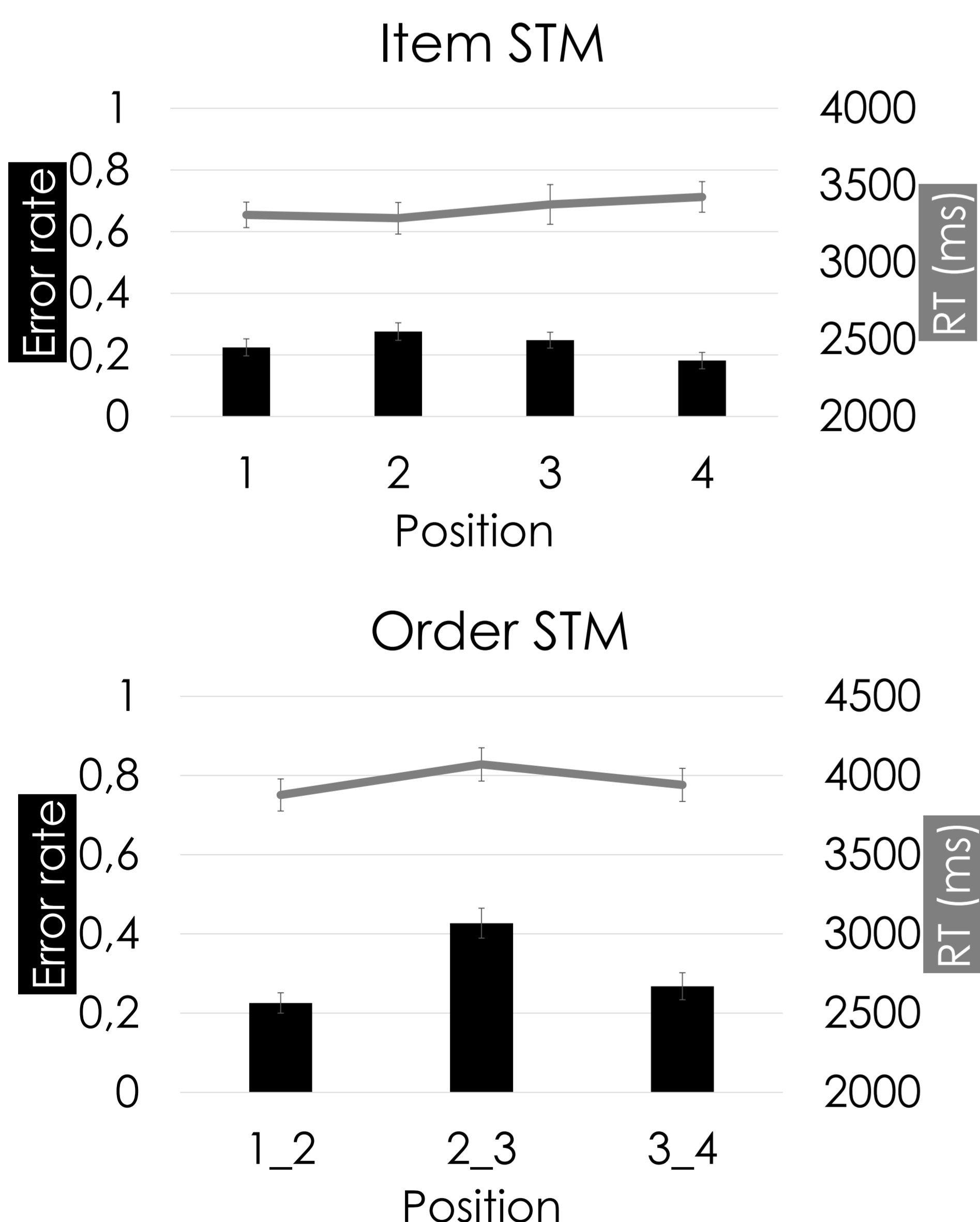
Math fluency

TTR (De vos, 1998)

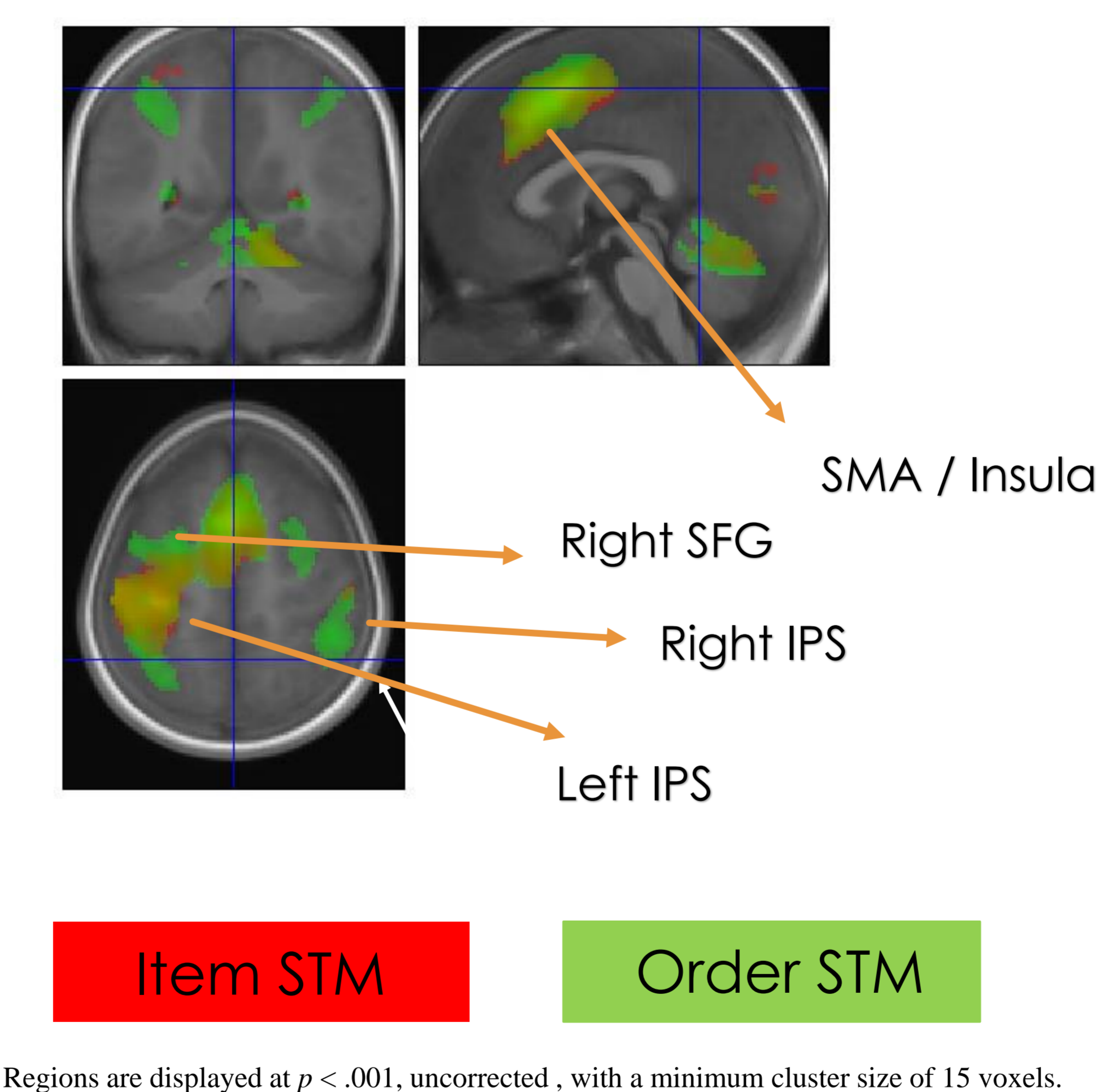
- 1+1=
- 2+1=
- 3+0=
- 4+1=
- 2+3=
- ...



Behavioral results

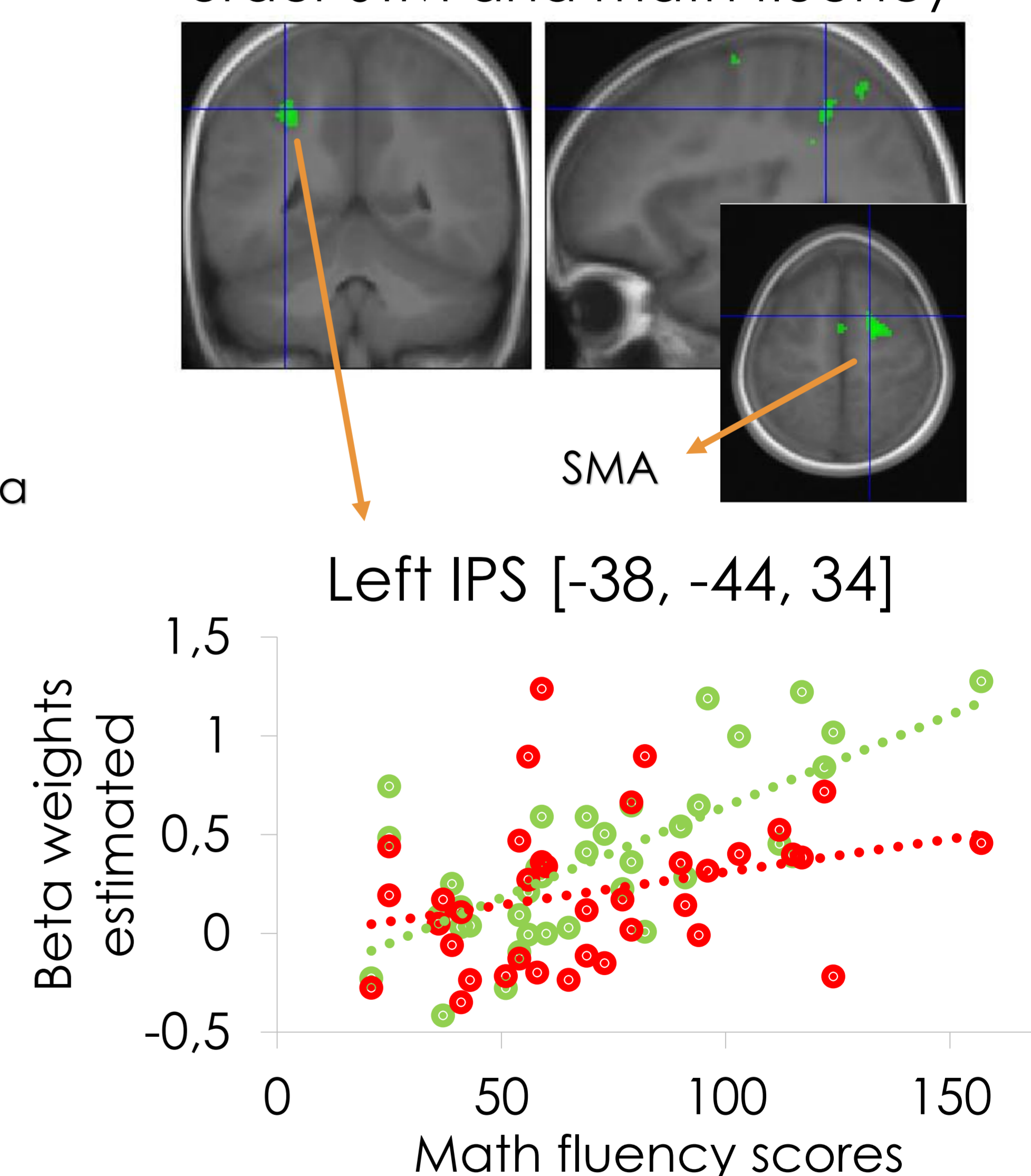


fMRI main effect - recognition



Regions are displayed at $p < .001$, uncorrected, with a minimum cluster size of 15 voxels.

Correlation only between serial order STM and math fluency



- Distinct processes between item and order STM were already present in children but with a progressive specialization of order STM.
- The left IPS and SMA correlated positively with math fluency and this for order STM but not item STM

→ This study shows that a specialized network supports serial order STM already in school-age children and that this specific areas are closely related to the developmental increase in calculation abilities.

Contact

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