Visuo-spatial abilities are key for children's verbal number skills

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Theoretical background

- The acquisition of number words and their meaningful use (« ***verbal number skills*** ») represents a milestone in early mathematical development taking place in the preschool years (1)
- Different research studies highlight the importance of **verbal abilities** (VA; e.g. 2,3,4) and/or **visuo-spatial abilities** (VSA; 5,6,7**)** for mathematical development
- Understanding the role of verbal and/or visuo-spatial abilities for the development of verbal number skills is important with regard to effective practices in early childhood education and intervention

Research question

What is the nature of verbal number skills?

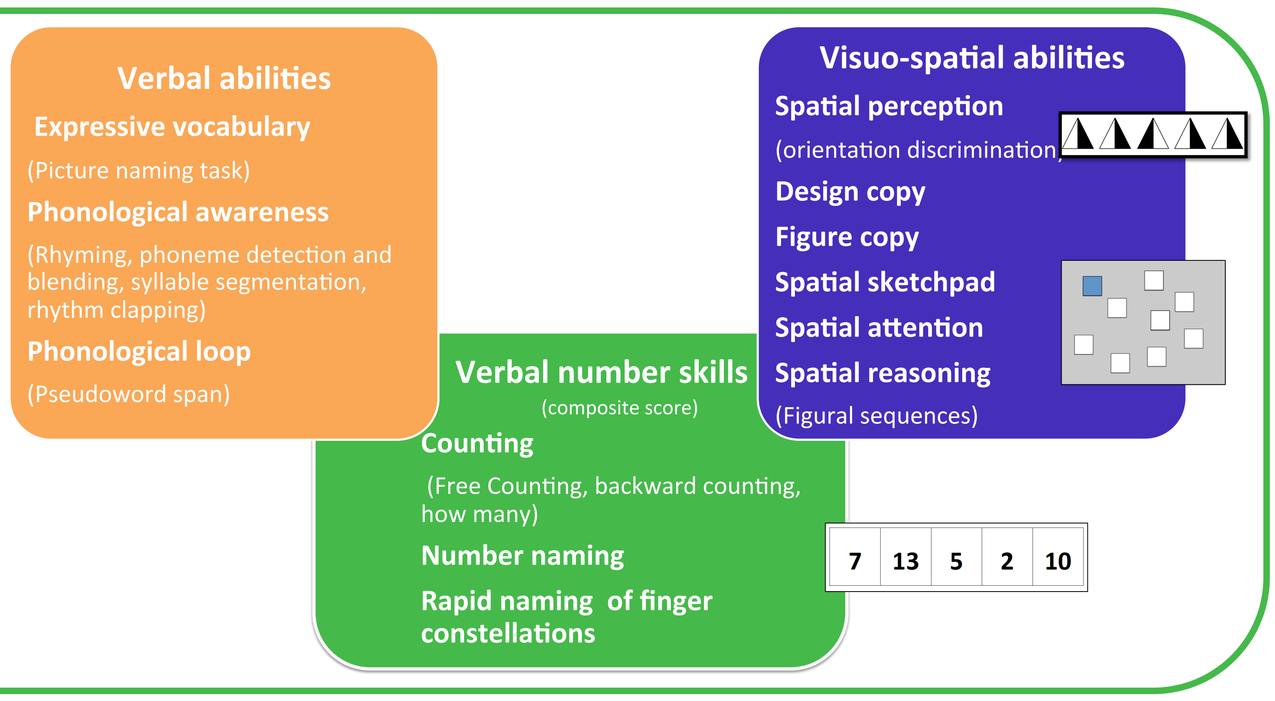
Are they are primarily verbal, or do they call upon other math-related processes, such as visuo-spatial abilities?

Method

Sample: ***N* = 151** kindergarten children (80 boys), Age_{mean}= 5.9 years (age range: 4 to 6 years)

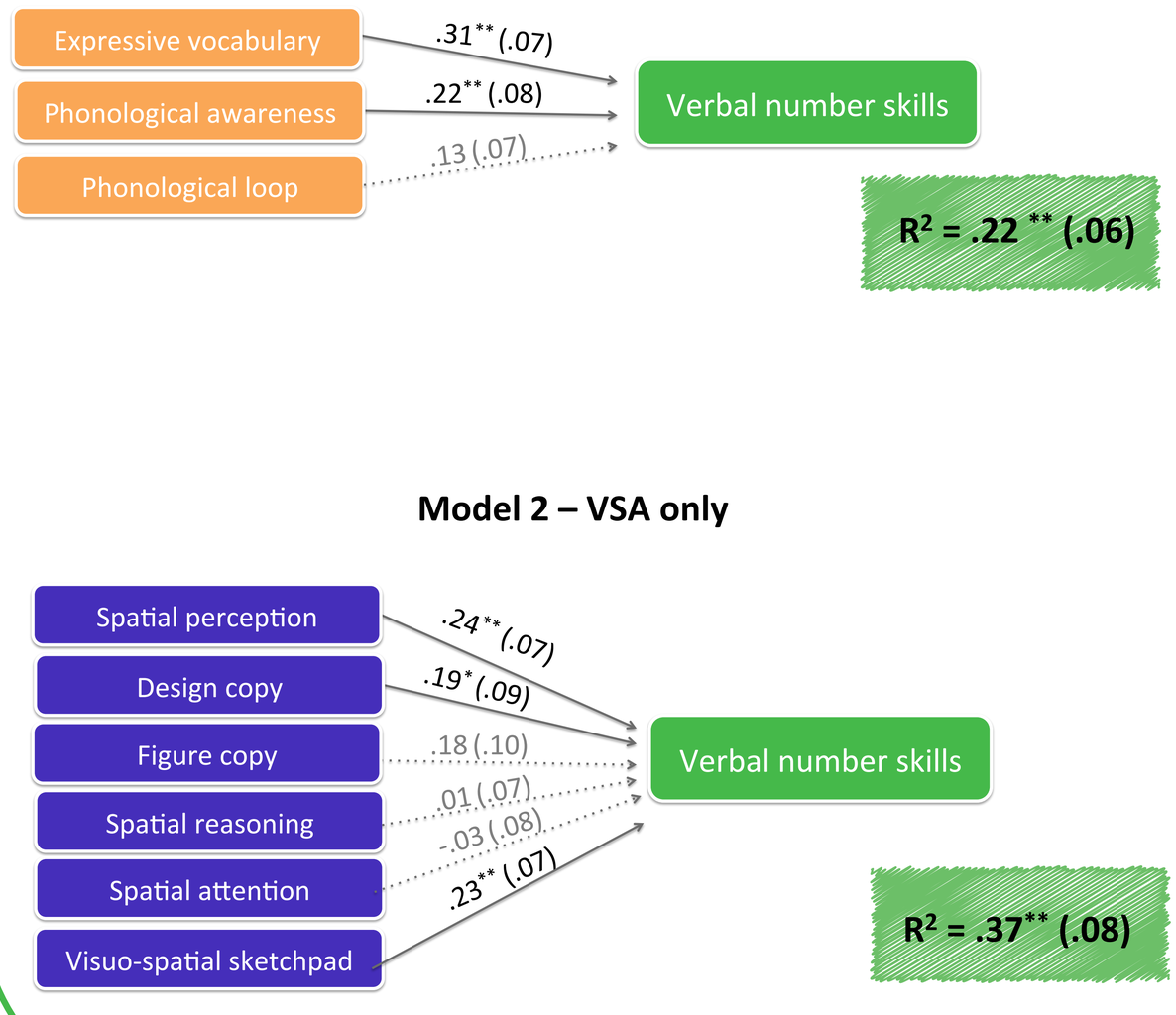
Different measures of **VA**, **VSA** and **verbal number skills** were administered (all tasks yielded acceptable to good internal consistencies). Verbal abilities and VSA are both broad concepts including a variety of different tasks and facets. In the present study, we focused on different aspects that have been related to mathematics in prior research and considered them concurrently .

Internal structure of the variable "*verbal number skills*" is confirmed by exploratory factor analysis yielding a 1-factor solution



Results

Prediction of verbal number skills



Note: Regressions computed with Mplus using FIML and MLR
* Similar pattern of results when controlling for age and socioeconomic status

Discussion

- The **concurrent consideration** of different measures, within the broad concepts of VA and VSA allowed us to gain information about the **relative importance** of these different measures
- Importance of VSA for early math tasks that appear, at first sight, to be primarily verbal in nature
- VSA important for **novel** math tasks (e.g. 7,8) → VSA especially important in the preschool years
- VSA as potential **target of interventions** to provide children with a good foundation for math learning
- Longitudinal study required to investigate the predictive role of the different measures for mathematical achievement in 1st grade

Conclusion

Importance of VSA also for number skills with a strong <u>verbal</u> component in young children

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