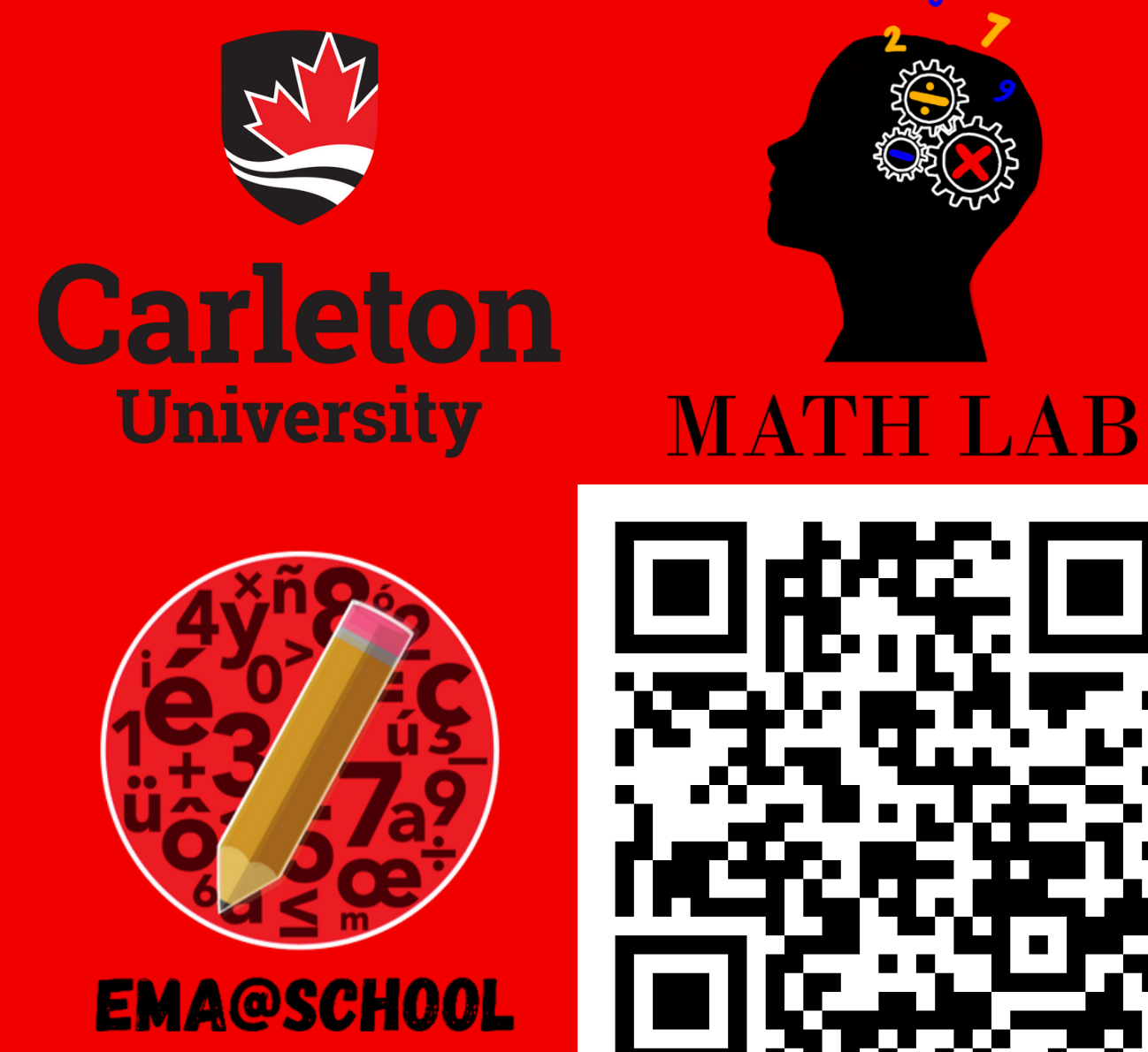


What foundational numeracy skills predict arithmetic performance one year later in grades 2-3:

Data from the Provincial Numeracy Screening Assessment

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FOUNDATIONAL SKILLS: **Cardinal knowledge** - size of a number (number comparison task).
Ordinal knowledge - order of numbers (order judgement task)

RESEARCH QUESTIONS: Are both these foundational number skills related to children's developing arithmetic skills? Do those relations change with development?

1 Concurrent: Is order judgment a better predictor of arithmetic performance than number comparison (Lyons et al., 2014)?

2 Longitudinal: Do both order judgment and number comparison predict growth in arithmetic performance?

Data from the Provincial Numeracy Screening Assessment (Douglas & LeFevre, 2021) used in Alberta, Canada:

Multiple regression on arithmetic (+/-):

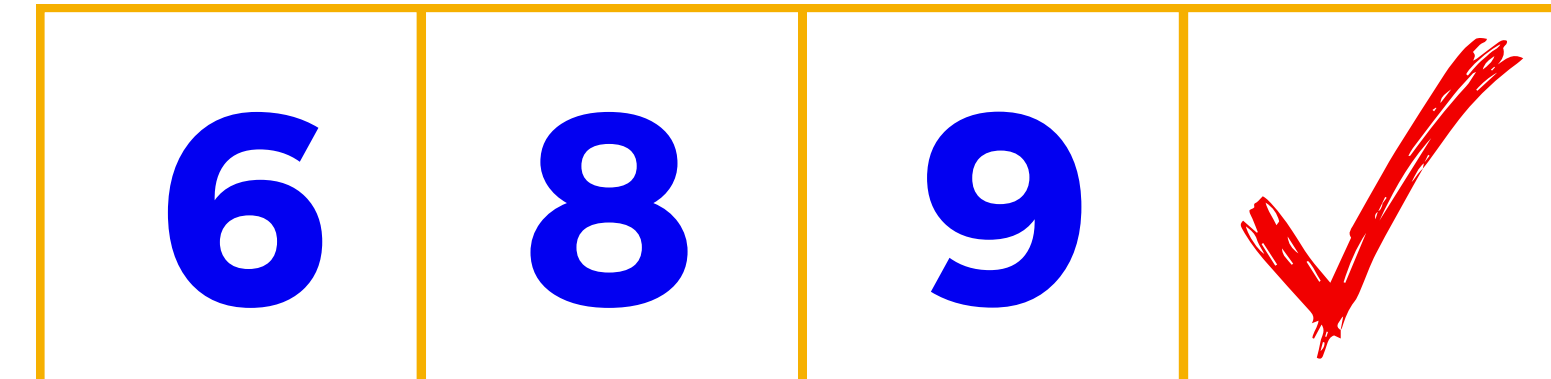
- Number comparison (1)(2)
- Order judgment (1)(2)
- Prior arithmetic scores (2)

TASKS

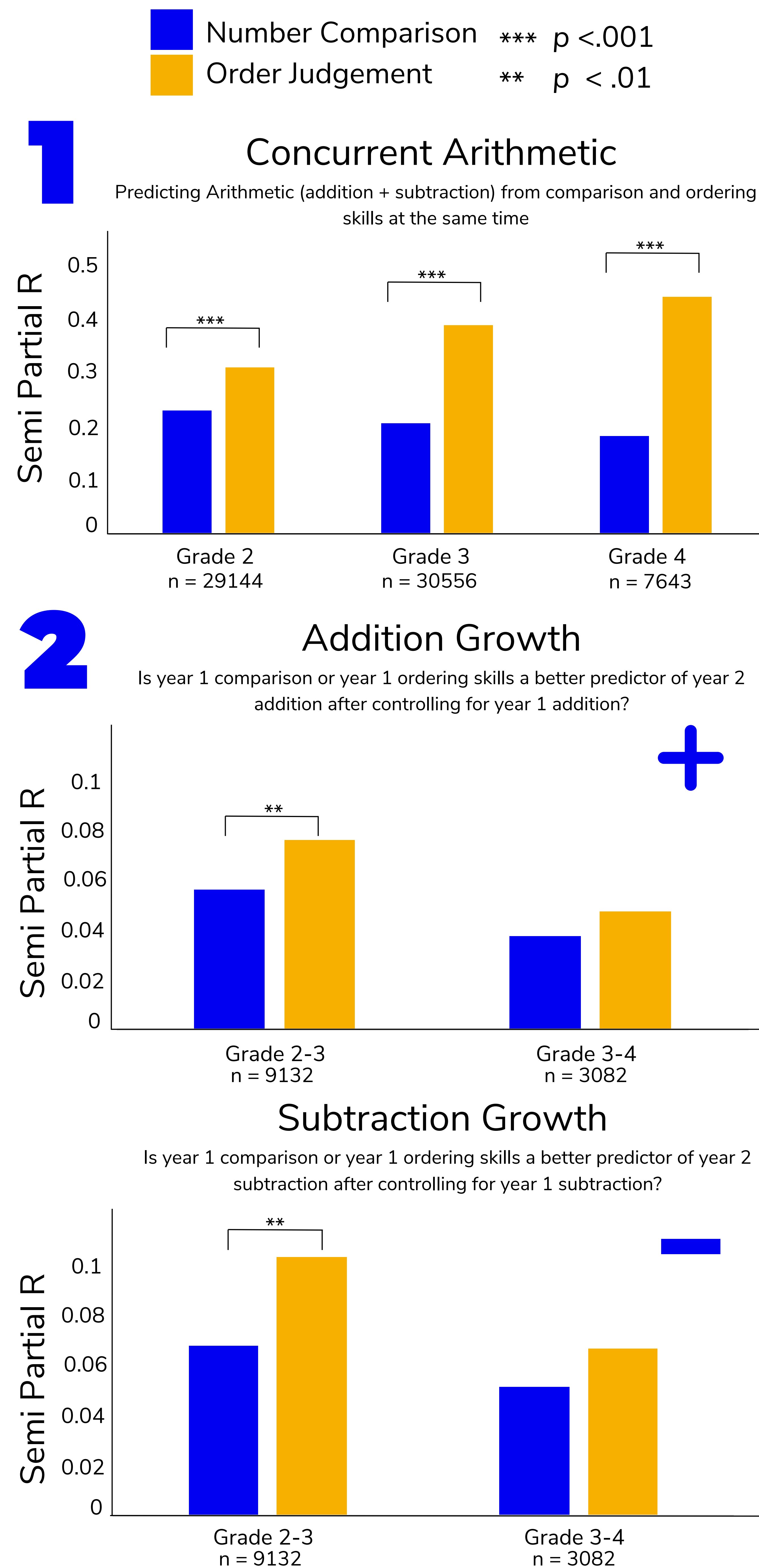
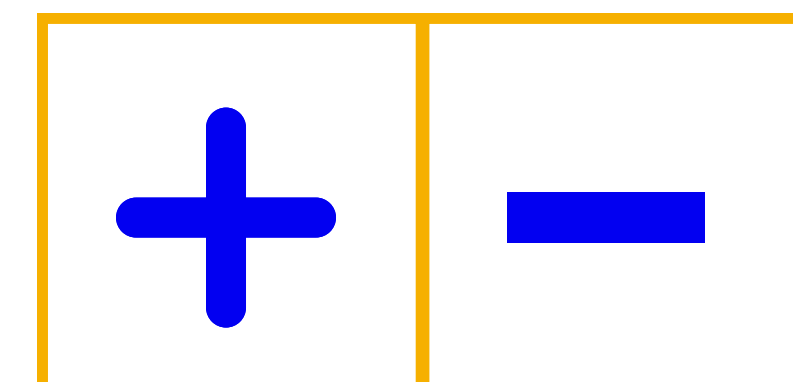
Number Comparison



Order Judgement



Arithmetic



1 **Ordering skills** were a stronger predictor of growth in arithmetic skills than comparison skills, replicating Lyons et al. (2014) and others but **BOTH** ordering and comparison are significant predictors of unique variance in arithmetic

2 From **grades 2-3** **ordering skills** were a stronger predictor of growth but from **grades 3-4**, both skills predicted arithmetic to the same degree

! Foundational numeracy skills measured one year earlier **predicted changes** in arithmetic performance at the start of grades 3 and 4;

Numeracy screening to identify children who are at-risk should include **both** foundational skills to capture individual differences in arithmetic performance

Lyons, I. M., Price, G. R., Vaessen, A., Blomert, L., & Ansari, D. (2014). Numerical predictors of arithmetic success in grades 1-6. *Developmental Science*, 17(5), 714-726. <https://doi.org/10.1111/desc.12152>