

INTRODUCTION

- The majority of developmental studies of adolescents are variable-centered, using measures emphasizing population-based averages (e.g., Latent Growth Curve Models), or, at best, sub-group analyses (e.g., Growth Mixture Modeling). However, findings from average or aggregated data analysis may not veridically represent individual trajectories and may result in policies and interventions that are not sufficiently suited to specific individuals.
- The Bornstein Specificity Principle notes that development is specific to individuals, times, domains, and contexts; thus, developmental research should initially focus on assessing potentially unique individual developmental trajectories within specific contexts.
- The goal of the MMDC project is to develop person-specific (i.e., idiographic) methods that may be used to identify individual trajectories before data are aggregated. Such measures must also be sensitive to intraindividual change.
- Goal: To determine whether a new working memory task captured intraindividual variability, and whether trials of varying lengths systematically vary in performance within and across participants.**

WORKING MEMORY

- A key attribute of youth development is executive function, which includes **working memory**, inhibitory control, and cognitive flexibility.
- To test working memory, we developed a measure termed the Common Objects Ordering (COO) task. This task was designed to be change-sensitive for use in an intensive repeated measures design.
- The COO includes 4 trials per day, each presenting a series of common objects (e.g., a chair, a toothbrush, or a car) on a screen. Participants are then asked to arrange the object in the order in which they appeared. At each occasion of measurement, participants are asked to sort sets of three, five, seven, and nine objects. Overall accuracy percentage will be computed for each of up to 50 occasions over the school year.

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PILOT STUDY SAMPLE

- A pilot study included four youth (50% female), ranging from 10.1 to 15.8 years old.
- Parent education ranged from high school graduate to 4-year college completion.

COO WM TEST – IS THERE A PATTERN OF ACCURACY?

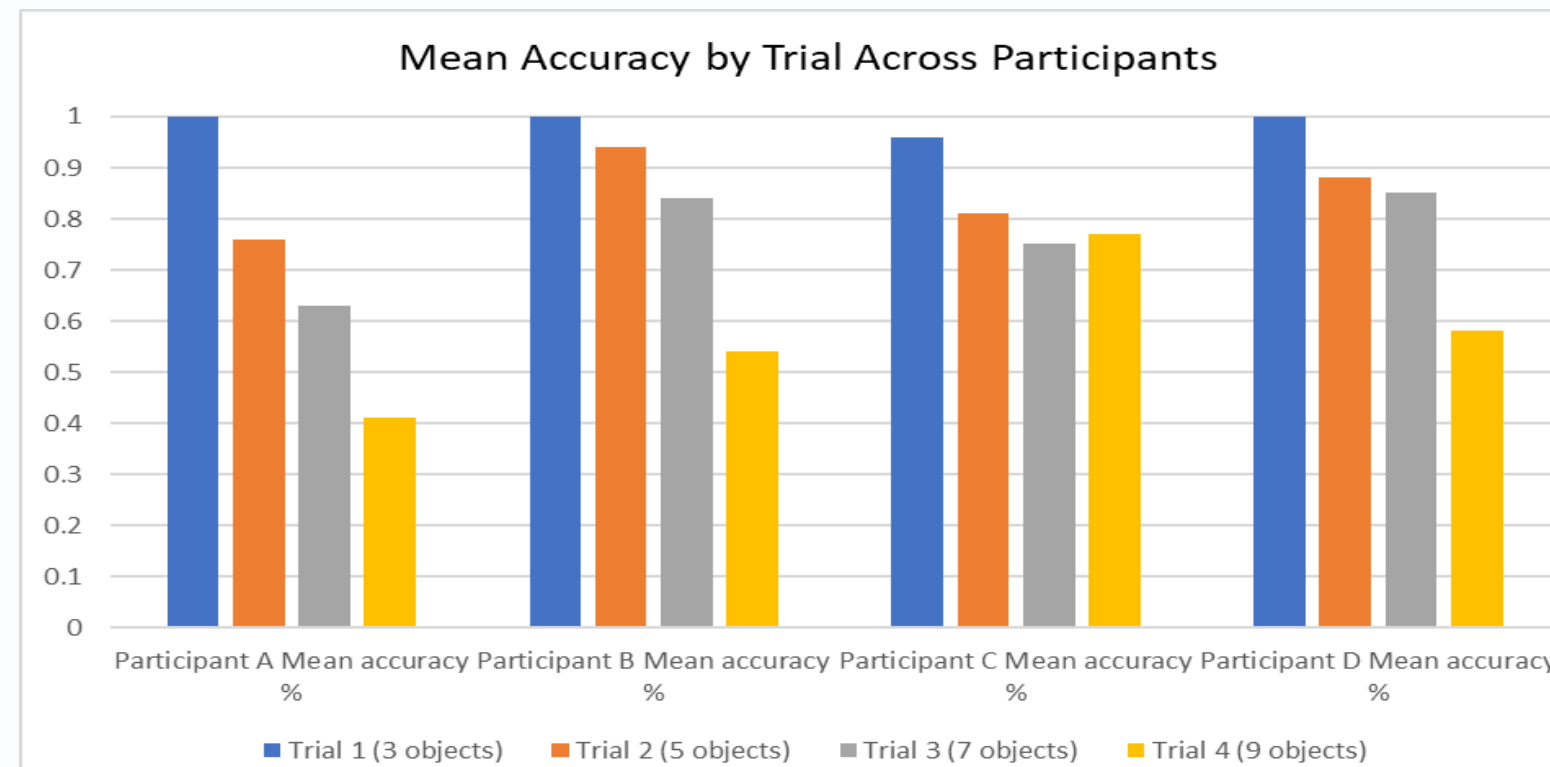
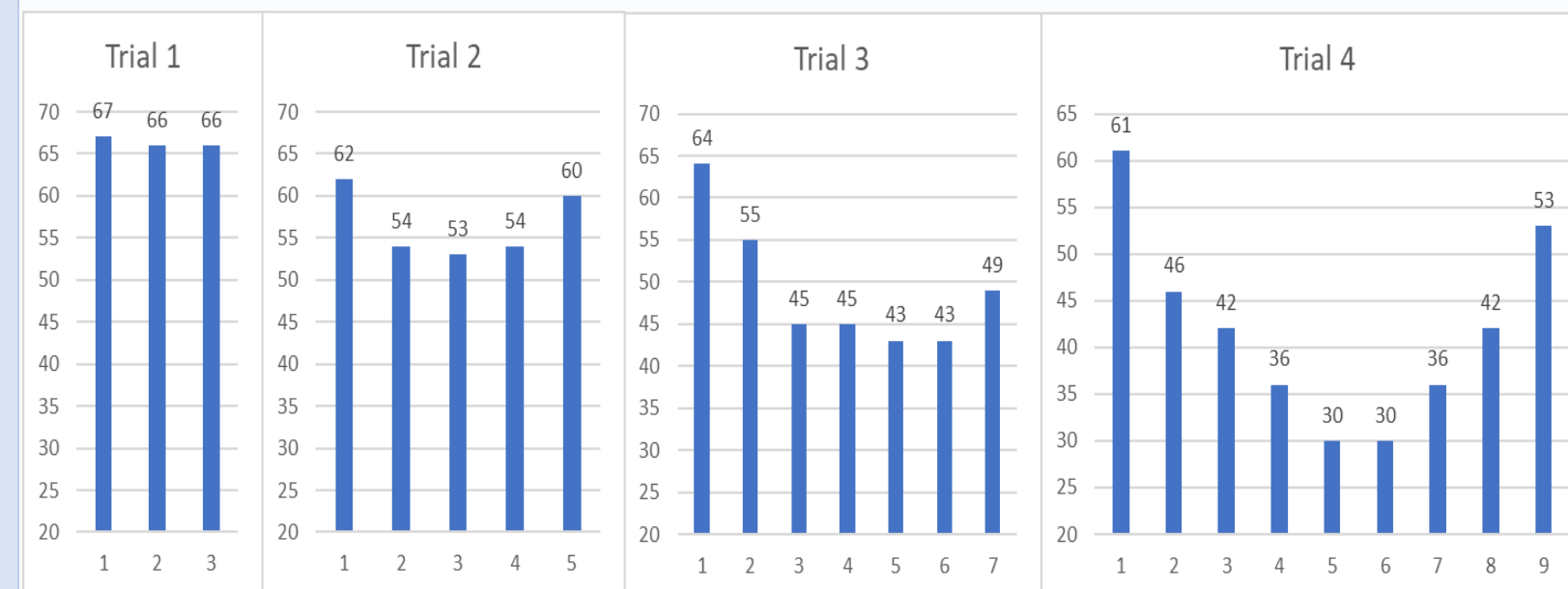


Figure 1. Mean accuracy by trial across pre-pilot participants (N=4).

The Take-Away: With the possible exception of Participant C, there is a clear pattern of higher percentage accuracy in earlier trials (with fewer objects to memorize). Results of a one-way between-subjects ANOVA indicated that percentage accuracy differed significantly by trial, $F(3, 191) = 20.96, p < 0.001$.



Item 1 VS 5 6.53(<.01)**
Item 5 VS 9 -4.11(<.01)**
Item 1 VS 9 1.84(.07)

Figure 2. Differences in percent correct by order of object in each trial (N=4).

The Take-Away: Overall, there is a clear pattern of higher percentage accuracy in the beginning and end of each trial (especially in more difficult trials). This significant difference may be explained by recency and primacy effects.

MMDC STUDY WORKING MEMORY (COO) DATA

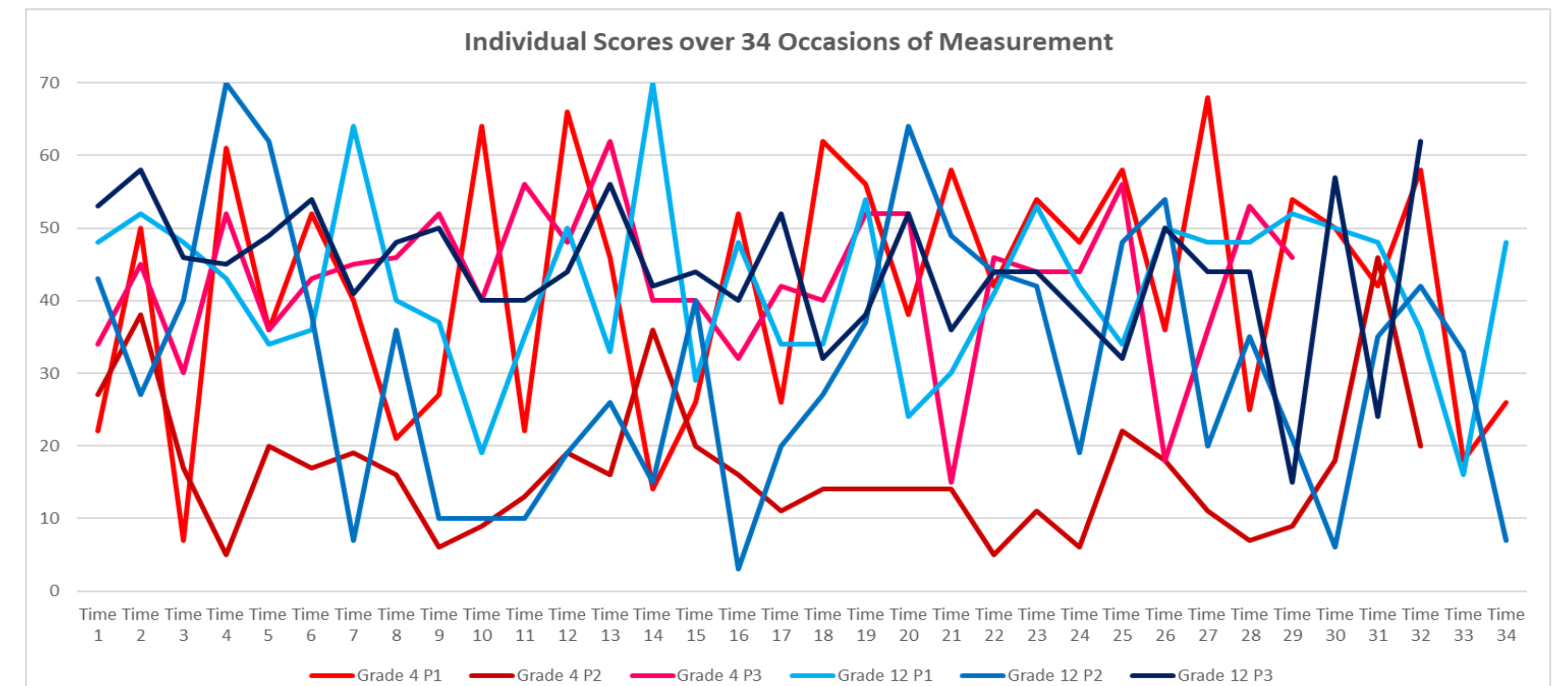


Figure 3. Variation in individual scores in the Full MMDC study (N = 6). NOTE: Each of the trajectories above represent students across 34 occasions of measurement. “cool” colors represent students in Grade 12, and “warm” colors represent students in Grade 4.

The Take-Away: Grade 4 and Grade 12 students showed meaningful variation both at the interindividual and intraindividual level across 34 occasions of measurement.

CONCLUSIONS

RQ 1: Can the COO working memory task capture intraindividual variability in working memory?

Answer: YES. All participants varied greatly in their COO scores across time.

RQ 2: Can the COO Working Memory task identify systematicity?

Answer: YES, SO FAR. Some response patterns have emerged across individuals but more data will be needed.

NEXT STEPS:

- When data collection is complete, we will conduct assessments of reliability, factorial validity, and convergent validity.
- We will also attempt to identify additional meaningful patterns of development for each of the three conditions (i.e., EF, RS, and ISR) across all three age groups.
- This work will involve conducting analyses of person-specific data across multiple occasions of measurement with a variety of time series analyses, most notably Dynamic Factor Analysis. In addition, we plan to test for measurement invariance across various conditions, such as grade level, gender, and socioeconomic status.
- We will also look for patterns based on grades, standardized test scores, absences, and suspensions for previous and current school years.
- Finally, we will explore whether a participant’s mood and sleep quality (measured daily) predict working memory.