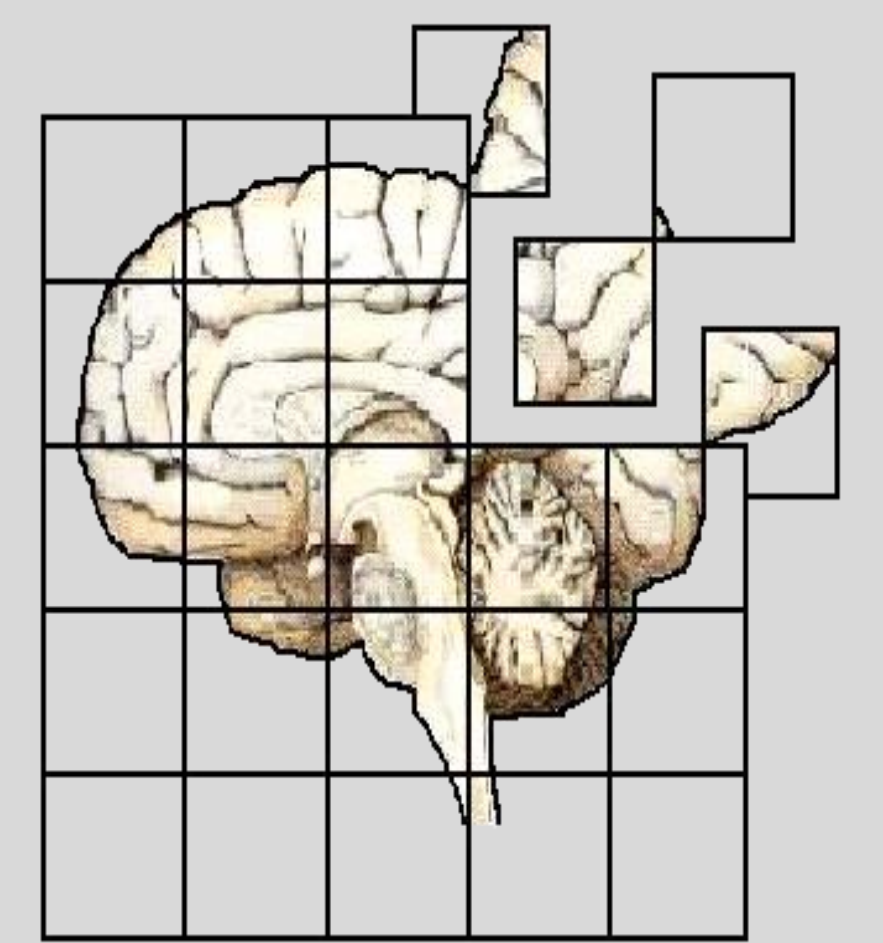




Computerized Tool for Math Fluency

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Introduction

Literacy was defined as the ability to use language, numbers, images, computers and other basic abilities to understand, communicate, gain useful knowledge, solve mathematical problems and use the symbol system of the culture. A high level of literacy predicts education, salary, and even health.

Reading development was considered to be the key to literacy. Accurate and fluent reading provides a necessary platform for text comprehension. However, no attention was given to accuracy and fluency in math.

The Math Fluency Computerized Tool

We developed a new computerized tool to assess math fluency (MFCT). The task include exercises in addition and subtraction (up to a range of 20), and exercises in multiplication and division (from the multiplication table). The length of the task is 180 seconds and the number of exercises, accuracy and reaction time per exercise are recorded.

The range and operands in a specific test can be changed.

Current Study

Step 1: Reliability of tool

Forty-five students from Ben-Gurion University of the Negev (BGU) performed the task twice with gap of a week between sessions.

Step 2: Prediction of math ability

Twenty-eight student from BGU preformed the Woodcock Johnson battery for math achievements. The battery includes a paper-and-pencil fluency test, and tests of calculation, concepts, problems and series. Psychometric exam grades were also collected.

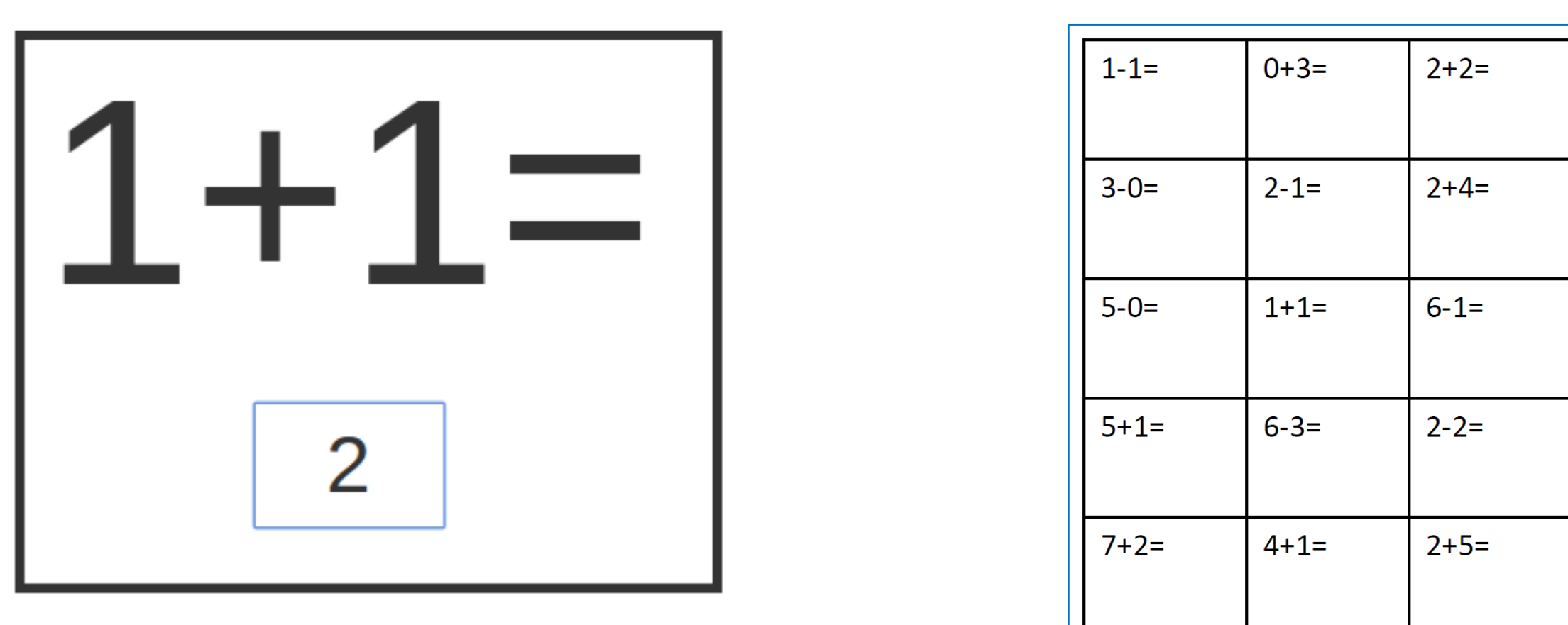


Figure 1. Example of an exercise in the math fluency computerized task (left) and paper-and-pencil math fluency task (right).



Figure 2. Woodcock Johnson battery for math achievements.

Results

Reliability of MFCT

| | |
|----------------------------|------------------|
| Number of Exercises | .883, $p < .001$ |
| Accuracy Rates | .41, $p < .01$ |
| Reaction Time per Exercise | .47, $p < .01$ |

Reliability of MFCT with Woodcock Johnson Fluency Test

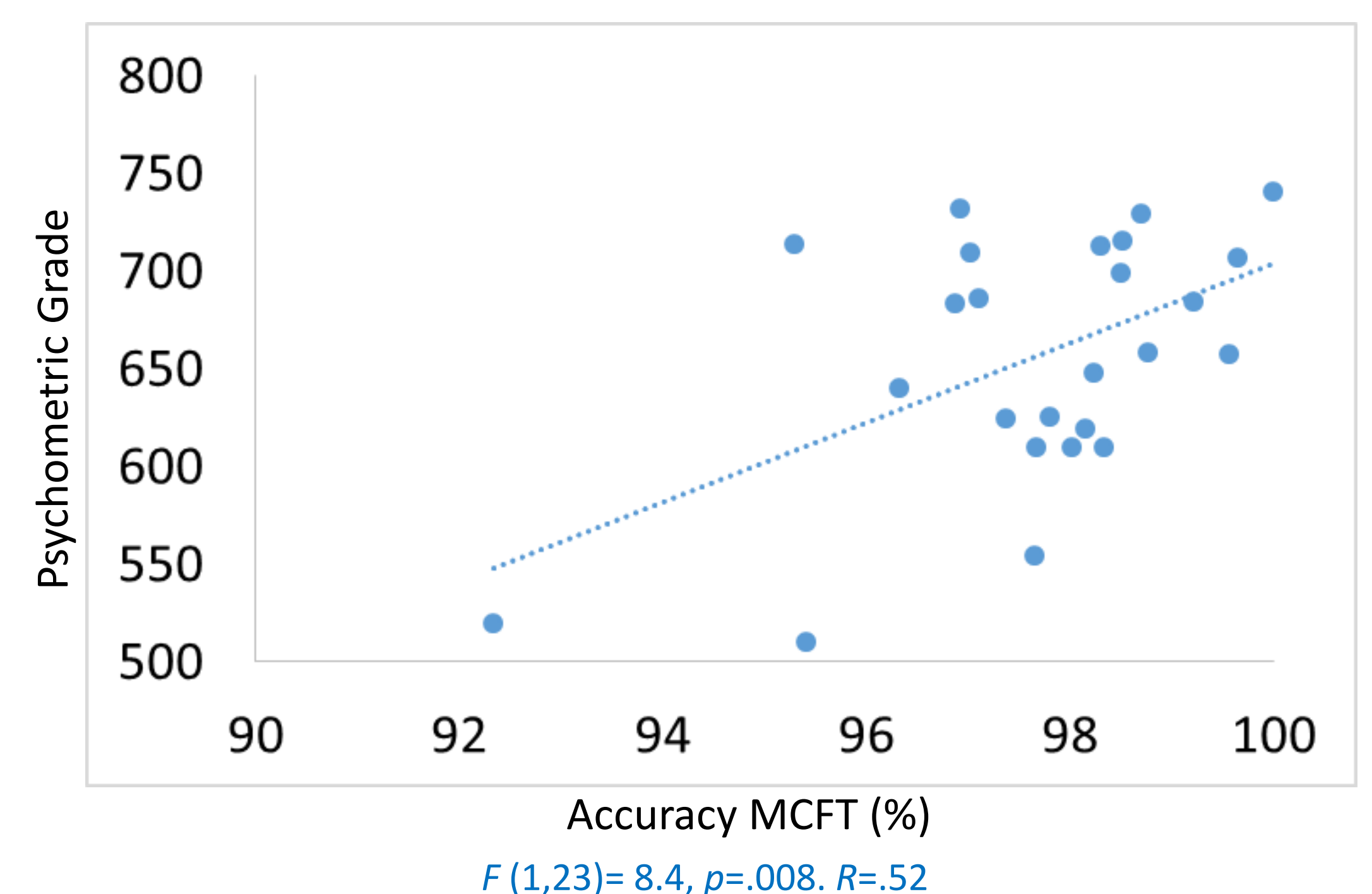
| | |
|----------------------------|----------------|
| Number of Exercises | .52, $p < .01$ |
| Accuracy Rates | .53, $p < .01$ |
| Reaction Time per Exercise | .45, $p = .01$ |

Correlations between MFCT and Woodcock Johnson Math Tests

The only test that was correlated to the performance of MFCT was calculation.

| | |
|----------------------------|----------------|
| Number of Exercises | .43, $p = .03$ |
| Accuracy Rates | .47, $p = .03$ |
| Reaction Time per Exercise | -.4, $p = .04$ |

Accuracy Rates in MCFT predict Psychometric Grade



Discussion and Future Directions

- The Math Fluency Computerized Tool is an important, reliable and simple tool, which can be used for diagnosis and for training of math.
- We are now looking at the performance of children in elementary school for the development of math fluency.

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