Project Numtest

Assessing basic number competence without language

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Introduction

Some estimated 5-7% of children (Butterworth et al., 2011) suffer from developmental dyscalculia (DD). Universally valid diagnostic instruments are still lacking, as all current DD test batteries are based on language instructions. Consequently, their measurements are tightly linked to the specic language context of test administration.

This poses two major issues:

- Test results are partially dependent on language skills
- Test results cannot be easily compared across countries

The results of the following pilot study are part of a research project that aims to develop a screener for basic number competence that minimizes language use by using hands-on video instructions.

Methods

Population

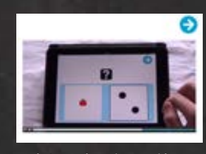
81 children
54% female
mean age: 6 y 7 m
65% germanophonic
35% francophonic

Design

two groups:

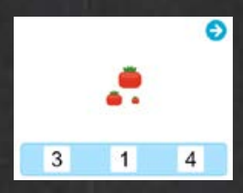
Text instruction

vs

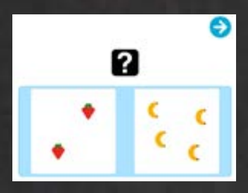


Video instruction

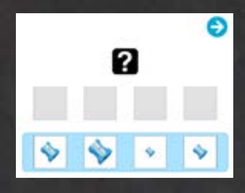
Three Tasks:



Counting & correspondance



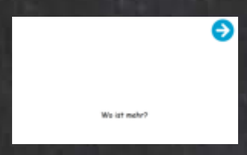
Comparison



Seriation

Procedure

Instruction



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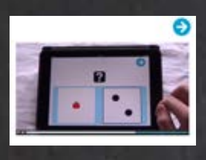
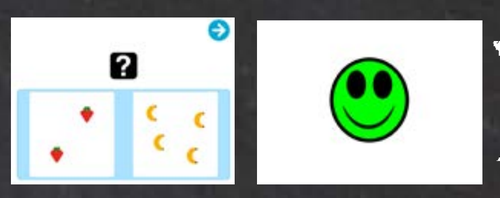


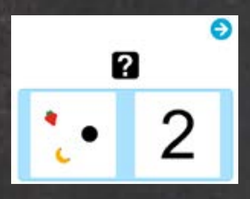
Practice

with visual feedback

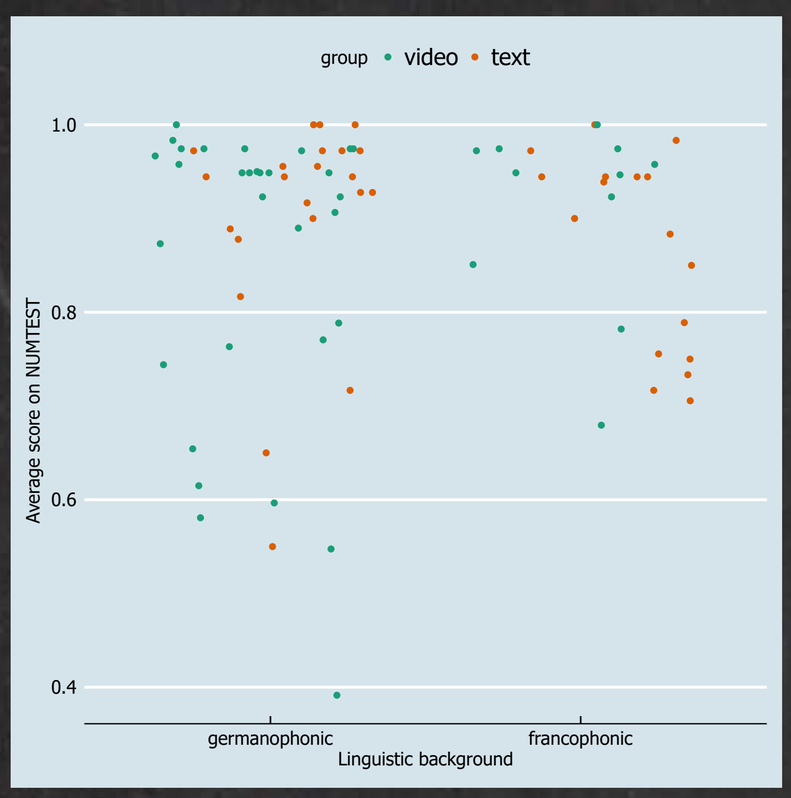


One repetition of all practice items in case of mistake

Test



Results



Task Performance

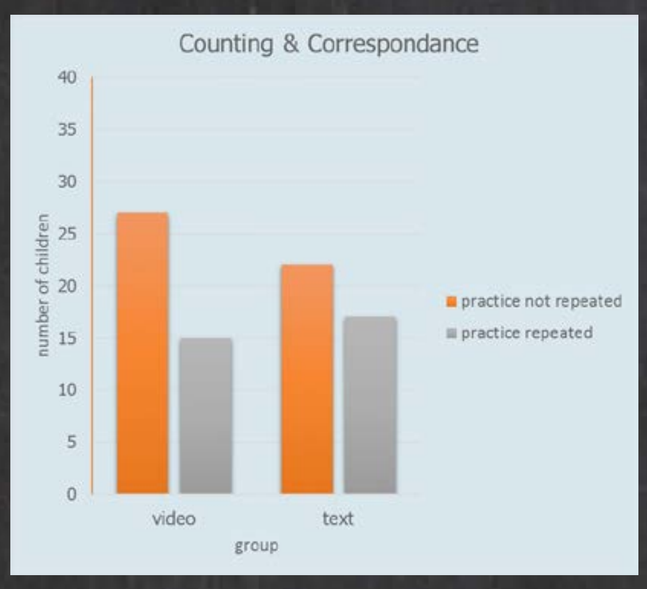
Here we show averaged performance over the three tasks in relation the experimental group and linguistic background. NO signicant differences in performance were observed between experimental nor linguistic groups. These results suggest that it is possible to replace explicit text instructions with implicit video instructions without affecting task performance.

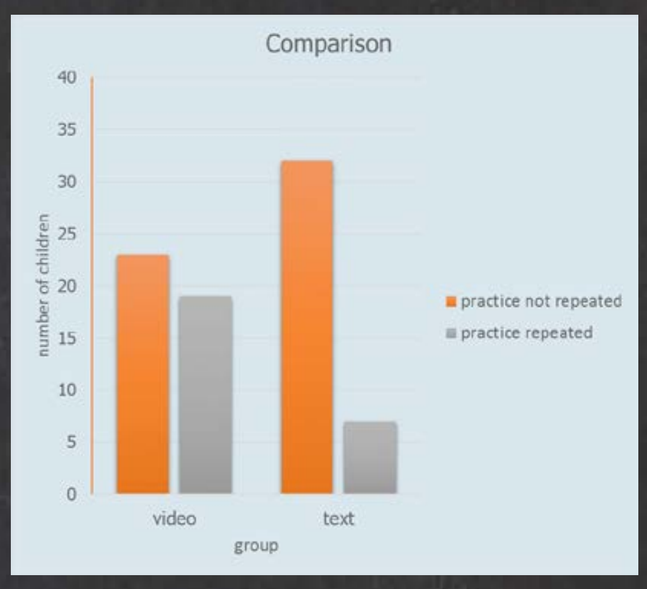
Control measures

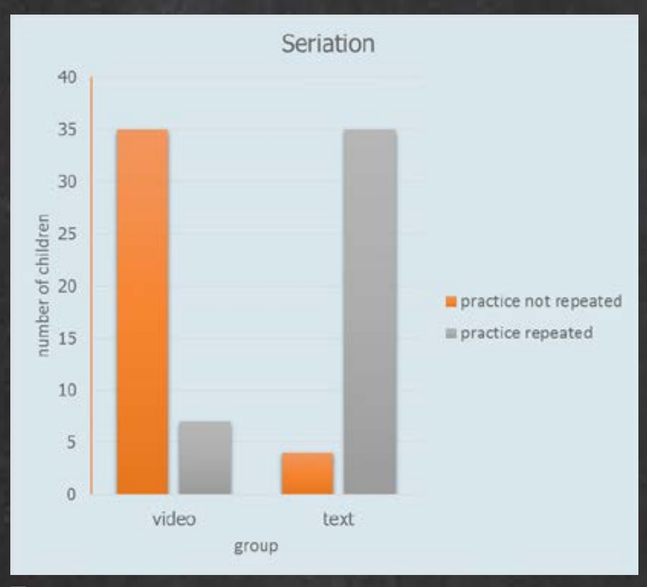
We administered pen & paper control tasks among which the addition scale of the TTR (De Vos, 1992) and a self-developed counting task with oral and written answer possibilities. Globally, they correlate well with NUMTEST:

	TTR: Addition	Counting: Oral	Counting: Written
Counting & Correspondance	.42*	.16	.41*
Comparison	.29*	-.01	.30*
Seriation	.49*	.25*	.54*

How many children had to repeat the practice session?







We observed group differences in the number of children that needed to repeat the practice session. Less participants repeating the practice items could be translated into faster understanding of the task.
Indeed, signicantly less participants repeated the practice session when faced with text instructions in the comparison task (Chi2=6.91, p<.01).
On the other hand, signicantly less participants repeated the practice session of the seriation task (Chi2=43.26, p<.00) when faced with video instructions.
These results indicate that video instruction can help task comprehension, but that it depends on the task and the method used in the video instruction.

References

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