Rapid Automatized Naming: is Inhibition Involved?

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INTRODUCTION

The Rapid Automatized Naming-task (RAN-task) is a well-used diagnostic tool to assess dyslexia. This task involves the rapid naming of four kinds of stimuli: colors, numbers, objects and letters. Phonological skills and general processing speed supposedly contribute to RAN-performance. These factors do not account for all of the variance in RAN-performance. So, there must be other factors.

When naming items as fast as possible, previous items are still active in short-term-memory when trying to name the next item in row. This information should be suppressed for better task performance. Suppressing irrelevant task information is a part of response inhibition called interference control.

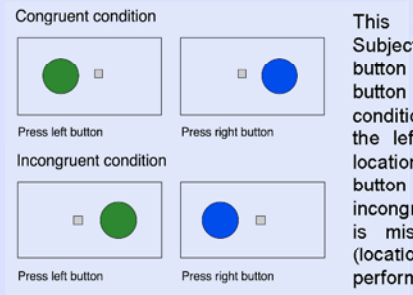
RESEARCH QUESTIONS

1. Is response inhibition involved in rapid automatized naming.
   - Our hypothesis is that response inhibition is involved.
   - We expect that Simon-task performance predicts RAN-performance, even when general speed and phonological skills are accounted for
2. Which kind of response inhibition is involved?
   - We hypothesize that only the part of response inhibition called interference control is involved.
   - We expect that Simon-task-performance predicts RAN-performance, while Stop-task-performance does not.

RAN task

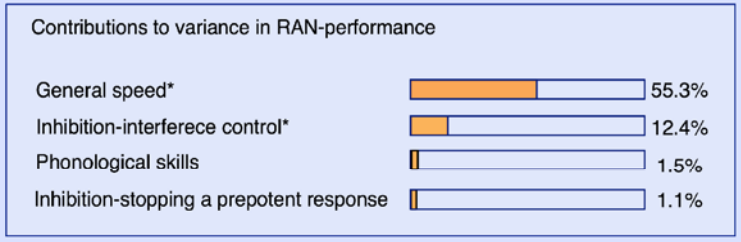
Instructions: Please name the colors/numbers/objects/letters on this card as fast as you can. Start at the arrow and go down from there. Remember to do it as fast as you can. Go..

Simon task



This task taps interference control. Subjects are instructed to press the left button if the circle is green and the right button if the circle is blue. There are two conditions, as indicated in the pictures at the left. In the congruent condition the location of the circle corresponds to the button that has to be pressed. In the incongruent condition this correspondence is missing. Irrelevant task information (location) has to be ignored for good performance.

Results



*Significant change in model

METHODS

Thirty children, who were referred to the IWAL-institute, were asked to perform three tasks: the Stop-task, which involves motor inhibition, the Simon-task, which involves inhibiting irrelevant task information and a choice-reaction-time task to assess general processing speed. Data from these tasks were linked to data on phonological processing and RAN-performance acquired at the diagnostical assessment.

RESULTS

Regression analyses showed that Simon-task performance does predict RAN-performance when general speed and phonological skills are accounted for, but Stop-task performance does not. Phonological skills did, unexpectedly, not contribute to RAN-performance.

GENERAL CONCLUSIONS

The findings on inhibition indicate involvement of response inhibition, and in particular interference control, in RAN-performance. This has implications for the use of the RAN-task as a diagnostic tool for dyslexia. Dyslexia and ADHD are comorbid disorders. Children with ADHD consistently perform poorer on inhibition tasks than non-ADHD children. Can we still conclude whether a child is dyslexic based on failing the RAN-task, when RAN-performance also involves response inhibition?

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