Testing routes to keep track of frontal brain functions in adults with Down syndrome: Our research findings

Why are we interested in frontal brain functions in adults with Down syndrome?

Frontal brain functions are often called ‘executive functions’, and these are the functions involved in planning, organising, controlling impulses and remembering.

Recent research indicates that decline in executive functions can be an early sign of problems relating to dementia in the Down syndrome population.

This is an important finding because the risk of early onset Alzheimer’s dementia is higher in the Down syndrome population compared to those without Down syndrome.

It is unclear why some individuals with Down syndrome develop dementia while others do not, therefore tracking abilities related to early signs of dementia is an important goal.

We developed a framework to extract three core measures of executive function within a single task.

We tested whether a task such as this may have potential for successful tracking of frontal functions in future.

Method

- Participants completed the task on a tablet. The task involved remembering rules, inhibiting responses, and we varied the time within which participants could respond.

- Participants with Down syndrome were tested twice to assess how accurately and reliably the task measured any individual’s performance.

What we found...

- The expected effect of each variable was found: participants were faster and more accurate as a result of lower memory demands, lower inhibitory demands and reduced time-based demands.

- Both the Down syndrome group and the typically developing group were similarly affected by these variables.

- Accuracy was relatively high in both populations.

- For adults with Down syndrome the task had good reliability from time 1 to time 2.

Conclusions

- It is possible to extract 3 measures of executive function within this simple framework.

- The overall levels of reliability indicate that this framework could be further adapted to provide a simplified, fast baseline screening measure to assess abilities in executive functions over time among individuals with Down syndrome.

- Further developing such a measure to track executive functions is vital in order to provide appropriate support and treatment as early as possible to those who need it.

With thanks from the University of Bristol to all participants!
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