Cognitive Control Challenges: Difficulties in Stopping the Wrong Response

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Cognitive Control

- System for guiding behavior based on one’s goals, plans, and context
- The ability to suppress irrelevant thoughts and actions while maintaining or strengthening others (Posner & Petersen 1990)
Cognitive control
Cognitive Control in 22q

Previous studies indicate that children with 22q might be impaired on tasks that measure cognitive control...

- What might be the nature and extent of these impairments?

  testing response inhibition

- Might these impairments change throughout development?

  7-14 year-old children with 22q and typically developing (TD) children
Methods

- **Paradigm:** Go/No-Go response inhibition task

- **Participants:**
  - 27 children with 22q (7-14 years old, mean = 11.6)
    - 12 younger (7-10 years old; mean = 9.0)
    - 15 older (11-14 years old; mean = 13.7)
  - 22 typically developing (TD) children (7-14 years old, mean = 10.8)
    - 12 younger (7-10 years old; mean = 8.9)
    - 10 older (11-14 years old; mean = 13.0)
Go/No-Go

“Whack the mole as FAST as you can before it gets away!”
Go/No-Go

“The mole tries to be tricky and put on different disguises.”

“You still need to whack the mole as quickly as you can!”
Go/No-Go

“Sometimes a vegetable will pop up in your garden.”

“Don’t squash the vegetable!”
Let’s Practice...
AWESOME!
Methods

Go/No-Go Response Inhibition Task:

- **“Go” trials (75%)**: press a button as quickly as possible to “whack” the mole
- **“No-Go” trials (25%)**: do NOT press button to not “squash” the vegetable
- Preceded by 1, 3, or 5 “Go” trials
Results: Overall group differences

Unlike TD children, some children with 22q do not do better when more “Go” trials indicate an upcoming “NoGo” trial.
Results: Overall group differences

Monitoring of upcoming inhibitory response is the same between groups, despite ultimate performance error in 22q
While TD children improve with age, some children with 22q do not appear to get better with age.
**Results: Age-Related Variance**

Increased performance variance in older children with 22q suggests a subgroup with atypical development of response inhibition.
Conclusions

- Neurocognitive experiments such as the “whack-a-mole” go/no-go might help us to better understand the nature of cognitive control challenges in children with 22q.

- Individual performance patterns might identify those with more, and less, typical cognitive control abilities.

- As part of a larger study, this investigation might help identify risk factors leading to early diagnosis and targeted therapeutic intervention.
Thank You!

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Participants and families

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