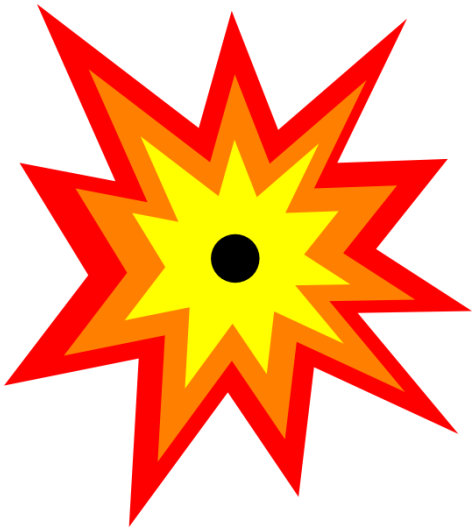
RECOGNeyes

A gaze control training game

Developed by Elizabeth Liddle, Peter Collins, Jacob Habgood

in collaboration with young people with ADHD, their families and teachers



- We tend to pay attention to where we are looking
- Very hard not to look at distractors!
- They attract our **ATTENTION**
- We find it hard to suppress the **IMPULSE** to look
- We **MOVE** our eyes so we are looking at the distractor!

Attention Deficit/Hyperactivity Disorder (ADHD)

- People with ADHD are:
  - Find it hard to pay ATTENTION
  - Are IMPULSIVE
  - MOVE a lot (hyperactive)

- Affects about 5% of children
- Doesn't always get better as you grow up!

RECOGNeyes

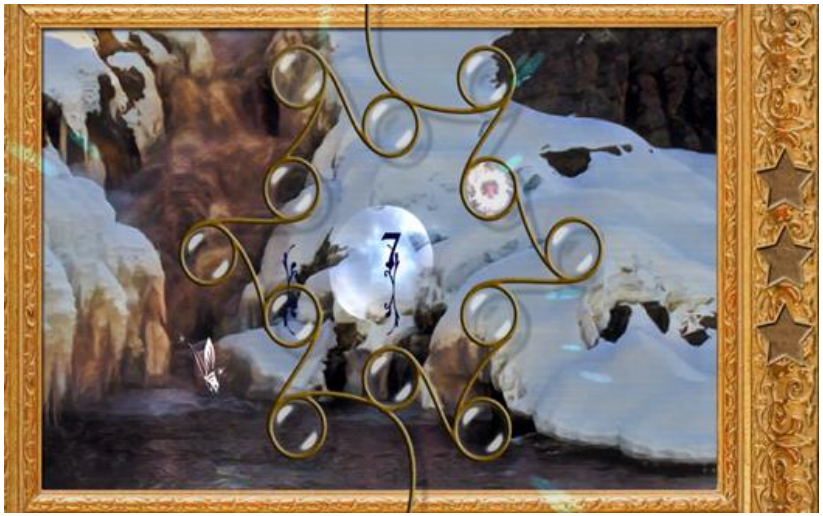
- We invented a computer game to train better control your gaze direction
  - If you can control where you are looking – you are controlling your **ATTENTION**!
  - If you can inhibit the urge to look – you are controlling your **IMPULSE** to attend somewhere else
  - If you are stopping your eyes moving – you are controlling your MOVEMENT.
- You get better at anything if you practice enough!
- Brain physically changes

RECOGNeyes

- Uses small eyetracker on laptop
  - Trainee uses direction of gaze to control game-play

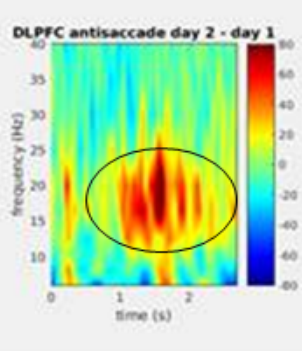
RECOGNeyes

- Games all involve control
  - Resisting distractors
  - Waiting for a signal
  - Controlling where to and when to look next



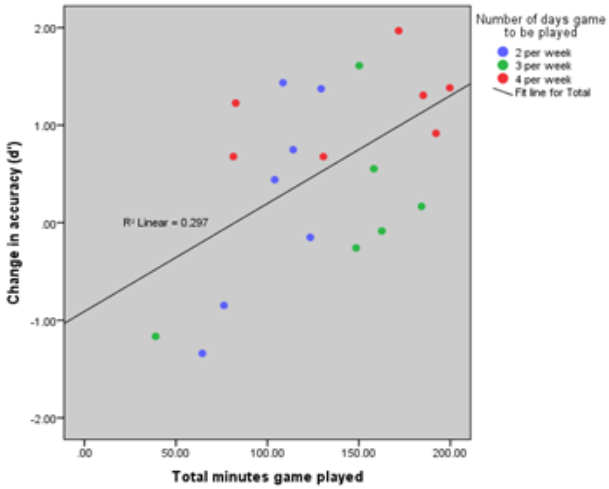
Recent and ongoing projects

- Barcelona project (Hans Supèr et al)
  - RCT with ADHD children (14 RECOGNeyes, 14 Control) played RECOGNeyes with eye-tracker for three weeks (3 times/week for 30 minutes)
  - Improvements in a neural marker of attention in ADHD group
- CiC MEG project (Jyothika Kumar, Alice Waitt, Lauren Gascoyne)
  - Students receiving Academic Support for an SpLD (dyslexia, dyspraxia, dyscalculia) or ADHD
  - Played recognise for 20-30 minutes, 2, 3 or 4 times a week for two weeks
    - Improvements in inhibitory control
    - Improvements in cognitive control of arousal
    - Greater efficiency of eye movements during reading
    - Changes to brain markers of attention
- Schools Project
  - How useful could RECOGNeyes be as a resource in Schools?
  - On going project at Denewood School



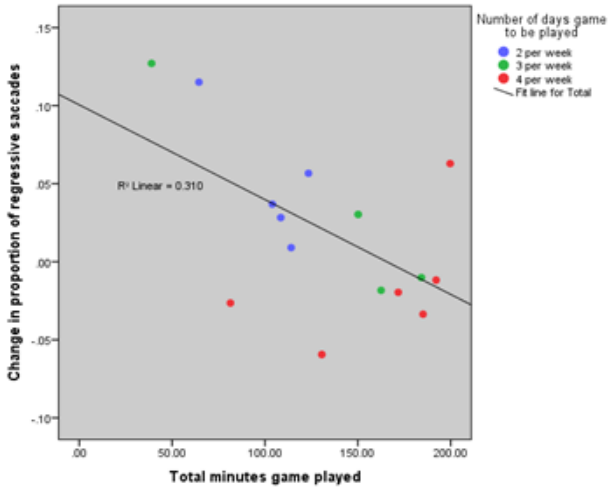
Pilot study of young adults with ADHD and/or specific learning disabilities, using magnetoencephalography (MEG) during a gaze control task. Students were randomized to 2, 3 undertake or 4 of training sessions per week.

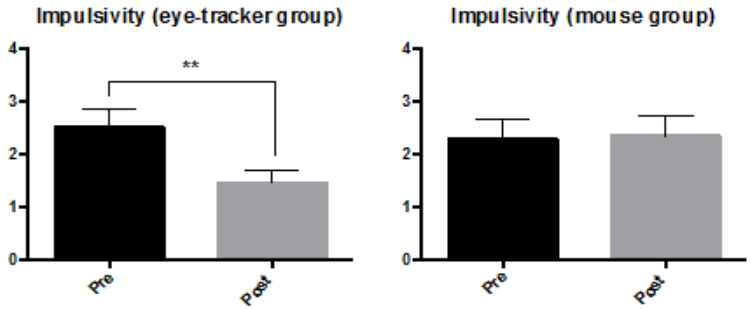
← Increase in beta power (orange area) in a brain region (DLPFC=Dorsolateral Pre-Frontal Cortex) involved in top-down control. Beta power is associated with motor inhibition.



← Gaze control performance positively correlated with time spent on RECOGNeyes training

Greater reduction in regressive (right-to-left) eye movements associated with greater time spent training. →





Pilot study of 28 children with ADHD, randomized to either the full RECOGNeyes prototype or to a version using a mouse instead of an eyetracker.

← After training, impulsivity was significantly decreased in the eye-tracker group ($p<0.01$) but not in the mouse group.

Collaborators

- Alba García, Tomas D’Amelio, Isadora Oliveira, Peter Collins, Carme Echevarria, Laura Perez Zapata, Hans Supèr.
- Peter Collins, Alice Waitt, Jyothika Kumar, Lauren Gascoyne, Jess Wintour, Bryony Waters, Georgia Demarteau
- Jade Weightman, Jason Keddy, Denewood School

Try it yourself!

We have laptops with the game installed in the MBD lab for you to try.