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# Eye gaze technology to gain access to cognitive processes in individuals with profound intellectual and physical disabilities (PIPD)

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## CONCLUSION

**Eye gaze technology has the potential to investigate basic underlying cognitive processes in adults with PIPD.**

**Multiple training sessions to learn to use eye gaze is necessary to gain access to cognitive processes among Individuals with PIPD.**

**Results:** Five out of six individuals understood cause and effect (>7 times). Five of them were able to give appropriate response, explore the whole screen, target specific objects and turn-taking (2-7 times). Only 3 of them were able to choose between objects (2-5 times).

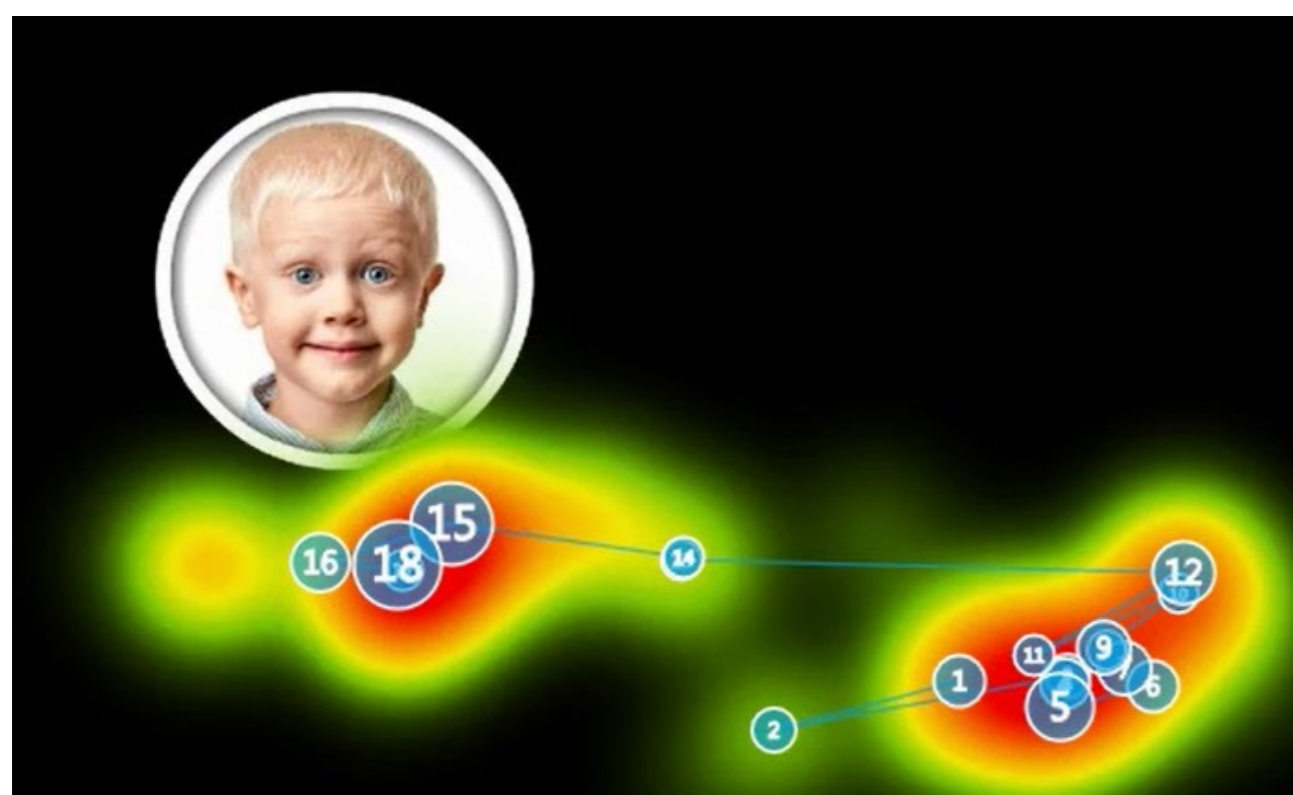


Fig.1a: 20170216 First session – it took 18 gaze points for participant A to come closer to the boy

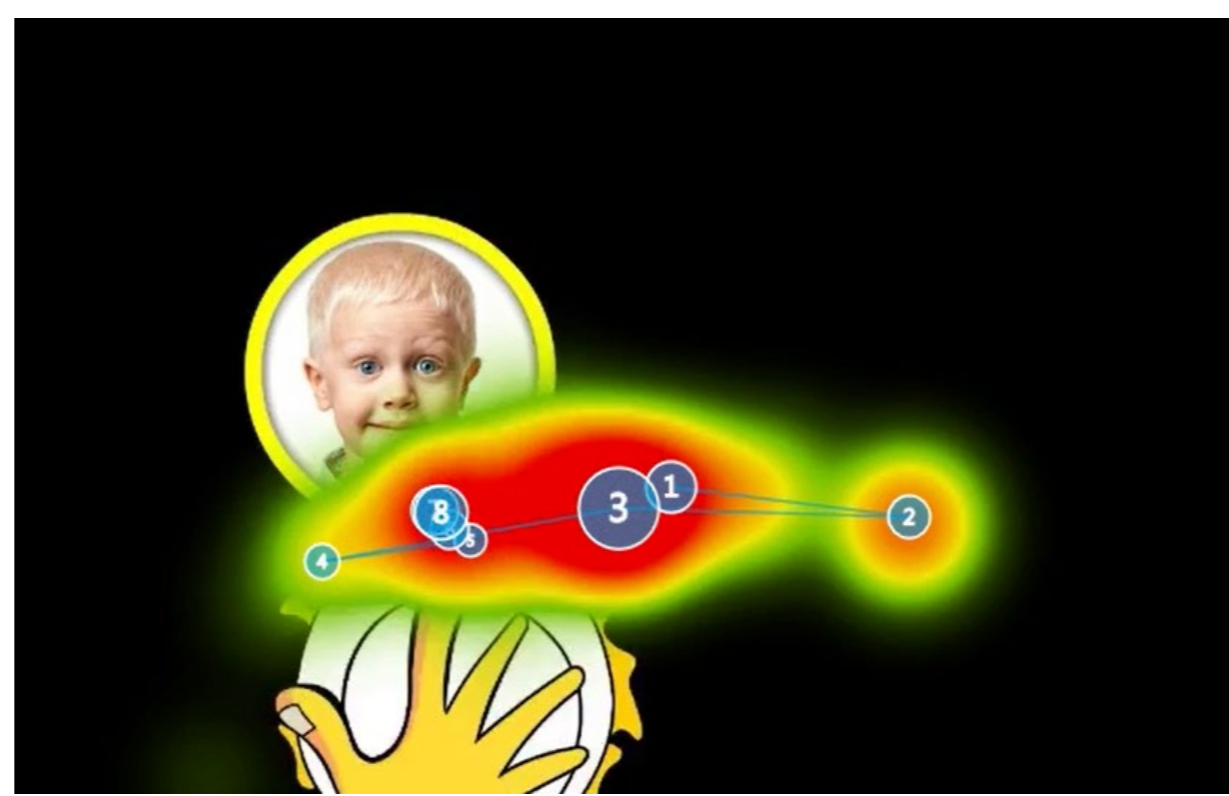


Fig.1b. 20170309 – it took 8 gaze points for participant A to come closer to the boy



Fig.1c. 20180517 – it took 7 gaze points for participant A to meet the boy's face.

**Objective:** Individuals with profound intellectual and physical disabilities (PIPD) often cannot speak for themselves and do things for themselves. Their level of cognitive abilities is unclear. Eye gaze technology has the potential to gain access to cognitive processes and eventually enable communication among these individuals.

**Method:** Six individuals with PIPD were given multiple sessions of eye gaze training (9-36 sessions) between February 17 to October 18. They used a screen eye-tracker (Tobii pc eye-mini) to control the objects/icons on the screen. An eye-gaze training program with different levels of activities was used to teach cause and effect, give appropriate response, explore the whole screen, target specific objects, choosing objects AND turn taking.



Fig 2a. Explore the screen – a participant used a water hose to wash car



Fig 2b. Target specific objects – a participant tried to shoot a lion



Fig 2c. Choosing between objects – a participant chose between different bars of a xylophone

**Analysis:** Eye-tracking data was video-recorded by Tobii gaze viewer program. The software shows heat maps and gaze plots of the areas the user has viewed on the screen. The heat map and gaze plot are superimposed over the image that the client was viewing at the time. The heat map (orange/yellow/green areas) shows what areas of the screen the user was looking at and the gaze plot shows the order of the user's gaze.