University of Helsinki introduces Neurofeedback to Finland. Finland is heavily invested in cutting-edge brain science, yet it has never before had dealings with neurofeedback (NFB), either in research or clinical practice. However research on ADHD in Finland has developed strongly (e.g. Helenius et al., 2011, Gumienyuk et al., 2004) and thus provides a good ground for the introduction of neurofeedback into Finland.

On par with more global estimates (Polanczyk et al., 2007), the prevalence of ADHD in Finnish 8-year-olds is estimated at 4% (DSM-III) (Almqvist, 2004), while among Finnish 16-18 year olds it rises to 8.5% (DSM-IV) (Smalley et al., 2007). Indeed, given that in Finland medication therapy for ADHD is lowest among all Scandinavian countries (Zoega et al., 2011), Finland’s need for other treatments may be substantial.

The CENT project will conduct a study on the effects of NFB on adult ADHD within Finland. Research is being conducted by the Cognitive Science Unit at the Institute of Behavioural Sciences, University of Helsinki, with NFB conducted by trained technicians supervised by qualified psychotherapists. Software is custom-built for the project, with games sourced from local companies.

**STUDY DESIGN**

The experiment aims to test the efficacy of neurofeedback for adults with either ADHD or ADD by randomized controlled clinical trial (RCT). The persistence of the treatment effects will also be monitored (using ASRS - Adult ADHD Self-Report Scale and placebo questionnaire of Barkley and Silfver (2005)).

Navigation and Data Acquisition

**SOFTWARE**

A new software platform was developed by the Finnish company BiStream for the study, integrating OpenVibe platform's signal analysis capabilities with a graphical user interface designed for the project. The platform gives the researcher or clinician the option to use different neurofeedback protocols and activities, for example, different games or auditory content. The program records relevant background information on the patient’s state before each session and tracks the patient's progress as the treatment proceeds.

The program is designed for a dual-monitor setup, with separate monitors for the therapist and the patient. In principle, it is possible for the patient and the therapist to be in different locations while training, thus enabling tele-neurofeedback.

**REFERENCES**


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**HARDWARE**

The study is using Neuroelectrics’ Enbloc system to feedback patient's EEG signals. Enbloc is a wireless 4-channel active-electrode EEG amplifier, which can utilise wet or dry electrodes interchangeably. With dry electrodes, uncomfortable abrasive skin preparation and messy gel is not needed, so recording can start almost immediately after the subject is ready and electrochemical equilibrium is established.

**Fig. 2 Timeline schematic of the Cent study.**

**Fig. 3 Screenshot of the software used in CENT**

**RESEARCHERS**

**PARTNERS**

Software: BILAtreat
Ludocraft
Secret Exit
Spinverse Oy

Clinical Mental Capital Cark
YHTS

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4th SEPTEMBER 2012

The training itself is based on thresholds calculated from baseline measurements. Currently two NFB protocols are supported, theta-bas (the default option) and SMi, one of these is chosen by the trainer at the beginning of a session.

**Fig. 1 EEG-based brain-computer interface**

**Fig. 3 Screenshot of the software used in CENT**

**RESEARCHERS**

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Lead Researcher: PhD Ben Copley
Research Assistants: Mona Moraala, Kristina Juhbma, Svetlana Kirjanen, Marbro Reifoo
Psychiatric Consultant: Dr. Leo Kovarik
Psychological Consultant: Prof. Laura Hakkikant

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