

ADHD Neurofeedback: Gameful gestures as transfer into daily life

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Abstract— The goal of neurofeedback training for ADHD is to learn to focus in daily life. However, many software-based trainings support success on the computer, but neglect the use of the ability in daily life. By the use of gestures in a mobile application we show a possibility to support the transfer of the learned focus in daily life. In an expert interview, this was assessed as very promising for training success.

I. INTRODUCTION AND RELATED WORK

ADHD (Attention deficit hyperactivity disorder) is the most common psychiatric disorder among children between 8 and 14 years and leads to problems in behavior and development. It is expressed by high distractibility, impulsiveness and restlessness. This often causes problems in social life or at school. At the same time, ADHD also brings positive characteristics such as deep immersion in a task (hyperfocus), a need for harmony and creativity. Instead of focusing on the negative traits, as is often the case today, the positive traits should be brought to the fore [1]. The relevance of positive reinforcement has been shown in an endless runner game [2]. Currently, ADHD is often treated with medication. An alternative is neurofeedback training, which is frequently described by children as uninteresting. The 30-60 minute training is carried out in up to 60 sessions in clinics or practices. However, the actual goal is to use the skills in daily life or to get support and to be reminded inconspicuously on the learned focus skill. Therefore, in this paper we propose a training game on a tablet, which is controlled by neurofeedback as well as a hand gesture, which can be used as a reminder. The contributions are a concept and a prototype to transfer the training into everyday life, to address the positive, as well as a first qualitative evaluation on psychological basis.

II. DESIGN CONSIDERATIONS AND PROTOTYPE

We have designed a casual game for training at home and on the go that can complement the current training. After previous interviews with therapists and children with ADHD, who quickly find their hyperfocus in the game 'Minecraft' (Mojang AB), the concept is based on building with blocks. The goal is to build a tower or other constructs (Figure 1). The background varies depending on the height. A MindWave Headset (NeuroSky) measures the height of the focus by a sensor. This is represented in the game: The higher the focus, the calmer is the gripper arm. The gesture is tracked by a Myo armband (Myo). A fist holds the crate on the gripper arm, while stretching the fingers lets the crate fall. For a better



Figure 1: Left: Gesture to control the crate, Middle: Focus to influence the gripper, Right: Tower under construction

memory, the gesture is carried out with the non-dominant hand. This inconspicuous gesture can be used, for example, in school to remind of the way to focus.

III. QUALITATIVE EVALUATION – METHOD AND RESULTS

We presented the project to a psychologist. In a semi-structured qualitative interview (duration: approx. 30 minutes) we asked questions about the possible effect of the game on children and the use of the gesture in play and everyday life.

It has been found that automating the gesture in the game creates a connection with the focus. The gesture can therefore, when used in everyday life, be a reminder of the way how to focus. The combination with the game supports the learning of the gesture positively and is well tailored to the target group.

IV. DISCUSSION, CONCLUSION AND FUTURE WORK

The gesture used may support the success of neurofeedback focus training for children with ADHD in daily life. Whether it is used probably depends on whether it is inconspicuous enough to avoid stigmatisation. The next step is to evaluate the effect of the game on children. This might create an opportunity to use gestures as a supportive expansion in ADHD therapy.

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*Research supported by ABC Foundation.

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