Computer games for user engagement in Attention Deficit Hyperactivity Disorder (ADHD) monitoring and therapy

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Abstract—State-of-the-art computer games and psychological tests for symptom monitoring and therapy in Attention Deficit Hyperactivity Disorder (ADHD) are explored and reviewed. Three foci for research studies are identified: task (human performance) focus; educational focus; medical/clinical focus. It is found that game designs in the literature include a variety of tests of cognition mostly dependent on attention and executive functions (inhibitory motor control, working memory, interference suppression) which involve reactions to stimuli on computer (or mobile phone) screens. In addition, based on the measurement of neural pathways that can be accessed by Brain Computer Interfaces, there are several applications of games that employ biofeedback and demand the user to control aspects of their brain activity to play them, with the aim of improving function. A number of games have been used in clinical studies for self-monitoring and therapy, some of these controlled with comparators such as treatment as usual or cognitive therapies, or with the individual as their own control, where efficacy is evaluated by measuring behavioural and functional outcomes on measurement instruments such as ADHD or behavioural trait questionnaires or other cognitive tests. Other applications of games include education and raising awareness of mental health conditions to reduce stigma. The paper then presents and proposes designs of new games that are based on psychological tests or tasks that aim to monitor or improve attention, inhibitory and/or motor activity including Continuous Performance Tests, Go/No-go and Stop-signal tasks.