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Exploring time perception and related neural activity in ADHD and non-ADHD young adults.

Viviers, Jean-Pierre

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Abstract

Attention-Deficit Hyperactivity Disorder (ADHD) is one of the most prevalent disorders diagnosed in children. However, less is known about the clinical manifestation of the disorder in adults and the impact thereof on for instance social and occupational functioning. With respect to temporal perception deficits in both child and adult ADHD, contemporary findings have produced mixed results. In line with this, the current investigation aimed to identify whether young adults who possess significant ADHD symptomology have pure time perception deficits and/or differences in self-reported habitual time perception.

Stratification of the ADHD and non-ADHD group was achieved using the Adult ADHD Self-report Scale (ASRS V1.1). Between group differences in self-reported temporal orientation was investigated using the Zimbardo Time Perspective Inventory (ZTPI). These outcome scores were compared using an ANOVA. The investigation into pure psychophysical time perception was conducted on a sub sample of that used in the self-report investigation. The ADHD group consisted of 12 participants whereas the non-ADHD group consisted of 10 participants. These two groups conducted temporal estimation and temporal discrimination tasks. Between groups, performances on these tasks were compared using an ANOVA.

In addition to this, electroencephalography (EEG) recordings of frontal, frontal midline and parietal activity during resting states and task performance were conducted. This allowed for between group comparisons in absolute and relative power scores at four different frequency bands (delta, theta, alpha and beta) to be made. A non-parametric Mann-Whitney-U test was used in this regard. The same statistical technique was used to compare the theta/beta ratios elicited by the resting state and temporal perception conditions. Results showed that those with significant ADHD symptomology have a characteristically different self-reported habitual time perception. This is illustrated by negative thoughts towards past and present life events, and an absence of future orientated behaviour.

In terms of the objective psychophysical measures, the current investigation found no group differences in estimation or discrimination task performance. Despite this absence of difference, the group with significant ADHD symptomology showed significantly different EEG recorded neural activity, during resting states and during task performance. The nature of this activity was in line with a generalised cortical under arousal hypothesis of ADHD. Taken together, these findings indicate that individuals with significant ADHD symptomology do not only consciously perceive time differently to those who do not have significant symptomology, but also show different neuro-physiological processes when performing tasks that require the utilisation of temporal processing mechanisms. In this way, the findings provide insight into possible objective measures that could be utilised in ADHD diagnosis.