

TIME PERCEPTION DEFICITS AND PROCRASTINATION IN ADULTS WITH ADHD: A CASE-CONTROL STUDY

Hilal Kolsuz Kaya¹, Hatice Kaya²

¹*Gaziantep City Hospital, Department of Psychiatry, Gaziantep, Türkiye*

²*Erenköy Mental and Nervous Diseases Training and Research Hospital, Department of Psychiatry, İstanbul Health Sciences University, İstanbul, Türkiye*

BACKGROUND AND AIM: Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by attentional difficulties, impulsivity, and hyperactivity that begins in childhood and often persists into adulthood. ADHD symptoms may change over time, and their presentation can become less evident with age. Thus, identifying secondary features in adult ADHD that are not fully reflected in standard diagnostic criteria is important. Although motor hyperactivity often becomes less apparent in adulthood, attentional deficits may manifest as difficulty sustaining attention, task completion problems, poor time management, and procrastination (Kooij et al., 2019). The presence of time-related difficulties in the daily lives of individuals with ADHD suggests a potential deficit in time perception. Accordingly, studies have suggested that time perception deficits are a significant component of the cognitive profile of ADHD and may represent a focal symptom (Noreika et al., 2013). Children with ADHD have consistently been shown to perceive time with lower accuracy, systematically overestimate or underestimate durations, and exhibit significant impairments in time discrimination (Ptacek et al., 2019). In contrast, research assessing time perception in adult ADHD samples remains limited, and the persistence and specific characteristics of these deficits in adulthood are still unclear (Mette, 2023).

Meanwhile, procrastination—a common and functionally impairing problem in adult ADHD—may also be related to similar underlying cognitive mechanisms associated with time perception (Bolden & Fillauer, 2020). In this context, the present study aimed to assess time perception impairments in adults with ADHD using time estimation (TE) and time reproduction (TR) tasks, to examine their relationship with procrastination, and to compare the findings with healthy controls.

METHODS (Ethics Committee Approval must be obtained and the number should be specified.): The study was approved by the Clinical Research Ethics Committee of Erenköy Mental and Neurological Diseases Training and Research Hospital (Approval No: 2024/11; April 19, 2024). The study included 54 adults aged 18–45 whose ADHD diagnosis was confirmed

using the DIVA-5 structured clinical interview, and 50 age- and sex-matched healthy controls with no history of psychiatric disorders. Psychiatric comorbidities were ruled out via structured clinical interviews using SCID-5.

Time perception was assessed using TE and TR tasks. Procrastination behavior was evaluated using the General Procrastination Scale and the Tuckman Procrastination Scale, while emotional symptoms were assessed with the Depression Anxiety Stress Scale-21 (DASS-21), and ADHD symptom severity with the Adult ADHD Self-Report Scale (ASRS).

RESULTS: While no significant differences were found between groups on the TE task, the ADHD group exhibited significantly lower accuracy and higher deviation scores on the TR task, particularly at longer intervals (8 and 10 seconds) ($p < 0.01$). They also systematically underestimated these durations compared to controls. Both general and academic procrastination scores were significantly higher in the ADHD group ($p < 0.01$). A meaningful association was observed between time perception impairments and procrastination behavior, especially at longer intervals. Among emotional variables, academic procrastination was significantly associated with stress levels. In subgroup analyses, non-medicated ADHD participants showed significantly greater estimation errors in TE tasks at longer durations, whereas no significant differences were found in TR task performance.

CONCLUSIONS: This study demonstrates that time perception deficits persist in adult ADHD and suggests that TR tasks—particularly at longer durations—may serve as a more sensitive measure for detecting these impairments. Furthermore, procrastination behavior is highlighted as a clinically relevant feature in adult ADHD beyond conventional diagnostic criteria. The observed association between impaired time perception and increased procrastination offers novel insight into potential shared cognitive mechanisms. Although these findings offer valuable clinical implications, future studies with larger samples and more refined variable analyses are needed to substantiate and elaborate on the observed relationships.

REFERENCES

- Bolden J, Fillauer JP. "Tomorrow is the busiest day of the week": Executive functions mediate the relation between procrastination and attention problems. *J Am Coll Health*. 2020;68(8):854-63.
- Kooij JJS, Bijlenga D, Salerno L, Jaeschke R, Bitter I, Balázs J, et al. Updated European Consensus Statement on diagnosis and treatment of adult ADHD. *Eur Psychiatry*. 2019 Feb;56:14-34.
- Mette C. Time Perception in Adult ADHD: Findings from a Decade-A Review. *Int J Environ Res Public Health*. 2023 Feb 10;20(4):3098.
- Noreika V, Falter CM, Rubia K. Timing deficits in attention-deficit/hyperactivity disorder (ADHD): evidence from neurocognitive and neuroimaging studies. *Neuropsychologia*. 2013 Jan;51(2):235-66.
- Pracek R, Weissenberger S, Braaten E, Klicperova-Baker M, Goetz M, Raboch J, et al. Clinical Implications of the Perception of Time in Attention Deficit Hyperactivity Disorder (ADHD): A Review. *Med Sci Monit*. 2019 May 26;25:3918-24.

Keywords: Adult ADHD, time perception, time reproduction, time estimation, procrastination