Article

Unique Patterns of Eye Movements Characterizing Inattentive Reading in ADHD

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Abstract

Objective: We aimed to identify unique patterns of eye-movements measures reflecting inattentive reading among adults with and without ADHD. **Method & Results:** We recorded eye-movements during uninterrupted text reading of typically developed (TD) and ADHD adults. First, we found significantly longer reading time for the ADHD group than the TD group. Further, we detected cases in which words were reread more than twice and found that such occasions were much more frequent in participants with ADHD than in TD participants. Moreover, we discovered that the first reading pass of these words was less sensitive to the length of the word than the first pass of words read only once, indicating a less meaningful reading. **Conclusion:** We propose that high rate of words that were reread is a correlate of inattentive reading which is more pronounced among ADHD readers. Implications of the findings in the context of reading comprehension are discussed. (*J. of Att. Dis. 2024; 28(6) 1008-1016*).

Keywords

adult-ADHD, reading, eye-movements, inattentive reading

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by behavioral symptoms of inattention and hyperactivity/impulsivity. ADHD in adults is often associated with poor outcomes in occupational, social and emotional functioning, and with poor academic achievement (Able et al., 2007; Arnold et al., 2020; Barkley et al., 2006; Biederman et al., 2006, 2012).

Academic achievement is based on many factors, including intelligence, motivation, educational history and learning skills, to name a few. One of the most fundamental learning skills is reading. Effective reading requires not only proficiency, but also allocation of attention to the processing and comprehension of the text. People with ADHD struggle with maintaining their attention and suffer from frequent lapses of concentration, thus their attention and thoughts are often not linked to the text they are reading, but rather captured elsewhere (Wender, 2001).

Such mind wandering during reading negatively affects comprehension (Bonifacci et al., 2023; Franklin et al., 2011; Smallwood et al., 2007). This phenomenon is known in the literature as mindless reading.

The pattern of inattentive reading could be related to mind wandering observed in ADHD in other contexts: adults with ADHD self-report more mind wandering in questionnaires pertaining to daily life (e.g., Arabacı & Parris, 2018; Biederman et al., 2017; Mowlem et al., 2019; Seli et al., 2015), and several previous studies using cognitive tasks with probes also demonstrated increased mind wandering in ADHD (Franklin et al., 2017; Van den Driessche et al., 2017). Furthermore, mind wandering could be related to the broader phenotype of inattention. Among children and adults without ADHD, mind wandering (as measured by both probes and questionnaires) has been linked to reduced sustained attention and increased response time (RT) variability (Bastian & Sackur, 2013; Seli et al., 2013). While this relationship has not been directly assessed in ADHD, increased RT variability is one of the main characteristics of cognitive performance in ADHD (Christakou et al., 2013; Karalunas et al., 2012; Kofler et al., 2013; Rubia et al., 2009; Segal et al., 2015). Specifically, it has been suggested that RT variability in ADHD is partially attributed to 'lapses of attention': occasional exceptionally long RT on some trials, that skews the RT distribution (Gmehlin et al., 2014; Tamm et al., 2012; Thomson et al.,

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2020). Such lapses of attention seem like candidate correlates of the instances of inattentive reading, and it is possible that both arise from the same neural mechanism.

The different reading experience of students with ADHD is also shown in a slower text reading speed compared to TD young adults (Miranda et al., 2017) and in altered eye movements during reading: shorter fixations, a lower proportion of left to right saccades, a greater proportion of vertical saccades (Deans et al., 2010), a significantly higher number of fixations, regressions, saccades in return sweeps, and anomalies of fixations and regressions compared to the control group (Molina et al., 2020).

Previous eye-tracking studies with TD participants, demonstrated that inattentive reading is characterized by different patterns of eye movements than attentive reading. In normal attentive reading the word length is expected to associate with its fixation duration. That is, fixation duration is expected to be longer for longer words than for short words as longer words are often fixated more than once before leaving the word (Rayner, 2009). During mindless reading fixations were longer for short words than during normal reading thus less affected by lexical and linguistic variables (Reichle et al., 2010). While fixation durations are expected to be shorter when reading frequent compared to infrequent words during attentive reading this pattern was absent during mindless reading (Foulsham et al., 2013; Schad et al., 2012; Steindorf & Rummel, 2020). Furthermore, eye movements are less active (i.e., slower and/or less frequent) when participants reported mind-wandering episodes. In particular, duration and frequency of within-words regressions became significantly reduced (Uzzaman & Joordens, 2011). Notably, these previous studies investigating mindless reading deployed self-caught or probe-caught mind wandering paradigms. In the self-caught paradigm participants press a button whenever they notice they were inattentive, providing a measure of mind wandering that has reached awareness. In the probe-caught paradigm, participants report if they are experiencing mind wandering or not by random probes. If indeed participants were caught inattentive it is an indication of mind wandering episodes that participants were not aware of (Sayette et al., 2009). However, both ways create external intrusions to the natural reading process and might interfere artificially with the inattentive reading mode. To avoid that, in the present study participants read the text continuously with no interruptions, and they were given no specific instructions regarding attention.

First, we compared the overall reading duration of typically developed (TD) and ADHD participants. Then, we computed eye movement measures to examine the reading patterns of typically developed (TD) and ADHD individuals aiming at identifying spontaneous episodes of inattentive reading. People with ADHD frequently report the need to read the same paragraph repeatedly to comprehend it (Robin, 1998). Therefore, we hypothesized that this pattern of repeated reading is caused by inattentive reading, in the first place, during which the reader processes the text superficially which does not allow him to extract the meaning of the text (Smallwood, 2011) because his/her attention drifts away. When the reader's attention returns to the text, they will read the passage again after noticing that the text is not comprehended. If this is indeed the case, eye-movements that were recorded before the reader reread the passage again, will enable us to identify the inattentive reading period prior to the point in time where the readers were aware of their inattentive reading, without interrupting the natural reading process. The aim of the present study was to identify eye-movement measures that reflect the repetitive pattern of inattentive reading and to test whether they can discriminate between reading of individuals with ADHD and reading of TD individuals.

Method

The experimental protocol was approved by the Ethics Committee at Tel-Aviv University and conformed to the guidelines for human subject research. All participants signed on informed consent prior to participation.

Participants

A total of 52 adults with ADHD (32 females, mean age = 27.22 years, SD = 4.72) and 30 typically developed (TD) adults (16 females, mean age = 26.86 years, SD = 3.87; $t[81] = .35$, $p = .27$) participated in the study. Participants were recruited to participate in the study through advertisements within university and college campuses. Participants with ADHD filled the Hebrew version of the Adult ADHD Self-Report Scale (ASRS; Adler et al., 2006). The questionnaire is based on the DSM-IV list of symptoms. In the Hebrew version, a sum score (across all 18 items) of 51or higher is considered as an indication of ADHD (Zohar & Konfortes, 2010). This measure was found to be more sensitive than the 6-items screen suggested by the authors of the original version (in English) of the ASRS (Adler et al., 2006). As expected, the average score of the participants with ADHD was higher than 51 ($M = 63.67$, $SD = 10.52$). All the participants were higher education students at the time of the study or in the past, and all were Hebrew speakers.

Inclusion and exclusion criteria: participants with ADHD were asked to complete the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983) and the Beck Depression Inventory (BDI; Beck et al., 1961)—to assess anxiety and depression, respectively. Selection criteria for participants with ADHD were: (1) Previous diagnosis of ADHD by a psychiatrist or neurologist. (2) No clinical levels of anxiety or depression, as defined by scores lower than 60 in the STAI (Epstein et al., 2010) and lower than 20 in the BDI

(Dozois et al., 1998) (3) No previous diagnosis of neurological or psychiatric disorders, including epilepsy, schizophrenia, autism spectrum disorder, depression or anxiety (according to self-report). (4) No regular use of psychoactive drugs, except those used to treat ADHD. Participants with ADHD who fulfilled the above criteria underwent a clinical interview by a psychiatrist who was a member of the research team (ST) to confirm the diagnosis of ADHD and to rule out other psychopathologies. Participants with ADHD who were using stimulants underwent a 24-h washout period prior to the experimental session. Typically developed (TD) participants were included in the study if they were not diagnosed as having neither ADHD or any other psychopathology or neurological condition in the past, based on self-report.

Apparatus

An EyeLink 1000 eye tracker (SR research, Ottawa, Ontario, Canada) monitored the gaze location of the participant's left eye during reading. The eye tracker had a spatial resolution of 30 arcmin and a 1000-Hz sampling rate. Participants viewed the text on a 17" Dell computer monitor located 65 cm from their eyes, at a visual angle of 32°. Chin and forehead rests were used to minimize head movements. The eye tracker was calibrated at the beginning of the session. No further calibrations were done during the session, to enable uninterrupted reading. Texts were presented using SR research Experiment Builder software and eye movement data were analyzed off-line using SR Research Data Viewer software.

Materials

The text was taken from an academic paper in the field of education, titled: "All about children and numbers: How the standardized test and achievement policy ruins our schools" (Goldshmidt, 2011; in Hebrew). Two segments of text were extracted from the paper, and participants were randomly assigned to read one of them. Half of the participants read one text and the other half read the other. The texts consisted of 1,271 and 1,299 words and were divided to 16 sections of 4 to 8 lines each. One section was displayed on a computer monitor at a time, and participants could progress between sections by pressing the "Enter" key. Participants were told that they will be requested to answer comprehension questions at the end, to ensure meaningful reading.

Eye movement measures

To assess eye movement patterns, we calculated five measures from the data obtained by the eye tracker:

Overall reading duration: The overall time in seconds, participants spent reading the text.

The average fixation duration: We computed the ratio between the total duration of fixations performed in the entire text and the number of fixations performed in the text.

Average viewing time per word: We computed an overall proportional measure by dividing the sum of all fixation durations (including those occurring as a result of inter-word regressions) by the number of all fixated words. Due to the possibility of erratic nature of eye movements during unattended reading, we included all fixations in this analysis (Reichle et al., 2010).

Proportion of words that were passed only once: These are the words that were fixated only during the first pass and the reader did not return to them once the eyes moved on to the next word. We computed the ratio between the number of words that were passed only once and the number of words in the article. This measure reflects attentive reading periods since there was no need to reread parts of the text again to understand it.

Proportion of words that were re-fixated more than twice: These are the words that the reader returned to read more than twice by moving the eyes backward (regression saccades). We assumed that there could be various reasons to read a word twice (e.g., misunderstanding, lack of proficiency, word ambiguity or vocabulary difficulty), but reading a word more than twice is likely to reflect initial inattentive reading. We computed the ratio between the number of words that were re-fixated more than twice and the number of words in the article.

Procedure

The reading session began with a calibration of the eye tracker. The participants were instructed to read the text to understand it and to be able to answer comprehension questions. Participants then read at their own pace by clicking the "Enter" key to move forward to the next section until they read all the 16 sections. After that, they were given six open questions printed on a paper and they could see a printed version of the text while answering.

The first five questions were short and scored 10 points each. The last question summarized the main ideas of the text and was scored 25 points. To evaluate the answers an indicator was composed based on the answers of the TD group participants. Grading of the answers was done by two graduate students and the first author. In any case of disagreement, a discussion was held to reach agreement by all three judges.

Statistics

All statistical tests were conducted using SPSS version 27. Given the use of two texts, ANOVAs with text and group as the between-participants factors were calculated.

Additional analysis of the main group comparisons was conducted using the non-parametric Mann-Whitney test, to account for the non-normal distribution of some of the measures. The results confirmed the effects found in the main analysis and are reported in the Supplementary Materials. Repeated-measures ANOVAs were used to analyze sub-groups of words according to their reading patterns and lexical properties.

Results

Two different texts were extracted from a single academic article, each read by half of the participants in each group. Although the texts were matched in style and difficulty level, we first verified that eye movement patterns during reading of these texts is equivalent. ANOVAs with eye movement measures (*overall reading duration, the average fixation duration, average viewing time per word*, *proportion of words that were passed only once* and *proportion of words that were re-fixated more than twice*) as the dependent variables and text as the between-participants factor showed no significant differences between the texts (see Supplementary materials for full report). To avoid missing possible interactions between text and ADHD, we, nevertheless included the text variable as a between-participants factor in all the following analyses.

Participants from both the ADHD group and the TD group performed similarly in the comprehension questions. On average, the ADHD group scored 75% (56.44 out of 75) and the TD group scored 74% (55.17 out of 75), indicating that participants of both groups showed a high level of understanding. In addition, comprehension scores were similar in both texts ($M1 = 57.35$, $SD = 14.50$; $M2 = 54.46$, $SD = 13.73$); ($t_{(1,80)} = .92$, $p = .36$, *Cohen's d* = .20)

Eye-movement patterns in reading of individuals with ADHD compared to typically developed (TD) adults

Figure 1 demonstrates the differences in eye movement measures between the ADHD and the TD groups.

First, we checked the overall reading duration. ANOVA with group and text as the between-participants factor revealed main effect of group suggesting significantly longer reading time for the ADHD group ($M = 550.04$ sec, $SD = 209.73$) than for the TD group ($M = 435.67$ sec, $SD = 119.60$; $F_{(1,78)} = 8.87$, $p = .004$, $\eta_p^2 = .10$). No text effect, nor interaction between group and text were found ($F_{(1,78)} = 3.40$, $p = .07$, $\eta_p^2 = .04$; $F_{(1,78)} = .89$, $p = .35$, $\eta_p^2 = .01$, respectively). Further, ANOVA on the average viewing time per word (msec) with group and text as the between-participants factor revealed main effect of group suggesting significantly longer viewing time per word for the ADHD group ($M = 522.54$ msec, $SD = 176.09$) than for the TD group ($M = 432.12$ msec, $SD = 104.39$; $F_{(1,78)} = 7.42$, $p = .008$, $\eta_p^2 = .09$). No text effect, nor interaction between group and text were found ($F_{(1,78)} = 1.69$, $p = .197$, $\eta_p^2 = .02$; $F_{(1,78)} = 1.10$, $p = 3.0$, $\eta_p^2 = .01$ respectively).

Why Participants With ADHD Tend to Exhibit Prolonged Viewing Time?

One possible reason for longer viewing time per word found in the ADHD group can be longer fixation duration. However, ANOVA with the *average fixation duration* and with group and text as the between-participants factors showed no significant difference between the two groups (ADHD: $M = 221.87$ msec, $SD = 26.05$; TD: $M = 219.49$ msec, $SD = 29.48$; $F_{(1,78)} = .16$, $p = .69$, $\eta_p^2 = .002$). As well as no text effect, or interaction between group and text ($F_{(1,78)} = .01$, $p = .92$, $\eta_p^2 = .00$; $F_{(1,78)} = .41$, $p = .51$, $\eta_p^2 = .005$ respectively). Alternatively, the difference in average viewing time per word between the ADHD and the TD groups could be the result of ADHD participants rereading words more often compare to TD participants. Such frequent rereading can in turn increase the overall reading time. ANOVA with the *proportion of words that were re-fixated more than twice* and with group and text as the between-participants factors confirmed this hypothesis. A main effect of group suggested that the ADHD group made significantly more re-fixations on words ($M = .145$, $SD = .108$) than the TD group ($M = .082$, $SD = .074$; $F_{(1,78)} = 9.36$, $p = .003$, $\eta_p^2 = .11$). It should be noted that, a main effect of text was also found, suggesting that more re-fixations were made while reading text 2 than text 1 ($F_{(1,78)} = 4.21$, $p = .04$, $\eta_p^2 = .051$) for both groups as no interaction was found between group and text ($F_{(1,78)} = .32$, $p = .57$, $\eta_p^2 = .004$). As can be seen in Figure 1, there are outliers in all measures, thus we re-analyzed the data using non-parametric tests. The results confirmed the effects of the main analyses and are detailed in the supplementary materials.

Why Participants With ADHD Exhibited More Episodes of Re-fixated Words?

Next, we wanted to examine whether the phenomenon of repeated fixations on words that were more pronounced among the ADHD group was a result of inattentive reading in the first place. As in the current study we decided not to disrupt the readers while reading the text, to enable them to authentically get into zoning out periods, participants were not asked to report when they realized that they experienced an episode of inattentive reading. Thus, to answer the above question we compared the gaze durations (sum of all first pass fixations) of words that were passed only once and words that were re-fixated more than twice, assuming that words that were passed only once were attended at their first pass, whereas the first pass of words that were re-fixated

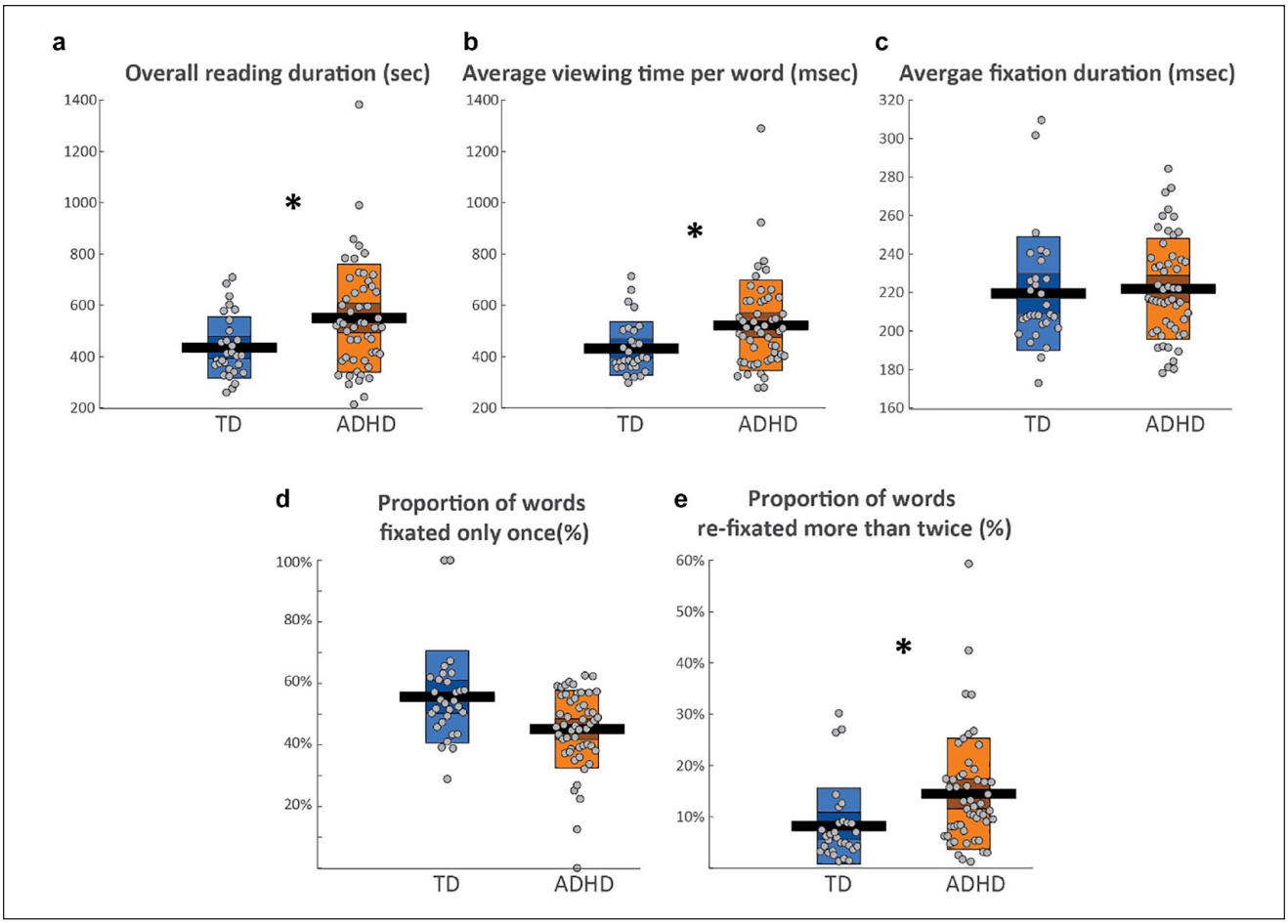

Figure 1. Group comparisons of eye movement measures.
Note. In each panel, the left bar (blue) represents the typically developing group (TD), and the right bar (orange) represents the ADHD group. Horizontal black lines denote the group mean, bars denote 95% confidence intervals, and the central dark area of each bar denotes 1 *SD* around the mean. Gray symbols represent individual participants.
*Denotes a significant group difference ($p < .01$).

several times was not attended and therefore re-reading was needed. Gaze duration is an early measure that is influenced by lower-level lexical properties such as word frequency and word length (Rayner & Duffy, 1986).

According to Reichle et al. (2010), fixation durations were shorter for short words during normal reading than during mindless reading. It was expected therefore that during periods of inattentive reading the relation between the total time a word is fixated and its length will be weaker than during attentive reading because the decision about when to move the eyes is less affected by cognitive processing that occurs during normal reading (Reichle et al., 2010). For this analysis, we calculated the median of the word's length across the entire text and used it to classify each word as long or short. Words shorter than the median were classified as short words and words longer than the median were classified as long words. For each participant, gaze durations were calculated for the short and for the long words separately. We expected that for words that were re-fixated more than twice (reflecting inattentive reading) the difference between gaze duration of short and long words will be smaller than the same difference for words that were passed only once (reflecting attentive reading). Gaze durations by word length and whether the word was fixated only once or more than twice are presented in Table 1. Three-way ANOVA with number of passes (only once vs. more than twice), word length (short vs. long), as within-subjects fixed factors, group (ADHD vs. TD) as between subject factor and gaze duration as the dependent variable revealed a significant main effect of word length ($F_{(1,80)} = 155.52$, $p < .001$, $= .66$). Gaze durations of long words ($M = 319.98$ msec, $SD = 78.52$) were longer than gaze durations of short words ($M = 261.76$ msec, $SD = 50.29$), as expected. More interestingly, there was a significant interaction between word length and number of passes ($F_{(1,80)} = 26.48$, $p < .001$, $\eta_p^2 = .25$). The difference of gaze durations between short and long words that were passed only once was

Table 1. Gaze Durations (msec) of Long and Short Words That Were Passed Only Once and Words That Were Re-fixated Repeatedly.

	Long words ($n=82$)		Short words ($n=82$)	
	Mean	*SD*	Mean	*SD*
Read only once	329.72	89.48	256.13	47.14
Re-fixated more than twice	310.22	64.91	267.40	53.00

significantly greater than the same difference for words that were repeatedly re-fixated ($t_{(81)}=5.56$, $p<.001$, Cohen's $d=0.65$; see Table 1 and Figure 2). This finding suggests that the first reading of words that were repeatedly read was less sensitive to their length compared to the reading of words that were passed only once. In other words, the first read of words that were passed more than twice was less cognitively driven. Hence, this effect supports our hypothesis that these words were read less attentively.

The main effect of group was not significant (difference of gaze durations between short and long words: read only once: ADHD—$M=77.07$ msec, $SD=49.37$; TD—$M=67.54$ msec, $SD=41.44$; $F_{(1,80)}=.79$, $p=.38$, $\eta_p^2=.010$; read more than twice: ADHD—$M=43.28$ msec, $SD=51.93$; TD—$M=42.03$ msec, $SD=40.72$; $F_{(1,80)}=.01$, $p=.91$, $\eta_p^2=.000$). Similarly, all of the interactions involving group were not significant (passes × group: $F_{(1,80)}=.45$, $p=.50$, $\eta_p^2=.006$; length × group: $F_{(1,80)}=.34$, $p=.56$, $\eta_p^2=.004$; passes × length × group: $F_{(1,80)}=.52$, $p=.48$, $\eta_p^2=.006$).

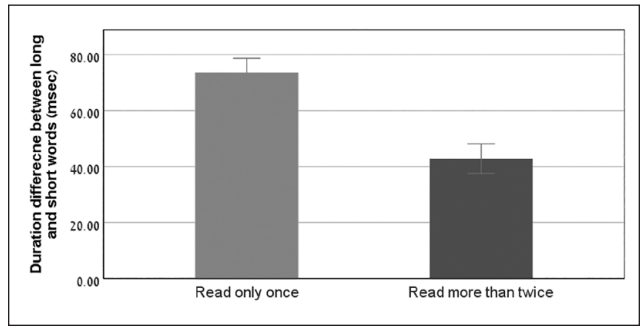

Figure 2. The difference of gaze durations (msec) between short and long words that were read only once versus words that were read more than twice.

Discussion

This study focused on eye-movements patterns during reading among higher-education adults with and without ADHD. Adults with attention deficits pursuing higher education are a unique subgroup of the broader ADHD population (Sedgwick, 2018). They are likely to have relatively high intellectual abilities, less cognitive impairments, and high motivation, that enabled them to successfully persist through high school and be admitted to higher education institutions. In addition, over their long learning experience many of them have developed compensatory skills that enable them to cope successfully with their difficulties, specifically in academic settings (Frazier et al., 2007; Sedgwick, 2018). Nonetheless, inefficient reading comprehension remains a frequent obstacle experienced by higher-education students with ADHD (Smallwood et al., 2007). In the present study, participants with ADHD had significantly longer reading time of a text compared to participants without ADHD. The goals of the present study were to develop eye-movements based measures that can reflect inattentive (mindless) reading and to compare higher education students with and without ADHD. To do so, we detected cases in which words were reread more than twice. We did not analyze words read exactly twice, to avoid cases in which second reading of a given word was necessary to select the appropriate meaning of homonym or to disambiguate the meaning of a word in a complex sentence. Significant differences were found between observed patterns of eye movements during reading of participants with ADHD and TD participants—individuals with ADHD showed significantly more repeated reading than TD individuals. To characterize eye movement correlates of inattentive reading, we compared eye-movement patterns in words that were read more than twice with those observed in words that were read only once. Analysis of the first pass of words that were reread more than twice revealed an attenuated word-length effect: The difference in fixation duration between short and long words was smaller in the reread words than in words that were passed only once. Reichle et al. (2010) found that first pass fixation durations were shorter during normal reading for shorter words than during mindless reading, and so did Kliegl et al. (2004). The authors explained that this finding may reflect some combination of both sub-lexical processing (e.g., the extraction of orthographic information) and lexical processing (e.g., the activation of word meaning). Thus, the finding in the present study that the first reading of words that were read repeatedly was less sensitive to lexical properties of the word (the word length) supports the hypothesis that the encoding and processing of these words were less driven by cognitive processes (Reichle et al., 2003). This finding corroborates the assumption that words that are read repeatedly can be the result of inattentive reading. In addition, regarding this length effect, group (ADHD vs. TD) had no significant

effects, which indicates that words that were re-fixated more than twice were read initially inattentively among the TD group as well. Yet, in the present study it occurred significantly more frequently among ADHD than TD readers.

Our findings demonstrate that reading of participants with ADHD is characterized by more frequent repeated reading. Unlike previous studies, this result was obtained during naturalistic reading, without external interference that may change the natural dynamics of mindless reading. This is an ecologically valid paradigm, providing objective empirical measures, which, revealed the tendency of ADHD individuals to lapse more often into periods of mind wandering during reading. This effect is in accordance with the hypothesis that decisions on when to move the eyes during reading are linked to ongoing cognitive processes such as word identification (Clifton et al., 2016). Therefore, it seems that during reading the process of word identification among individuals with ADHD is disrupted more often than in TD participants.

One of the main limitations of the study is that we did not screen the TD participants using ADHD symptoms questionnaires and/or psychiatric assessment. Note however that applying such measures may have resulted in a more homogenous TD group that could have strengthen our effects. Other limitations are (1) our small sample size which limited the statistical power, specifically the small size of the TD group. Nevertheless, the statistical power of the present study enabled detecting medium to large effects. (2) We did not assess the participants' reading skill and intelligence before the experiment since we assumed that students who succeeded to get to university have good reading skills and normal intelligence. Moreover, their reading comprehension was good and can probably testify to good reading ability. (3) We decided to include all ADHD participants that their diagnosis was approved by the psychiatrist in the study regardless of their subtype. Notably, there are mixed reports about differences in cognitive functioning between subtypes of ADHD in adulthood. For example, Tucha et al. (2008) found that while distinct profiles of attentional functioning were observed between adult patients with ADHD and healthy adults, in patients with ADHD, differences between ADHD subgroups were only weak and Murphy et al. (2001) failed to find differences between ADHD subtypes.

In conclusion, to our knowledge, this is the first study that documented eye-movement patterns of authentic inattentive reading episodes without using self-caught, probe-caught or manipulation of the text (see Schad et al., 2012), all of which intervene with the ecological nature of reading. Moreover, this is the first study that documented eye-movement patterns of inattentive reading among adults with ADHD. Although eye-movements of adults with ADHD have been studied in a variety of cognitive tasks they were under-studied in the context of reading, despite the great difficulty of individuals with ADHD in reading comprehension (Brock & Knapp, 1996; Ghelani et al., 2004; Martinussen & Mackenzie, 2015; Stern & Shalev, 2013). As such, the findings of this study add valuable information about reading patterns as measured by eye-movements that shed light on the reasons for the difficulty individuals with ADHD face in reading comprehension, especially for studying purposes. Notably, the ADHD group in the present study comprised of higher education adults, who likely developed successful learning strategies. Yet, even these high functioning and well-experienced individuals showed significant differences in terms of eye-movement measures that characterize inattentive reading. The present findings can also unravel potential causes of the tendency of ADHD individuals to avoid reading. Based on these results, the present findings suggest that simple techniques may aid students with ADHD in reading tasks, by refocusing their attention. For example, integration of brief comprehension questions throughout the text, and using visuals emphasizing important information, could be helpful and should be evaluated in future research.

Declaration of Conflicting Interests

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Supplemental Material

Supplemental material for this article is available online.

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