Chronic Stress and Cognitive Functioning: Mediation Effects on ADHD Symptomatology

A DISSERTATION

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by

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Abstract

Background: This study sought to broaden our understanding of ADHD symptomatology in a large sample of adults (*n* = 118, female = 87, male = 31), aged 18-62 years. This study investigated the mediating effects of cognitive functioning on the association between chronic stress and Attention-Deficit-Hyperactive-Disorder (ADHD). The objective was to expose a potential mechanism emphasizing the relationship between chronic stress and ADHD symptoms. **Methods:** An online questionnaire was conducted consisting of three scale measures; Chronic Stress Index (CSI) Cognitive Functioning Self-Assessment Scale (CFSS) and Attention-Deficit-Hyperactive-Disorder Self-Report Scale (ASRS-v1.1). **Results:** A significant indirect effect of chronic stress (X) on ADHD symptoms (Y), through cognitive functioning (M) was observed (*B* = 1.40, *95% BCa CI* [.613, 2.29], *p* = .0009), while the direct effect of X on Y became non-significant (*B* = .686, *95% BCa CI* [-.234, 1.61], *p* = .142), in the presence of M, indicating full mediation. **Conclusion:** Findings highlight the detrimental effects that exposure to chronic stress imposes on cognitive functioning, while presenting as a fundamental influential factor in the prevalence of ADHD symptoms via indirect effects. These findings inform our knowledge and understanding of ADHD symptomatology, which may inform future clinical practice.

Keywords: chronic stress, cognitive functioning, ADHD symptomatology, mediation analysis

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Introduction

This research examined whether cognitive functioning mediates the relationship between chronic stress and Attention-Deficit-Hyperactive-Disorder (ADHD) symptoms in a large sample of 118 adults to broaden our understanding of ADHD symptomatology. The following section will discuss key literature published on this topic to date and present a rationale for the current study.

Attention-Deficit-Hyperactive-Disorder (ADHD) is a neurodevelopmental disorder characterised by the following behavioural symptoms: hyperactivity, inattentiveness, and impulsive behaviours (Block et al., 2023), believed to be genetically inherited (Sharp et al., 2009). With substantial heritability rates being observed across the lifespan, ranging from 72-88% (Larsson et al., 2013). ADHD was originally defined by the American Psychiatric Association's (APA) manual of disorders, DSM-III (Cooper & Michels, 1981), as ADD- with or without hyperactivity, but later changed their definition to what it is known as today, reflecting the new research findings in the area, DSM-IV (Carter, 2014).

Studies have been carried out globally to estimate the prevalence of ADHD diagnosis in adults. Ayano et al., (2024) published findings from a comprehensive umbrella review of numerous studies, meta-analyses and systematic reviews, inclusive of 3.25 million participants. Their findings indicate the global prevalence rate of ADHD in children and adolescence to equate to 8%, with apparent gender differences whereby boys were twice as likely to be diagnosed (10%) in comparison to girls (5%). In more recent years, Abdelnour et al. (2022) reported findings which showcased an increase in the prevalence of ADHD diagnoses from 6.1% to 10.2%, across a 20-year span. Compiled reports indicating a high global prevalence of both childhood, adolescent and adult ADHD. Besides behavioural symptoms associated with the neurodevelopmental disorder, impairments in cognitive

functioning have also been found to be significantly correlated with ADHD (Claesdotter et al., 2017).

Cognitive Functioning

Cognitive functioning is characterised by, but not limited to, emotional regulation, working-memory, planning and organising, decision-making, timekeeping, reaction times, and cognitive flexibility (Extremera et al., 2019; Banaschewski et al., 2018; Logue & Gould, 2014). A previous cross-sectional study in a non-ADHD population reported significant gender differences on performance measures of cognitive functioning utilizing computerised tasks i.e., working memory, alertness, response inhibition, reporting women reacted significantly slower and produced more errors than males (Stibbe et al., 2020), while declines in mediums of cognition have been found to be a normal process of aging (Harada et al., 2013). The literature will now explore cognitive functioning in relation to ADHD populations.

Cognitive Functioning in ADHD

It has been reported in the literature that cognitive domains demonstrate impairments in ADHD brains, including executive or complex functions, i.e., working-memory, planning and memory functions, in addition to non-executive basic functions, such as attention and reaction times (Coghill et al., 2018; Mohamed et al., 2021). Mohamed et al., (2021) reported 25% of variance in ADHD diagnosis was explained by impairments in complex cognitive functioning when assessed in a group of ADHD adults (n = 48), versus normal controls (n = 48) (*Nagelkerke* R^2 = .25). Furthermore, with regards complex cognitive functions, the two groups significantly differed in scores on tests measuring selective attention (WAFS-test) (M = 4.23, SD = 4.0 versus M = 1.81, SD = 1.77, $p < .001$) and verbal learning and memory (VLMT-delayed recall) (M = 11.06, SD = 2.79 versus M = 12.55, SD = 2.57, $p < .005$), revealing patients with ADHD committed more errors on the WAFS test and displayed poorer

performances on the VLMT-delayed recall test, in comparison with normal controls. While it was found that patients with ADHD had significantly lower levels of education obtained overall (Mohamed et al., 2021). Along with the characteristics of cognitive functioning and the association with ADHD, the underlying processes of such have been associated with several brain regions, with particular emphasis on the prefrontal cortex (Miller, 2000; Arnsten, 2009).

The role of the prefrontal cortex in cognitive functioning processes

Previous research indicates that the prefrontal cortex (PFC) aids in higher-order cognitive functioning such as memory, attention, thought and emotion (Hanganu-Opatz et al., 2023; Arnsten, 2009; Goyal et al., 2008). Therefore, it can be assumed that the PFC maintains the ability to assist in emotional regulation and cognitive functioning processes, as discussed by Arnsten (2009). Arnsten (2009) found the PFC to be sensitive to structural changes as a result of prolonged exposure to unpredictable and uncontrollable stressors, positively correlating with impairments in PFC abilities i.e., cognitive functioning (Arnsten, 2009; McEwen & Morrison, 2013). Findings reported by Weidmann and Chopik (2022) and Boals and Banks (2012) support the above findings, showing that the probability of experiencing cognitive functioning impairments to be significantly greater in participants who reported higher levels of stress, in comparison to those who reported lower levels of stress.

Stress may be experienced by individuals in response to internal psychological processes, or external environmental stimuli (Selye, 1950). When an individual is exposed to prolonged or frequent exposure to negative environmental stimuli (NES), it is conceptualised as chronic stress exposure (McGonagle & Kessler, 1990). Chronic stress is considered a toxic stress found to significantly impact multiple cognitive domains through alterations in neurobiological structures like the PFC and hippocampus (Branco & Linhares, 2018; Franke, 2014; Care et al., 2012), with evidence to suggest chronic stress exposure contributes to long-

lasting negative effects on cognitive functioning (Marin et al., 2011), particularly executive functioning and memory. Öhman et al. (2007) conducted a study investigating cognitive functioning in outpatients with perceived chronic stress (n = 19), versus normal controls (n = 19). The author reported how chronic stress patients experienced higher levels of memory concerns across all test domains in comparison with normal controls, while also providing evidence indicating lower performance on 24 cognitive tasks for the chronic stress group (Wilks' $\lambda = 0.14$, $F(24, 13) = 3.46$, $p < 0.012$, $\eta^2 = 0.86$). In particular, it was shown how executive functioning and memory tasks elicited greater deficits within the chronic stress group, i.e., tasks requiring undivided attention, and working-memory abilities.

Classifications of Chronic Stress

Chronic stress can be experienced by individuals through prolonged exposure to various sources of negative environmental stimuli (NES). In the literature, the variables commonly utilized to explore chronic stress include adverse childhood experiences including; sexual, physical, or emotional abuse, and neglect towards physical and/or emotional needs (Kennedy, 2023), refined and outlined by Felitti et al., (1998) as "ACEs". Along with various other forms of stress-inducing life events, namely; neighbourhood social/physical environment (Israel et al., 2006), safety (Israel et al., 2006), everyday unfair treatment (Williams et al., 1997), financial vulnerability (James et al., 1992), and major life events (Blazer et al., 1987). With previously conducted research studies providing insight into the relationship between the above variables and chronic stress.

One such study conducted by Mosley-Johnson et al., (2021) found exposure to ACEs positively correlated with the number of daily stressors reported by individuals (β =0.12, 95% CI 0.02 – 0.22 for count of 3, p <.05). While another study conducted by Ryu and Fan (2022) performed a hierarchical regression analysis investigating financial vulnerability and psychological distress. With their findings suggesting higher financial worries were

significantly associated with higher levels of psychological distress, while providing evidence to suggest more pronounced levels of psychological distress in those who were unemployed or low-income earners ($\beta = 0.467$, $p < .001$). In addition, Steptoe and Feldman (2001) employed the use of an 11-item questionnaire investigating neighbourhood problems in relation to stress with their results indicating neighbourhood issues are an impactful form of chronic stress. Finally, findings produced by Ajrouch et al., (2010) discovered that both moderate and high rates of discrimination (everyday unfair treatment) were significantly linked with psychological distress ($\beta = 10.6$, 95% CI [8.3 – 12.9, $p < .001$), in contrast with lower levels of psychological distress where emotional support was provided ($\beta = -.07$, 95% CI [-2.5 – 1.1). Having reviewed literature and gained an understanding around the impact of different sources of chronic stress on individual's psychological stress, the researcher of the current study will now explore such experiences in relation to cognitive functioning.

Chronic Stress exposure in relation to Cognitive Functioning

A previously conducted longitudinal study categorised chronic stressors into deprivation and threat-type events for the purpose of their investigations, with their findings indicating higher levels of exposure to chronic stressors (particularly deprivation-types) significantly correlated with poorer cognitive functioning in adults aged 18-42 years old (Hawkins et al., 2021), chronic stress in this instance was measured employing the use of the ACEs scale (Felitti et al., 1998). In addition, another study reported significant relations between negative early-life experiences and cognitive dysfunction, regardless of the level of exposure (Gould et al., 2012). It can be concluded from this that chronic stress exposures positively correlate with cognitive functioning impairments, with early evidence to suggest that long-term implications may involve permanent alterations to neuronal systems, contributing to long-last cognitive impairments in adult populations (Rosenblum et al., 1994). While investigating adverse experiences gains great insight into the relationship between

chronic stress and cognitive functioning, stress-inducing life events have also been explored in-depth in relation to same.

Stress-inducing life events (SLEs) can be classified as non-normative events such as life-threatening illnesses or accidents, loss of loved ones, exposure to illegal substances through family member(s), criminal activity in neighbourhood, safety concerns, physical/social neighbourhood environment, and financial vulnerability (Schwarzer & Schulz, 2003; Santini et al., 2015; Schulz et al., 2012; Zenk et al., 2013; Israel et al., 2006). Muñoz et al. (2020) assessed the relationship between cognitive functioning and neighbourhood stressors with their findings showing significant associations between perceived neighbourhood stress (NS) and cognitive functioning; specifically executive functioning, and working-memory. Furthermore, a coordinated analysis of 3 studies employing adult populations investigated the relationship between attention-demanding (executive and/or spatial functioning) tasks and NS, finding high levels of NS reported negatively correlated with lower levels of cognitive functioning (Muñoz et al., 2018). While participants of a qualitative-method analysis described difficulties with cognitive functioning in relation to neighbourhood social interactions, access to public outdoor spaces, and safety concerns (Stevens et al., 2023). Financial vulnerability was also found to be positively correlated with cognitive functioning impairments in adults, according to a meta-analysis conducted by De Almeida et al. (2024).

In short, the literature so far has gained insight into how exposure to chronic stressors are significantly correlated with cognitive impairments in adulthood. With supporting evidence suggesting that prolonged or intense exposure to negative stressful experiences, alters brain regions, such as the PFC, responsible for cognitive functioning (Anda et al., 2005). Furthermore, literature has also shown how people with ADHD are more likely to experience cognitive dysfunction, in comparison to people without ADHD. Therefore, the

current researcher was encouraged to investigate literature around the relationship between the prevalence of ADHD symptomatology and individuals' exposure to chronic stressors.

Chronic Stress exposure and the prevalence of ADHD Symptomatology

One such study aimed to define the role of chronic stress exposure in ADHD, with their findings suggesting that the odds of an ADHD diagnosis to be 1.39, 1.92, and 2.72 times higher among children who had experienced 1, 2, or 3, or more, chronic stressors than those who had not experienced any (Walker et al., 2021). Supporting literature identified how children who were exposed to a cumulation of chronic stressors were more likely to receive an ADHD diagnosis, with evidence to suggest ACE scores of 2, 3, and ≥ 4 were more likely to have moderate to severe ADHD, indicating a significant association between high levels of chronic stress exposure and ADHD diagnosis and severity (Brown et al., 2017). Alongside ACEs as a form of chronic stress, SLEs have also been explored in relation to ADHD.

Compiled data from a case-control quantitative analysis found how SLEs, among other stress defined variables, are significantly positively correlated with total ADHD scores reported by adult participants (Vrijsen et al., 2017; Li et al., 2020). Additionally, mediation analysis conducted by Li et al., (2020) showed how SLEs partially mediate the correlation between ADHD-PRS (polygenic risk scores) and hyperactive-impulsivity. These findings are indicative that SLEs partially explain the relationship between having a predisposition to ADHD genetics and the presence / occurrence of hyperactive-impulsivity in adulthood. Alongside above findings, studies conducted by Sundquist et al., (2015) and Dahal et al., (2018) found that neighbourhood deprivation and adversity, significantly increased the risk for a diagnosis of childhood ADHD (as cited by; Sharp et al., 2019). With the strongest association between neighbourhood deprivation and ADHD being observed in moderately deprived neighbourhoods (*OR* = 1.31, 95% CI = 1.19 – 1.44) (Sundquist et al., 2015). The literature and publications evaluated above gain insight into how cognitive impairments are

significantly correlated with both ADHD diagnoses and chronic stress exposure, while indicating that chronic stressors are significantly associated with high prevalence rates of ADHD diagnosis, and the severity of such.

The Current Study

Overall, it can be understood that ADHD is a neurodevelopmental disorder, believed to be genetically inherited (Sharp et al., 2009), characterised by both behavioural and cognitive impairments (Claesdotter et al., 2017). Furthermore, sources of chronic stress have been found to be significantly correlated with both cognitive impairments (Hawkins et al., 2021; Muñoz et al., 2018; Muñoz et al., 2020) and ADHD diagnoses in both child and adult populations (Walker et al., 2021; Li et al., 2020). While previous publications have reported significant relationships between chronic stress, cognitive functioning and ADHD, the gap in the literature sees no previous study exploring the relationship between the three variables via mediation analysis. Giving the current researcher the rationale for their study.

The current researcher poses the question, “Does the relationship between chronic stress and the prevalence of ADHD symptomatology occur at least in part, through cognitive functioning?” Prompting the researcher to hypothesise the following; H1) there will be a significant indirect relationship observed between chronic stress (X) and the prevalence of ADHD symptomatology (Y), through / mediated by cognitive functioning (M). While the null hypothesis would be that there is no significant indirect effect, through same.

While significant findings would support the proposed hypothesis, they would also contribute to the research literature by providing statistical evidence to suggest cognitive functioning mediates the relationship between chronic stress and ADHD. Such findings would suggest that chronic stress may predict ADHD, via the underlying mechanism of cognitive functioning, in addition to genetic predispositions. The overarching aim of this study is to examine the contribution of cognitive functioning to the association between

chronic stress and ADHD symptoms. This study also aims to address previous methodological limitations addressing the relationship between chronic stressors and the prevalence of ADHD symptoms, whereby a vast array of studies in the literature were conducted using child-populations and parent-report questionnaires. For this reason, the researcher of this study intends to utilize an adult sample population, using self-report questionnaires.

Methods

Participants

The final sample for this study consisted of 118 adults (female = 87, and male = 31), ranging in age from 18-62 years, with an average age of 31.99 (*SD* = 10.09). Participants were initially recruited using a non-probability convenience sampling method by sharing a hyperlink to the study on social platforms (Instagram, Facebook and Reddit), while also hoping to employ the use of snowball sampling, as participants were free to share the study link with others. General recommendations for sufficient sample sizes in correlation analysis and multiple regression were considered (Fraenkel & Wallen, 1990; Stevens, 2002; Pelham, 2013), while G*Power analysis (Faul et al., 2009) was performed to determine sufficient sample size for regression analysis, indicating a total sample of ≥ 98 participants was required to gain statistical power ($\alpha = .05$, $\beta = .8$, $R^2 = .129$) (Amato, 2016) (Appendix A).

Materials

Demographics

Participants were asked to outline their gender (male, female, non-binary, prefer not to say), report their age (in numbers), and report how many years of education they obtain, before commencing the questionnaires (Appendix B). Data for years of education was excluded from the final data set as the responses were too obscured to clean for analysis. Non-binary participants data ($n = 2$) was also excluded from the final data set due to small cell sizes. Age and gender were controlled for as covariates during mediation analysis due to their relationship with cognitive functioning outlined in the literature review (Stibbe et al., 2020; Harada et al., 2013).

Chronic Stress Index, including Major Life Events (CSI)

The *Chronic Stress Index* (CSI) (Zenk et al., 2013) (Appendix C), is a self-report measure consisting of 5-subscales, and major life events scale, with a total of 31-items. The

subscales investigate an individual's neighbourhood physical environment (Israel at el., 2006; Schulz et al., 2012) (α = 0.69)*, neighbourhood social environment (Israel et al., 2006; Schulz et al., 2012) (α = 0.77)*, safety (Israel et al., 2006; Schulz et al., 2012) (α = 0.84)*, everyday unfair treatment (Williams et al., 1997) (α = 0.77)*, financial vulnerability (James et al., 1992), and major life events (Blazer et al., 1987; Schulz et al., 2012). The first 4-subscales named employ a 5-point Likert scale, ranging from "1" (disagree) to "5" (agree), while major life events are rated yes/no, in relation to whether an individual has experienced the event or not, in the last 12-months. Data on major life events was not used for the current study, rather collected for the purpose of analysis as part of a larger future study. Psychometric properties reported above, where available, indicated sufficient – excellent internal reliability (α)* (Zenk et al., 2013). Authors created a composite measure for this scale by calculating z-scores for each subscale, and then taking the mean of these five z-scores, to investigate chronic stress exposure as a cumulative measure (Zenk et al., 2013b). Cronbach's alpha in the current study for chronic stress and major life events were .834 and .536 respectively, indicating excellent internal reliability.

Cognitive Functioning Self-Report Scale (CFSS)

The *Cognitive Functioning Self-Assessment Scale* (CFSS) (Annunziata et al., 2012; 2016) (Appendix D) is a self-reported 18-item scale. Individual's score themselves on a 5-point Likert scale, ranging from "1" (never) to "5" (always). Lower scores indicating better cognitive functioning in participants, than higher scores. This scale measures cognitive domains such as, memory, attention and spatio-temporal orientation. Internal reliability was indicated to be satisfactory (α = 0.856). With Cronbach's alpha in the current study indicating excellent internal reliability (α = .911). The authors of this scale reported how the CFSS was a "promising self-report cognitive functioning measure" (Annunziata et al., 2012). The author of the scale assumes that once further studies have demonstrated content validity (by studying

the correlation of the score between CFSS and a set of neurocognitive instruments) that the CFSS could be a promising tool to fill the gap in the instrument set available to professionals and researchers for the evaluation of self-perceived cognitive functioning (Annunziata et al., 2011). Although, there are currently no psychometric properties available for same. Permission to use this scale for the current study was sought from and granted by the scale author.

Attention Deficit Hyperactive Disorder (ADHD) Self-Report Scale – ASRS-v1.1

The *DSM-IV ADHD Symptom Rating Scale* (Kessler et al., 2005) (Appendix E) was established in order to test the identified diagnostic criteria for ADHD. It is an 18-item scale which measures symptoms of the 3 main domains of ADHD: inattentiveness, impulsivity, and hyperactivity. A 5-point Likert scale is utilized to capture the frequency at which each symptom presents itself for the individual. "1" being never, through to "five" being very often. Six questions, out of the eighteen, were found to be the most predictive symptoms coherent with ADHD, these are indicated in "Part A" of the scale. If more than 4 symptoms in Part A are reported on as either sometimes, often, or very often, it may be likely that the participant has reported a high correlation between symptoms present and a diagnosis of ADHD. Internal consistency was found to be high when the test was conducted on a sample of ADHD-diagnosed children ($\alpha = 0.88$) (Etcoff, 2013). With the current study finding excellent internal reliability ($\alpha = .938$). From a population survey, the ASRS-v1.1 scale had moderate sensitivity valued at 68.7% and high specificity valued at 99.5% (Kessler et al., 2005; as cited by Van De Glind et al., 2013).

Research Design

This study was a quantitative, cross-sectional multivariate within-subjects design, employing mediation analysis. The following variables were included in the study; Demographic variables; age, gender and years of education (Appendix B), chronic stress

exposure (IV/X), cognitive functioning (IV/M) and ADHD symptomology (DV/Y). Data was collected from participants under the same conditions at one-specific time point, with all participants completing online surveys on a self-report basis.

Procedure

Data for this study was collected by means of an online Microsoft Forms questionnaire. Posters (Appendix F) including a QR code were posted around the National College of Ireland college campus, and posted within groups / forums on social media platforms (Instagram, Facebook and Reddit), where participants were able to voluntarily click a hyperlink / scan a QR code to take them to the URL where the study was available for participation. The link took participants to Microsoft Forms, where no log in was required for participation. Participation took approximately 20 minutes to complete. Before commencement of the study, an Information Sheet (Appendix G) was provided informing individuals of what exactly the study would entail and what was required from them to facilitate participation. Once the individual had read and acknowledged the information sheet, they were then prompted with a Consent Form (Appendix H) to provide informed consent through a "tick-box" facility, before being allowed to proceed to the materials (questionnaires) included in the study for data collection. Once consent was given, participants were able to access the required materials.

There were three questionnaires to fill out: Chronic Stress Index (CSI), including Major Life Events, Cognitive Functioning Self-Assessment Scale (CFSS) and the DSM-IV ADHD Symptom Rating Scale. It was urged that all questions be answered on each questionnaire before proceeding to the next scale. Once all scales had been answered fully, or to the best of the individuals' ability they then submitted their answers at the end of the Microsoft Form. Following the submission of participants answers they were presented with a Debrief Sheet (Appendix I) thanking them for their participation, while adequately

informing them of necessary/appropriate emotional or psychological supports for any emotional or psychological stress they may have endured as a result of participating in the study. Participants were also informed that they were free to share the study link with anybody who they believe may be interested in participating, may they meet the inclusion / exclusion criteria. After a statistically satisfactory number of participants had been recruited, the survey was closed. Thereafter, collected data was exported to an excel document before being imported to SPSS where it was cleaned, prior to statistical analysis.

Ethical considerations

Ethical approval for this research study was sought and obtained from the Ethics Committee within the National College of Ireland, in accordance with the NCI Ethical Guidelines and Procedures for conducting research involving human subjects. This research study also complies with The Psychological Society of Ireland's Code of Professional Ethics (PSI, 2019).

Data Analysis

Preliminary analyses were conducted using Pearson's product-moment correlation coefficient, Spearman's rho, an independent samples t-test, and simple linear regressions. Hypothesis testing comprised of mediation analysis; employing Hayes PROCESS Macro, Model 4 with bootstrapping (Hayes, 2009; 2017). Mediation analysis was performed to investigate whether there was a significant indirect effect of chronic stress (IV/X) on ADHD symptomology (DV/Y), having mediated for cognitive functioning (M), while controlling for covariates age and gender (COV1,2). Statistical analyses were conducted using IBM SPSS Statistics – version 28.0.1.1 (15).

Results

Descriptive Statistics

Descriptive statistics were run for all variables utilized from the final data set for the purpose of statistical analysis. Variables were both categorical; gender, and continuous; age, cognitive functioning, chronic stress and ADHD symptomatology. The total sample size for this study was N = 118. Of the total sample size 73.7% of participants were female, while 26.3% were male. The mean (M) age of participants was 31.99 (Table 1). Descriptive statistics (Mean, Median, Standard Deviations) for continuous variables are outlined in table 1 below. Preliminary analyses were carried out on the data set to ensure there were no violations of the assumptions of normality. Kolmogorov-Smirnov tests of normality indicated normally distributed data for cognitive functioning ($p = .20$), chronic stress ($p = .20$) and ADHD scores ($p = .20$), while age was indicated to be non-normally distributed ($p < .001$). Histograms for all continuous variables are presented in Appendix J.

Table 1

Descriptive statistics for all continuous variables, N = 118

Variable	*M* [95% CI]	*Median*	*SD*	Range
Age	31.99 [30.15 – 33.83]	30	10.09	18 – 62
Cognitive Functioning	49.60 [47.65 – 51.55]	50	10.69	27 – 76
Chronic Stress	0 [-.39 - .39]	-.32	2.14	-4.37 – 7.26
ADHD	54.22 [51.54 – 56.92]	54	14.75	25 – 89

Note: M = mean, *95% CI* = 95% confidence interval, *SD* = standard deviation

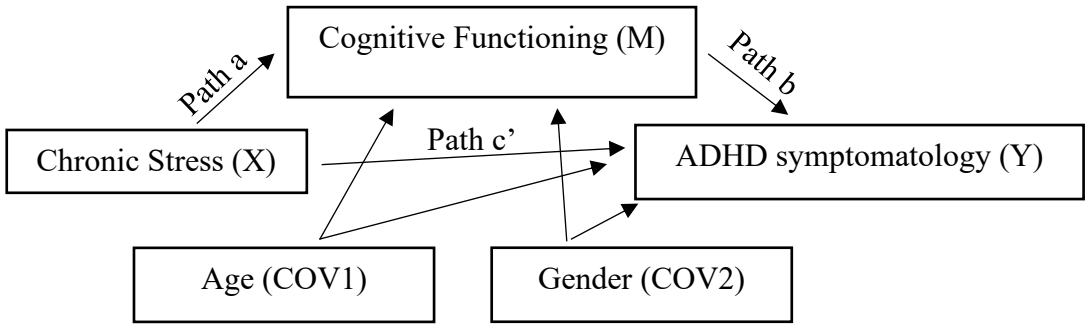
Inferential Statistics

The researcher of the current study employed mediation bootstrapping analysis using PROCESS Macro, Model 4, with covariates (Hayes, 2009; 2017) (Figure 1). The purpose of this was to gain a more comprehensive analysis of the mediation effects by dissecting the

causal relationship between variables, as process macro computerizes complex calculations, offering strong and reliable mediation results (Admin, 2024). This model serves distinct and valuable functions of analysis.

Figure 1

Illustrative graph of mediation pathways



Preliminary Analyses for Data Analysis

Age and Gender on Cognitive Functioning

As age was non-normally distributed non-parametric correlation analysis Spearman's rho was conducted to investigate inter correlations between age and cognitive functioning. A significant relationship was observed between age and cognitive functioning, indicating a weak, negative relationship (ρ = -.29, n = 118, p = .002). These findings indicate that as age increases, cognitive functioning declines.

Pearson's correlation analysis revealed that gender was significantly related to cognitive functioning, indicating a weak, positive relationship (r = .25, n = 118, p = .006). As there was a significant relationship between gender and cognitive functioning, an independent samples t-test was conducted to compare cognitive functioning scores between males and females. There was a significant difference in scores, with females (M = 51.19, SD = 10.76) scoring higher than males (M = 45.13, SD = 9.27); t(116) = -2.79, p = .006). The magnitude of the differences in the means (mean difference = -6.11, 95% CI = -10.37 – -1.76) was

medium (Cohen's d = -.584). These findings indicate that females have lower cognitive functioning in comparison with males.

As both age and gender were significantly related to cognitive functioning in the current dataset, and in previous literature, the researcher controlled for the effects of these variables by inputting them as covariates in the mediation analysis method via process macro, model 4.

Regression analysis of pathway variables included in Mediation Analysis – PROCESS Macro (X, Y, M)

Linear regression analyses were performed to investigate mediation pathways. See Table 2 linear regression output.

Path a: Chronic Stress (X) was found to significantly predict Cognitive Functioning (M) ($\beta = .30$, $t(117) = 3.39$, $p < .001$). The model indicated that chronic stress explained 9.1% of the variance in cognitive functioning scores ($R^2 = .091$, $F(1, 126) = 11.56$, $p < .001$), indicating a moderate effect size.

Path b: Cognitive Functioning (M) was found to significantly predict ADHD symptoms (Y) ($\beta = .73$, $t(117) = 11.46$, $p < .001$). The model indicated that cognitive functioning explains 53.1% of variance in ADHD scores ($R^2 = 0.531$, $F(1, 126) = 131.36$, $p < .001$), indicating a large effect size.

Path c': Chronic Stress (X) was found to significantly predict ADHD symptoms (Y) ($\beta = .31$, $t(117) = 3.47$, $p < .001$). The model indicated that chronic stress explains 9.4% of variance in ADHD scores ($R^2 = .094$, $F(1, 116) = 12.11$, $p < .001$), indicating a moderate effect size.

All predictor variables were observed to significantly predict the criterions they were regressed against. These findings satisfy the criteria for *Step 4:* mediation analysis, as outlined by Baron and Kenny (1986).

Table 2

Inter-correlations (Pearson's) between model pathway variables, N = 118

Variable	1.	2.
Path a (Cognitive Functioning) Chronic Stress	.301***	-
Path b (ADHD) Cognitive Functioning	.729***	-
Path c' (ADHD) Chronic Stress	.31***	-

Note: Statistical significance *** $p < .001$

Mediation Analysis via PROCESS Macro Model 4 with Covariates

Preliminary analyses were performed to ensure no violation of the assumptions of outliers, normality, linearity and homoscedasticity (Appendix K). Tests for multicollinearity also indicated that all Tolerance and VIF values were in an acceptable range (Appendix K). These results indicate there was no violation of the assumption of multicollinearity, and that data was suitable for examination through regression analysis, which is utilized in mediation analysis.

The mediation analysis revealed that the predictors Chronic Stress, Age and Gender explain 22.5% of the variance in Cognitive Functioning scores ($R^2 = .225$, $F(3, 114) = 11.05$, $p < .001$), with a moderate effect size. The results seen how all predictors were statistically significant. While the total effect model revealed how Chronic Stress, Age and Gender explain 16.8% of the variance in ADHD symptomatology scores ($R^2 = .168$, $F(3, 114) = 7.72$,

$p < .001$), with a moderate effect size. Results indicated that Age and Chronic Stress were statistically significant predictors, while gender was not. Additionally, the combined regression model, inclusive of cognitive functioning, resulted in a model that explains 54% of the variance in ADHD symptomatology ($R^2 = .54$, $F(4, 113) = 33.21$, $p < .001$), indicating a large effect size.

When the mediator was controlled for in the combined mediation model, the coefficients table indicated that Chronic Stress had a positive but non-significant effect on ADHD symptomatology ($B = .686$, $SE = .464$, $\beta = .099$, $t(117) = 1.48$, $p = .142$), while Age ($B = -.044$, $SE = .099$, $\beta = -.03$, $t(117) = -.44$, $p = .658$) and Gender ($B = -.43$, $SE = 2.21$, $\beta = -.013$, $t(117) = -.21$, $p = .846$) both had negative but non-significant effects on ADHD symptomatology, whereas Cognitive Functioning had a significant positive effect ($B = .956$, $SE = .10$, $\beta = .69$, $t(117) = 9.56$, $p < .001$). Having introduced Cognitive Functioning into the model the regression weights for Age, Gender and Chronic Stress consequently reduced, indicating a reduction in the strength of the relationship between Age, Gender and Chronic Stress on ADHD symptomatology, while also no longer significantly predicting ADHD. See Table 3 for full details.

Furthermore, the indirect effect of Chronic Stress (X) on ADHD symptomatology (Y) through Cognitive Functioning (M) was found to be significant as the confidence intervals based on 5,000 bootstrap samples did not contain zero ($B = 1.40$, *BootSE* = .434, *95% BCa CI* [.613, 2.29], $p = .0009$), supporting H1. Additionally, Chronic Stress ($B = .686$, $SE = .464$, *95% BCa CI* [-.234, 1.61], $p = .142$), had a non-significant direct effect on ADHD symptomatology in the presence of the mediator, indicating full mediation was observed. While a Sobel test confirmed full mediation ($z = 3.32$, $p = .0009$), indicating that Cognitive Functioning fully mediates the relationship between Chronic Stress and ADHD symptomatology. Mediation analysis matrix summary presented in Table 4.

Table 3

Mediation Analysis Matrix Summary Table, N = 118

		Mediator Variable Model				
Variable	R^2	*B*	*SE*	*β*	*t*	*p*
(CogFunction)	.225***					
Age		-.30	.089	-.29	-3.43	.0008
Gender		4.41	2.03	.18	2.17	.0321
Chronic Stress		1.47	.41	.29	3.56	.0005
		Total Effect Model				
Variable	R^2	*B*	*SE*	*β*	*t*	*p*
(ADHD)	.168***					
Age		-.34	.13	-.23	-2.64	.0095
Gender		3.78	2.90	.11	1.30	.196
Chronic Stress		2.11	.59	.30	3.54	.0006
		Combined Mediation Model (Dependent Variable Model)				
Variable	R^2	*B*	*SE*	*β*	*t*	*p*
(ADHD)	.54***					
Age		-.044	.09	-.03	-.44	.658
Gender		-.432	2.21	-.01	-.19	.846
Chronic Stress		.686	.46	.09	1.48	.142
Cognitive Functioning		.956	.10	.69	9.56	.0000

Note: R^2 = R-squared; *B* = unstandardized beta value; *SE* = Standard errors of B;

β = standardized beta value; *t* = test-statistic, *N* = 118, Statistical significance *** $p < .001$

Table 4

Mediation Analysis Summary, N = 118

Relationship	Total Effect	Direct Effect	Indirect Effect	Confidence Interval (95%)		t-statistics	Conclusion
				Lower Bound	Upper Bound		
Chronic Stress -> Cognitive Functioning -> ADHD	2.11 (.0006)	.686 (.142)	1.40 (.0009)	.613	2.29	9.56	Full Mediation

Discussion

The purpose of this study was to examine whether chronic stress (X) influences the prevalence of ADHD symptomatology (Y) through the mediating variable; cognitive functioning (M), while controlling for covariates age (COV1) and gender (COV2), in an adult population. The current study sought to broaden our understanding of ADHD symptomatology. Profoundly, the primary objective of the current study was to expose a potential mechanism emphasizing the relationship between chronic stress and ADHD symptomatology.

In support of the proposed hypothesis, current findings indicate that chronic stress predicts cognitive functioning, which in turn predicts the prevalence of ADHD symptomatology, irrespective of age and gender. Herewith, the mediation analysis observed a significant total effect between X and Y, while also revealing a significant indirect effect of X on Y through M. These results further support the idea that cognitive functioning mediates the relationship between chronic stress and ADHD symptomology. Interestingly, while the indirect effect was found to be significant, the direct effect of X on Y became non-significant in the presence of M. These findings imply that cognitive functioning is the key mechanism by which the observed indirect effect of X on Y occurs, further permitting the researcher to reject the null hypothesis.

Additionally, supplementary results observed in the current dataset merit comment as they support the idea that there are significant associations between the mediated pathway variables; *Path a;* chronic stress and cognitive functioning, *Path b;* cognitive functioning and ADHD symptomatology, *Path c'*; and chronic stress and ADHD symptomatology. Which will now be discussed in further detail.

Chronic Stress and Cognitive Functioning (path a)

In the current cross-sectional study chronic stress was evaluated using a self-report scale-index measure evaluating individuals' exposure to chronic stress, inclusive of five subscales; neighbourhood physical and social environment stressors, safety concerns, financial vulnerability, and discrimination. A total chronic stress score was computed and utilized for the purpose of analysis (See *Materials*). Results revealed that chronic stress is significantly predictive of cognitive functioning, suggesting that chronic stress exposure increases an individuals' likelihood of experiencing cognitive functioning impairments. The current findings are consistent with previously reported findings which suggest that high levels of chronic stress exposure significantly correlates with diminished cognitive functioning abilities (Hawkins et al., 2021), indicating similar effect sizes. Furthermore, a previously conducted coordinated analysis employing a large sample observed an overall pattern in the population whereby lower perceptions of neighbourhood safety and social cohesion, and greater perceived neighbourhood crime were consistently associated with poorer performances on cognitive functioning tasks targeted at evaluating individuals' working memory and executive functioning (Muñoz et al., 2020). These variables directly link with the chronic stress measure utilized in the current research, further supporting consistency between previous and current findings. Furthermore, the above findings highlight the significance of an individuals' psychosocial environment on their cognitive abilities in adulthood.

While both studies conclude similar findings, it is important to note the contrasting differences in research designs employed by both researchers. The current cross-sectional study provides a snapshot of the associations between the mediated pathway at one-time point, limiting the generalisability of findings to a wider population, while the coordinated analysis strengthens the robustness of findings by replicating same across multiple datasets.

Additionally, the measurement tools outlined by Muñoz et al., (2020) as means of data collection across datasets differed from the current means employed. The current researcher utilized the use of online self-report questionnaires while Muñoz et al., (2020) noted a difference in cognitive measures across their combined datasets, compiling in-person and phone-call assessment measures. Despite the differences noted regarding research design and measurement tools between studies, findings produced were consistent across both datasets, indicative of a consistent underlying relationship between chronic stress and cognitive functioning, providing the opportunity for future meta-analyses to combine results into a well amalgamated conclusion to strengthen comparability and reliability of cross-study evaluations.

Cognitive Functioning and ADHD symptomatology (path b)

Cognitive functioning was investigated using a self-report scale aimed at evaluating an individual's self-perception of their cognitive functioning abilities, with specific focus on particular cognitive domains namely; memory, attention and spatio-temporal orientation. The current study found a significant positively predictive effect when cognitive functioning was regressed on ADHD symptom scores. These findings show how self-reported cognitive functioning impairments are linked with the prevalence of ADHD symptomatology. In accordance with the present results, Mohamed et al., (2021) previously reported significant cognitive impairments, such as memory and attention deficits, in an ADHD population, when compared with normal controls. Overall, the above findings suggest that the performance of cognitive functions, through the aforementioned cognitive domains, may impact the extent to which cognitive impairments contribute to the prevalence of ADHD symptomatology.

While similarities were observed between above findings, it is important to note the contrasting methodologies in the way in which cognitive functioning was assessed between the datasets. The current study employed a simplified but validated, self-report 18-item

measure for gaining data on participants cognitive functioning abilities, whereas Mohamed et al., (2021) used both; a validated self-report scale, in addition to more in-depth and complex methods for investigating cognitive functioning domains; such as attention, on a more intricate level, gaining more enriched data. However, the operational definition of the variable cognitive functioning was outlined in a similar manner across both studies, assisting in the prevalence of the apparent similarities between findings, regardless of methodological differences.

Furthermore, it may be assumed that similarities prevail due to the use of differing but validated scale measures across both studies to assess ADHD symptoms. The current study employed the use of the ASRS scale for assessing the prevalence of ADHD symptomatology in the current sample population, while Mohamed et al., (2021) assessed ADHD symptoms through the use of the Conners' Adult ADHD Rating Scales (CAARS). With Fuller-Killgore et al. (2012) reporting acceptable reliability levels across both scales having conducted a comparison analysis between three varying ADHD screeners.

While differing methodologies prevailed, triangulation is a process by which the same phenomena is investigated through the use of varying methods (Noble & Heale, 2019), and is idealised as a strength due to the ability to cross-validate findings of different measures, further strengthening the reliability of the conclusions made by researchers. This phenomena can be applied to understanding the similarities outlined above. Highlighting a consistent significant relationship between cognitive functioning and ADHD symptoms across literature.

Chronic Stress and ADHD symptomatology (path c')

Regression analyses performed as part of preliminary analysis, found how chronic stress significantly predicts ADHD scores in the current sample. These findings are consistent with previous research, reporting how chronic stress partially mediates the relationship between ADHD polygenic risk scores and ADHD symptoms (hyperactive-impulsivity) (Li et

al., 2020), while being positively correlated with ADHD scores (Vrijsen et al. 2017). It can be seen how past and current findings support the idea that chronic stress plays an important role in the prevalence of ADHD symptoms. Directly linked with the measure used to capture individuals' exposure to chronic stress in the current study, findings previously reported by Dahal et al., (2018) indicate individuals who reside in moderately deprived neighbourhoods were more likely to be diagnosed with externalizing disorders such as ADHD. Similarities observed further strengthen the findings having been obtained using both parent-report (Dahal et al., 2018) and self-report scale measures (present study), as using multi-informant approaches improves robustness in the dataset, while limiting potential single-source biases. Furthermore, the evident contrasting differences between the scale variations gain insight into both subjective experiences and observable behaviours in relation to the association between chronic stress and the prevalence of ADHD symptomatology, strengthening the credibility of concluded findings within the presented literature.

Implications

The results in the current study build on existing evidence in the literature around the relationships between chronic stress and cognitive functioning, cognitive functioning and ADHD symptomatology, and chronic stress and ADHD symptomatology, having replicated previously reported findings. Furthermore, the current study generated new findings which contribute to the current body of literature in the area by providing novel and unique insights around the mediating effect of cognitive functioning and the association between chronic stress and ADHD symptomatology. Indicating that cognitive functioning is the key mechanism by which the association occurs. These findings emphasize the detrimental effects that exposure to chronic stressors impose on cognitive functioning, while presenting as a fundamental influential factor in the prevalence of ADHD symptomatology via indirect effects. Moreover, the current study findings highlight the importance of thinking about

chronic stress in relation to neurodevelopmental assessment practices, while contributing to knowledge which broadens our understanding of the intricate relationship between influential variables on the prevalence of ADHD symptomatology. Overall, the current findings add to the current literature which may inform future clinical practice in accordance with ADHD symptomatology, assessment and diagnoses.

Strengths

It is worth noting that the large sample size of 118 participants in the current study is a strength of the study, playing an important role in retaining the integrity and strength of the statistical findings. The sample size was significant in accordance with the conducted G*Power analysis for ensuring adequate statistical power. Obtaining a significant sample size is fundamental for identifying true effects in the data, and reducing the risk of Type 2 errors. Furthermore, a larger sample size increases the likelihood that the observed differences or relationships in the data do not occur due to random chance, rather they indicate genuine patterns. Moreover, a sufficient statistical power increases the generalisability and reliability of the study's findings, permitting for more vigorous conclusions to occur. Likewise, a sufficiently powered study provides more accurate effect size estimates which in turn strengthens the confidence in the generated results.

Another strength worth mentioning is the use of valid scales, as they are more precise and reliable when it comes to assessing the variable which they are aimed at investigating. The current study employed the use of scale measures used in previous research, which were reported as being acceptable to excellent in terms of internal consistency and reliability (Zenk et al., 2013; Annunziata et al., 2012; Kessler et al., 2005). With the current study also reporting excellent reliability across all scales.

Limitations

While the cognitive functioning scale measure used in the current study assisted the researcher in yielding significant findings, it was an overly simplistic measure of cognitive functioning, relying on an 18-item self-report questionnaire. This may prove to be a limitation as using basic and simplistic measures often fail to capture the complexities and nuance of the variable being studied. The use of more intricate and sophisticated measures of cognitive functioning could be utilized to provide richer data, allowing for a more intricate understanding of the relationships between variables while enhancing the overall validity of the study. This would make for more generalisable findings in relation to cognitive functioning, assisting in the ability to draw more meaningful conclusions.

Furthermore, the exclusion of non-binary participants from the final data set due to small cell sizes proves to be a limitation of the current study as it excludes a gender diverse population from the data which would provide valuable insights into non-traditional gender categories. Similarly, the exclusion of the demographic variable “years of education” due to obscured data limited the researcher’s ability to control for the confounding effects of same in the mediation analysis.

Additionally, while the researcher oriented the reader to ACEs / SLEs as scale measures for investigating the variable chronic stress, due to ethical implications the use of said scales was not permitted at undergraduate level due to the risk of psychological harm. This influenced the decision of the researcher to employ the use of the chronic stress index measure to assess chronic stress in the current study. Therefore, this can be seen as a limitation as the researcher was limited in terms of the richness of data they could gather, with regard to investigating chronic stress on a more intricate level. Finally, it should be noted that while the researcher employed the use of self-report questionnaires to address previous methodological limitations observed in the reviewed literature, self-report

questionnaires contribute limitations themselves as they increase the risk for response biases such as social-desirability bias. This concept ultimately relates to the tendency of survey participants answering questions in a manner that represents a reality in line with what is deemed socially acceptable (Chung & Monroe, 2003).

Future Direction

In light of the current research findings, the researcher proposes several future directions to enhance and extend the study. One key recommendation is to replicate the study using a mixed-methods research design on a longitudinal basis, tracking participants from birth to adulthood. In-person assessments would be conducted at various time points, providing a rich dataset through repeated measures of the same variables for comprehensive analysis. This longitudinal approach would also address demographic limitations identified in the present study, ensuring a more balanced gender distribution, and including a larger sample of non-binary participants. Furthermore, the study would re-examine participants' responses to years of education obtained by offering a range of categories for them to choose from. Socio-economic status would also be incorporated as a variable to explore its potential confounding effects on study outcomes and the associations / patterns observed in the data.

Another important recommendation is to replicate the study while making the necessary adjustments outlined above and incorporating computerized neurocognitive tasks. These tasks, alongside the current self-report cognitive function scale, would provide deeper insights into specific cognitive domains and overall cognitive abilities. This approach would also contribute to evaluating the construct validity of the cognitive function self-report scale, as initially suggested by Annunziata et al. (2011).

Lastly, the researcher advises including the use of the ACE and SLE scales as measures of chronic stress in the replicated study. This would facilitate an exploration of the relationship between chronic stress and the prevalence of ADHD symptoms, offering a more

nuanced understanding of ADHD, while enriching the existing literature which may potentially inform future clinical practice.

Conclusion

Overall, it can be seen how the current study replicated previous findings while making unique and novel contributions to the literature having found significant mediating effects of cognitive functioning on the relationship between chronic stress and ADHD symptomatology. These findings contribute to the literature informing our knowledge and understanding of ADHD symptomatology, which may in turn influence future clinical practice. The current study is the first to examine the intricate relationship between chronic stress, cognitive functioning and ADHD symptomatology, through means of mediation analyses. Furthermore, the current findings highlight the detrimental effects that prolonged exposure to chronic stressors impose on an individual's cognitive functioning, while also presenting as a fundamental influential factor in the prevalence of ADHD symptomatology. Further longitudinal research is required to explore the study variables on a more intricate level, to gain more sophisticated and comprehensive insights into the interplay between chronic stress, cognitive functioning, and ADHD symptomatology, further broadening our understanding of same.

References

Abdelnour, E., Jansen, M., & Gold, J. A. (2022). ADHD diagnostic trends: Increased recognition or overdiagnosis? *PubMed*, *119*(5), 467–473. https://pubmed.ncbi.nlm.nih.gov/36337990

Admin. (2024, July 29). *Mediation Analysis using Hayes PROCESS Macro*. Statistical Analysis Services for Academic Research. https://spssanalysis.com/mediation-analysis-using-hayes-process-macro/#:~:text=This%20powerful%20tool%20automates%20complex,and%20interpretability%20of%20their%20findings

Ajrouch, K. J., Reisine, S., Lim, S., Sohn, W., & Ismail, A. (2010). Perceived everyday discrimination and psychological distress: does social support matter? Ethnicity and Health, 15(4), 417–434. https://doi.org/10.1080/13557858.2010.484050

Amato, J. (2016). Early adversity and executive dysfunction in children with attention deficit hyperactivity disorder. *AURA - Antioch University Repository and Archive*. https://aura.antioch.edu/psydcpne/1?utm_source=aura.antioch.edu%2Fpsydcpne%2F1&utm_medium=PDF&utm_campaign=PDFCoverPages

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., Dube, S. R., & Giles, W. H. (2005). The enduring effects of abuse and related adverse experiences in childhood. *European Archives of Psychiatry and Clinical Neuroscience*, *256*(3), 174–186. https://doi.org/10.1007/s00406-005-0624-4

Annunziata, M. A., Muzzatti, B., Flaiban, C., Giovannini, L., & Lucchini, G. (2016). Cognitive Functioning Self-Assessment Scale (CFSS): Further psychometric data. *Applied Neuropsychology Adult*, *25*(1), 1–4. https://doi.org/10.1080/23279095.2016.1225575

Annunziata, M. A., Muzzatti, B., Giovannini, L., & Lucchini, G. (2012). Cognitive Functioning Self-Assessment Scale [Dataset]. In *PsycTESTS Dataset*. https://doi.org/10.1037/t41006-000

Annunziata, M. A., Muzzatti, B., Giovannini, L., & Lucchini, G. (2011). Cognitive functioning self-assessment scale (CFSS): Preliminary psychometric data. *Psychology Health & Medicine, 17*(2), 207–212. https://doi.org/10.1080/13548506.2011.596552

Arnsten, A. (2009). Stress signalling pathways that impair prefrontal cortex structure and function. *Nature Reviews. Neuroscience, 10(6),* 410–422. https://doi.org/10.1038/nrn2648

Ayano, G., Tsegay, L., Gizachew, Y., Demelash, S., & Alati, R. (2024). The Prevalence of attention deficit hyperactivity Disorder in children and Adolescents: An umbrella review of Global evidence. *European Psychiatry*, *67*(S1), S76. https://doi.org/10.1192/j.eurpsy.2024.203

Banaschewski, T., Coghill, D., & Zuddas, A. (2018). Oxford Textbook of Attention Deficit Hyperactivity Disorder. *Oxford University Press.*

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173. https://doi.org/10.1037//0022-3514.51.6.1173

Blazer, D., Hughes, D., & George, L. K. (1987). Stressful life events and the onset of a generalized anxiety syndrome. *The American journal of psychiatry*, *144*(9), 1178-1183. https://doi.org/10.1176/ajp.144.9.1178

Block, R. W., MD, Macdonald, N. E., PhD, & Piotrowski, N. A., PhD. (2023). Attention deficit hyperactivity disorder (ADHD). *Magill's Medical Guide (Online Edition)*

Boals, A., & Banks, J. B. (2012). Effects of traumatic stress and perceived stress on everyday cognitive functioning. *Cognition & Emotion*, *26*(7), 1335–1343. https://doi.org/10.1080/02699931.2011.651100

Branco, M. S. S., & Linhares, M. B. M. (2018). The toxic stress and its impact on development in the Shonkoff's Ecobiodevelopmental Theorical approach. *Estudos De Psicologia*, *35*(1), 89–98. https://doi.org/10.1590/1982-02752018000100009

Brown, N., Brown, S. N., Briggs, R. D., Germán, M., Belamarich, P. F., & Oyeku, S. O. (2017). Associations between adverse childhood experiences and ADHD diagnosis and severity. *Academic Paediatrics*, *17*(4), 349–355. https://doi.org/10.1016/j.acap.2016.08.013

Care, D., Developmental, S. O., Garner, A. S., Shonkoff, J. P., Siegel, B. S., Dobbins, M. I., Earls, M. F., McGuinn, L., Pascoe, J. M., & Wood, D. L. (2012). Early childhood adversity, toxic stress, and the role of the Paediatrician: Translating Developmental science into Lifelong health. *Paediatrics*, *129*(1), e224–e231. https://doi.org/10.1542/peds.2011-2662

Carter, M. J. (2014). Diagnostic and Statistical Manual of Mental Disorders, 5th ed. *Therapeutic Recreation Journal*, *48*(3). https://js.sagamorepub.com/trj/article/view/5720

Chung, J., & Monroe, G. S. (2003). Exploring social desirability bias. *Journal of Business Ethics*, *44*, 291-302. https://doi.org/10.1023/A:1023648703356

Claesdotter, E., Cervin, M., Åkerlund, S., Råstam, M., & Lindvall, M. (2017). The effects of ADHD on cognitive performance. *Nordic Journal of Psychiatry*, *72*(3), 158–163. https://doi.org/10.1080/08039488.2017.1402951

Coghill, D. R., Banaschewski, T., Bliss, C., Robertson, B., & Zuddas, A. (2018). Cognitive Function of Children and Adolescents with Attention-Deficit/Hyperactivity Disorder

in a 2-Year Open-Label Study of Lisdexamfetamine Dimesylate. *CNS Drugs*, *32*(1), 85–95. https://doi.org/10.1007/s40263-017-0487-z

Cooper, A. M., & Michels, R. (1981). Diagnostic and Statistical Manual of Mental Disorders, 3rd ed. *American Journal of Psychiatry*, *138*(1), 128–129. https://doi.org/10.1176/ajp.138.1.128

Dahal, S., Swahn, M. H., & Hayat, M. J. (2018). Association between Neighborhood Conditions and Mental Disorders among Children in the US: Evidence from the National Survey of Children's Health 2011/12. *Psychiatry Journal*, *2018*, 1–9. https://doi.org/10.1155/2018/5914315

De Almeida, F., Scott, I. J., Soro, J. C., Fernandes, D., Amaral, A. R., Catarino, M. L., Arêde, A., & Ferreira, M. B. (2024). Financial scarcity and cognitive performance: a meta-analysis. *Journal of Economic Psychology*, *101*, 102702. https://doi.org/10.1016/j.joep.2024.102702

Etcoff, L. M. (2013). DSM-IV ADHD Symptom Rating Scale [Dataset]. In *PsycTESTS Dataset*. https://doi.org/10.1037/t25416-000

Extremera, N., Quintana-Orts, C., Sánchez-Álvarez, N., & Rey, L. (2019). The Role of Cognitive Emotion Regulation Strategies on Problematic Smartphone Use: Comparison between Problematic and Non-Problematic Adolescent Users. *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, *16*(17), 3142. https://doi.org/10.3390/ijerph16173142

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160. https://doi.org/10.3758/brm.41.4.1149

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V. J., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. *American Journal of Preventive Medicine, 14*(4), 245–258. https://doi.org/10.1016/s0749-3797(98)00017-8

Franke, H. (2014). Toxic stress: effects, prevention, and treatment. *Children, 1*(3), 390–402. https://doi.org/10.3390/children1030390

Fraenkel, J. R., & Wallen, N. E. (1990). *How to design and Evaluate research in Education*. http://digitallib.pps.unj.ac.id/index.php?p=show_detail&id=28065&keywords=

Fuller-Killgore, M. D., Burlison, J., & Dwyer, W. (2012). Comparison of three ADHD screening instruments in college students of varying cognitive ability. *Journal of Attention Disorders, 17(*5), 449–454. https://doi.org/10.1177/1087054712438136

Gould, F., Clarke, J., Heim, C., Harvey, P. D., Majer, M., & Nemeroff, C. B. (2012). The effects of child abuse and neglect on cognitive functioning in adulthood. *Journal of Psychiatric Research*, *46*(4), 500–506. https://doi.org/10.1016/j.jpsychires.2012.01.005

Goyal, N., Siddiqui, S., Chatterjee, U., Kumar, D., & Siddiqui, A. (2008). Neuropsychology of prefrontal cortex. *Indian Journal of Psychiatry*, *50*(3), 202. https://doi.org/10.4103/0019-5545.43634

Hanganu-Opatz, I. L., Klausberger, T., Sigurdsson, T., Nieder, A., Jacob, S. N., Bartos, M., Sauer, J., Durstewitz, D., Leibold, C., & Diester, I. (2023). Resolving the prefrontal mechanisms of adaptive cognitive behaviors: A cross-species perspective. *Neuron, 111*(7), 1020–1036. https://doi.org/10.1016/j.neuron.2023.03.017

Harada, C. N., Love, M. C. N., & Triebel, K. L. (2013). Normal cognitive aging. Clinics in Geriatric Medicine, 29(4), 737–752. https://doi.org/10.1016/j.cger.2013.07.002

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical Mediation Analysis in the New Millennium. *Communication Monographs*, *76*(4), 408–420. https://doi.org/10.1080/03637750903310360

Hayes, A. F. (2017). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. *Guilford publications*.

Harada, C. N., Love, M. C. N., & Triebel, K. L. (2013). Normal cognitive aging. *Clinics in Geriatric Medicine*, *29*(4), 737–752. https://doi.org/10.1016/j.cger.2013.07.002

Hawkins, M. A., Layman, H. M., Ganson, K. T., Tabler, J., Ciciolla, L., Tsotsoros, C. E., & Nagata, J. M. (2021). Adverse childhood events and cognitive function among young adults: Prospective results from the national longitudinal study of adolescent to adult health. *Child Abuse & Neglect*, *115*, 105008. https://doi.org/10.1016/j.chiabu.2021.105008

Israel, B. A., Schulz, A. J., Estrada-Martinez, L., Zenk, S. N., Viruell-Fuentes, E., Villarruel, A. M., & Stokes, C. (2006). Engaging urban residents in assessing neighborhood environments and their implications for health. *Journal of Urban Health*, *83*(3), 523–539. https://doi.org/10.1007/s11524-006-9053-6

James, S. A., Keenan, N. L., Strogatz, D. S., Browning, S. R., & Garrett, J. M. (1992). Socioeconomic status, John Henryism, and blood pressure in Black adults: The Pitt County study. *American journal of epidemiology*, *135*(1), 59-67. https://doi.org/10.1093/oxfordjournals.aje.a116202

Kennedy, A. M. (2023). Adverse childhood experiences (ACEs). *Salem Press Encyclopaedia.* Adverse childhood experiences (ACEs). - EBSCO

Kessler, R. C., Adler, L. A., Ames, M., Demler, O., Faraone, S. V., Hiripi, È., Howes, M. J., Jin, R., Secnik, K., Spencer, T., Üstün, T. B., & Walters, E. E. (2005). Adult ADHD

Self-Report Scale Symptom Checklist [Dataset]. In *PsycTESTS Dataset*. https://doi.org/10.1037/t03454-000

Larsson, H., Chang, Z., D'Onofrio, B. M., & Lichtenstein, P. (2013). The heritability of clinically diagnosed attention deficit hyperactivity disorder across the lifespan. *Psychological Medicine, 44*(10), 2223–2229. https://doi.org/10.1017/s0033291713002493

Li, T., Franke, B., Arias Vasquez, A., & Mota, N. R. (2020). Mapping relationships between ADHD genetic liability, stressful life events, and ADHD symptoms in healthy adults. *American Journal of Medical Genetics Part B Neuropsychiatric Genetics*, *186*(4), 242–250. https://doi.org/10.1002/ajmg.b.32828

Logue, S. F., & Gould, T. J. (2014). The neural and genetic basis of executive function: Attention, cognitive flexibility, and response inhibition. *Pharmacology, Biochemistry and Behavior*, *123*, 45–54. https://doi.org/10.1016/j.pbb.2013.08.007

Marin, M., Lord, C., Andrews, J., Juster, R., Sindi, S., Arsenault-Lapierre, G., Fiocco, A. J., & Lupien, S. J. (2011). Chronic stress, cognitive functioning and mental health. *Neurobiology of Learning and Memory*, *96*(4), 583–595. https://doi.org/10.1016/j.nlm.2011.02.016

McGonagle, K. A., & Kessler, R. C. (1990). Chronic stress, acute stress, and depressive symptoms. *American journal of community psychology*, *18*(5), 681-706. https://doi.org/10.1007/bf00931237

McEwen, B. S., & Morrison, J. H. (2013). The Brain on Stress: Vulnerability and Plasticity of the Prefrontal Cortex over the Life Course. *Neuron*, *79*(1), 16–29. https://doi.org/10.1016/j.neuron.2013.06.028

Miller, E. K. (2000). The prefrontal cortex and cognitive control. *Nature Reviews. Neuroscience*, *1*(1), 59–65. https://doi.org/10.1038/35036228

Mohamed, S. M. H., Butzbach, M., Fuermaier, A. B. M., Weisbrod, M., Aschenbrenner, S., Tucha, L., & Tucha, O. (2021). Basic and complex cognitive functions in Adult ADHD. *PLoS ONE*, *16*(9), e0256228. https://doi.org/10.1371/journal.pone.0256228

Mosley-Johnson, E., Campbell, J. A., Garacci, E., Walker, R. J., & Egede, L. E. (2021). Stress that Endures: Influence of Adverse Childhood Experiences on Daily Life Stress and Physical Health in Adulthood. *Journal of Affective Disorders*, *284*, 38–43. https://doi.org/10.1016/j.jad.2021.02.018

Muñoz, E., Scott, S., Corley, R., Wadsworth, S. J., Sliwinski, M. J., & Reynolds, C. A. (2018). THE ROLE OF NEIGHBORHOOD STRESS ON COGNITIVE FUNCTION: A COORDINATED ANALYSIS. *Innovation in Aging*, *2*(suppl_1), 68. https://doi.org/10.1093/geroni/igy023.257

Muñoz, E., Scott, S. B., Corley, R., Wadsworth, S. J., Sliwinski, M. J., & Reynolds, C. A. (2020). The role of neighborhood stressors on cognitive function: A coordinated analysis. *Health & Place*, *66*, 102442. https://doi.org/10.1016/j.healthplace.2020.102442

Noble, H., & Heale, R. (2019). Triangulation in research, with examples. *Evidence-Based Nursing*, *22*(3), 67–68. https://doi.org/10.1136/ebnurs-2019-103145

Öhman, L., Nordin, S., Bergdahl, J., Birgander, L. S., & Neely, A. S. (2007). Cognitive function in outpatients with perceived chronic stress. *Scandinavian Journal of Work Environment & Health*, *33*(3), 223–232. https://doi.org/10.5271/sjweh.1131

Pelham, B. W. (2013). *Intermediate Statistics: A Conceptual course*. https://doi.org/10.4135/9781071909836

PSI (2019). *The Psychological Society of Ireland: Code of Professional Ethics* (Revised 19th October 2019). https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahU

KEwjzpc6U0JmLAxU3QkEAHUpsN9sQFnoECBYQAQ&url=https%3A%2F%2Fwww.psychologicalsociety.ie%2Fsource%2FCode%2520of%2520Professional%2520Ethics%2520(Oct%25202019).pdf&usg=AOvVaw13tgj4FdUg3m7vxWv7uIGn&opi=89978449

Rosenblum, L., Coplan, J., Friedman, S., Bassoff, T., Gorman, J., & Andrews, M. (1994). Adverse early experiences affect noradrenergic and serotonergic functioning in adult primates. *Biological Psychiatry*, *35*(4), 221–227. https://doi.org/10.1016/0006-3223(94)91252-1

Ryu, S., & Fan, L. (2022). The relationship between financial worries and psychological distress among U.S. adults. *Journal of Family and Economic Issues*, *44*(1), 16–33. https://doi.org/10.1007/s10834-022-09820-9

Santini, Z. I., Koyanagi, A., Tyrovolas, S., & Haro, J. M. (2015). Stressful life Events measure [Dataset]. In *PsycTESTS Dataset*. https://doi.org/10.1037/t42165-000

Schulz, A. J., Zenk, S. N., Kannan, S., Israel, B. A., & Stokes, C. (2012). Community based participation in survey design and implementation. In B. Israel, E. Eng, A. J. Schulz, & E. Parker (Eds.) *Methods for conducting community-based participatory research for health* (2nd ed., pp. 197–224). San Francisco: Jossey Bass.

Schwarzer, R., & Schulz, U. (2003). Stressful life events. *Handbook of psychology*, *9*, 29-56. Cognitive-Transactional Theory of Stress

Selye, H. (1950). Stress and the general adaptation syndrome. *British medical journal*, *1*(4667), 1383. https://doi.org/10.1136/bmj.1.4667.1383

Sharp, S. I., McQuillin, A., & Gurling, H. (2009). Genetics of attention-deficit hyperactivity disorder (ADHD). *Neuropharmacology*, *57*(7–8), 590–600. https://doi.org/10.1016/j.neuropharm.2009.08.011

Sharp, W., Mangalmurti, A., Hall, C., Choudhury, S., & Shaw, P. (2019). Associations between neighborhood, family factors and symptom change in childhood attention deficit hyperactivity disorder. *Social Science & Medicine*, *271*, 112203. https://doi.org/10.1016/j.socscimed.2019.02.054

Steptoe, A., & Feldman, P. J. (2001). Neighborhood problems as sources of chronic stress: Development of a measure of neighborhood problems, and associations with socioeconomic status and health. *Annals of Behavioral Medicine*, *23*(3), 177–185. https://doi.org/10.1207/s15324796abm2303_5

Stevens, J. P. (2002). Applied multivariate statistics for the social sciences, 4th ed. *Lawrence Erlbaum Associates Publishers*. https://psycnet.apa.org/record/1992-98099-000

Stevens, M., Matosevic, T., Suarez-Pinilla, M., Pais, S., Rossor, M., & Knapp, M. (2023). The link between cognitive health and neighbourhood: perceptions of the public, and of policy-makers, about problems and solutions. *BMC Public Health*, *23*(1). https://doi.org/10.1186/s12889-023-16592-w

Stibbe, T., Huang, J., Paucke, M., Ulke, C., & Strauss, M. (2020). Gender differences in adult ADHD: Cognitive function assessed by the test of attentional performance. *PLoS ONE*, *15*(10), e0240810. https://doi.org/10.1371/journal.pone.0240810

Sundquist, J., Li, X., Ohlsson, H., Råstam, M., Winkleby, M., Sundquist, K., Kendler, K. S., & Crump, C. (2015). Familial and neighborhood effects on psychiatric disorders in childhood and adolescence. *Journal of Psychiatric Research*, *66–67*, 7–15. https://doi.org/10.1016/j.jpsychires.2015.03.019

Van De Glind, G., Van Den Brink, W., Koeter, M. W., Carpentier, P., Van Emmerik-Van Oortmerssen, K., Kaye, S., Skutle, A., Bu, E. H., Franck, J., Konstenius, M., Moggi, F., Dom, G., Verspreet, S., Demetrovics, Z., Kapitány-Fövény, M., Fatséas, M., Auriacombe, M., Schillinger, A., Seitz, A., Levin, F. R. (2013). Validity of the Adult

ADHD Self-Report Scale (ASRS) as a screener for adult ADHD in treatment seeking substance use disorder patients. *Drug and Alcohol Dependence*, *132*(3), 587–596. https://doi.org/10.1016/j.drugalcdep.2013.04.010

Vrijsen, J. N., Tendolkar, I., Onnink, A. M. H., Hoogman, M., Schene, A. H., Fernández, G., Van Oostrom, I., & Franke, B. (2017). ADHD symptoms in healthy adults are associated with stressful life events and negative memory bias. *Attention Deficit and Hyperactivity Disorders*, *10*(2), 151–160. https://doi.org/10.1007/s12402-017-0241-x

Walker, C. S., Walker, B., Brown, D., Buttross, S., & Sarver, D. E. (2021). Defining the role of exposure to ACEs in ADHD: Examination in a national sample of US children. *Child Abuse & Neglect*, *112*, 104884. https://doi.org/10.1016/j.chiabu.2020.104884

Weidmann, R., & Chopik, W. J. (2022). Romantic attachment, stress, and cognitive functioning in a large sample of middle-aged and older couples. *Journal of Research in Personality*, *98*, 104233. https://doi.org/10.1016/j.jrp.2022.104233

Williams, D. R., Yu, N. Y., Jackson, J. S., & Anderson, N. B. (1997). Racial differences in physical and mental health. *Journal of Health Psychology*, *2*(3), 335–351. https://doi.org/10.1177/135910539700200305

Zenk, S. N., Schulz, A. J., Izumi, B. T., Mentz, G., Israel, B. A., & Lockett, M. (2013). Chronic Stress index [Dataset]. In *PsycTESTS Dataset*. https://doi.org/10.1037/t23910-000

Zenk, S. N., Schulz, A. J., Izumi, B. T., Mentz, G., Israel, B. A., & Lockett, M. (2013b). Neighborhood food environment role in modifying psychosocial stress–diet relationships. *Appetite*, *65*, 170–177. https://doi.org/10.1016/j.appet.2013.02.008

Appendix A

G-Power Analysis for Multiple Regression Measuring Five Predictor Variables

F tests - Linear multiple regression: Fixed model, R^2 deviation from zero

Analysis: A priori: Compute required sample size

Input:	Effect size f^2	=	.129
	α err prob	=	0.05
	Power (1-β err prob)	=	0.8
	Number of predictors	=	4
Output:	Noncentrality parameter λ	=	12.6420000
	Critical F	=	2.4695953
	Numerator df	=	4
	Denominator df	=	93
	Total sample size	=	98
	Actual power	=	0.8029764

Appendix B

Demographic Information

1. Gender

☐ Woman

☐ Man

☐ Non-Binary

☐ Prefer not to say

☐ Other

2. Age: _____

3. Years of Education: _____ (see guideline below)

   11 years (Junior Certificate)

   Approx. 14 years (Leaving Certificate)

   Approx. 17-18 years (Undergraduate Degree)

   Approx. 18-20 years (Master's Degree)

   Approx. 20-24 years (Postgraduate/Doctorate PhD)

Appendix C

Chronic Stress Index (CSI)

Chronic Stress Index

Items	
Neighborhood physical environment (Israel et al., 2006; Schulz et al., 2012) 1. Houses in my neighborhood are generally well maintained. (reverse-coded) 2. There is heavy car or truck traffic in my neighborhood 3. My neighborhood has a lot of vacant lots or vacant houses 4. There is air pollution like diesel from trucks or pollution from factories or incinerators in my neighborhood 5. Streets, sidewalks and vacant lots in my neighborhood are kept clean of litter and dumping. (reverse-coded) 6. There is a lot of loud noise from cars, motorcycles, music, neighbors, or airplanes in my neighborhood 7. There is contaminated land in my neighborhood	Five-point disagree–agree scale
Neighborhood social environment (Israel et al., 2006; Schulz et al., 2012) 1. Gang activity in your neighborhood 2. Drug dealing or drug dealers in your neighborhood 3. Gunfire or shooting in your neighborhood. 4. Prostitutes or cars driving through looking for prostitutes in your neighborhood 5. People loitering or hanging around on the street in your neighborhood 6. Theft, vandalism, or arson in your neighborhood	Five-point disagree–agree scale
Safety (Israel et al., 2006; Schulz et al., 2012) 1. Worry about your safety in your home 2. Worry about being robbed or having your home broken into 3. Worry about your safety in your neighborhood	Five-point never–always scale
Everyday unfair treatment (Williams, Yu, Jackson, & Anderson, 1997) 1. Treated with less courtesy or respect than other people 2. Receive poorer service than other people at restaurants or stores 3. People act as if they think you are not smart 4. People act as if they are afraid of you 5. Threatened or harassed	Five-point never–always scale

Chronic Stress Index

Items	
Financial vulnerability (James, Keenan, Strogatz, Browning, & Garrett, 1992) 1. If you lost all your current sources of household income – your wages, public assistance, or other sources of income – how long could you continue to live at your current address and standard of	Five-point scale from >1 year to <1 month
Major life events (Blazer, Hughes, & George, 1987; Schulz et al., 2012) 1. Had a serious illness or injury that started or got worse 2. Been a victim of a serious attack or assault 3. Were robbed or home was burglarized 4. Lost a loved one due to violence 5. You or someone in your household lost job or retired when they did not want to 6. Someone close to you died 7. Family member or close friend had a serious illness or injury 8. Divorce or separation from husband/wife or partner	Happened in last 12 months (yes, no)

Appendix D

Cognitive Functioning Self-Assessment Scale (CFSS)

Cognitive Functioning Self-Assessment Scale
CFSS

Items
Lack of concentration
Absent-mindedness
Difficulty in performing two tasks simultaneously
Difficulty in performing mental calculation
Tip of the tongue phenomenon
Absent-mindedness during intellectual/cognitive activities
Difficulty in organizing extra-routine activities
Difficulty in recalling recent information
Difficulty in recalling old information
Difficulty in recalling autobiographical events
Forgetfulness
Lack of concentration while reading
Lack of motor coordination
Slowness in the execution of movements
Difficulty in finding the appropriate words
Use of periphrases or generic terms instead of specific words
Difficulty in spatial orientation
Difficulty in temporal orientation

Note. Items utilized a 5-point scale, anchored by "never" to "always." Min = 1, Max = 5.

Appendix E

DSM-IV ADHD Symptom Rating Scale (ASRS-v1.1)

Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist

Patient Name		Today's Date					
Please answer the questions below, rating yourself on each of the criteria shown using the scale on the right side of the page. As you answer each question, place an X in the box that best describes how you have felt and conducted yourself over the past 6 months. Please give this completed checklist to your healthcare professional to discuss during today's appointment.			Never	Rarely	Sometimes	Often	Very Often
1. How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?							
2. How often do you have difficulty getting things in order when you have to do a task that requires organization?							
3. How often do you have problems remembering appointments or obligations?							
4. When you have a task that requires a lot of thought, how often do you avoid or delay getting started?							
5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?							
6. How often do you feel overly active and compelled to do things, like you were driven by a motor?							
							Part A
7. How often do you make careless mistakes when you have to work on a boring or difficult project?							
8. How often do you have difficulty keeping your attention when you are doing boring or repetitive work?							
9. How often do you have difficulty concentrating on what people say to you, even when they are speaking to you directly?							
10. How often do you misplace or have difficulty finding things at home or at work?							
11. How often are you distracted by activity or noise around you?							
12. How often do you leave your seat in meetings or other situations in which you are expected to remain seated?							
13. How often do you feel restless or fidgety?							
14. How often do you have difficulty unwinding and relaxing when you have time to yourself?							
15. How often do you find yourself talking too much when you are in social situations?							
16. When you're in a conversation, how often do you find yourself finishing the sentences of the people you are talking to, before they can finish them themselves?							
17. How often do you have difficulty waiting your turn in situations when turn taking is required?							
18. How often do you interrupt others when they are busy?							
							Part B

Appendix F

Research Recruitment Poster

Appendix G

Participant Information Sheet

Project Title

Chronic Stress and Cognitive Functioning: Mediation Effects on ADHD Symptomatology.

Invitation & Background

You are being asked to participate in a study which aims to investigate whether chronic stress exposure predicts the prevalence of ADHD symptomatology, with cognitive functioning as a mediating variable. Before agreeing to take part please read this document which explains reasoning for this research and what it would involve for you.

My name is Dawn, I am an undergraduate student in the National College of Ireland. As part of our degree, we are required to design and produce an independent research project. I am the researcher conducting this study, under the supervision of Dr. David Mothersill, my dissertation supervisor. The purpose of my study is to evaluate relevant research and conduct a mediated hierarchical analysis to explore the relationship between chronic stress exposure and the prevalence of ADHD symptomatology (criterion variable), while mediating for cognitive functioning (mediator variable).

What will happen?

This project consists of completing relevant online questionnaires to measure levels of chronic stress exposure, cognitive functioning, and the prevalence of ADHD symptoms. You will be asked to conduct three questionnaires to facilitate in the collection of data necessary for the study. This project aims to investigate whether there is a statistically significant relationship between chronic stress exposure and the prevalence of ADHD symptoms through the mediation of cognitive functioning.

Inclusion/Exclusion Criteria

You can participate if you are at least 18 years of age. Participants of any gender, ethnicity, or socio-economic background. No other requirements/restrictions for participation. You must also be participating on a completely voluntary basis, with no coercion from either myself or any other individual. You are not able to participate in this study if you have ever been

officially diagnosed with PTSD, or if you are currently experiencing exposure to traumatic events.

Time Commitment

Participation in the study will take approximately 20 minutes to complete, one time only.

Participants Rights

You have the right to withdraw from participating in the study at any stage, up until submission of answers. To do so just close your browser.

You have the right to withhold from answering any questions, without any penalty.

You have the right to have your questions about any of the research procedures answered (unless doing so would obscure the outcome of the study).

If you have any questions following this information sheet, please do not hesitate to contact myself, the researcher, before commencement.

Benefits or Risks

While there are no direct benefits to you, your participation will contribute to helping psychology researchers understand the prevalence of ADHD symptomatology while controlling for cognitive functioning following chronic stress exposure. There is also a small risk involved with participating int this study, as it may cause minor distress for participants. If this may be the case, necessary supports will be provided to you during the debriefing procedure, and you also reserve the right to withdraw from participation effective immediately. Participation in this study involves answering questionnaires which have been designed for clinical diagnosis purposes, but under no circumstance does participating in this study replace medical health advice.

Confidentiality/Anonymity

The data collected does not contain any personal information about you. Therefore, the data will be unidentifiable in relation to you. Any data obtained from you, and the results of such data will be stored on a private laptop, in a password secure folder, which only myself and my supervisor, named in “invitation & background” section, have access to.

Anonymised data will be stored on NCI servers in line with NCI’s data retention policy. It is envisaged that anonymised data will also be uploaded to a secondary data repository to facilitated validation and replication, in line with Open Science best practice and conventions.

The results derived from the data gathered during this study will be used for the purpose of my Final Year Project Thesis/Dissertation as part of my undergraduate degree in Psychology. The data may also be used in the future for presentations at psychological conferences, or for publication purposes. Please note that even though this may be the case, you will still remain completely anonymous.

Further Information

For any further information, please do not hesitate to contact myself, Dawn Katie Campbell – Undergraduate BA Psychology – at x21234051@student.ncirl.ie, or my supervisor Dr. David Mothersill at david.mothersill@ncirl.ie, or by contacting the National College of Ireland on 01 – 4498 500.

Appendix H

Informed Consent Form

By signing below; you are agreeing to participate in this research study with the understand of the following:

•The method proposed for this research project has been approved in principle by the Departmental Ethics Committee, which means that the Committee does not have concerns about the procedure itself as detailed by the student. It is, however, the above-named student's responsibility to adhere to ethical guidelines in their dealings with participants and the collection and handling of data.
•If I have any concerns about participation, I understand that I may refuse to participate or withdraw at any stage by exiting my browser.
•I understand that once my participation has ended, that I cannot withdraw my data as it will be fully anonymized.
•I have been informed as to the general nature of the study and agree voluntarily to participate.
•All data from the study will be treated confidentially. The data from all participants will be compiled, analysed, and submitted in a report to the Psychology Department in the School of Business.
•I understand that my data will be retained and managed in accordance with the NCI data retention policy, and that my anonymized data may be archived on an online data repository and may be used for secondary data analysis. No participants data will be identifiable at any point.
•At the conclusion of my participation, any questions or concerns I have will be fully addressed.

- I consent

Date: ____/____/____

Appendix I

Debriefing Sheet

I would like to take this opportunity to thank you for generously offering your time to participate in my study: investigating whether chronic stress exposure predicts the prevalence of ADHD symptomatology, due to cognitive functioning as a mediating variable.

For any further information, please do not hesitate to contact myself, Dawn Katie Campbell – Undergraduate BA Psychology – at x21234051@student.ncirl.ie, or my supervisor Dr. David Mothersill at david.mothersill@ncirl.ie, or by contacting the National College of Ireland on 01 – 4498 500. Please feel free to share the study link with anybody you feel may be interested in participating, should they meet the inclusion / exclusion criteria.

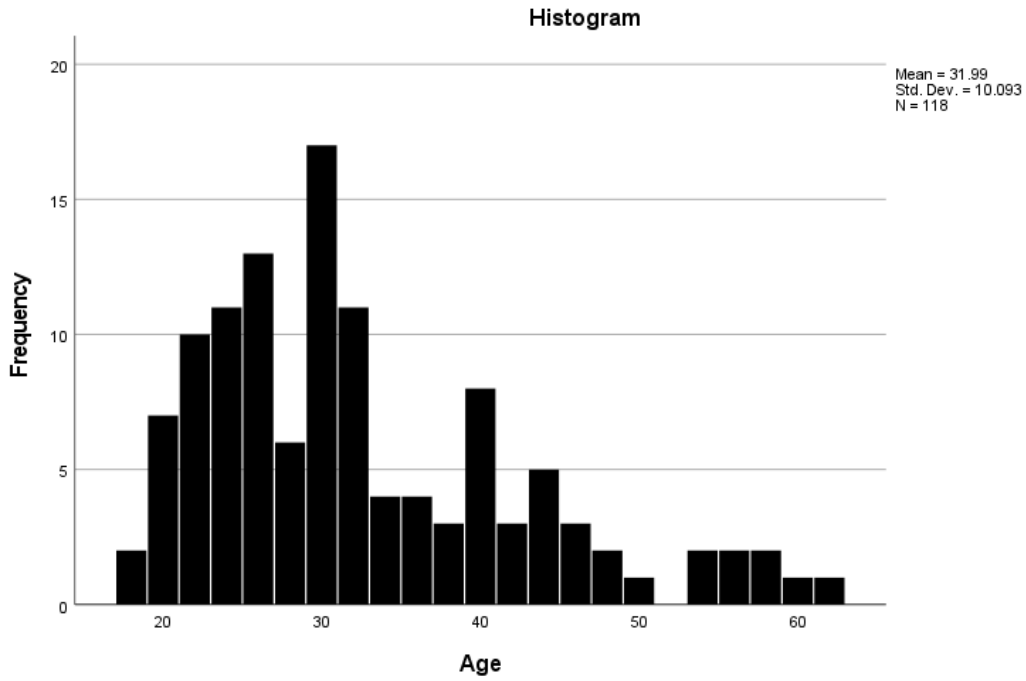
Should you have been affected by any minor distress following participation, please find contact information for relevant emotional and psychological support:

Free Text *"Hello" to 50808* – "Text About It" is a free, 24/7 service, providing everything from a calming chat to immediate support for your mental health and emotional wellbeing.

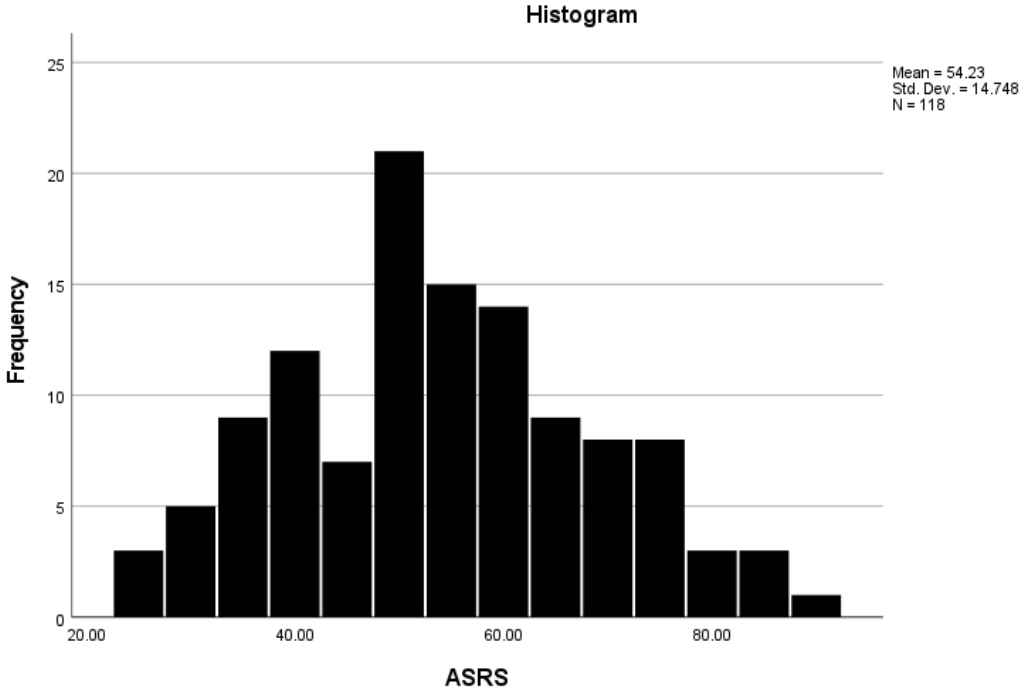
Freephone the *Samaritans on 116 123* – Volunteers are on duty 24 hours a day, 7 days a week, offering emotional support to those who need someone to talk to.

Appendix J

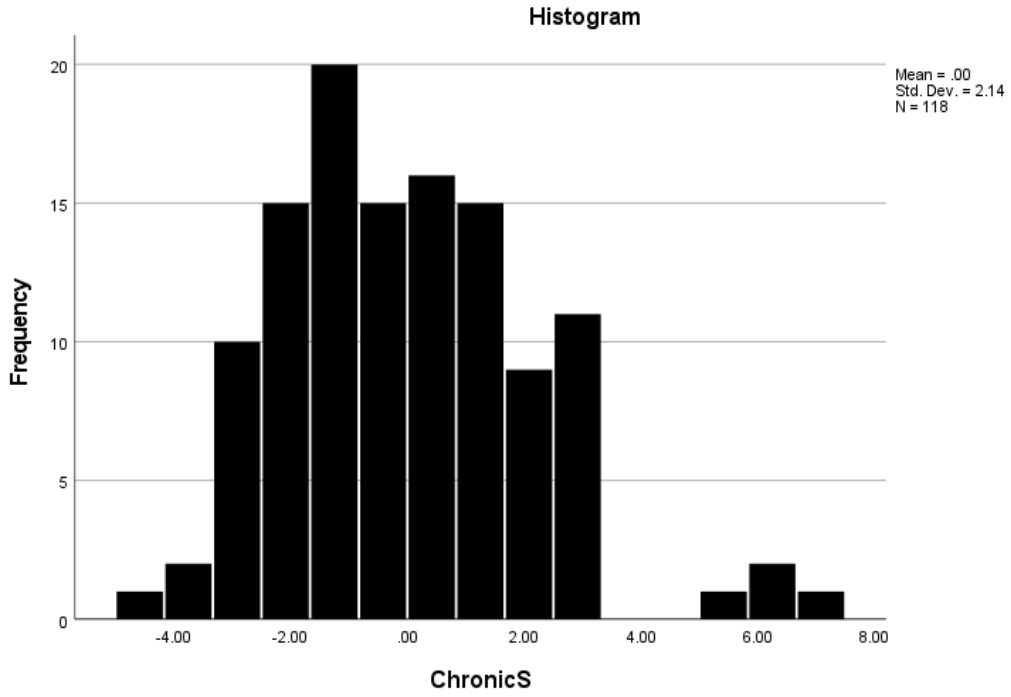
(i) Histogram of Normality for Age



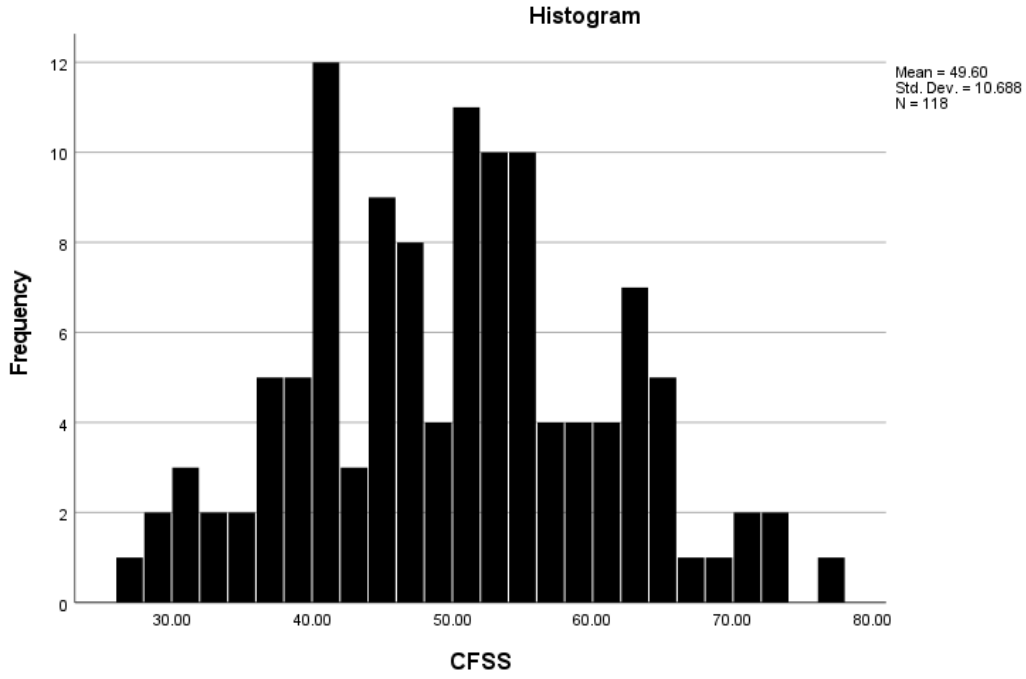
(ii) Histogram of Normality for ADHD



(iii) Histogram of Normality for Chronic Stress



(iv) Histogram of Normality for Cognitive Functioning



Appendix K

(i) Assumptions for Multicollinearity (Pearson's r values less than .90 between predictor variables)

Correlations

		ASRS	Age	Gender	ChronicS	CFSS
Pearson Correlation	ASRS	1.000	-.246	.172	.307	.729
	Age	-.246	1.000	-.181	.012	-.317
	Gender	.172	-.181	1.000	.057	.251
	ChronicS	.307	.012	.057	1.000	.301
	CFSS	.729	-.317	.251	.301	1.000
Sig. (1-tailed)	ASRS	.	.004	.031	<.001	<.001
	Age	.004	.	.025	.448	.000
	Gender	.031	.025	.	.270	.003
	ChronicS	.000	.448	.270	.	.000
	CFSS	.000	.000	.003	.000	.
N	ASRS	118	118	118	118	118
	Age	118	118	118	118	118
	Gender	118	118	118	118	118
	ChronicS	118	118	118	118	118
	CFSS	118	118	118	118	118

(ii) Assumptions for Multicollinearity (Tolerance and VIF values)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	61.373	5.321		11.533	<.001					
	Age	-.325	.133	-.222	-2.440	.016	-.246	-.222	-.219	.967	1.034
	Gender	4.397	3.039	.132	1.447	.151	.172	.134	.130	.967	1.034
2	(Constant)	62.169	5.078		12.244	<.001					
	Age	-.335	.127	-.229	-2.640	.009	-.246	-.240	-.225	.967	1.034
	Gender	3.778	2.902	.113	1.302	.196	.172	.121	.111	.964	1.037
	ChronicS	2.089	.589	.303	3.544	<.001	.307	.315	.303	.996	1.004
3	(Constant)	8.568	6.771		1.265	.208					
	Age	-.044	.100	-.030	-.444	.658	-.246	-.042	-.028	.877	1.141
	Gender	-.432	2.212	-.013	-.195	.845	.172	-.018	-.012	.926	1.080
	ChronicS	.686	.464	.100	1.478	.142	.307	.138	.094	.896	1.115
	CFSS	.956	.100	.692	9.556	<.001	.729	.669	.609	.775	1.291

a. Dependent Variable: ASRS

(iii) Assumptions for Outliers, Normality, Linearity and Homoscedasticity