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DEVELOPMENTAL TRAJECTORIES IN COLLEGE STUDENTS WITH ADHD: THE RELATIONSHIP BETWEEN TREATMENT AND QUALITY OF LIFE

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ABSTRACT

Objective: Individuals with Attention-Deficit Hyperactivity Disorder (ADHD) are attending college at higher rates than ever before. While much research has been performed to assess academic and vocational outcomes, very few studies have examined quality of life (QoL) outcomes. The present study sought to closely examine the role of treatment, executive functioning, symptom severity, and demographic factors in predicting quality of life among college students with ADHD. **Method:** Data for the proposed study was gathered through the four year, longitudinal Trajectories Related to ADHD in College Students (TRAC) project and were analyzed to identify differences in quality of life among college students with ADHD according to treatment status, executive functioning, ADHD symptom severity, race, ethnicity, and sex. Predictors were compared across individuals with and without ADHD. **Results:** Predictors for individuals with and without ADHD were comparable, with no significant differences within the variables explored. Medication, but not therapy, was predictive of QoL in Year 1, while executive functioning was predictive of QoL in Years 1 and 4. **Conclusion:** Medication and executive functioning emerged as the most important contributors to QoL in the present model and should be considered in treatment approaches for college students with ADHD.

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PREFACE

The present thesis has been formatted according to the manuscript guidelines of the Journal of Attention Disorders, which follows American Psychological Association (APA) guidelines for formatting and publication. Manuscript format is in use.

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Publication Status

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Introduction

Attention-Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder affecting 3-10% of children and adolescents, characterized by developmentally inappropriate attentional deficits, hyperactivity, and impulsivity (American Psychiatric Association, 2013). Despite the academic and social challenges faced by individuals with ADHD, the pursuance of higher education by this population has increased substantially in the past two decades. For example, DuPaul and colleagues (2009) reported that 2-8% of all college students endorse an ADHD diagnosis and 25% of college students with a disability are diagnosed with ADHD. In fact, ADHD currently represents the fastest-growing disability category among college students (Nelson & Liebel, 2018). As a result of increased participation in higher education by students with ADHD, there has been a recent increase in research regarding ADHD in college students. Many of these studies center on the impact of ADHD on academic performance (e.g., Abikoff et al., 2013; Baweja et al., 2015; Gormley et al., 2019; Jangmo et al., 2019). Although a significant focus has been placed on the academic performance of college students with ADHD, other domains of functioning have been relatively unexplored. Specifically, issues pertaining to quality of life (QoL), defined by the World Health Organization as an individual's subjective judgment of their life according to their own system of values (WHO Quality of Life, 1995), are relatively unexplored, even as it has been demonstrated that QoL is adversely impacted by ADHD (Adler et al., 2013; Coghill, 2010; Klassen et al., 2004; Pinho et al., 2019). Prior research has demonstrated that there is a significant main effect of ADHD status on QoL ($F(1, 356) = 9.453$, $p = .002$) among college students, as students with ADHD endorse a lower QoL

than their peers without ADHD (Pinho et al. 2019). QoL is a multifaceted domain encompassing physical health, psychological health, social interactions, and environmental factors (WHOQOL Group, 1998). Research is needed to compare QoL outcomes between college students with and without ADHD, to identify whether particular mechanisms of treatment, such as medication and therapy, are associated with greater improvement in QoL, and to examine the impact of ADHD considering potential within-group heterogeneity based on demographic and individual factors (Galloway et al., 2019).

Treatment Modalities

Understanding the association between treatment and QoL outcomes among college students with ADHD is crucial, as research has demonstrated both that QoL is significantly impaired in college students with ADHD when compared to students without ADHD, and that more individuals with ADHD are entering college than have ever before (DuPaul et al., 2009; Nelson & Liebel, 2018; Pinho et al., 2019). Specifically, a greater understanding of the role of broad treatment modalities (i.e., medication and therapy) as they pertain to QoL in college students with ADHD may help to elucidate whether a particular approach would help maximize QoL for college students with this disorder.,

Medication

Stimulant medication is the first line of treatment for ADHD in childhood and adulthood (Shier et al., 2012). The most commonly prescribed stimulant medication for ADHD across the lifespan, methylphenidate, is effective at reducing ADHD symptoms by up to 31% (Chan et al., 2016; Krinzinger et al., 2019). Nonstimulant medications (e.g., atomoxetine) are also effective in reducing symptoms of ADHD among children and adolescents (Banaschewski, et al., 2004; Wolraich et al., 2019), although these medications generally

demonstrate smaller effect sizes than treatment with stimulant medication (e.g., *d* = .30-.69; Chan et al., 2016; Wolraich et al., 2019).

Although prior research has consistently demonstrated that medication is effective in reducing general symptoms of ADHD (Chan et al., 2016; Corbisiero et al., 2018), specific issues related to QoL outcomes are largely unexplored in the study of treatment's efficacy. Within the limited research on this facet of ADHD treatment outcomes, preliminary evidence suggests that medication significantly improves QoL (Temizsoy et al., 2019). It is important to note that even when medication is associated with enhancement within this domain, QoL remains below that demonstrated by neurotypical counterparts (Rajeh et al., 2017). The improvements demonstrated in QoL because of stimulant medication are directly related to improvements in general functioning, with psychosocial domains of QoL improving along with core ADHD symptoms (Coghill, 2010; Danckaerts et al., 2010). Interestingly, physical QoL, or the sense of physical wellbeing an individual experiences in the body, has been demonstrated to remain unimproved during treatment of ADHD with medication (Danckaerts et al., 2010; WHOQOL Group, 1998; Yang et al., 2007).

The finding that physical QoL remains unaltered after treatment with medication suggests that the physiological side effects of medication may play a role in QoL. Despite improvements in symptomology, stimulant medications produce side effects that may substantially interfere with an individual's daily functioning, including appetite suppression, insomnia, irritability, anxiety, perceived lower levels of creativity, changed perception of oneself, depression, psychotic-like symptoms, substance use disorders, tics and dyskinesias, seizures or EEG abnormalities, and aggression (Corbisiero et al., 2018; Krinzinger et

al., 2018; Rajeh et al., 2017). However, it should be noted that DuPaul and colleagues (2012) explored the effectiveness of lisdexamfetamine dimesylate among college students with ADHD and found that students reported minimal side effects as well as substantial improvement in executive functioning and psychosocial functioning (DuPaul et al., 2012). Nonstimulant medication is associated with similar side effects, including somnolence, gastrointestinal problems, and decreased appetite (Spencer et al., 2007). Less commonly, atomoxetine is related to hepatitis and growth delays, as well as suicidal thoughts, precipitating an FDA Black Box warning (Bangs et al., 2008; Reed et al., 2016). Several forms of nonstimulant medication are associated with cardiovascular changes, with atomoxetine associated with increased heart rate and blood pressure and others associated with decreased heart rate and blood pressure (Vaughan & Kratochvil, 2012). These potentially severe side effects are important to consider alongside the benefits of medication in other domains of functioning in order to truly evaluate the role of medication in QoL.

Psychosocial Treatment

Several nonpharmacological, psychosocial techniques are commonly implemented to improve overall symptoms of ADHD, including contingency management, modified cognitive behavioral therapy (CBT), and specific skills training (Antshel & Olszewski, 2014; Evans et al., 2014; Evans et al., 2018). Such techniques are beneficial in long-term functioning because they add a behavioral component to assist with applied tasks related to academic performance and daily functioning (Corbisiero et al., 2018). The advantage of the applied focus of psychosocial treatment is seen in the benefits that often persist even after treatment is ceased, whereas the cessation of medication yields an immediate cessation of benefits (Corbisiero et al., 2018; Wolraich et al., 2019).

Research supports that psychosocial treatment of ADHD is, in general, associated with increased QoL, although these results tend to have smaller effect sizes than those examining the impact of medication (Lopez et al., 2018). While some studies (e.g., Kousha & Abbasi Kakrodi, 2019) have found that QoL improves in psychological, social, and environmental, but not physical QoL, following psychosocial interventions, other research demonstrates that these interventions, especially CBT, are associated with improvements in all domains of QoL, including the physical domain related to fatigue, dependence on medication, and feelings of energy and restlessness. Pan and colleagues (2019) found that participants with ADHD receiving an adjusted form of CBT without medication reported higher physical QoL ($b = 8.62$, $p < 0.01$) than those receiving medication alone or a combination of CBT and medication. The comparison of CBT to medication is pertinent, as stimulant medication has been demonstrated to consistently improve psychosocial, but not physical, QoL in individuals with ADHD (Danckaerts et al., 2010). Additional research is needed, however, to explore the magnitude of the relationship between psychosocial treatment and QoL, as preliminary studies demonstrate promising results for increasing QoL.

Combined Approach to Treatment

Given that both medication and psychosocial approaches to improving QoL in individuals with ADHD can be beneficial, providers sometimes turn to a combination of the two modalities to enhance the benefits of each method of treatment. Indeed, a combined approach to treatment is recommended by the American Academy of Pediatrics (Wolraich et al., 2011). Data concerning the benefits of combined treatment, however, are inconsistent across studies. In some cases, a combined approach has been demonstrated to yield a greater improvement in symptoms than either approach alone (Rosch et al., 2016; Sprich et al., 2016). For example, Rosch and colleagues (2016) found that a combined approach

can statistically improve executive functioning abilities beyond the level of improvement demonstrated by one approach alone. Other studies, such as the Multimodal Treatment Study of Children with ADHD (MTA), however, found that combination treatments do not offer significantly greater benefits than medication management for ADHD symptoms among children (Molina et al., 2009). Still, other research has found that a combined approach yields significantly worse outcomes among adults than either modality alone (Pan et al., 2019).

Examination of a combined approach to treatment among college students with ADHD is necessary, as much of the research on ADHD treatment is focused on young children, adolescents, and adults, with little emphasis on emerging adulthood (e.g., Molina et al., 2009; Pan et al., 2019; Rosch et al., 2016). As a result of the unique academic and social demands faced by college students, this population may demonstrate different needs that may be better addressed by a combination of medication and psychosocial treatment. In particular, study is needed to assess whether treatment in childhood is related to outcomes in early adulthood.

Potential Moderators of the Relationship between Treatment and QoL

In examining QoL among college students with ADHD, it is important to address potential moderators that may place certain populations at higher risk for negative outcomes. The study of moderators is particularly important as previous studies have demonstrated that treatment is not related to increased global QoL among individuals with ADHD (Pinho et al., 2019), but has not considered within-group heterogeneity, including variables such as executive function, symptom severity, and demographic differences. Examining differences as moderators in the relationship between QoL and treatment modality may clarify the true outcomes related to treatment.

Severity of Symptoms and Executive Functioning Deficits

Severity of ADHD symptoms is important to understand treatment effectiveness in the domain of QoL. Treatment, particularly medication, has been found to have greater efficacy when symptoms are more severe (Ginsberg et al., 2011). Individuals with more severe ADHD symptomology receiving treatment may gain the greatest benefits relative to their initial QoL endorsement, supporting a stronger relationship between treatment and QoL among this group. Further, research has found that each core symptom of ADHD (hyperactivity, impulsivity, inattention) is related to marked deficits across multiple domains of everyday functioning such as managing personal responsibilities, social interactions, and even driving (Weiss et al., 2012). It follows logically that, due to the broad impact of each symptom of ADHD, increased severity of symptoms is likely related to worsened QoL beyond the categorical presence or absence of a diagnosis, with worsened symptoms indicating an exponential impact on QoL (Thorell et al., 2019).

Beyond the core symptoms of ADHD, executive functioning as a distinct subdomain has been found to contribute significantly to QoL. Executive functioning, generally defined as the cognitive ability to plan, inhibit, regulate, and shift behavior (de Frias, et al., 2006; Weyandt, 2009), has been shown to account for more variation in QoL than overall severity of ADHD symptoms (Thorell et al., 2019). Similar to the wide-reaching impact of ADHD core symptomology, executive functioning is also necessary for the implementation of a broad range of crucial everyday tasks (Barkley & Murphy 2010; Brown & Landgraf, 2010; Dijkhuis et al., 2017; Sanz et al., 2018; Weyandt et al., 2017). Because increased executive functioning abilities are a significant predictor of greater QoL, it is also important to examine the role of executive functioning as a moderator in the relationship between treatment and QoL in college students.

Demographic Moderators

Race and ethnicity are two variables that have frequently been neglected in ADHD research, which is particularly concerning given the poor quality of treatment for ADHD among minoritized groups (Alsalamah, 2018). For example, Black and Hispanic youth with ADHD receive follow-up care and utilize treatment services at significantly lower rates than other groups, especially White and non-Hispanic youth (Bailey & Owens, 2005). Black youth with ADHD are 22.4% more likely to cease medication use and 13.1% more likely to stop psychosocial treatment than White youth, while Hispanic youth with ADHD are 16.7% more likely to cease medication use and 9.4% more likely to stop psychosocial treatment than non-Hispanic youth (Cummings et al., 2017).

Similarly, disparities in outcomes relating to QoL are seen across sexes. Female children with ADHD experience increased internalizing and somatic symptoms compared to their male counterparts and are more likely to demonstrate a lower QoL (Dallos et al., 2017; Skogli et al., 2013; Rucklidge & Tannock, 2001). Specifically, female children with ADHD have demonstrated heightened impairments in satisfaction with self (Wehmeier et al., 2012) and stimulant medication is associated with improved QoL in both males and females. Notably, larger differences are typically found in females, particularly in the domains of restricted activity and comfort. To understand and improve outcomes related to ADHD across race, ethnicity, and sex, research would benefit from prioritizing issues related to disparities in access and efficacy of treatment in these historically marginalized and underrepresented groups. Research is needed to determine whether the disparities seen in childhood continue into young adulthood.

Aims

A growing presence of students with ADHD in higher education has emerged in the last two decades, inspiring increased research regarding ADHD symptomology and academic functioning (DuPaul et al., 2009; Weyandt & DuPaul, 2013). Relatively less attention, however, has been placed on QoL, a critical avenue of study because it relates to one's perceived worth in daily functioning (WHO Quality of Life, 1995). Preliminary studies support that ADHD is related to diminished QoL (Adler et al., 2013; Coghill, 2010; Klassen et al., 2004; Pinho et al., 2019), however, research is lacking regarding the relationship between treatment modality and QoL and whether this relationship is influenced by within-group heterogeneity. Further, both medication and psychosocial treatments have been demonstrated as effective in reducing symptoms of ADHD in children and adults, however, it is unclear whether these treatments have a significant relationship with QoL in college students (Corbisiero et al., 2018; Krinzinger et al., 2018; Rajeh et al., 2017).

Given the importance of QoL in understanding the full impact of ADHD on the lives of college students, the purpose of the present study was to closely examine the relationship between various treatment modalities and QoL in college students with ADHD with particular attention to moderating variables. Based on extant literature, the following hypotheses were advanced: 1) In a regression model in which race, ethnicity, sex, and executive functioning would be predictive of QoL across the entire sample including college students with and without ADHD, the four regression variables would account for greater variation in QoL among college students with ADHD compared to college students without ADHD; 2) Reports of a history of psychosocial treatment of ADHD in Year 1, reports of a history of use of medication for ADHD in Year 1, ADHD symptom severity, executive functioning ability, race, ethnicity, and sex would create a regression

model predictive of QoL among college students with ADHD in Years 1 and 4; 3) Specifically, within the latter model, there would be an interaction between a history of psychosocial treatment and medication indicative of greater QoL in Years 1 and 4; 4) The relationship between treatment in Year 1 and QoL in Years 1 and 4, as explored through regression analyses between treatment and QoL, would be moderated by ADHD symptom severity and executive functioning ability; 5) The relationship between treatment in Year 1 and QoL in Years 1 and 4 would be moderated by race and ethnicity, with Black and Hispanic students who reported a history of treatment in Year 1 demonstrating lower QoL in Years 1 and 4 than White and non-Hispanic students who report a history of treatment in Year 1; 6) The relationship between treatment in Year 1 and QoL in Years 1 and 4 would be moderated by sex, with female participants who report a history of treatment in Year 1 demonstrating lower QoL in Years 1 and 4 than male participants who report a history of treatment in Year 1.

Methods

Procedure

Study procedures were approved by the institutional review board for each data collection site (University of Rhode Island IRB Number: HU1112-087). Data for the proposed study was gathered through the Trajectories Related to ADHD in College Students (TRAC) project examining multiple functional trajectories, including behavioral, educational, social, and vocational domains, across early adulthood to identify risk and protective factors to inform clinical assessment and treatment. Collection of data occurred at three primary sites, two in the northeast and one in the southeast United States. Six colleges and universities near the primary sites served as recruitment, but not testing, sites. Two cohorts of first-year students were recruited across the first year of the project, with a total of n = 219 participants recruited in Cohort 1 and n = 237 participants recruited in Cohort 2. All participants underwent an annual four-stage assessment with an incentive of up to $100 for completing all required processes. See Appendix B for descriptions of measures used and Appendices C-H for copies of the measures used.

Participants were recruited from a variety of sources, including summer orientation presentations, disability services, student counseling centers, flyers, and presentations to large, first-year classrooms. Recruited participants were first-year college students between the ages of 18-25 with and without ADHD. Written consent was obtained before they were asked to complete current and childhood self-reports of the ADHD Rating Scale (ADHD-RS). Participants' parents were then asked to complete the parent version of the ADHD-RS to address current and childhood symptoms of the participant. The data collected by the self- and parent-report of the ADHD-RS served as the basis of decisions regarding which participants were excluded from the study and which moved to the next phase of

assessment. Participants whose ADHD-RS score indicated possible inclusion underwent additional evaluation by the Semi-Structured Interview for Adult ADHD and the Structured Clinical Interview for DSM-5 (SCID-5), which informed decisions pertaining to which cases were brought to the expert panel for review and final determination of ADHD or Comparison group classification, as well as psychiatric comorbidity status. To be eligible for the study, participants either met a full DSM-5 diagnosis for ADHD by demonstrating five or more symptoms of inattention or hyperactivity, or they met criteria for the Comparison group by demonstrating three or fewer symptoms of inattention or hyperactivity characterized by ADHD, both during childhood and in the past six months. The expert panel was comprised of four doctoral-level licensed psychologists with expertise and clinical experience with ADHD. Group assignment required unanimous agreement by the panel.

Participants

The Trajectories Related to ADHD in College Students (TRAC) project database was used for the present study. This longitudinal study followed two cohorts of college students with and without ADHD from nine different universities in the eastern United States across four years, beginning in the academic year of 2012-2013. Attrition was evident, with somewhat smaller sample sizes in Year 2 (N = 449, n_{ADHD} = 222), Year 3 (N = 452, n_{ADHD} = 227), and Year 4 (N = 435, n_{ADHD} = 218). Power analyses revealed that the sample size throughout all four years of data collection was sufficient to detect a medium effect size across all proposed for a power of .80. Table 1 illustrates the demographic characteristics of the current sample. Participant demographics and characteristics can be seen in can be found in Tables 1A-F.

Results

Foundational Analyses

Prior to testing the hypotheses, foundational statistics were completed to test for multicollinearity. First, the correlation matrix between the subscale scores and global score of the AIM demonstrated that, as expected, the correlations among each subscale score and between the global and subscale scores were between $.30 < r < .80$.

Because the correlation matrices yielded correlations between $.30 < r < .80$, a multivariate analysis of variance (MANOVA) procedure was performed between the grouping variable of history of any form of treatment, dichotomized as any treatment and no treatment, and each subscale score of the AIM. The MANOVA was significant ($F(6, 210) = 2.45$, $p = .026$. $\eta^2 = .065$) and revealed that only the "Living with ADHD" subscale was significantly related to treatment ($F(1, 215) = 13.099$, $p < .001$, $\eta^2 = .057$), hence, only the "Living with ADHD" subscale was used in future analyses. Results of the correlation matrix and MANOVA can be seen in Tables 2 and 3.

Hypotheses

Hypothesis 1

Hypothesis 1, that race, ethnicity, sex, and executive functioning would be predictive of QoL across the entire sample including college students with and without ADHD, and more predictive of QoL among participants with ADHD, was tested via two hierarchical multiple regression analyses. The first hierarchical multiple regression analysis was performed with the dependent variable of global AIM score from Year 2 and the second was performed with the dependent variable of global AIM score from Year 4. It is important to note that the global AIM scores were only available for the Comparison groups for Years 2-4, and subscale scores were not available at any time point for the Comparison

group. In both analyses, race, ethnicity, and sex were entered as independent variables of the first hierarchical model and executive functioning, as measured by the Behavior Rating Inventory of Executive Functioning (BRIEF), was entered as the independent variable in the second hierarchical model. A visual representation of the hierarchical model can be found in Figure 1.

The first step of the hierarchical models from Year 2 (n_{ADHD} = 180, $n_{Comparison}$ = 207), containing only demographic variables, were not significant (ADHD: $F(6, 163) = .680$, $p = .666$; Comparison: $F(6,200) = .740$, $p = .618$). When executive functioning was added to the model, however, significance was achieved for both the ADHD ($F(7, 172) = 4.830$, $p < .001$) and Comparison ($F(7, 199) = 4.978$, $p < .001$) groups. The addition of executive functioning to the hierarchical model yielded an increase in the amount of variance accounted from 2.3% to 16.4% in the ADHD group and from 2.2% to 14.9% in the Comparison group. Executive functioning emerged as the only significant predictor of QoL within the model (ADHD: ß = -.387, $p < .001$, Comparison: ß = -.360, $p < .001$). These results indicate that greater baseline executive functioning is predictive of QoL, while other demographic factors were not predictive of QoL in this sample. Further, findings suggest that executive functioning demographic characteristics account for similar variation in QoL in college students with and without ADHD. The results of these analyses can be seen in Tables 4A-D.

The next hierarchical multiple regression analysis contained the same independent variables as the first regression (i.e., race, ethnicity, and sex added first and executive functioning, as measured by the Behavior Rating Inventory of Executive Functioning (BRIEF) from Year 2 added second) and the dependent variable of global AIM score in Year 4

(n_{ADHD} = 74; $n_{Comparison}$ = 99). The first hierarchical model containing only demographic variables as predictors was not significant (ADHD: $F(5,68) = .413$, $p = .838$; Comparison: $F(6,92) = .796$, $p = .575$). When executive functioning was added to the analysis, the models remained nonsignificant (ADHD: $F(6,67) = 1.414$, $p = .222$; Comparison: $F(7,91) = 1.327$, $p = .247$), however the increase in F value following the addition was significant ($p_{ADHD} = .015$; $p_{Comparison} = .040$). Further, executive functioning emerged as a significant predictor within the nonsignificant overall model (ADHD: ß = -.305, $p = .015$, Comparison: ß = -.210, $p = .040$). This result indicates that, while the overall hierarchical regression did not predict QoL in Year 4, executive function continues to be predictive of QoL (See Tables 4E-H).

Hypothesis 2

Hypothesis 2, that reports of a history of psychosocial treatment of ADHD in Year 1, reports of a history of use of medication for ADHD in Year 1, ADHD symptom severity, executive functioning ability, race, ethnicity, and sex predict QoL among college students with ADHD in Years 1 and 4, was tested via two separate hierarchical multiple regression analyses including only data from the ADHD group. The first hierarchical multiple regression first entered demographic variables (i.e., race, ethnicity, and sex), then ADHD symptom severity Year 1 as measured by the Conners' Adult ADHD Rating Scales (CAARS) and executive functioning ability in Year as measured by the BRIEF, and finally a history of treatment as independent variables. The dependent variable for the first hierarchical multiple regression analysis was the AIM "Living with ADHD" score from Year 1 and the dependent variable for the second analysis was the AIM "Living with ADHD" score from

Year 4. The "Living with ADHD" subscale of the AIM, as the MANOVA procedure performed previously demonstrated that this subscale was the only subscale significantly related to treatment. A visual representation of this model can be found in Figure 2. The sample size of this regression was $n = 203$ with no evidence of multicollinearity. The second multiple regression included the same predictor variables as the first regression with the outcome variable of "Living with ADHD" score from Year 4. The sample size of this regression was $n = 75$, with no evidence of multicollinearity.

In the first analysis, upon entering the demographic variables, the model was not significant ($F(6, 196) = .407$, $p = .874$). When executive functioning and ADHD symptom severity were added to the model, it became significant ($F(8, 194) = 3.784$, $p < .001$), with the amount of variance accounted for increasing from 1.2% to 13.5% and the F value increasing significantly ($p < .001$). Within the model, however, only executive functioning emerged as a significant predictor of QoL (ß = -.361, $p < .001$). When treatment was added to the model, the F value again increased significantly ($p < .001$) and the amount of variance accounted for increased from 13.5% to 19.1%. The overall model was also significant ($F(9, 193) = 5.065$, $p < .001$). To further investigate the impact of treatment, the treatment variable was parsed into medication only and therapy only and added to the model. With the addition of medication alone, the F value increased significantly ($p = .003$) and the amount of variance accounted for increased from 19.1% to 22.7%. The addition of therapy only, however, did not yield a significant increase in the F value ($p = .074$) and only increased the amount of variance accounted for by 1.3%. Medication (ß = .310, $p < .001$) emerged as a significant predictor in this final model, while therapy (ß = .153, $p = .074$) was not a significant predictor of QoL within the model. These results indicate that, within

the paradigm of treatment, medication, and not therapy, is predictive of QoL (See Table 5A-5B).

A second analysis containing the same predictors from the previous analysis (i.e., demographic variables entered first, executive functioning and ADHD symptom severity entered second, and reports of a history of treatment subsequently entered) was performed with the independent variable of AIM "Living with ADHD" from Year 4 (n = 75). The first model containing only demographic variables was not significant (F(6,68) = .453, p = .840). The addition of ADHD symptom severity and executive functioning significantly increased the F value (p = .002) and increased the amount of variance accounted for from 3.8% to 20.5%. The overall model became significant with this addition, as well (F(8, 66) = 2.125, p = .045). Within this model, however, executive functioning was the only significant predictor (ß = -.473, p < .001). ADHD symptom severity was not significant (ß = .083, p = .501). The addition of treatment variables (i.e., a history of any treatment, a history of medication, and a history of therapy) in the subsequent three models did not yield a significant improvement in F value, and the overall model became nonsignificant with each addition (F(11, 63) = 1.632, p = .112; See Tables 5C and 5D). These results indicate that executive functioning remains significantly predictive of QoL over the four years of college, however treatment loses significance over time. It is possible that this lack of significance may be due to decreased power from lower sample size in Year 4 (n = 75.

The results of Hypothesis 2 indicate that medication use and executive functioning are significant predictors of QoL am).ng college students with ADHD. While a history of any form of treatment was initially significantly predictive of QoL, when medication was added to the model, general treatment history lost significance, suggesting that medication

is the component of treatment relating to improved QoL. Notably, treatment was no longer significantly predictive of QoL in Year 4, possibly indicating that treatment, in particular medication, is no longer associated with improvement in QoL over time. It is plausible that his relationship may be due to the mechanism of treatment (i.e., side effects or tolerance), loss of power from decreased sample size, or the fact that relationships become weaker over time. Greater analysis of the roles of medication and therapy, specifically their commencement and cessation, can be found in post-hoc tests 1 and 2 (Appendix A).

Hypothesis 3

Hypothesis 3, that there would be an interaction medication and therapy indicating that QoL was higher when both modalities were endorsed, was tested using the basic model (i.e., sex, race, and ethnicity entered first, executive functioning and symptom severity entered second, and the medication/therapy interaction entered third) from Hypothesis 2. The interaction was significant (ß = .287, $p < .001$) when it was entered, indicating that a history of both therapy and medication is indicative of greater QoL than either modality alone. When medication and therapy were added to the model in an additional step, however, the interaction was no longer significant. Rather, a history of medication was significantly predictive of QoL (ß = .241, $p = .012$), while therapy (ß = .089, $p = .400$) and the interaction term (ß = .064, $p = .633$) remained nonsignificant. Executive functioning was a significant predictor in both models (first: ß = -.487, $p < .001$; second: ß = -4.966 $p < .001$) utilizing the AIM Living with ADHD score from Year 1 (See Tables 6A and 6B).

The same predictors (i.e., demographic variables entered first, executive functioning and ADHD symptom severity entered second, and the medication and therapy interaction entered last) were utilized in a model predicting QoL in Year 4. The overall model was

nonsignificant with the addition of the interaction term ($F(9, 65) = 2.012$, $p = .052$) and the interaction term itself was not significant(ß = .126, p =.301). When a history of therapy (ß = .073, p =.732), and history of medication (ß = .105, p =.581) were added, the model remained nonsignificant ($F(11,63) = 1.632$, $p = .112$). Executive functioning was the only significant predictor in both models utilizing the AIM Living with ADHD score from Year 4 (first: ß = -.362, $p < .001$; second ß = -.3.587, $p < .001$; See Tables 6C and 6D).

Similar to the findings from Hypothesis 2, these results indicate that medication, and not therapy, is a significant predictor of QoL in Year 1. The role of medication in Year 4, however, is diminished and no longer serves as a significant predictor of QoL. These results suggest that either medication is no longer associated with QoL over time, or demonstrates that the sample size in Year 4 (n = 75) may be too small to detect the association. Executive functioning remained a significant predictor of QoL regardless of the other predictors entered into the model in both Year 1 and Year 4.

Hypothesis 4

Hypothesis 4, that the relationship between report of a history of treatment, as measured by the SCSI, and QoL, as measured by the AIM, would be influenced by ADHD symptom severity, as measured by the CAARS, and executive functioning ability was tested using analysis of covariance (ANCOVA). Any treatment (i.e., medication and/or therapy) served as the independent variable and the "Living with ADHD" subscale of the AIM in Years 1 and 4 served as outcome variables. The covariates of the model were CAARS and BRIEF scores.

The first ANCOVA conducted, utilizing the "Living with ADHD" (n = 203, $n_{treatment}$ = 161) subscale score from Year 1 as a dependent variable, revealed that a significant

difference in the relationship between a history of treatment and QoL when executive functioning and ADHD symptom severity were taken into account ($F(1, 203) = 16.172$, $p < .001$, $\eta_p = .075$). Specifically, the ANCOVA revealed that greater executive functioning ability and ADHD symptom severity are predictive of a greater correlation between treatment and QoL. The second ANCOVA ($n = 75$, $n_{treatment} = 65$), utilizing the "Living with ADHD" subscale score of the AIM from Year 4 as the dependent variable did not reveal a significant difference in the relationship between treatment and QoL when executive functioning and ADHD symptom severity were taken into account ($F(1, 74) = .112$, $p = .738$, $\eta^2_p = .002$). While the overall model was nonsignificant, the contribution of ADHD symptom severity was significant in Year 4 ($F(1,71) = 9.618$, $p = .003$). Levene's test of equality of error variances was nonsignificant ($p = .919$), indicating equal variances between groups (See Tables 7A and 7B).

Next, the ANCOVA for Year 1 was repeated with the treatment variable (i.e., any treatment) replaced by medication only and again with therapy only ($n = 203$, $n_{medication} = 127$, $n_{therapy} = 120$). Results suggested that there was a significant difference in the relationship between a history of medication and QoL when executive functioning and ADHD symptom severity were taken into account ($F(1, 203) = 25.944$, $p < .001$, $\eta^2_p = .115$). These results suggest that executive functioning ability significantly influences the relationship between treatment and QoL. Both greater executive functioning and ADHD symptom severity were significant predictors of increased QoL. The relationship between therapy and QoL was also significantly strengthened by greater executive function ($F(1, 204) = 8.574$, $p = .004$, $\eta^2_p = .041$). Levene's test of equality of error variances was nonsignificant ($p = .595$), indicating equal variances between groups (See Tables 7C and 7D).

These results support that executive functioning ability is an important consideration in the relationship between treatment and QoL as it appears to strengthen the relationship between QoL and treatment. Again, these results are no longer significant in Year 4, possibly due to the small sample size and low statistical power. Greater analysis of the role of executive functioning can be found in post-hoc 3 (Appendix A).

Hypothesis 5

Hypothesis 5, that the relationship between reports of a history of treatment in Year 1, as measured by the SCSI, and QoL, as measured by the AIM, would be influenced by race and ethnicity, was tested through an ANOVA ($n = 218$) between the independent variables of race, ethnicity, and history of treatment and the dependent variable of "Living with ADHD" subscale score of the AIM in Year 1. The ANOVA found that neither race ($F(3, 204) = .958$, $p = .414$, $\eta^2_p = .014$) nor ethnicity ($F(1, 204) = .347$, $p = .347$, $\eta^2_p = .001$) significantly impacted the relationship between treatment and QoL. When utilizing the "Living with ADHD" score of the AIM from Year 4 ($n = 78$) the second ANOVA similarly found that neither race ($F(1, 67) = .451$, $p = .504$, $\eta^2_p = .007$) nor ethnicity ($F(1, 67) = .030$, $p = .863$. $\eta^2_p = .000$) significantly impacted the relationship between treatment and QoL (See Tables 8A and 8B and Figures 3A-D). When race was parsed into White and all other races in an attempt to improve group sizes and, subsequently, power, race remained non-significant in the relationship between treatment and quality of life ($F(1,218) = 1.663$, $p = .199$, $\eta^2_p = .008$).

A chi square test was performed next to explore whether any racial or ethnic group demonstrated a difference in endorsement of treatment. The chi square test was not significant across race (chi square (4, $N = 204$) $= 6.824$, $p = .146$), indicating that there is no

difference in endorsement of treatment across race in the current sample. Similarly, according to ethnicity, there was not a significant difference in endorsement of treatment across groups (chi square (1, $N = 228$) = 2.061, $p = .901$), indicating that there is a similar distribution of endorsement of treatment among Hispanic and non-Hispanic participants (See Tables 8C-F). Greater analysis of the role of race in treatment can be found in post-hoc tests 4 and 5 (Appendix A).

Hypothesis 6

Hypothesis 6, that the relationship between treatment in Year 1 and QoL in Years 1 and 4 would be impacted by sex was explored through a two-way ANOVA ($n_{Year1} = 218$, $n_{Year4} = 78$) with the grouping variables of sex and treatment history and the outcome variable of QoL, as measured by the "Living with ADHD" subscale of the AIM. There was no significant association between sex and the relationship between treatment and QoL in Year 1 ($F(1, 110) = .078$, $p = .780$, $\eta^2_p = .000$) or in Year 4 ($F(1, 40) = .983$, $p = .325$, $\eta^2_p = .013$; See Tables 9A-9B and Figures 4A and 4B).

Last, to further explore the relationship between sex and treatment status, a Chi-Square test was performed to determine whether there is significantly different endorsement of treatment across sexes. The chi square was not significant (chi square (1, $N = 228$) = 1.789, $p = .180$), indicating similar endorsement of treatment across sexes (See Tables 9C and 9D).

Discussion

The purpose of the present study was to examine the relationship between treatment (i.e., medication and therapy) and QoL among college students while considering covariates (i.e., executive functioning, ADHD symptom severity, race, ethnicity, and sex) that might influence this relationship. Overall, executive functioning and medication emerged as the two most important contributors to QoL in the present models. Greater executive functioning was significantly predictive of greater QoL regardless of the year of study, treatment modality (i.e., medication or therapy), or sample (i.e., comparison or ADHD). This result is consistent with previous studies demonstrating that executive functioning is critical for academic performance, cognitive ability, and QoL, underscoring the importance of this executive functioning among college students with and without ADHD (e.g., Dijkhuis et al., 2017; Ludwig et al., 2018; Stern et al., 2017). This relationship has also been demonstrated cross-culturally, with prior research supporting that executive dysfunction significantly reduces QoL among both Hispanic and non-Hispanic individuals (Huang et al., 2020). Indeed, in the present study, executive functioning emerged as a stronger predictor of QoL than race or ethnicity. Beyond demographic characteristics, the relationship between executive functioning and QoL remained regardless of ADHD diagnosis status. The literature supports that executive functioning is important across a wide range of psychological diagnoses, such as bipolar disorder, and physical health concerns, such as epilepsy and Marfan Syndrome (Cotrena et al., 2016; Ratiu et al., 2018; Sanz et al., 2018; Schraegle & Titus, 2021). Collectively, these findings support that executive functioning is a critical component of QoL and suggest that improvements in executive functioning may improve QoL among heterogeneous samples of college students regardless of culture, physical and mental health concerns, or neurodevelopmental differences.

Beyond executive functioning, the paradigm of treatment was considered in relation to QoL. As hypothesized, medication use was significantly predictive of QoL in Year 1. This finding is in line with research by Buitelaar and colleagues (2012) and Banaschewski and colleagues (2014), who found improvements in QoL following 52 weeks of treatment by methylphenidate and 24 months of treatment by lisdexamfetamine dimesylate (Vyvanse), respectively. While such research supports improvements following medication use for up to two years, the present study found that medication was no longer predictive of QoL in Year 4. Additional studies have found similar results regarding long term use of stimulant medication. For example, Matthijissen and colleagues (2019) found no difference in QoL among individuals with ADHD who were or were not taking medication after two years. These findings suggest that medication treatment effects may wane over time, which raises issues concerning the age at which medication is begun for maximal efficacy. Although not addressed by the present study, it may be important for future research to consider whether medication is a sustainable long-term treatment for ADHD symptomology in college students.

Akin to the findings regarding medication and QoL, a combined approach to treatment (i.e., both therapy and medication) was only significantly predictive of QoL in Year 1. The significance, no longer existed, however, when the medication only variable was added to the model as a covariate. This finding is supported by research by the MTA Cooperative Group (1999), which suggested that medication, and not therapy or a combined approach, is the most important contributor to treatment outcomes (i.e., a reduction in ADHD symptomology). Collectively these findings suggest that medication, rather than

therapy, is the component of a combined treatment approach that predicts significant improvements in QoL.

The small role that therapy may play in QoL was highlighted with the finding that therapy alone was not significantly predictive of QoL in any model. This finding contradicts prior research demonstrating that a wide range of behavioral interventions can be highly effective in treating ADHD (Charach et al., 2013; Fabiano et al., 2009). The results of the present study are, however, in line with other research supporting that therapy is not as important in contributing to treatment outcomes as medication. For example, Ackermann and colleagues (2018) demonstrated that medication improves cognitive ability beyond the effect of behavioral intervention. While these results are not specific to QoL, when paired with the results of the present study, it is supported that medication is critical across multiple facets of functioning.

Due to the demonstrated importance of medication in improving QoL, it logically follows that ADHD symptom severity would be significantly associated with QoL. Despite this, ADHD symptom severity did not directly predict QoL among college students in the present study. It was, however, a significant covariate in the relationship between treatment and QoL. Specifically, individuals with more severe ADHD symptomology demonstrated a stronger relationship between treatment and QoL. This finding contradicts past research demonstrating that ADHD symptom severity contributes uniquely as a predictor of QoL (Klassen et al., 2004; Miklós et al., 2019; Thorell et al., 2019). Due to the role of ADHD symptom severity as a moderator in the relationship between treatment and QoL, however, it is still an important construct to consider when evaluating QoL among college students with ADHD.

In addition to treatment, demographic factors were also explored in their relationship with QoL. Contrary to expectations, the relationship between treatment and QoL was not significantly moderated by race, ethnicity, or sex. This finding was unexpected due to several studies finding that demographic factors account for a significant amount of variation in measures of ADHD (DuPaul et al., 2020; Manly et al., 2011) and suggests that symptoms and outcomes may vary across race, ethnicity, and sex and that treatment should be specifically tailored to each group. Further, previous research found that Black and Hispanic individuals are more likely to receive worse quality of treatment and lower rates of follow-up care for ADHD than White and non-Hispanic individuals (Cummings et al., 2017). Paired with the findings of the present study underlining the importance of treatment in QoL, these racial and ethnic differences in quality of care suggest that differences would be seen in the relationship between treatment and QoL according to race and ethnicity. One possible explanation for the result that demographic characteristics are not related to the efficacy of treatment in the present study is that a sample of Black and Hispanic college students does not fully represent the Black and Hispanic young adult population, as there are significantly fewer Black and Hispanic students in degree-granting college programs compared to White students (Baker et al., 2018).

While no demographic variables were associated with QoL in the present models, post-hoc tests revealed that endorsement of medication use differed significantly across race. Specifically, Black students endorsed medication at significantly lower rates than White students. Racial disparities in the treatment of ADHD are prominent in the literature, with Black children endorsing lower rates of treatment than White children (Cocker et al.,

2016). This finding is particularly important because it underlines the need to increase access to ADHD treatment to improve outcomes among Black students. Unlike race, endorsement of treatment did not differ across sex and ethnicity. This lack of sex difference in endorsement of treatment is consistent with previous studies finding that females are as likely to receive medication and therapy as their male counterparts (Mowlem et al., 2019). Inconsistent with previous research, however, was the finding that endorsement of treatment did not vary across ethnicity. In the current study, Hispanic and non-Hispanic participants were equally likely to endorse prior treatment, contradicting the findings of researchers such as Cocker and colleagues (2016), that suggest that Hispanic children have a lower likelihood of being treated for ADHD. It is important to note that a possible explanation for this discrepancy is that the current sample was underpowered to detect a small or medium effect according to ethnicity, with only n = 24 Hispanic participants with ADHD included. To detect medium effect size in endorsement of treatment, 210 total participants split evenly into Hispanic and non-Hispanic groups would be needed.

It is important to note that the present study faced several limitations. First, the sample size from Year 4 (n_{AIM} = 75) was smaller than that of Year 1 (n_{AIM} = 204). The sample from Year 4 was underpowered to capture a small or medium effect size, possibly contributing to the nonsignificant results in Year 4. A second limitation is that the Comparison group only completed the AIM in Years 2-4, and only the global score was available, hence comparison of QoL in the first year of college between individuals with and without ADHD was not possible. Finally, in the current dataset, medication is not parsed into different types of medication (e.g., stimulant and nonstimulant) and therapy is defined broadly, with no definition of the specific type of therapy (e.g., CBT, skills training, etc.)

that was used by participants. In addition, school-based interventions (e.g., IEP, 504 plan, etc.) were not investigated.

In summation, the findings from the current study emphasize the importance of executive functioning and medication in predicting increased QoL in college students with ADHD. Future research would benefit from exploring possible executive functioning interventions to improve QoL broadly among college students. For example, Poissant and colleagues (2019) found that an intervention targeting both ADHD symptoms and executive functioning was effective in improving QoL among adults with ADHD. Given that such interventions are preliminarily effective among adults, similar interventions may improve QoL among college students as well. Beyond executive functioning, interventions to improve medication adherence in college students may also be helpful, as the present study supports that medication use predicts greater QoL among college students with ADHD. Cessation of use of medication is common through the transition to college (Edvinsson & Ekselius, 2018a; Edvinsson & Ekselius, 2018b), and further study is warranted to understand the causes and implications of this cessation, as well as mechanisms to improve medication adherence during this period of development. Finally, a longitudinal experimental design examining the role of medication in QoL throughout the four years of college is needed to expand upon the finding of the present study that medication was no longer predictive of QoL in Year 4. Such research would aid in elucidating the importance of medication as a long- or short-term treatment for college students with ADHD.

As larger numbers of students with ADHD are entering college than ever before (DuPaul et al., 2009; Nelson & Liebel, 2018), it is of paramount importance to understand the unique profiles of these students. While the academic performance of college students

with ADHD has been frequently evaluated, QoL is a relatively understudied issue with wide-reaching implications in the health and wellbeing of these students. The present study aids in filling this gap in the research by illustrating the unique predictors of QoL in college students with ADHD (i.e., medication use and executive functioning), helping professionals working with this population understand potentially important contributors to QoL to improve the likelihood of these students succeeding in college.

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Tables

Table 1A.
Demographic Characteristics of Sample in Year 1 (*N* = 456)

Characteristics		ADHD n = 228 (50%)	Comparison n = 228 (50%)
Ethnicity			
	Hispanic	24 (10.4%)	23 (10.1%)
	non-Hispanic	204 (89.5%)	205 (89.9%)
Race			
	White	175 (76.8%)	152 (66.7%)
	Black	25 (11.0%)	31 (13.6%)
	Asian	6 (2.6%)	19 (8.3%)
	More than one race	10 (4.4%)	8 (3.5%)
	Other	12 (5.3%)	18 (7.9%)
Sex			
	Male	109 (47.8%)	111 (48.7%)
	Female	119 (52.2%)	117 (51.3%)
Mean age (sd)		18.27 (0.58)	18.19 (0.46)

Table 1B.
Descriptive Statistics: ADHD and Comparison Groups

	ADHD			Comparison		
	N	Mean	SD	N	Mean	SD
CAARS DSM Total Score (Year 1)	228	31.64	8.804	228	8.89	6.163
CAARS DSM Total Score (Year 4)	77	23.1	8.816	100	7.2	6.257
ADHD Impact Module: Overall (Year 2)	184	7.08	1.531	207	7.91	1.312
ADHD Impact Module: Overall (Year 4)	79	7.33	1.517	99	7.92	1.275
ADHD Impact Module: Living with ADHD (Year 1)	218	57.9702	12.868	NA	NA	NA
ADHD Impact Module: Living with ADHD (Year 4)	78	60.1603	11.377	NA	NA	NA
BRIEF Composite (Year 1)	205	137.95	21.986	216	93.47	15.439
BRIEF Composite (Year 2)	182	134.04	26.119	209	88.62	18.578
BRIEF Composite (Year 4)	79	130.34	24.583	100	88.53	18.606

Table 1C.
Any Treatment Among College Students with ADHD

	Frequency	Percent
No	42	18.4
Yes	186	81.6
Total	228	100

Table 1D.
Medication and Therapy Among College Students with ADHD

	Frequency	Percent
No	118	51.8
Yes	110	48.2
Total	228	100

Table 1E.
History of Medication Among College Students with ADHD

	Frequency	Percent
No	77	33.8
Yes	151	66.2
Total	228	100

Table 1F.
History of Therapy Among College Students with ADHD

	Frequency	Percent
No	83	36.4
Yes	145	63.6
Total	228	100

Table 2.
ADHD Impact Module Correlation Matrix (n = 204)

	AIM Overall Score	Living with ADHD	General Wellbeing	Performance and Daily Functioning	Relationships and Communication	Symptom Impact: Bother/Concern	Symptom Impact: Daily Interference
AIM Overall Score	1						
Living with ADHD	.461**	1					
General Wellbeing	.510**	.604**	1				
Performance and Daily Functioning	.396**	.539**	.586**	1			
Relationships and Communication	.214**	.199**	.331**	.234**	1		
Symptom Impact: Bother/Concern	.305**	.414**	.650**	.422**	.326**	1	
Symptom Impact: Daily Interference	.359**	.426**	.655**	.465**	.454**	.761**	1

**correlation is significant at the 0.01 level (2-tailed)

Table 3.
ADHD Impact Module MANOVA Results (*n* = 217)

	df	Error	F	Sig.	Partial Eta Squared
Living with ADHD	1	215	13.099	<.001	0.057
General Wellbeing	1	215	1.669	0.198	0.008
Performance and Daily Functioning	1	215	2.885	0.091	0.013
Symptoms Impact: Bother/Concern	1	215	0.922	0.338	0.004
Symptom Impact: Daily Interference	1	215	0.478	0.49	0.002

*Alpha = .05

Table 4A.
Change in Model of Predictors of Quality of Life Among College Students with ADHD (Year 2)
(*n* = 180)

Model	R	R Square	Std. Error of the Estimate	Change Statistics			
				R Square Change	F Change	df1	df2	Sig. F Change
Demographics	0.152	0.023	1.517	0.023	0.68	6	173	0.666
Executive Functioning	0.405	0.164	1.408	0.141	29.066	1	172	<.001

Table 4B.
Overall Model of Predictors of Quality of Life Among College Students with ADHD (Year 2)
(*n* = 180)

Model		df	F	Sig.
Demographics	Regression	6	0.68	0.666
	Residual	173		
	Total	179		
Executive Functioning	Regression	7	4.83	<.001
	Residual	172		
	Total	179		

Table 4C.
Change in Model of Predictors of Quality of Life Among College Students without ADHD (Year 2)
(*n* =207)

Model	R	R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
Demographics	0.147	0.022	1.317	0.022	0.74	6	200	0.618
Executive Functioning	0.386	0.149	1.231	0.127	29.766	1	199	<.001

Table 4D.
Overall Model of Predictors of Quality of Life Among College Students without ADHD (Year 2)
(*n* =207)

Model		df	F	Sig.
Demographics	Regression	6	0.74	0.618
	Residual	200		
	Total	206		
Executive Functioning	Regression	7	4.978	<.001
	Residual	199		
	Total	206		

Table 4E.
Change in Model of Predictors of Quality of Life Among College Students with ADHD (Year 4)
(*n* = 74)

Model	R	R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
Demographics	0.172	0.029	1.575	0.029	0.413	5	68	0.838
Executive Functioning	0.335	0.112	1.518	0.083	6.262	1	67	0.015

Table 4F.
Overall Model of Predictors of Quality of Life Among College Students with ADHD (Year 4)
(*n* = 74)

Model		df	F	Sig.
Demographics	Regression	5	0.413	0.838
	Residual	68		
	Total	73		
Executive Functioning	Regression	6	1.414	0.222
	Residual	67		
	Total	73		

Table 4G.
Change in Model of Predictors of Quality of Life Among College Students without ADHD (Year 4)
(*n* = 99)

Model	R	R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
Demographics	0.222	0.049	1.283	0.049	0.796	6	92	0.575
Executive Functioning	0.304	0.093	1.261	0.043	4.337	1	91	0.04

Table 4H.
Overall Model of Predictors of Quality of Life Among College Students without ADHD (Year 4)
(*n* = 99)

Model		df	F	Sig.
Demographics	Regression	6	0.796	0.575
	Residual	92		
	Total	98		
Executive Functioning	Regression	7	1.327	0.247
	Residual	91		
	Total	98		

Table 5A.
Change in Model of Treatment and Quality of Life Among College Students with ADHD (Year 1)
(*n* = 203)

Model	R	R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
Demographics	0.111	0.012	12.96918	0.012	0.407	6	196	0.874
ADHD Symptom and Executive Function	0.367	0.135	12.19944	0.123	13.757	2	194	<.001
Any Treatment	0.437	0.191	11.82785	0.056	13.381	1	193	<.001
Medication	0.476	0.227	11.59436	0.036	8.852	1	192	0.003
Therapy	0.489	0.24	11.52763	0.013	3.23	1	191	0.074

Table 5B.
Overall Model of Treatment and Quality of Life Among College Students with ADHD (Year 1)
(*n* = 203)

Model		df	F	Sig.
Demographics	Regression	6	0.407	0.874
	Residual	196		
	Total	202		
ADHD Symptom and Executive Function	Regression	8	3.784	<.001
	Residual	194		
	Total	202		
Any Treatment	Regression	9	5.065	<.001
	Residual	193		
	Total	202		
Medication	Regression	10	5.629	<.001
	Residual	192		
	Total	202		
Therapy	Regression	11	5.471	<.001
	Residual	191		
	Total	202		

Table 5C.
Change in Model of Treatment and Quality of Life Among College Students with ADHD (Year 4)
(*n* = 75)

Model	R	R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
Demographics	0.196	0.038	11.559	0.038	0.453	6	68	0.84
ADHD Symptom and Executive Function	0.453	0.205	10.669	0.166	6.906	2	66	0.002
Any Treatment	0.461	0.212	10.701	0.007	0.615	1	65	0.436
Medication	0.465	0.216	10.757	0.004	0.319	1	64	0.574
Therapy	0.471	0.222	10.804	0.006	0.448	1	63	0.506

Table 5D.
Overall Model of Treatment and Quality of Life Among College Students with ADHD (Year 4)
(*n* =75)

Model		df	F	Sig.
Demographics	Regression	6	0.453	0.84
	Residual	68		
	Total	74		
ADHD Symptom and Executive Function	Regression	8	2.125	0.045
	Residual	66		
	Total	74		
Any Treatment	Regression	9	1.946	0.061
	Residual	65		
	Total	74		
Medication	Regression	10	1.765	0.085
	Residual	64		
	Total	74		
Therapy	Regression	11	1.632	0.112
	Residual	63		
	Total	74		

Table 6A.
Change in Model of Therapy and Medication Interaction (Year 1)
(*n* = 203)

Model	R	R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
Demographics	0.111	0.012	12.969	0.012	0.407	6	196	0.874
ADHD Symptom and Executive Function	0.367	0.135	12.199	0.123	13.757	2	194	<.001
Therapy/Medication Interaction	0.462	0.214	11.661	0.079	19.323	1	193	<.001
Therapy and Medication	0.489	0.24	11.528	0.026	3.249	2	191	0.041

Table 6B.
Overall Model of Therapy and Medication Interaction (Year 1)
(*n* = 203)

Model		df	F	Sig.
Demographics	Regression	6	0.407	0.874
	Residual	196		
	Total	202		
ADHD Symptom Severity and Executive Function	Regression	8	3.784	<.001
	Residual	194		
	Total	202		
Therapy/Medication Interaction	Regression	9	5.829	<.001
	Residual	193		
	Total	202		
Therapy and Medication	Regression	11	5.471	<.001
	Residual	191		
	Total	202		

Table 6C.
Change in Model of Therapy and Medication Interaction (Year 4)
(n = 75)

Model	R	R Square	Std. Error of the Estimate	Change Statistics			
				R Square Change	F Change	df1	df2	Sig. F Change
Demographics	0.196	0.038	11.559	0.038	0.453	6	68	0.84
ADHD Symptom and Executive Function	0.453	0.205	10.670	0.166	6.906	2	66	0.002
Therapy/Medication Interaction	0.467	0.218	10.663	0.013	1.086	1	65	0.301
Therapy and Medication	0.471	0.222	10.804	0.004	0.155	2	63	0.857

Table 6D.
Overall Model of Therapy and Medication Interaction (Year 4)
(n = 75)

Model		df	F	Sig.
Demographics	Regression	6	0.453	0.84
	Residual	68		
	Total	74		
ADHD Symptom Severity and Executive Function	Regression	8	2.125	0.045
	Residual	66		
	Total	74		
Therapy/Medication Interaction	Regression	9	2.012	0.052
	Residual	65		
	Total	74		
Therapy and Medication	Regression	11	1.632	0.112
	Residual	63		
	Total	74		

Table 7A.
Executive Functioning and ADHD Symptom Severity with Any Treatment (Year 1)
(*n* = 203)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	3	15.256	<.001	0.187
Intercept	1	163.277	<.001	0.451
BRIEF Composite	1	29.946	<.001	0.131
CAARS DSM Total Score	1	4.079	0.045	0.02
Any treatment	1	16.172	<.001	0.075
Error	199			
Total	203			
Corrected Total	202			

Table 7B.
Executive Functioning and ADHD Symptom Severity with Any Treatment (Year 4)
(*n* = 75)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	3	3.578	0.018	0.131
Intercept	1	99.002	<.001	0.582
BRIEF Composite	1	0.41	0.524	0.006
CAARS DSM Total Score	1	9.618	0.003	0.119
Any treatment	1	0.112	0.738	0.002
Error	71			
Total	75			
Corrected Total	74			

Table 7C.
Executive Functioning and ADHD Symptom Severity with Medication (Year 1)
(*n* = 203)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	3	18.066	<.001	0.214
Intercept	1	243.287	<.001	0.55
BRIEF Composite	1	21.733	<.001	0.098
CAARS DSM Total Score	1	0.583	0.446	0.003
Medication	1	25.944	<.001	0.115
Error	199			
Total	203			
Corrected Total	202			

Table 7D.
Executive Functioning and ADHD Symptom Severity with Therapy (Year 1)
(*n* = 203)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	3	11.548	<.001	0.148
Intercept	1	255.414	<.001	0.562
BRIEF Composite	1	21.373	<.001	0.097
CAARS DSM Total Score	1	0.035	0.851	.000
Therapy	1	8.574	0.004	0.041
Error	199			
Total	203			
Corrected Total	202			

Table 8A.
Race and Ethnicity and Quality of Life (Year 1)
(*n* = 218)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	13	1.465	0.133	0.085
Intercept	1	665.9	<.001	0.765
Any treatment	1	3.618	0.059	0.017
Race	4	0.183	0.947	0.004
Ethnicity	1	1.393	0.239	0.007
Treatment Race Interaction	3	0.958	0.414	0.014
Treatment Ethnicity Interaction	1	0.13	0.719	0.001
Race Ethnicity Interaction	3	0.347	0.792	0.005
Error	204			
Total	218			
Corrected Total	217			

Table 8B.
Race and Ethnicity and Quality of Life (Year 4)
(*n* = 78)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	10	0.343	0.966	0.049
Intercept	1	359.56	<.001	0.843
Any treatment	1	0.129	0.721	0.002
Race	4	0.324	0.861	0.019
Ethnicity	1	0.233	0.631	0.003
Treatment Race Interaction	1	0.451	0.504	0.007
Treatment Ethnicity Interaction	1	0.03	0.863	.000
Race Ethnicity Interaction	2	0.036	0.965	0.001
Error	67			
Total	78			
Corrected Total	77			

Table 8C.
Chi Square Tests: Race and Treatment

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.824	4	0.146
Likelihood Ratio	6.451	4	0.168
Linear-by-Linear Association	1.63	1	0.202
N of Valid Cases	204		

Table 8D.
Treatment Counts Across Race

		No History of Treatment	History of Treatment	Total
Race: White	Count	42	113	155
	% within sample	27.10%	72.90%	100.00%
	% within treatment	65.60%	80.70%	76.00%
	Adjusted Residual	-2.3	2.3	
Race: Black	Count	13	12	25
	% within sample	52.00%	48.00%	100.00%
	% within treatment	20.30%	8.60%	12.30%
	Adjusted Residual	2.4	-2.4	
Race: Asian	Count	2	4	6
	% within sample	33.30%	66.70%	100.00%
	% within treatment	3.10%	2.90%	2.90%
	Adjusted Residual	0.1	-0.1	
Race: More than one	Count	3	4	7
	% within sample	42.90%	57.10%	100.00%
	% within treatment	4.70%	2.90%	3.40%
	Adjusted Residual	0.7	-0.7	
Race: Other	Count	4	7	11
	% within sample	36.40%	63.60%	100.00%
	% within treatment	6.30%	5.00%	5.40%
	Adjusted Residual	0.4	-0.4	
Total	Count	64	140	204
	% within sample	31.40%	68.60%	100.00%
	% within treatment	100.00%	100.00%	100.00%

Table 8E.
Chi Square Tests: Ethnicity and Treatment

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.061	1	0.151
Likelihood Ratio	1.852	1	0.174
Linear-by-Linear Association	2.052	1	0.152
N of Valid Cases	228		

Table 8F.
Treatment Counts Across Ethnicity

		No History of Treatment	History of Treatment	Total
Non-Hispanic	Count	35	169	204
	% within sample	17.20%	82.80%	100.00%
	%within treatment	83.30%	90.90%	89.50%
	Adjusted Residual	-1.4	1.4	
Hispanic	Count	7	17	24
	% within sample	29.20%	70.80%	100.00%
	%within treatment	16.70%	9.10%	10.50%
	Adjusted Residual	1.4	-1.4	
Total	Count	42	186	228
	% within sample	18.40%	81.60%	100.00%
	%within treatment	100.00%	100.00%	100.00%

Table 9A.
Sex and Quality of Life (Year 1)
(n = 218)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	3	4.409	0.005	0.058
Intercept	1	2598.009	<.001	0.924
Any Treatment	1	13.216	<.001	0.058
Sex	1	0.152	0.697	0.001
Any Treatment Sex Interaction	1	0.078	0.78	.000
Error	214			
Total	218			
Corrected Total	217			

Table 9B.
Sex and Quality of Life (Year 4)
(n = 78)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	3	0.676	0.569	0.027
Intercept	1	927.7	<.001	0.926
Any treatment	1	0.668	0.416	0.009
Sex	1	0.088	0.767	0.001
Any Treatment Sex Interaction	1	0.983	0.325	0.013
Error	74			
Total	78			

Table 9C.
Chi Square Tests: Sex and Treatment

	Value	df	Asymptotic Signif-icance (2-sided)
Pearson Chi-Square	1.798	1	0.18
Likelihood Ratio	1.799	1	0.18
Linear-by-Linear Association	1.79	1	0.181
N of Valid Cases	228		

Table 9D.
Treatment Counts Across Sex

		No History of Treatment	History of Treatment	Total
Female	Count	18	101	119
	% within sample	15.10%	84.90%	100.00%
	% within treatment	42.90%	54.30%	52.20%
	Adjusted Residual	-1.3	1.3	
Male	Count	24	85	109
	% within sample	22.00%	78.00%	100.00%
	% within treatment	57.10%	45.70%	47.80%
	Adjusted Residual	1.3	-1.3	
Total	Count	42	186	228
	% within sample	18.40%	81.60%	100.00%
	% within treatment	100.00%	100.00%	100.00%

Figures

Figure 1.

Hierarchical model predicting quality of life among college students with and without ADHD

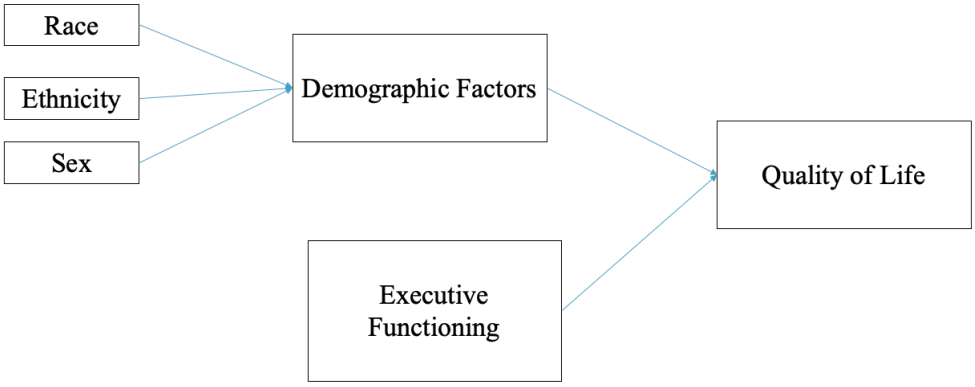


Figure 2.

Hierarchical model predicting quality of life among college students with ADHD

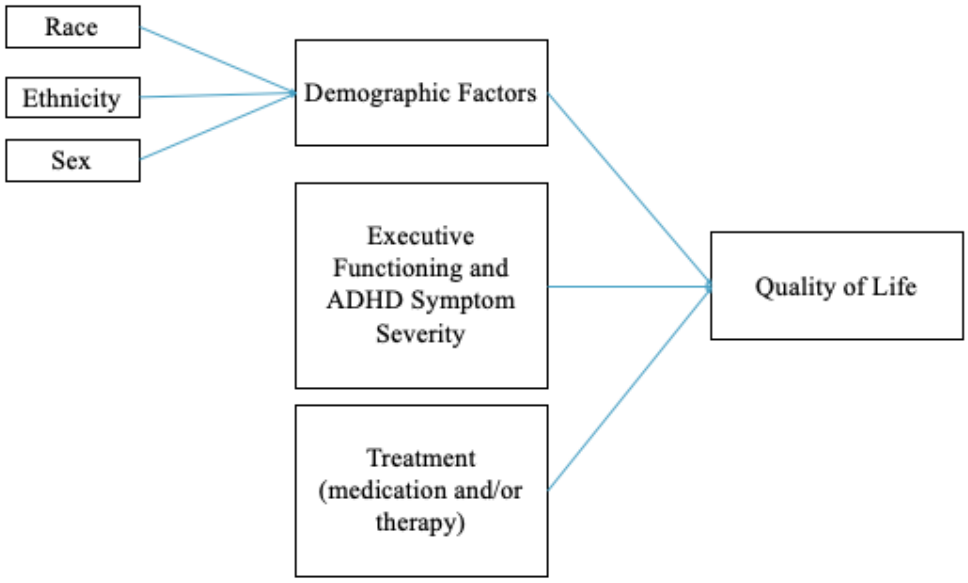


Figure 3A.

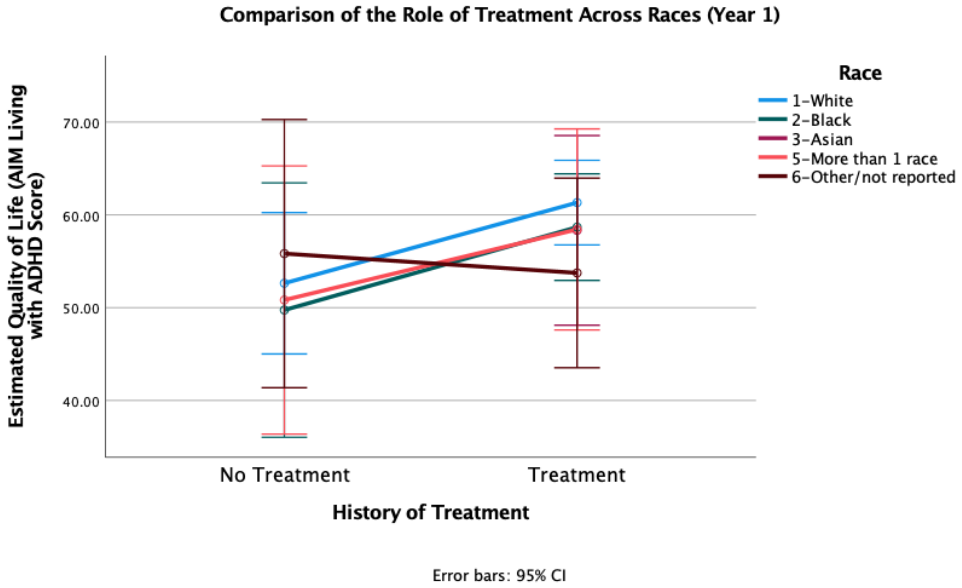


Figure 3B.

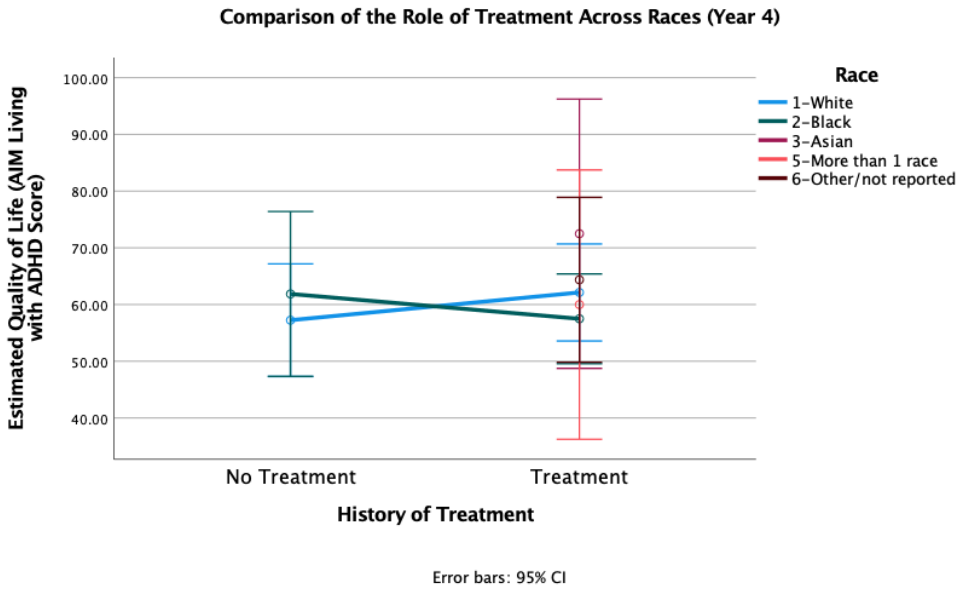


Figure 3C.

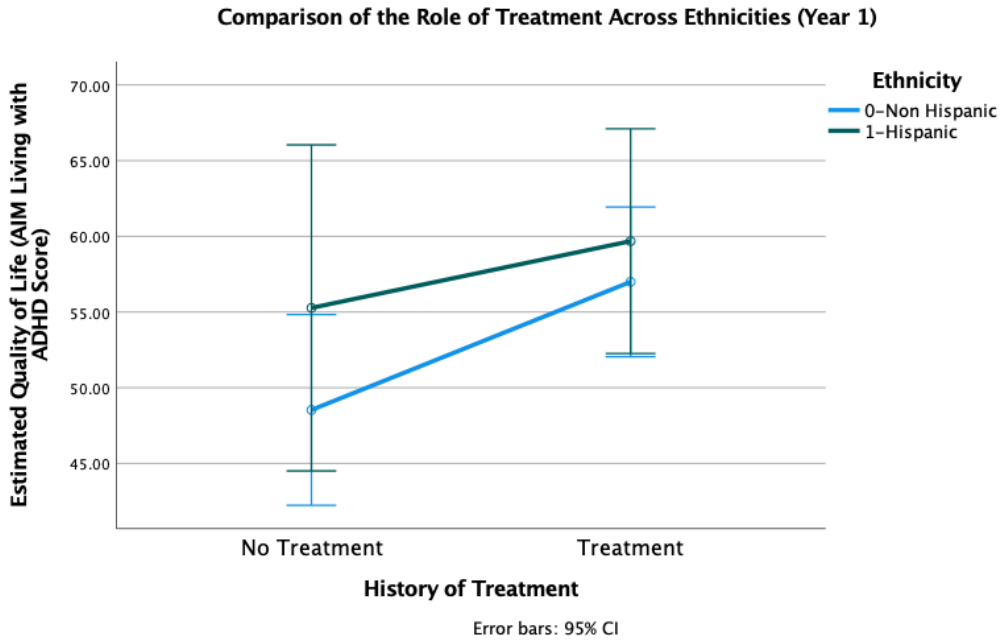


Figure 3D.

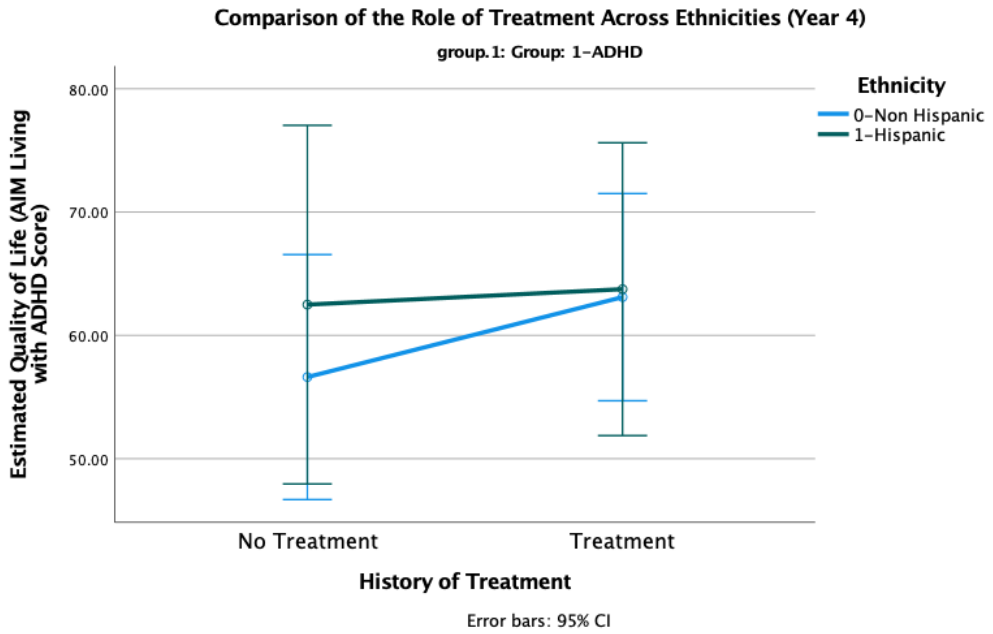


Figure 4A.

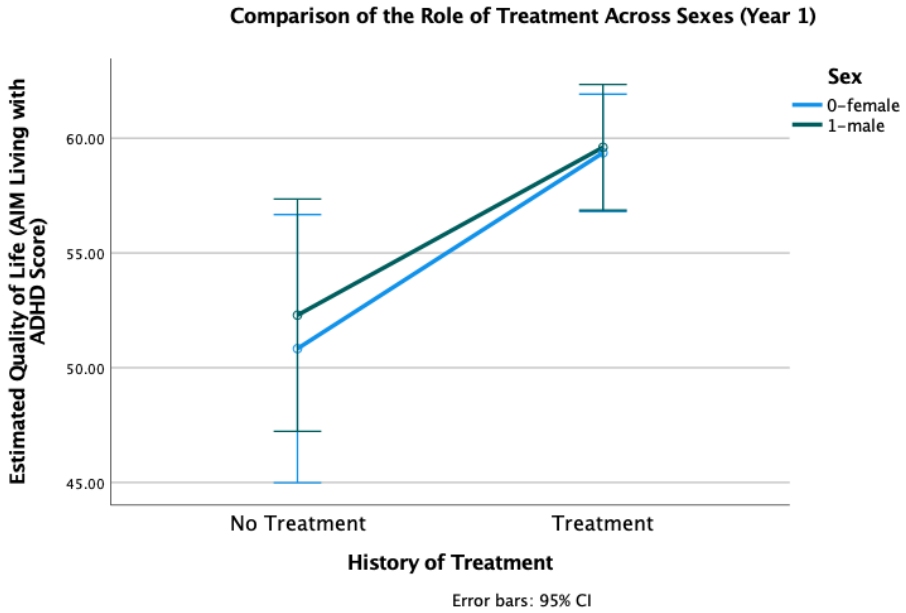
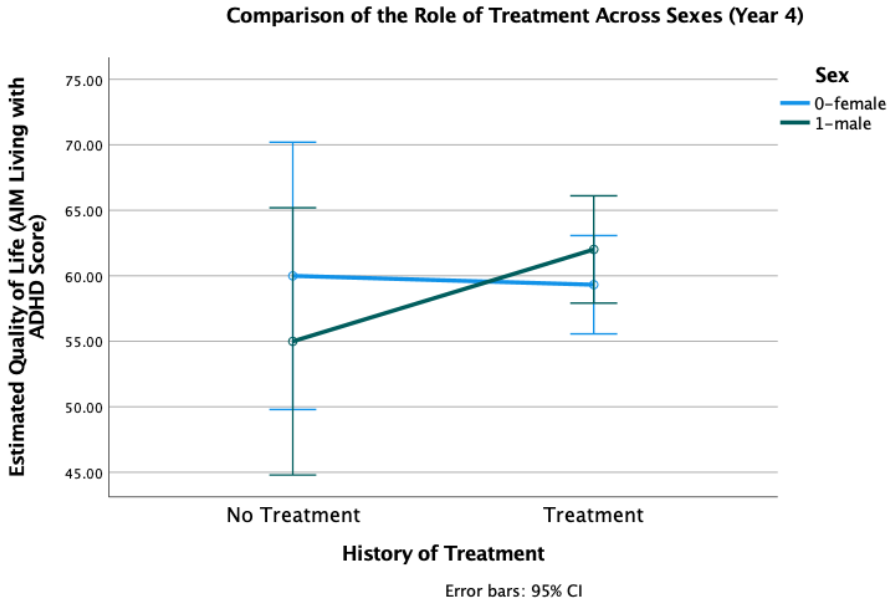


Figure 4B.



Appendices

Appendix A: Post-hoc analyses

Post-hoc 1

A post-hoc factorial ANOVA (n = 148) was performed to examine whether a difference exists in QoL among college students with ADHD according to when they stopped receiving medication and psychosocial treatment prior to college (i.e., elementary school, middle school, or high school). No significant difference was found in QoL, as measured by the "Living with ADHD" subscale of the ADHD Impact module, according to when treatment was ceased (F(14, 59) = 1.460, p = .156).

Table 10.
Cessation of Treatment
(n = 148)

Source	df	F	Sig.
Corrected Model	14	1.46	0.156
Intercept	1	1414.583	<.001
Cessation of Medication	3	2.188	0.099
Cessation of Therapy	3	1.753	0.166
Interaction of Cessation of Medication and Cessation of Therapy	8	1.077	0.392
Error	59		
Total	74		
Corrected Total	73		

Post-hoc 2A

To evaluate whether there are differences in QoL between participants who began medication before or during the first year of college, a one-way ANOVA (n = 204) was performed with the grouping variable of first medication use (i.e., never, before college, during college). The overall model was significant (F(2, 201) = 13.511, p < .001, η^2_p = .139), with those who began taking medication before college reporting significantly

higher quality of life in their first year of college compared to those who had never taken medication ($p < .001$). Participants who began taking medication during college did not report significantly greater quality of life than those who had never taken medication. Thus, beginning medication before the first year of college appears to predict higher QoL in the first year of college than prior medication use (See Table 11A). It should be noted, however, that only $n = 7$ participants reported beginning medication in the first year of college. Therefore, there may not have been a large enough sample to adequately reflect the role of beginning medication in the first year of college.

Table 11A.
Quality of Life and First Medication
($n = 204$)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	2	13.511	<.001	0.119
Intercept	1	1256.75	<.001	0.862
First Medication	2	13.511	<.001	0.119
Error	201			
Total	204			
Corrected Total	203			

Post-hoc 2B

An ANOVA ($n = 204$) was performed to examine whether a difference in quality of life exists according to when participants began psychosocial treatment (i.e., never, before college, or during college). The overall model was significant ($F(2, 201) = 3.270$, $p = .040$, $\eta^2_p = .617$; See Table 11B). Specifically, Bonferroni follow up tests revealed that beginning therapy before college significantly improved QoL beyond a history of no therapy ($p = .039$), but that beginning therapy in the first year of college did not significantly improve QoL when compared to a history of no therapy or therapy beginning before the first year of college.

Table 11B.
Quality of Life and First Therapy
(n = 204)

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	2	3.27	0.040	0.032
Intercept	1	1514.499	<.001	0.883
First Therapy	2	3.27	0.040	0.032
Error	201			
Total	204			
Corrected Total	203			

Post-hoc 2C

A multiple regression was performed to evaluate the contribution of beginning medication or therapy in elementary school, middle school, and high school (n = 218). The overall model was significant (F(4, 213) = 6.328, p < .001) and accounted for 8.9% of the variance in quality of life. The results of this multiple regression suggested that first endorsement of medication use in elementary school (ß = .272, p < .001) and first endorsement of medication use in high school (ß = .220, p = .002) are significant predictors of increased quality of life in the first year of college. No participants in the ADHD group endorsed the commencement of therapy in middle or high school, and these variables were dropped from the model. Commencement of therapy in elementary school was not a significant predictor of quality of life in the first year of college (ß = .108, p = .111).

Table 11C. Medication and Therapy Before College (n = 218)					
	B	Std. Error	Beta	t	Sig.
Medication: Elementary School	7.939	2.071	0.272	3.834	<.001
Medication: Middle School	6.076	3.164	0.133	1.92	0.056
Medication: High School	6.971	2.257	0.220	3.089	0.002
Therapy: Elementary School	2.766	1.728	0.108	1.601	0.111

Post-hoc 3

To assess the role of executive functioning, the global, composite score of the BRIEF used in previous analyses was replaced by the metacognition and behavior regulation indices in the regressions used to test Hypothesis 2 (n = 203). The overall model was significant ($F(10) = 4.412$, $p < .001$) and accounted for 14.5% of the variance in quality of life, as measured by the "Living with ADHD" subscale of the AIM. The significant predictors in this model were behavioral regulation index score (ß = -.191, $p = .027$), metacognition index score (ß = -.207, $p = .013$), and a history of any treatment (ß = .239, $p < .001$). When a history of both forms of treatment was added to the model containing a history of any treatment, the model remained significant ($F(11) = 5.032$, $p < .001$) and accounted for 18.0% of the variance in quality of life. The significant predictors in this model were behavioral regulation index score (ß = -.214, $p = .012$), metacognition index score (ß = -.188, $p = .022$), a history of any treatment (ß = .147, $p = .043$), and a history of both forms of treatment (ß = .221, $p = .003$). Next, the variable representing any form of treatment was removed. The overall model was significant ($F(10) = 5.040$, $p < .001$) and accounted for 16.7% of the variance in quality of life. The significant predictors in

this model were behavioral regulation index score (ß = -.215, p = .012), metacognition index score (ß = -.190, p = .022), and a history of both forms of treatment (ß = .282, p < .001). Finally, the treatment variable was parsed into medication and therapy. The overall model was significant (F(11) = 5.251, p < .001) and accounted for 18.8% of the variance in quality of life. The significant predictors in this model were behavioral regulation index score (ß = -.206, p = .015), metacognition index score (ß = -.188, p = .022), and a history of medication (ß = .275, p < .001). These results indicate that the two index scores of the BRIEF, the metacognition index and behavioral regulation index, are predictive of quality of life along with global executive functioning.

Table 12.
Executive Functioning Subscales
(n = 203)

	B	Std. Error	Beta	t	Sig.
Sex	-0.114	1.747	-0.004	-0.065	0.948
Ethnicity	3.614	3.469	0.086	1.042	0.299
Race: White	6.19	4.867	0.205	1.272	0.205
Race: Black	2.272	5.386	0.058	0.422	0.674
Race: Asian	2.799	6.915	0.037	0.405	0.686
Race: More than one	4.019	6.523	0.057	0.616	0.539
CAARS DSM Total Score	0.028	0.108	0.02	0.261	0.794
BRIEF: BRI	-0.228	0.103	-0.191	-2.222	0.027
BRIEF: MI	-0.18	0.072	-0.207	-2.5	0.013
Any treatment	7.573	2.117	0.239	3.577	<.001

Post-hoc 4

To further understand the relationship between treatment and race, treatment was parsed into medication and therapy and a second chi square test (n = 228) was performed to identify whether there existed significant differences across race in endorsement of medication and therapy separately. Regarding medication, the chi square test was significant (chi square (4, N = 228) = 12.88, p = .012). White students with ADHD endorsed the

greatest rates of medication use (83.40%), followed by Black students (6.6%), students of more than one race (3.3%), students of other races (4.0%), and Asian students (2.6%). Despite being the second largest group to endorse medication use, Black participants were the only category in which fewer students endorsed medication use (40%) than a lack of medication use (60%) and were the most likely to report no use of medication (z = 2.9). Regarding therapy, the chi square test was not significant across race (chi square (4, n = 228) = 1.361, p = .851).

Table 13A.
Chi Square: Race and Medication
(n = 228)

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.887	4	0.012
Likelihood Ratio	12.296	4	1.50
Linear-by-Linear Association	5.391	1	0.02
N of Valid Cases	228		

Table 13B.
Race and Medication
(*n* = 228)

		Race: White	Race: Black	Race: Asian	Race: More than one	Race: Other	Total
No History of Medication	Count	49	15	2	5	6	77
	% within medication	63.60%	19.50%	2.60%	6.50%	7.80%	100.00%
	Adjusted Residual	-3.3	2.9	0	1.1	1.2	
History of Medication	Count	126	10	4	5	6	151
	%within medication	83.40%	6.60%	2.60%	3.30%	4.00%	100.00%
	Adjusted Residual	3.3	-2.9	0	-1.1	-1.2	
	Count	175	25	6	10	12	228

Table 13C.
Chi Square: Race and Therapy
(*n* = 228)

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.361b	4	0.851
Likelihood Ratio	1.487	4	0.829
Linear-by-Linear Association	0.099	1	0.754
N of Valid Cases	228		

Table 13D.
Race and Therapy
(n = 228)

		Race: White	Race: Black	Race: Asian	Race: More than one	Race: Other	Total
No History of Therapy	Count	63	10	1	4	5	83
	% within therapy	75.90%	12.00%	1.20%	4.80%	6.00%	100.00%
	Adjusted Residual	-0.2	0.4	-1	0.2	0.4	
History of Therapy	Count	112	15	5	6	7	145
	% within therapy	77.20%	10.30%	3.40%	4.10%	4.80%	100.00%
	Adjusted Residual	0.2	-0.4	1	-0.2	-0.4	

Post-hoc 5

To explore racial differences in the treatment of ADHD further, disparities in diagnosis of ADHD were explored according to race using a chi square test. The test was significant (chi square (4, n = 456) = 10.443, p = .03), suggesting that White college students were significantly more likely to be diagnosed with ADHD (z = 2.4, 76.80%) and Asian students were significantly less likely to be diagnosed with ADHD (z = -2.7, 2.60%).

Table 14A.
Chi Square: Race and Diagnosis of ADHD
(*n* = 228)

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.443	4	0.034
Likelihood Ratio	10.797	4	0.029
Linear-by-Linear Association	3.037	1	0.081
N of Valid Cases	456		

Table 14B.
Race and Diagnosis of ADHD
(*n* = 228)

		Race: White	Race: Black	Race: Asian	Race: More than one	Race: Other	Total
ADHD Diagnosis	Count	175	25	6	10	12	228
	% within sample	76.80%	11.00%	2.60%	4.40%	5.30%	100.00%
	Adjusted Residual	2.4	-0.9	-2.7	0.5	-1.1	
No ADHD Diagnosis	Count	152	31	19	8	18	228
	% within sample	66.70%	13.60%	8.30%	3.50%	7.90%	100.00%
	Adjusted Residual	-2.4	0.9	2.7	-0.5	1.1	
	Count	327	56	25	18	30	456
	% within group.1: Group	71.70%	12.30%	5.50%	3.90%	6.60%	100.00%

Appendix B

Measures

Demographic, social, and family history questionnaire.

A questionnaire designed by the research team was administered at the first point of assessment in Year 1 to inquire about demographic information. Data including race, ethnicity, sex, and age were collected, as well as information concerning an individual's family structure and medical history.

Services for College Students Interview (SCSI).

A 13-question self-report measure designed specifically for use in the TRAC project was administered in Year 1 of assessment to measure student's engagement and satisfaction with psychosocial and psychological services and treatment modalities. The items of this measure inquire about students' utilization of health services, including psychosocial and psychopharmacological treatments (Pinho et al., 2019). For the purposes of the proposed study, participation in psychosocial and psychopharmacological treatments was defined as any participation in treatment reported from elementary school to current use. Two versions of the SCSI were used, one which assessed services prior to college and one which assessed services during college.

ADHD Impact Module (AIM): Global and Subscales.

The purpose of this measure is to assess the level of interference of symptoms of ADHD on QoL. The measure was administered at each time point of assessment. The AIM measures QoL in six domains (i.e., Living with ADHD; General Well-Being; Work, Home, and School Performance and Daily Functioning; Relationships and Communication; Impact of Symptoms) using a Likert scale of five points. The AIM is scored on a standard scale from 0 to 100, with a higher score reflecting greater QoL. The measure has good

internal consistency ($\alpha \approx .68$-$.91$) and has been shown to be highly correlated with other measures of QoL and is sensitive to change (Landgraf, 2007).

Conners' Adult ADHD Rating Scales (CAARS).

A self-report scale measuring inattention and hyperactivity in individuals over the age of 18 was administered to assess ADHD symptom severity at each of the four assessment points. Psychometric calculations reveal that the internal consistency of the CAARS is very good to excellent ($\alpha \approx .74$-$.94$; Adler et al., 2008). Unfortunately, little research has been performed concerning the validity of the CAARS in minoritized populations. Analyses using data from this measure must be performed carefully to assess for potential biases. Higher scores on the CAARS indicate greater presence of ADHD symptomology.

Behavior Rating Inventory of Executive Function (BRIEF).

The purpose of this assessment is to measure executive functioning ability (Gioia et al., 2000). The BRIEF has a two-factor composition: Behavioral Regulation, composed of Inhibit, Self-Monitor, and Emotional Regulation subfactors; and Metacognition (Roth et al., 2013). Convergent validity between the BRIEF and other measures of executive functioning (e.g., Behavior Assessment System for Children) is acceptable for each subscale (.24-.83) (McCandless & O'Laughlin, 2007). The BRIEF has been found to have adequate psychometric properties in individuals with ADHD and neurotypical individuals (Roth et al., 2013). Higher scores on the BRIEF reflect higher executive dysfunction. The BRIEF was administered at each time point of assessment over the four years of data collection.

Appendix C

Demographic, Social, and Family History Questionnaire

Demographic Information

1. Age (in years):

_____

2. Gender (0 = female, 1 = male):

_____

3. Ethnicity (Non-Hispanic = 0, Hispanic = 1):

_____

4. Race:

_____

1 = Caucasian 3 = Asian 5 = More than 1 race
2 = African American 4 = Native American 6 = Other/Not Reported

5. Marital status (1 = Single, 2 = Married, 3 = Separated, 4 = Divorced)

Social History

1. Prior Fraternity/Sorority (Yes = 1, No = 0)

_____

2. Current Fraternity/Sorority (Yes = 1, No = 0)

_____

3. Prior University Sports Team (Yes = 1, No = 0)

_____

4. Current University Sports Team (Yes = 1, No = 0)

_____

5. Prior club sports/intramural sports (Yes = 1, No = 0)

_____

6. Current club sports/intramural sports (Yes = 1, No = 0)

_____

7. Prior university club/organizations (Yes = 1, No = 0)

_____

8. Current university club/organizations (Yes = 1, No = 0)

_____

9. Prior committed relationship (Yes = 1, No = 0)

_____

10. How many committed relationships (Enter number)

_____

11. Current committed relationship (Yes = 1, No = 0)

_____

Family Background (Current Family)

1. Number of siblings (#):

_____

2. Parents' marital status (1-5):

_____

3. Mother's education (1 -7):

_____

4. Father's education (1-7):

_____

5. Mother's occupation (2-digit NPB score):

_____

6. Father's occupation (2-digit NPB score):

_____

Family History (Current Family)

1. **ADHD:** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

2. **Oppositional-Defiant Disorder:** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

3. **Conduct Disorder:** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

4. **Learning Disability:** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

5. **Autism:** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

6. **Asperger's:** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

7. **Psychosis/Schizophrenia**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

8. **Depressive Disorder**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

9. **Bipolar Disorder**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

10. **Anxiety Disorder**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

11. **Obsessive-Compulsive Disorder**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

12. **PTSD**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

13. **Anorexia/Bulimia**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

14. **Tics/Tourette's:** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

15. **Alcohol Abuse:** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

16. **Substance Abuse**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

17. **Seizures/Epilepsy**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

18. **Head Injury**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

19. **Thyroid Condition**: a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

20. **Sleep Problems** a. Self

_____

(0 = none, 1 = suspected, 2 = diagnosed) b. Other family

_____

Appendix D

ID: _____
Date: _____

Services for College Students Interview (SCSI)
Pre-College

Directions: ***I am now going to ask you questions about help or assistance you may have received prior to attending college.***

1. ***At any time from kindergarten through high school, did you ever*** YES NO ***receive extra help in school for any attentional, learning, emotional, and/or behavioral difficulties?***

If NO, skip to Question #4; if YES, ask:

2. ***Was this extra help provided through an IEP or Individualized Education Program?*** YES NO

If NO, skip to Question #3; if YES, ask:

a. What is the main reason you received IEP services? _____ (1 = ADHD, 2 = LD, 3 = emotional/behavioral difficulties, 4 = other)

b. When did you begin receiving IEP services? _____ (1 = elementary school, 2 = middle school, 3 = high school)

c. When did you last receive IEP services? _____ (1 = elementary school, 2 = middle school, 3 = high school)

d. In your opinion, how helpful were these IEP services? _____ (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

3. ***Did you receive 504 accommodations? Informal accommodations?*** YES NO

If NO, skip to Question #4; if YES to either, ask:

a. What is the main reason you received [name] accommodations? _____ (1 = ADHD, 2 = LD, 3 = emotional/behavioral difficulties, 4 = other)

b. When did you begin receiving [name] accommodations? _____ (1 = elementary school, 2 = middle school, 3 = high school)

c. When did you last receive [name] accommodations? _____ (1 = elementary school, 2 = middle school, 3 = high school)

d. In your opinion, how helpful were these [name] accommodations? _____ (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

4. ***At any time from kindergarten through high school, did you ever take medication for ADHD-related difficulties?*** YES NO

If NO, skip to Question #6 if YES, ask:

a. What was the name of the medication prescribed for you the very first time? _____ (1 = MPH, 2 = Amphetamine, 3 = non-stimulant ADHD, 4 = other)

b. Who prescribed [name of medication]? _____ (1 = pediatrician, 2 = psychiatrist, 3 = other)

c. When did you first begin taking [name of medication]? _____ (1 = elementary school, 2 = middle school, 3 = high school)

d. How many times per day did you take [name of medication]? _____ (1 = once daily, 2 = twice daily, 3 = 3+ times daily)

e. How many days per week did you take [name of medication]? _____ (1 = every day, 2 = weekdays only, 3 = as needed)

f. When did you stop taking [name of medication]? _____ (1 = elementary school, 2 = middle school, 3 = high school, 4 = still taking)

g. In your opinion, how helpful was taking [name of medication]? _____ (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

h. What side effects (if any) did taking [name of medication] cause you? _____ (1 = appetite loss, 2 = sleep disruption, 3 = irritability, 4 = other)

5. ***Prior to college did you take any other medications for ADHD-related difficulties?*** YES NO

If NO, skip to Question #6; if YES, ask:

a. What was the name of the medication prescribed for you most recently? _____ (1 = MPH, 2 = Amphetamine, 3 = non-stimulant ADHD, 4 = other)

b. Who prescribed [name of medication]? _____ (1 = pediatrician, 2 = psychiatrist, 3 = other)

c. When did you first begin taking [name of medication]? _____ (1 = elementary school, 2 = middle school, 3 = high school)

d. How many times per day did you take [name of medication]? _____ (1 = once daily, 2 = twice daily, 3 = 3+ times daily)

e. How many days per week did you take [name of medication]? _____ (1 = every day, 2 = weekdays only, 3 = as needed)

f. When did you stop taking [name of medication]? _____ (1 = elementary school, 2 = middle school, 3 = high school, 4 = still taking)

g. In your opinion, how helpful was taking [name of medication]? _____ (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

h. What side effects (if any) did taking [name of medication] cause you? _____ (1 = appetite loss, 2 = sleep disruption, 3 = irritability, 4 = other)

6. ***Prior to college , did you ever take medication for other types of behavioral or emotional difficulties?*** YES NO

If NO, skip to Question #7; if YES, ask:

a. What medication(s) did you take? _____ (1 = mood, 2 = anxiety, 3 = other)

b. What was the main reason for taking [name of medication]? _____ (1 = depression, 2 = anxiety, 3 = anger, 4 = other)

c. Who prescribed [name of medication]? _____ (1 = pediatrician, 2 = psychiatrist, 3 = other)

d. When did you first begin taking [name of medication]? _____ (1 = elementary school, 2 = middle school, 3 = high school)

e. How many times per day did you take [name of medication]? _____ (1 = once daily, 2 = twice daily, 3 = 3+ times daily)

f. How many days per week did you take [name of medication]? _____ (1 = every day, 2 = weekdays only, 3 = as needed)

g. When did you stop taking [name of medication]? _____ (1 = elementary school, 2 = middle school, 3 = high school, 4 = still taking)

h. In your opinion, how helpful was taking [name of medication]? _____ (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

7. ***At any time from kindergarten through high school, did you ever receive individual, group, or family counseling/therapy?*** YES NO

If NO, end interview; if YES, ask:

a. What was the first type of counseling/therapy that you ever received? _____ (1 = individual, 2 = group, 3 = family)

b. What is the main reason you received [name of counseling/therapy]? _____ (1 = ADHD, 2 = depression, 3 = anxiety, 4 = anger, 5 = other)

c. When did you first begin receiving [name of counseling/therapy]? _____ (1 = elementary school, 2 = middle school, 3 = high school)

d. How often did you participate in or attend [name of counseling/therapy]? _____ (1= weekly, 2 = alternate weeks, 3 = once a month, 4 = other)

e. When did you stop receiving [name of counseling/therapy]? _____ (1 = elementary school, 2 = middle school, 3 = high school, 4 = still receiving)

f. In your opinion, how helpful was [name of counseling/therapy]? _____ (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

8. ***In addition to [name of counseling/therapy], did you receive any other counseling or therapy?*** YES NO

If NO, end interview; if YES, ask:

a. What type of counseling/therapy did you receive most recently? _____ (1 = individual, 2 = group, 3 = family)

b. What is the main reason you received [name of counseling/therapy]? _____ (1 = ADHD, 2 = depression, 3 = anxiety, 4 = anger, 5 = other)

c. When did you first begin receiving [name of counseling/therapy]? _____ (1 = elementary school, 2 = middle school, 3 = high school)

d. How often did you participate in or attend [name of counseling/therapy]? _____ (1= weekly, 2 = alternate weeks, 3 = once a month, 4 = other)

e. When did you stop receiving [name of counseling/therapy]? _____ (1 = elementary school, 2 = middle school, 3 = high school, 4 = still receiving)

f. In your opinion, how helpful was [name of counseling/therapy]? _____ (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

Appendix E

ID: _____

Date: _____

Services for College Students Interview (SCSI)College Version – Year 1

<u>Directions</u>: I am now going to ask you questions about any help or assistance you may have received during the current school year; that is, from the beginning of thefall semester to the present.

1. ***Not including required meetings, did you meet with a professor or your***
   YES
   NO

academic advisor to discuss your academic performance/progress?

If NO, skip to Question #2; if YES, ask:

a. With whom did you meet to discuss most of your concerns?(1 = advisor, 2 = course professor, 3 = other)

b. What was the reason you met with [name of faculty]?
(1 = not doing well, 2 = bad test/paper grade, 3 = help with assignment, 4 = other)

c. How many times did you meet with [name of faculty]? (1 = 1-2 times, 2 = 3-4 times, 3 = 5+ times)

d. In your opinion, how well did [name of faculty] listen and try to understand your concerns?(1 = not well, 2 = moderately well, 3 = very well)

e. What assistance or accommodations, if any, did [name of faculty] offer?
(1 = none, 2 = studying advice, 3 = extra credit opportunity, 4 = extended deadline, 5 = other)

f. In your opinion, how helpful was this assistance

from [name of faculty]?(1 = not helpful, 2 = moderately helpful, 3 = very helpful)

2. ***At any time since the fall semester began, did you receive campus***
   YES
   NO
tutoring services?

If NO, skip to #3; if YES, ask:

a. How many times did you receive tutoring?
(1 = 1-2 times, 2 = 3-4 times, 3 = 5 -9 times, 4 = 10 or more times)

b. Are you still receiving tutoring?
(1 = still receiving, 2 = stopped receiving)

c. In your opinion, how helpful was tutoring?
(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)***Since the fall semester began, did you receive academic skills*** YES NO
assistance (e.g., planners, organization, time management, etc.)?

If NO, skip to #4; if YES, ask:

d. How many times did you receive study skills assistance?
(1 = 1-2 times, 2 = 3-4 times, 3 = 5 – 9 times, 4 = 10 or more times)

e. Are you still receiving study skills assistance?(1 = still receiving, 2 = stopped receiving)

f. In your opinion, how helpful was study skills assistance?
(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

3. ***From the beginning of the fall semester until now, did you receive***
   YES
   NO
writing/speaking assistance?

If NO, skip to #5; if YES, ask:

a. How many times did you receive writing/speaking assistance? (1 = 1-2 times, 2 = 3-4 times, 3 = 5 - 9 times, 4 = 10 or more times)

b. Are you still receiving writing/speaking assistance?(1 = still receiving, 2 = stopped receiving)

c. In your opinion, how helpful was writing/speaking assistance?(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

4. ***During this same time period, did you receive career counseling?***
YES
NO

If NO, skip to #6; if YES, ask:

a. How many times did you receive career counseling? (1 = 1-2 times, 2 = 3-4 times, 3 = 5 – 9 times, 4 = 10 or more times)

b. Are you still receiving career counseling?(1 = still receiving, 2 = stopped receiving)

c. In your opinion, how helpful was career counseling? (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

5. ***At any time since the fall semester began, did you receive <u>formal</u>***
YES
NO
disability service accommodations?

If NO, skip to Question #7; if YES, ask:

Which of the following types of accommodations did you receive?

a. Extra time (1 = Yes, 0 = No)

b. Private testing room (1 = Yes, 0 = No)

c. Note-taker (1 = Yes, 0 = No)

d. Technology support (1 = Yes, 0 = No)

e. Other (1 = Yes, 0 = No)

f. What is the main reason you received these accommodations? (1 = ADHD, 2 = LD, 3 = other emotional/behavioral difficulties)

g. How long did you receive these accommodations? (1 = less than 1 month, 2 = 1-2 months, 3 = 3+ months)

h. How regularly did you use these accommodations? (1 = not at all, 2 = sometimes, 3 = often, 4= very often)

i. Are you still using these accommodations?(1 = still using, 2 = stopped using)

j. In your opinion, how helpful are these accommodations? (1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

6. ***At any time since the start of the fall semester, did you take medication for*** YES NO ***ADHD-related difficulties?***

If NO, skip to Question #10; if YES, ask:

a. What is the name of the medication? (1 = MPH, 2 = Amphetamine, 3 = non-stimulant ADHD, 4 = other)

b. Who prescribed or gave you [name of medication]? (1 = primary care physician, 2 = psychiatrist, 3 = other physician, 4 = another student)

c. How long did you take [name of medication]? (1 = less than 1 month, 2 = 1-2 months, 3 = 3+ months)

d. How many times per day did you

take [name of medication]?(1 = once, 2 = twice, 3 = 3+)

e. How many days per week were you supposed to take [name of medication]?(1 = daily, 2 = week-days only, 3 = as needed)

f. How closely did you follow this [name of medication] regimen?(1 = not well, 2 = moderately well, 3 = very well)

g. Are you still tak-ing [name of medication]?(1 = still taking, 2 = stopped taking)

h. In your opinion, how helpful was tak-ing [name of medication]?(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

Did taking [name of medication] cause any of the following side effects?

i. Loss of appetite (1 = Yes, 0 = No)

j. Sleep disruption (1 = Yes, 0 = No)

k. Irritability (1 = Yes, 0 = No)

l. Other (1 = Yes, 0 = No)

7. ***Did you take any other medication for ADHD-related difficulties?***
YES
NO

If NO, skip to Question #10; if YES, ask:

a. What is the name of that medication?
(1 = MPH, 2 = Amphetamine, 3 = non-stimulant ADHD, 4 = other)

b. Who prescribed or gave you [name of medication]?
(1 = primary care physician, 2 = psychiatrist, 3 = other physician, 4 = another student)

c. How long did you take [name of medication]?

(1 = less than 1 month, 2 = 1-2 months, 3 = 3+ months)

d. How many times per day did you take [name of medication]?(1 = once, 2 = twice, 3 = 3+)

e. How many days per week were you supposed to take [name of medication]?(1 = daily, 2 = week-days only, 3 = as needed)

f. How closely did you follow this [name of medication] regimen?(1 = not well, 2 = moderately well, 3 = very well)

g. Are you still tak-ing [name of medication]?(1 = still taking, 2 = stopped taking)

h. In your opinion, how helpful was tak-ing [name of medication]?(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

Did taking [name of medication] cause any of the following side effects?

i. Loss of appetite (1 = Yes, 0 = No)

j. Sleep disruption (1 = Yes, 0 = No)

k. Irritability (1 = Yes, 0 = No)

l. Other (1 = Yes, 0 = No)

8. ***In addition to [name of ADHD medications], did you take any other***
YES
NO
medication for ADHD-related difficulties?

If NO, skip to Question #10; if YES, ask:

a. What is the name of that medication?
(1 = MPH, 2 = Amphetamine, 3 = non-stimulant ADHD, 4 = other)

b. Who prescribed or gave you [name of medication]?
(1 = primary care physician, 2 = psychiatrist, 3 = other physician, 4 = another student)

c. How long did you take [name of medication]?
(1 = less than 1 month, 2 = 1-2 months, 3 = 3+ months)

d. How many times per day did you take [name of medication]?(1 = once, 2 = twice, 3 = 3+)

e. How many days per week were you supposed to take [name of medication]?(1 = daily, 2 = week-days only, 3 = as needed)

f. How closely did you follow this [name of medication] regimen?(1 = not well, 2 = moderately well, 3 = very well)

g. Are you still tak-ing [name of medication]?(1 = still taking, 2 = stopped taking)

h. In your opinion, how helpful was tak-ing [name of medication]?(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

Did taking [name of medication] cause any of the following side effects?

i. Loss of appetite (1 = Yes, 0 = No)

j. Sleep disruption (1 = Yes, 0 = No)

k. Irritability (1 = Yes, 0 = No)

l. Other (1 = Yes, 0 = No)

9. ***Since the fall semester began, did you take medication for any other***
YES
NO
behavioral or emotional difficulties?

If NO, skip to Question #12; if YES, ask:

a. What medication(s) did you take?(1 = mood, 2 = anxiety, 3 = other)

b. What was the main reason for taking [name of medication]?(1 = depression, 2 = anxiety, 3 = anger, 4 = other)

c. Who prescribed or gave you [name of medication]?
(1 = primary care physician, 2 = psychiatrist, 3 = another student)

d. How long did you take [name of medication]?
(1 = less than 1 month, 2 = 1-2 months, 3 = 3+ months

e. Are you still taking [name of medication]?(1 = still taking, 2 = stopped taking)

f. In your opinion, how helpful was taking [name of medication]?(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

10. ***In addition to [name of medication], did you take any other***
YES
NO
medication for these other types of behavioral or emotional difficulties?

If NO, skip to Question #12; if YES, ask:

a. What other medication(s) did you take?(1 = mood, 2 = anxiety, 3 = other)

b. What was the main reason for taking [name of medication]?(1 = depression, 2 = anxiety, 3 = anger, 4 = other)

c. Who prescribed or gave you [name of medication]?
(1 = primary care physician, 2 = psychiatrist, 3 = another student)

d. How long did you take [name of medication]?
(1 = less than 1 month, 2 = 1-2 months, 3 = 3+ months)

e. Are you still taking [name of medication]?(1 = still taking, 2 = stopped taking)

f. In your opinion, how helpful was taking [name of medication]?(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

11. ***At any time since classes started last fall, did you participate in or***
YES
NO
receive individual or group counseling/ therapy?

If NO, end Interview; if YES, ask:

a. What kind of counseling/therapy did you receive?(1 = individual, 2 = group, 3 = family)

b. What is the main reason you received [name of counseling/therapy]?(1 = ADHD, 2 = depression 3 = anxiety, 4 = other)

c. Who provided the [name of counseling/therapy]?
(1 = campus professional, 2 = off-campus professional)

d. How often did you participate in or attend [name of counseling/therapy]?(1 = weekly, 2 = alternate weeks, 3 = once a month, 4 = other)

e. Are you still receiving [name of counseling/therapy]?(1 = still receiving, 2 = stopped receiving)

f. How closely did you follow the therapy/counseling advice and guidance you received?(1 = not well, 2 = moderately well, 3 = very well)

g. In your opinion, how helpful was [name of counseling/therapy]?(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

12. ***In addition to [name of counseling/therapy], did you receive any***
YES
NO
other counseling or therapy?

If NO, end Interview; if YES, ask:

a. What type of counseling/therapy did you receive?(1 = individual, 2 = group, 3 = family)

b. What is the main reason you received [name of counseling/therapy]?(1 = ADHD, 2 = depression 3 = anxiety, 4 = other)

c. Who provided the [name of counseling/therapy]?
(1 = campus professional, 2 = off-campus professional)

d. How often did you participate in or attend [name of counseling/therapy]?(1 = weekly, 2 = alternate weeks, 3 = once a month, 4 = other)

e. Are you still receiving [name of counseling/therapy]?(1 = still receiving, 2 = stopped receiving)

f. How closely did you follow the therapy/counseling advice and guidance

you received?(1 = not well, 2 = moderately well, 3 = very well)

g. In your opinion, how helpful was [name of counseling/therapy]?(1 = not very helpful, 2 = moderately helpful, 3 = very helpful)

Appendix F

ADHD Impact Module – Adult (AIM-A)

INSTRUCTIONS: The following questions were developed to better understand how issues related to ADHD impact the quality of your everyday life. Your responses will be treated confidentially. There are no right or wrong responses. If you are unsure how to respond to a question, give the best response you can. It is very important that you fill in each question. Please use blue or black ink.

1. On a scale of 1-10, how would you rate the overall quality of your life right now?

(Worst) 1 2 3 4 5 6 7 8 9 10 (Best)

2. Has ADHD and its symptoms limited your ability to achieve what you want in life?

Yes, a lot Yes, some Yes, a little No, not at all

3. Do you feel you are on the right track with your life?

Yes, definitely Yes, somewhat No, not at all

4. How much do you agree with this statement: "Over the past few weeks, I've had more good days than bad days."

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

LIVING WITH ADHD

5. Thinking about your ADHD symptoms, how much do you agree or disagree with the following?
   a. I've devised ways to compensate for my ADHD symptoms

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

   b. I'm relieved to finally have an explanation for my difficulties and to have something I can do to correct them

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

   c. I feel as if I am just getting by in life

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

   d. I regret "things that could have been" or "what ifs"

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

e. I don't want others to know I have ADHD

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

f. I have been able to achieve balance in my life by managing my ADHD

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

g. I've turned my life around

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

h. I isolate myself from others because of my ADHD

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

i. Meds help with core symptoms but I still have to work on other issues

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

j. My ADHD symptoms are no longer controlling my life

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

GENERAL WELL-BEING

6. Thinking about your ADHD symptoms during the past 7 days, and the feelings they may cause, how often did you feel:
   a. Hopeful about the future

Very often Fairly often Sometimes Almost never Never

   b. Frustrated/annoyed

Very often Fairly often Sometimes Almost never Never

   c. Tense/stressed

Very often Fairly often Sometimes Almost never Never

   d. Ashamed/embarrassed

Very often Fairly often Sometimes Almost never Never

   e. Calm/relaxed

Very often Fairly often Sometimes Almost never Never

   f. Accepting of yourself

Very often Fairly often Sometimes Almost never Never

   g. Mentally exhausted/frazzled

Very often Fairly often Sometimes Almost never Never

   h. Confident

Very often Fairly often Sometimes Almost never Never

   i. Angry

Very often Fairly often Sometimes Almost never Never

   j. As if you had failed

Very often Fairly often Sometimes Almost never Never

k. Able to cope

Very often Fairly often Sometimes Almost never Never

WORK, HOME, AND SCHOOL – PERFORMANCE AND DAILY FUNCTIONING

7. During the past 7 days, how satisfied have you been with the following?

a. Ability to focus equally well on all tasks and not just those that interest you

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied\

b. Ability to take care of everyday responsibilities (pay bills, meet deadlines, get dinner going, run errands)

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

c. Ability to think things through more carefully and make timely decisions

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

d. Handling everyday hassles

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

e. Ability to adapt to disruptions or unexpected changes in your routine

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

f. Ability to implement ideas/solutions

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

g. Getting organized, prioritizing, starting tasks

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

h. The consistency of your productivity.

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

i. Reacting to other's annoyances/irritations

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

j. Performing to your full potential

Very dissatisfied Somewhat dissatisfied Neither satisfied nor dissatisfied Somewhat satisfied Very satisfied

RELATIONSHIPS/COMMUNICATION

8. During the past 7 days, because of issues with ADHD have you had difficulty with:
    a. Resolving interpersonal conflicts

No, not at all Yes, a little bit Yes, somewhat Yes, quite a bit Yes, a lot

    b. Responding to invitations, emails, calls in a timely way

No, not at all Yes, a little bit Yes, somewhat Yes, quite a bit Yes, a lot

    c. Acting logically and rationally with others

No, not at all Yes, a little bit Yes, somewhat Yes, quite a bit Yes, a lot

    d. Showing others that you are reliable and committed

No, not at all Yes, a little bit Yes, somewhat Yes, quite a bit Yes, a lot

    e. Keeping your train of thought and staying engaged during conversations

No, not at all Yes, a little bit Yes, somewhat Yes, quite a bit Yes, a lot

    f. Engaging in physical/sexual intimacy

No, not at all Yes, a little bit Yes, somewhat Yes, quite a bit Yes, a lot

    g. Being able to provide emotional support to others

No, not at all Yes, a little bit Yes, somewhat Yes, quite a bit Yes, a lot

    h. Reading other's emotions or non-verbal cues

No, not at all Yes, a little bit Yes, somewhat Yes, quite a bit Yes, a lot

IMPACT OF SYMPTOMS ON DAILY LIFE

9. The following question asks about common ADHD symptoms. There are two parts to the question. Fill in the box that corresponds to your response for each part of the question.

    How much do the following symptoms:

    A. BOTHER OR CONCERN YOU? B. INTERFERE WITH DAILY LIFE?

    1 = Not at all 2. A little bit 3. Some 4. Quite a bit 5. A lot

    a. Being distracted and jumping from one activity to another
       A: 1 2 3 4 5 B: 1 2 3 4 5
    b. Being unable to start/finish tasks that don't interest you
       A: 1 2 3 4 5 B: 1 2 3 4 5
    c. Feeling lost or in a fog
       A: 1 2 3 4 5 B: 1 2 3 4 5
    d. Sudden mood changes triggered by life events
       A: 1 2 3 4 5 B: 1 2 3 4 5
    e. Interrupting/blurting things out

A: 1 2 3 4 5 B: 1 2 3 4 5

f. Difficulty turning off your mind to fall asleep and/or trouble being alert in the morning
   A: 1 2 3 4 5 B: 1 2 3 4 5
g. Being overly sensitive to others comments/criticisms
   A: 1 2 3 4 5 B: 1 2 3 4 5
h. Intense temper outbursts that pass quickly
   A: 1 2 3 4 5 B: 1 2 3 4 5
i. Forgetfulness/losing things
   A: 1 2 3 4 5 B: 1 2 3 4 5

ECONOMIC IMPACTS (please respond to these questions as best as you can remember)

10. Number of motor vehicle infringements during the last year __
11. Number of jobs you've had to date __
12. Number of visits to the ER/Doctor for injuries/accidents in the past year (not motor vehicle accidents) __
13. Number of visits to the doctor in the past year regarding ADHD (can be medical, psychiatrist, other) __
14. Number of days missed from work/school in the past year due to ADHD __

Appendix G

CAARS- Self-Report: Long Version (CAARS- S:L)
Instructions: listed below are items concerning behaviors or problems sometimes experienced by adults. Read each item carefully and decide how much or how frequently each item describes you recently. Indicate your response for each item that corresponds to your choice. Use the following scale: 0 – Not at all, never; 1 – Just a little, once in a while; 2 – pretty much, often; and 3 – Very much, very frequently.

1. I like to be doing active things. 0 1 2 3
2. I lose things necessary for tasks or activities (e.g., to-do lists, pencils, books, or tools). 0 1 2 3
3. I don't plan ahead. 0 1 2 3
4. I blurt out things. 0 1 2 3
5. I am a risk-taker or daredevil. 0 1 2 3
6. I get down on myself. 0 1 2 3
7. I don't finish what I start. 0 1 2 3
8. I am easily frustrated. 0 1 2 3
9. I talk too much. 0 1 2 3
10. I am always on the go, as if driven by a motor. 0 1 2 3
11. I'm disorganized. 0 1 2 3
12. I say things without thinking. 0 1 2 3
13. It's hard for me to stay in one place very long. 0 1 2 3
14. I have trouble doing leisure activities quietly. 0 1 2 3
15. I'm not sure of myself. 0 1 2 3
16. It's hard for me to keep track of several things at once. 0 1 2 3
17. I'm always moving even when I should be still. 0 1 2 3
18. I forget to remember things. 0 1 2 3
19. I have a short fuse/hot temper. 0 1 2 3
20. I'm bored easily. 0 1 2 3
21. I leave my seat when I am not supposed to. 0 1 2 3
22. I have trouble waiting in line or taking turns with others. 0 1 2 3
23. I still throw tantrums. 0 1 2 3
24. I have trouble keeping my attention focused when working. 0 1 2 3
25. I seek out fast paced, exciting activities. 0 1 2 3
26. I avoid new challenges because I lack faith in my abilities. 0 1 2 3
27. I feel restless inside even if I am siting still. 0 1 2 3
28. Things I hear or see distract me from what I'm doing. 0 1 2 3
29. I am forgetful in my daily activities. 0 1 2 3
30. Many things set me off easily. 0 1 2 3
31. I dislike quiet, introspective activities. 0 1 2 3
32. I lose things that I need. 0 1 2 3
33. I have trouble listening to what other people are saying. 0 1 2 3
34. I am an underachiever. 0 1 2 3
35. I interrupt others when talking. 0 1 2 3
36. I change plans/jobs in midstream. 0 1 2 3
37. I act okay on the outside, but inside I'm unsure of myself. 0 1 2 3

38. I am always on the go. 0 1 2 3
39. I make comments/remarks that I wish I could take back. 0 1 2 3
40. I can't get things done unless there's an absolute deadline. 0 1 2 3
41. I fidget (with my hands or feet) or squirm in my seat. 0 1 2 3
42. I make careless mistakes or have trouble paying close attention to detail. 0 1 2 3
43. I step on people's toes without meaning to. 0 1 2 3
44. I have trouble getting started on a task. 0 1 2 3
45. I intrude on others' activities. 0 1 2 3
46. It takes a great deal of effort for me to sit still. 0 1 2 3
47. My moods are unpredictable. 0 1 2 3
48. I don't like homework or job activities where I have to think a lot. 0 1 2 3
49. I'm absent-minded in daily activities. 0 1 2 3
50. I am restless or overactive. 0 1 2 3
51. I depend on others to keep my life in order and attend to the details. 0 1 2 3
52. I annoy other people without meaning to. 0 1 2 3
53. Sometimes my attention narrows so much that I'm oblivious to everything else; other times it's so broad that everything distracts me. 0 1 2 3
54. I tend to squirm or fidget. 0 1 2 3
55. I can't keep my mind on something unless it's really interesting. 0 1 2 3
56. I wish I had greater confidence in my abilities. 0 1 2 3
57. I can't sit still for very long. 0 1 2 3
58. I give answers to questions before the questions have been completed. 0 1 2 3
59. I like to be up and on the go rather than being in one place. 0 1 2 3
60. I have trouble finishing job tasks or schoolwork. 0 1 2 3
61. I am irritable. 0 1 2 3
62. I interrupt others when they are working or playing. 0 1 2 3
63. My past failures make it hard for me to believe in myself. 0 1 2 3
64. I am distracted when things are going on around me. 0 1 2 3
65. I have problems organizing my tasks and activities. 0 1 2 3
66. I misjudge how long it takes to do something or go somewhere. 0 1 2 3

Appendix H

BRIEF-A: Behavior Rating Inventory of Executive Function- Adult Version Self Report Form

Instructions: On the following pages is a list of statements. We would like to know if you have had problems with these behaviors over the past month. Please answer all the items the best thay you can. Please DO NOT SKIP ANY ITEMS. Indicate your response by circling

N	if the behavior is	**Never** a problem
S	if the behavior is	**Sometimes** a problem
O	if the behavior is	**Often** a problem.

During the past month, how often has each of the following behaviors been a problem?
N = Never S = Sometimes O = Often

1. I have angry outbursts N S O
2. I make careless errors when completing tasks N S O
3. I am disorganized N S O
4. I have trouble concentrating on tasks (such as chores, reading, or work) N S O
5. I tap my fingers or bounce my legs N S O
6. I need to be reminded to begin a task even when I am willing N S O
7. I have a messy closet N S O
8. I have trouble changing from one activity or task to another N S O
9. I get overwhelmed by large tasks N S O
10. I forget my name N S O
11. I have trouble with jobs or tasks that have more than one step N S O
12. I overreact emotionally N S O
13. I don't notice when I cause others to get mad until it is too late N S O
14. I have trouble getting ready for the day N S O
15. I have trouble prioritizing activities N S O
16. I have trouble sitting still N S O
17. I forget what I am doing in the middle of things N S O
18. I don't check my work for mistakes N S O
19. I have emotional outbursts for little reason N S O
20. I lie around the house a lot N S O
21. I start tasks (such as cooking, projects) without the right materials N S O
22. I have trouble accepting different ways to solve problems with work, friends, or tasks N S O
23. I talk at the wrong time N S O
24. I misjudge how difficult or easy tasks will be N S O
25. I have problems getting started on my own N S O
26. I have trouble staying on the same topic when talking N S O
27. I get tired N S O
28. I react more emotionally to situations than my friends N S O
29. I have problems waiting my turn N S O
30. People say that I am disorganized N S O
31. I lose things (such as keys, money, wallet, homework, etc.) N S O

32. I have trouble thinking of a different way to solve a problem when stuck N S O
33. I overreact to small problems N S O
34. I don't plan ahead for future activities N S O
35. I have a short attention span N S O
36. I make inappropriate sexual comments N S O
37. When people seem upset with me, I don't understand why N S O
38. I have trouble counting to three N S O
39. I have unrealistic goals N S O
40. I leave the bathroom a mess N S O
41. I make careless mistakes N S O
42. I get emotionally upset easily N S O
43. I make decisions that get me into trouble (legally, financially, socially) N S O
44. I am bothered by having to deal with changes N S O
45. I have difficulty getting excited about things N S O
46. I forget instructions easily N S O
47. I have good ideas but cannot get them on paper N S O
48. I make mistakes N S O
49. I have trouble getting started on tasks N S O
50. I say things without thinking N S O
51. My anger is intense but ends quickly N S O
52. I have trouble finishing tasks (such as chores, work) N S O
53. I start things at the last minute (such as assignments, chores, tasks) N S O
54. I have difficulty finishing a task on my own N S O
55. People say that I am easily distracted N S O
56. I have trouble remembering things, even for a few minutes (such as directions, phone numbers) N S O
57. People say that I am too emotional N S O
58. I rush through things N S O
59. I get annoyed N S O
60. I leave my room or home a mess N S O
61. I get disturbed by unexpected changes in my daily routine N S O
62. I have trouble coming up with ideas for what to do in my free time N S O
63. I don't plan ahead for tasks N S O
64. People say that I don't think before acting N S O
65. I have trouble finding things in my room, closet, or desk N S O
66. I have problems organizing activities N S O
67. After having a problem, I don't get over it easily N S O
68. I have trouble doing more than one thing at a time N S O
69. My mood changes frequently N S O
70. I don't think about consequences before doing something N S O
71. I have trouble organizing work N S O
72. I get upset quickly or easily over little things N S O
73. I am impulsive N S O
74. I don't pick up after myself N S O
75. I have problems completing my work N S O