# ACADEMIC AND SOCIAL OUTCOMES OF COLLEGE STUDENTS WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER

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ABSTRACT

Attention-Deficit Hyperactivity Disorder (ADHD) is a common childhood disorder, and it is known to continue into adulthood. The purpose of this study was to investigate the social and academic outcomes of college students at UNCW reporting problems with attention and hyperactivity. Students were given questionnaires including a demographic form, ADHD Rating Scale (ADHDRS), Behavior Assessment System for Children-2, Self-Report of Personality, College Version (SRP-CV), and Rejection Sensitivity Questionnaire (RSQ). Participants completed a follow-up experimental procedure, the Heterosocial Initiation Task (HIT), and completed the Personal Rating Sheet (PRS), the Multiple Affect Adjective Checklist (MAACL), and the Estimating Personal Attractiveness Scale (EPAS). No differences were found between groups on the academic achievement variables from the demographic form. Differences were found between groups on the BASC-2, indicating a higher presence of problems with attention and hyperactivity as well as internalizing problems. Several interesting trends emerged from the HIT indicating the group with attention problems made more conversation initiations, maintained longer durations of facial contact, were rated as more desirable to continue an interaction with, as well as more likely to be considered for friendship. This demonstrates college students do exhibit behavioral fluencies characteristic of Barkley's (2006) conceptualization of ADHD as deficits in behavioral inhibition and indicates further investigation is warranted into the social outcomes of college students who report attention problems.

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# INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most commonly diagnosed childhood disorders, with prevalence rates estimated between 3-7% of grade-school age children (APA, 2000). ADHD is a persistent pattern of inattention and/or hyperactivity-impulsivity with some symptoms having emerged before age 7. Some impairment must be observed in at least two settings such as school and home, and there must be evidence of developmentally inappropriate behavior causing difficulty in social, academic, or occupational functioning.

ADHD is diagnosed with three subtypes: inattentive type, hyperactive-impulsive type, and combined type (APA, 2000).

ADHD is classified as a childhood disorder, but it often continues into adulthood for many individuals causing subsequent impairment and psychosocial issues in many domains including: increased risk for substance abuse, antisocial and illegal behavior, academic and work difficulties, as well as impaired social skills and relationships (Young & Gudjonsson, 2008). The study of college students with ADHD has increased most likely due to the fact that individuals with ADHD are much less likely to receive a college education than their non-ADHD peers (Barkley, Fischer, Smallish, & Fletcher, 2002). In order to provide a framework for why impairment occurs in adults with ADHD the following section will describe Barkley's theory of ADHD.

## Barkley's Theory of ADHD

Barkley's theory of ADHD (Barkley, 2006) is based on a hybrid model of prefrontal lobe functions and self-regulation. The prefrontal lobe function of behavioral inhibition is the first component in the model, and lays the groundwork for the other components in that it allows for

the development, internalization, and proper performance of the four executive functions: nonverbal working memory; verbal working memory (internalization of speech); self-regulation of affect/motivation/arousal; and reconstitution (planning and generativity). Behavioral inhibition inhibits the initial prepotent response, defined by Barkley (2006) as, "that response for which immediate reinforcement (positive or negative) is available or has been previously associated with that response" (p. 306), stops an ongoing response permitting delay, and protects the delay from disruption by competing events, allowing the individual to engage in self-regulation (self-directed action). Nonverbal working memory allows an individual to hold events in mind and to manipulate or act on the events (or similar past events) during delay periods to inform responding. The retention of a sequence of events in working memory provides the basis for a *sense of time* and thus the ability to manage behavior relative to time. Behavioral inhibition appears to be developmentally related to verbal working memory with important contributions for self-regulation. The internalization of speech allows one to engage in self-directed speech which is believed to be the basis of reflection and description, self-questioning, and problem-solving ability in the form of generating rules. Reconstitution is the human ability to analyze past behavior and recombine or synthesize its parts into novel behavior chains and responses which contributes to goal-directed behavioral flexibility and creativity (Barkley, 2006).

In order to understand the deficits in ADHD it is important not only to identify the inhibitory deficiencies, but also the difficulties with sustained attention. According to Barkley (2006), self-sustained attention is perhaps better characterized as "goal-directed persistence" (p. 317), and is particularly problematic for individuals with ADHD whereas externally reinforced attention is not. This could be due to the involvement of the prefrontal cortex, because it is does

not appear to be involved in contingency maintained attention, only "goal-directed persistence". There is increasing neurological evidence supporting the characterization of ADHD as a deficiency in the development, structure, and function of the prefrontal cortex and its networks with other brain regions, particularly the striatum and cerebellum, supporting this hypothesis. According to Barkley (2006), "The inhibitory deficit that characterizes ADHD disrupts the formation and execution of the executive functions, and thus disrupts their control of goal-directed motor behavior by the internally represented information they generate" (p. 318).

Several predictions of the social and academic outcomes can be made for individuals with ADHD based on this theory. Deficiencies in inhibition can be expected to interfere with the development of self-directed action as well as the use of visual imagery and private audition to regulate behavior (Barkley, 2006). Social relationships may be impaired due to deficiencies in altruistic behavior such as sharing and cooperation because the individual cannot sense the future implications of engaging in social reciprocity (the social future) due to impairment in nonverbal working memory (Barkley, 2006). Children with ADHD particularly have difficulties with self-regulation of emotion and motivation often displaying more raw and impulsive emotions than typical children, which may hamper peer relationships into adulthood. Poor self-regulation also may hamper the ability to self-motivate making them more likely to rely on extrinsic consequences for their behavior toward tasks and goals (Barkley, 2006). The lack of internally driven motivation may be partly responsible for poor academic performance in children with ADHD and the academic and occupational difficulties reported by adults with ADHD (Barkley, 2006). Problems with nonverbal working memory, specifically blindness to time, have been described as the ultimate disability of those with ADHD (Barkley, 2006).

Deficiencies in the reconstitution function may also contribute to poor academic performance in individuals with ADHD, particularly with mental problem solving because it inhibits the ability to rapidly construct and test response options. Individuals may also experience difficulty putting behavioral units into a coherent syntax evident in their organizational abilities (Barkley, 2006). Most significant to the academic performance of college students, deficiencies in reconstitution are likely to interfere with critical thinking ability.

Overall, Barkley's theory offers a comprehensive framework for understanding the deficits associated with ADHD, and offers several testable predictions regarding the presence of these deficits. Because the current study focuses on the academic and social outcomes of college students, the following sections review research examining the prevalence of ADHD in college students, and the relationship between ADHD and academic and social outcomes in college students.

## Prevalence Estimates and Associated Characteristics

The growth of the body of literature examining ADHD in college students is interesting because there is reason to suspect that college students with ADHD are somewhat unique from other individuals with ADHD. They are likely to have higher ability levels, greater academic success in grade- and high school, and better coping skills. Also, college students with ADHD have to adapt to a unique set of academic and social demands compared to ADHD peers who are not receiving a postsecondary education (Frazier, Youngstrom, Glutting, & Watkins, 2007). These factors suggest the outcomes obtained with children and adolescents with ADHD may not hold true for college students with ADHD. Therefore, college students with ADHD are perhaps a distinct subgroup of individuals with ADHD meriting closer investigation of academic achievement and social outcome measures (Fraizer et al., 2007).

As stated previously, the DSM-IV estimated prevalence of ADHD is 3-7% for children and youth with a higher frequency in males at any age (APA, 2000). It has been suggested that prevalence rates may differ among college students from the general population and that the gender ratio could be quite different depending on if information is assessed via parent or self-report (Lee, Oakland, Jackson, & Glutting, 2008). Because relatively little is known about college students with ADHD several studies have attempted to obtain prevalence rates and gender ratios from undergraduate college samples.

In order to estimate the prevalence of ADHD symptoms among college students a recent study administered a self report measure to a matched sample of 956 college freshman at three different universities in three different regions of the United States (Mid-Atlantic, Midwest, and Pacific Northwest) (Lee, Oakland, Jackson, & Glutting, 2008). The sample consisted of 52% male (48% female), and 89% Caucasian (11% African American) students. Students were asked to complete the Student Response Inventory (SRI) of the College ADHD Response Evaluation (CARE) in person during their college orientation, and their parents were asked to complete the Parent Response Inventory (PRI) of the CARE in person.

The SRI is a 44-item self-rating scale with 18 questions addressing the DSM-IV criteria for ADHD (9 from the Inattentive subscale, 9 from the Hyperactive/Impulsive subscale). Items are rated whether the subjects *agree, disagree,* or are *undecided* about how the item applies to their daily lives. The PRI is a 30-item questionnaire with 18 questions addressing the same 18 DSM-IV criteria for ADHD completed by one parent of a subject. Similar to the SRI, the PRI asks the parent to rate whether they *agree, disagree,* or are *undecided* about how an item applies to their child. Because a diagnosis of ADHD requires the presence of symptoms prior to age 7, the PRI is framed such that the questions use a retrospective framework (with the assumption

that parents will more accurately remember and report childhood symptoms than the college students themselves).

Mean scores of self-reported and parent reported symptoms were compared across gender and race. On the SRI, male students reported higher symptom totals than females on the Combined and Inattentive scale, but not on the Hyperactive/Impulsive scale. Mean scores were higher for male students compared to female students on all three subscales on the PRI as well. Mean scores on the SRI did not significantly differ on all three subscales for African American and Caucasian students. However, mean scores on the PRI were higher for Caucasian students compared to African American students on all three subscales. Of the male and female students, 1.2% and 4.6%, respectively, and 8.4% of African American and 2.3% of Caucasian students were identified as having ADHD based on self-report. 5.6% of male and 1.6% of female students and 1.9% of African American and 4.7% of Caucasian students were identified as having ADHD based on parental report (Lee, Oakland, Jackson, & Glutting, 2008). These findings support the DSM-IV's report of a higher prevalence of ADHD in males at all ages, and it supports the use of self-report to identify the presence of ADHD symptomology in male and female college students.

It has been noted that college students with previously undiagnosed ADHD will often present for evaluations at a university health or counseling center. Relatively little is known regarding their presenting symptoms and deficits compared to other adults with ADHD (Fraizer et al., 2007; Heiligenstein, Guenther, Levy, Savino, & Fulwiler, 1999; Heiligenstein & Keeling, 1995; Lewandowski, Lovett, Codding, & Gordon, 2008). This lack of information prompted Heiligenstein and Keeling (1995) to conduct a systematic, retrospective chart review of medical records obtained from a computer database of University of Wisconsin-Madison students

diagnosed with ADHD in 1993 to identify presenting problems (chief complaints during intake interview), recent associated problems (comorbid disorders and legal adversity), previous evaluations, and associated problems in childhood corroborated by parents or school records (Heiligenstein & Keeling, 1995).

Twenty-nine men and 13 women, for a total of 42 college students with a mean age of 27 years, were identified with ADHD. Fifty-five percent of students reported ADHD symptoms, while 14% reported simply academic underachievement, 10% reported a nonspecific learning disability, and 21% reported mood symptoms. Several comorbid disorders were reported as well including: anxiety disorders (5%), drug and alcohol abuse and/or dependence (26%), learning disabilities (2%), and eating disorders (2%). Twelve percent of students reported legal difficulties, while 45% of students had no evidence of comorbidity. Interestingly, one third (33%) had been evaluated as a child for academic or behavior problems, while almost one third (31%) were presenting for their first evaluation. Another 36% had sought previous psychological care for non-ADHD symptoms as adults. Nearly two-thirds (64%) of the students demonstrated evidence of childhood academic underachievement, 7% learning disabilities, 2% behavior problems, and 14% had no childhood problems (Heiligenstein & Keeling, 1995).

In a study by DuPaul, Schaughency, Weyandt, Tripp, Kiesner, Ota, and Stanish (2001) prevalence rates were obtained from a sample of 1,209 male and female university students from the U.S. (799 students), New Zealand (213 students), and Italy (197 students). The Young Adult Rating Scale (YARS), a 24 item questionnaire with 17 questions derived from the DSM-IV symptoms list on a 4-point Likert scale, was given to the students. A number of differences were found by subtype across all three countries for both men and women. A total of 2.9%, 7.4%, and 8.1% of men in the US, Italy and New Zealand, respectively, were identified as having one of the

three ADHD subtypes with a very low percentage reporting the combined type and the majority in the US and New Zealand reporting the hyperactive-impulsive subtype (2% and 5.4%, respectively), while Italian men reported equal percentages of both the inattentive and the hyperactive-impulsive subtype (3.7%). However, a greater percentage of women from the US (3.9%) were classified as having ADHD versus 0% for Italy and 1.7% for New Zealand. The majority of the US and all of the New Zealand women were classified as the hyperactive-impulsive subtype. Interestingly, the correlation between reported GPA and the total YARS score was statistically significant, $r = -.11$, $p < .001$, indicating that ADHD is inversely correlated with academic achievement in multiple countries.

Academic Outcomes

Students with ADHD face a number of challenges in the academic realm including: forgetting to complete assignments, completing assignments but forgetting to turn them in, time management, making careless mistakes in their schoolwork, as well as engaging in disruptive, impulsive, 'off-task' behavior (Langberg, Epstein, Urbanowicz, Simon & Graham, 2008). Unfortunately, these challenges often lead to low academic achievement in students with ADHD indicated by lower exam and class grades than their non-ADHD peers (Langberg et al., 2008). The relationship between ADHD and low academic achievement has been largely studied in school-age children (Fraizer et al., 2007; Spinella & Miley, 2003).

In a recent meta-analysis of the literature examining ADHD and academic achievement, it was found that only four of the 72 articles meeting criteria as a study of ADHD symptomatology and achievement were in college students (Fraizer et al., 2007). In fact, this study was the first to attempt to systematically examine and integrate results quantitatively across studies examining both ADHD and achievement. In a study secondary to the meta-

analysis the relationship between self- and parent-rated ADHD symptomatology and grade point average (GPA) as indicated by academic probationary status was examined in a college student population in hopes to "investigate the 1-year predictive validity of ADHD ratings in forecasting college achievement" (p. 55).

Similar to the study by Lee et al. (2008) participants were given the SRI from the CARE. Upon completion the students mailed the PRI home for a parent or guardian to complete. The university where the study was conducted supplied the binary data on whether students were placed on academic probation at the end of their first year (a GPA below 2.0 on a 4 point scale). The student-rated scores on the inattentiveness, hyperactivity, and impulsivity scales of the CARE and the parent-rated scores on the inattentiveness and hyperactivity scales were then correlated with the GPA criterion described above using a bivariate correlation. It was found that both parent and student scores on the Inattentiveness scales correlated significantly with probation status, $r = .17$, $p < .05$.

A test of a five step logistic regression model consisting of student-rated inattentiveness, student-rated hyperactivity, student-rated impulsivity, parent-rated inattentiveness and parent-rated hyperactivity against a constant only model was found to be statistically significant, indicating that all five student and parent-rated ADHD symptom variables distinguished college students on academic probation from college students with average to above-average achievement. Interestingly, only student-rated inattentiveness and parent-rated inattentiveness significantly contributed to predict academic standing (i.e., probationary status) in the model (Fraizer et al., 2007).

Several studies have been conducted examining adjustment to college in students with ADHD, most notably the relationship between ADHD status and GPA (Heiligenstein et al.,

1999; Rabiner, Anastopoulos, Costello, Hoyle, & Schwartzwelder, 2002). In a study by Heiligenstein, Guenther, Levy, Savino, and Fulwiler (1999), a retrospective chart review conducted of 508 students at the University of Wisconsin-Madison seen for an initial assessment in 1997 at the university's Counseling and Consultation Services (CCS) unit of the University Health Services revealed 54 charts meeting the DSM-IV criteria of ADHD. Each chart contained a Confidential Information Form (CIF) that contained demographic, academic, and clinical data including age, gender, ethnicity, and status in school. GPA was obtained from the CIF to determine academic achievement. The number of credits each student was enrolled in for the 1997 fall semester, as well as academic probation status, was also recorded. An Inventory of Common Problems (ICP) was completed as part of the CIF which consisted of 31 Likert scale rated questions in six subset areas including depression, anxiety, academics, interpersonal relationships, physical health, substance use, and lethality. The academic variables used in the data analysis were GPA, number of semester credits, probation status, and the ICP academic subset score. The remaining ICP items were used as the psychosocial variables in the data analysis.

In comparing the 54 students in the ADHD group to a control group (28 students presenting to the CCS for career concerns) it was found that the ADHD group reported significantly poorer academic functioning as indicated by lower mean GPAs and a higher probability of being on academic probation, but not number of semester credits. No differences were found between the groups regarding ICP scores or academic probation status which suggests that probation status and GPA did not influence the ICP academic subscale score. No group differences were found regarding age, gender, ethnicity, or level of education. Interestingly, no differences were found between the groups regarding psychological problems as

indicated by the remaining subscale scores on the ICP, but this could be due to students with comorbid disorders being excluded from the results (Heiligenstein et al., 1999).

In a study by Rabiner, Anastopoulos, Castello, Hoyle, and Swartzwelder (2008) examining adjustment to college in students with ADHD in 1,648 freshmen from a public and private university in the Southeastern US, it was found that students with ADHD reported higher rates of both academic concerns and depressive symptoms. Students were administered online surveys with questions addressing the presence of a previous ADHD diagnosis and included researcher created questionnaires assessing for ADHD symptoms, academic concerns, alcohol/drug use and social dissatisfaction. This made it possible to examine any differences between students who were identified with ADHD by reporting a previous diagnosis or by the questionnaire items. The Ten-item Personality Inventory (TIPI) was included as well the Center for Epidemiologic Studies Depression Scale (CES-D). Sixty-eight students (4%) were identified as having a current diagnosis of ADHD by the researcher created questionnaire, and surprisingly 44 of the 68 students identified as having ADHD (65%) were female. Students who reported a previous diagnosis of ADHD reported significantly more depressive symptoms and slightly more academic problems than control students, but this difference was not significant; however, students identified as ADHD did report significantly more academic problems and depressive symptoms. It is important to note that the ADHD sample comprised a high number of females, and it has been reported that females with ADHD are more likely to experience internalizing disorders such as depression and anxiety. No significant differences were found regarding social adjustment (Rabiner et al., 2008).

Since it has been reported that college students with ADHD experience more academic concerns even when succeeding academically, it is important to understand the nature of their

concerns. When identifying an adult with ADHD it is usually necessary to rely on unreliable biographical memories; thus, one must be sure the symptoms reported are a product of that particular disorder (e.g., inattention due to anxiety falsely attributed to ADHD). A recent study by Lewandowski, Lovett, Codding, and Gordon (2008) examined self-reports of symptoms in 534 college students from Syracuse University with and without a diagnosis of ADHD. By using a symptom questionnaire containing the 18 items from the DSM-IV checklist with a binary response option, it was hypothesized to increase participants' reports of symptoms overall while still demonstrating a higher endorsement rate among students with a diagnosis of ADHD. Thus, although endorsement would be high for all groups, the total symptom counts would continue to discriminate between those with and without an ADHD diagnosis, and affirm their validity in identifying students with ADHD.

It was found that college students with ADHD reported significantly more symptoms ($M$ = 8.8, $SD$ = 3.8) than their non-ADHD peers ($M$ = 4.45, $SD$ = 3.3). Thus, despite a high overall rate of endorsement of ADHD symptoms among college students, and consistent with the authors' hypothesis, self-reported total symptom counts remain of diagnostic value to researchers and practitioners when assessing ADHD in adults. Overall, it appears ADHD symptoms may be fairly common among college students, and high symptom counts may be protective against false positives (Lewandowski et al., 2008).

It has been argued that impulsivity is responsible for the academic impairments experienced by students with ADHD because the pursuit of higher education is a long-term self-controlled choice in which both the short- and long-term rewards are delayed whereas people with ADHD tend to choose smaller more immediate rewards (Barkley, 2006). College students in particular have a variety of demands placed on them both academically and socially, and an

impairment in impulse control would make the choice of the more immediate and appealing reinforcer more likely, often at the expense of academic achievement (e.g., attending a party instead of attending a study group for an exam the following day).

Using the Barratt Impulsiveness Scale (BIS-11) and a GPA based on three exam grades, Spinella and Miley (2003) examined the relationship between impulsivity and academic achievement in 27 undergraduate students. The BIS-11 is a 30-item self-rating scale measuring various aspects of impulsivity including non-planning (orientation toward the present rather than the future), motor impulsivity (acting without thinking), cognitive impulsivity (hasty decision making), and a total BIS score. Significant negative correlations were obtained between the students' calculated exam GPA for a psychology course they were enrolled in and their scores on the BIS-non planning scale, BIS-motor impulsivity scale, and total BIS score demonstrating an inverse relationship between self-reported impulsivity and an objective academic achievement measure (i.e., class grades).

It has also been argued that the nature of the academic impairment in college students with ADHD is due to a lack of academic motivation. An individual with ADHD who has been accepted into a postsecondary institution is likely to possess the academic ability to succeed. This is in line with Barkley's (2006) finding that individuals with ADHD tend to be of average to above average intelligence. A recent study examined the learning and study strategies of 150 undergraduate students, with 50 each in the ADHD, learning disability (LD), and nondisability (ND) groups, at a large public university in the Southeastern US (Reaser, Prevatt, Petscher, & Proctor, 2007). Students were administered the Learning and Study Strategies Inventory, 2nd edition (LASSI) which is an 80-item test with 10 eight-item scales including Anxiety, Attitude, Concentration, Information Processing, Motivation, Self-Testing, Selecting Main Ideas, Study

Aids, Time Management, and Test Strategies. Students were also asked to self-report their GPA on a demographic form. There were significant differences between the ADHD group and the ND group such that the ND group scored in a more positive direction on all subscales except Study Aids and Attitude. Interestingly, using a series of multiple regression analyses regressing 10 LASSI subscales on the GPA for each group revealed a significant effect of Motivation for ADHD students such that the higher the motivation scale score the higher the GPA. This finding supports the hypothesis that GPA will be positively related to motivation (Reaser et al., 2007).

Due to the increase in students with ADHD taking stimulant medications while attending college, concern has increased regarding escalation in illicit use to improve academic performance by non-ADHD college students. Advokat, Guidry, and Martino (2008), researchers at Louisiana State University, distributed a 31-question survey to students recruited from undergraduate classes. Students were instructed not to sign their name in order to ensure their anonymity. The survey collected information on age, sex, residence status (on- or off-campus), GPA, previous ADHD diagnosis (and if so, what category of health care professional), prescribed medications, and if they had ever been asked to give or sell their medications, or how to fake ADHD symptoms. Students without an ADHD diagnosis were asked if they had ever taken a stimulant medication without a prescription, asked someone with ADHD how to fake symptoms, which medications they may have taken, how and why they were taken, any side effects experienced, as well as how much they paid for the medication. All respondents were asked whether they believed stimulant medications actually improved academic performance. Surveys were collected at the end of the class period in which they were distributed or the students were instructed to mail them to the primary author's campus address.

Of the 1,550 students who responded, 163 (10.5%) identified as having a previous diagnosis of ADHD (ADHD group). Of the remaining 1,387 students, 591 (43%) reported having used a stimulant medication without a prescription (No ADHD, Illicit Use group) and 794 reported no stimulant use (No ADHD, No Illicit Use group). No group differences were found regarding age or residence status, but more males comprised the ADHD and No ADHD, Illicit Use groups. The majority of ADHD students were prescribed a stimulant medication, with 84% having been asked to give and 19% asked to sell their drugs. Students in the ADHD group had lower GPAs on average than the No ADHD, Illicit Use and the No ADHD, No Illicit Use groups. Not surprisingly, many more students in the ADHD and No ADHD, illicit use groups positively endorsed the statement, "Do ADHD medications help academic performance?" (Advokat et al., 2008, p. 603).

Only one study found no relationship between ADHD and academic impairment. In a study by Sparks, Javorsky, and Philips (2005), they compared college students with ADHD who had fulfilled their foreign language (FL) requirement to students classified as LD or both who had either passed or requested a waiver for their FL requirement. A systematic chart review was conducted of the students' cognitive ability (intelligence quotient, IQ), academic achievement (Woodcock-Johnson—Revised Tests of Achievement), scholastic aptitude (ACT test), and GPA. It was found that students with ADHD exhibited average to above-average range for cognitive ability and academic achievement with a mean IQ in the 83$^{rd}$ percentile. The students' average ACT score was above-average range (24.7) and their graduating college GPA was just below a B (2.73). In Sparks, Javorsky, and Philips' (2005) own words, "These findings show that the students classified as ADHD did not exhibit deficits in basic academic skills and achieved

college entrance scores and graduating GPAs similar to those of the middle 50 percent of students at the selective public university where the research was conducted" (p. 167).

## Social Outcomes

As stated previously, college students must face a number of unique academic and social challenges upon entering college. It has been reported that children with ADHD are likely to experience rejection from their peers at an early age as well as experience internalizing and externalizing behavior problems (Gaub & Carlson, 1997; Stormont, 2001). It has also been reported that children with ADHD are more likely to experience psychiatric comorbidity, police contact, delinquency, and psychosocial problems into adulthood (Young, Gudjonsson, Ball, & Lam, 2003). It has been demonstrated previously that college students with ADHD have scored higher on self-report scales of depressive symptoms than their non-ADHD peers which could be an indication of a failure to adjust to the social demands of college (Rabiner et al., 2008). Several recent studies have sought to shed light on the existence and nature of social deficits in college students with ADHD as well as to hypothesize a causal mechanism for such action, Rejection Sensitivity (RS).

An early study by Grenwald-Mayes (2001) examined the current quality of life and family origin relationship dynamics for college students with ADHD. Thirty-seven undergraduate students with ADHD and 59 without were recruited to complete a demographics form, the Quality of Life Questionnaire (QLQ), Family Environment Scale (FES), and Family Adaptability and Cohesion Evaluation Scale II (FACES II). The demographic form asked for age, sex, ethnicity, year in college, GPA, marital status, problems with alcohol and drugs, and arrests other than traffic offenses. The QLQ is self-report with 192 items and 15 subscales. The FES and the FACES II scores were combined into one total Family of Origins Dynamics score.

The FES is a 90-item inventory to measure the social and environmental characteristics of families, while the FACES II is a 30-item instrument consisting of two scales, Family Cohesion and Adaptability.

A series of chi-square analyses were conducted to determine any significant differences between the groups. Fathers of students with ADHD were more likely to have gone to college; this finding is somewhat surprising considering ADHD is believed to be highly genetic and it would therefore be statistically less likely for their fathers to have gone to college. Like previous studies, it was also found that students with ADHD were more likely to have problems with alcohol or other drugs, and were more likely to have been arrested. On the QLQ, ADHD students were more likely to report poor parent-child relations, less interest/involvement with politics, less success with personal growth, and less ability to present themselves in a socially desirable fashion. Students with ADHD also reported less marital and physical well-being.

A series of ANOVAs were used to determine if significant differences existed between the groups on Family of Origin Dynamics. Only one significant difference emerged between the groups on the Active-Recreational subscale of the FES, with ADHD participants scoring higher. This indicates that coming from a physically active family may help individuals overcome the deficits associated with ADHD that would often prevent them from successfully entering college (Grenwald-Mayes, 2001). Overall, it was found that the relationship between family of origin dynamics and current quality of life appears to be stronger for college students with ADHD than without, and college students with ADHD report an overall poorer quality of life (Grenwald-Mayes, 2001).

In order to determine why adults with ADHD experience psychosocial deficits, a study by Dooling-Litfin and Rosen (1997) examined self-esteem in a group of undergraduate students.

They found that students who reported a diagnosis of ADHD in childhood, or who were labeled as somewhat hyperactive as a child, reported lower self-esteem on average. Recently, Shaw-Zirt, Popali-Lehane, Chaplin, and Bergman (2005) investigated adjustment and self-reported levels of self-esteem and social skills in 21 students from two Catholic commuter colleges in the Northeast, US with ADHD symptoms compared to 20 college students with no history of ADHD.

Participants were screened for ADHD using the Wender Utah Rating Scale (WURS) and the ADD-H Adolescent Self-Report Scale. Diagnoses were made using the Structured Interview for ADD-H Symptoms, and the Parent's Rating Scale (adapted from the Conners' Teachers Abbreviated Rating Scale). Measures of college adjustment included the Student Adaptation to College Questionnaire (SACQ), and the Social Performance Survey Schedule (SPSS). The SACQ consists of 67 Likert scale items assessing four subscales including Academic Adjustment, Social Adjustment, Personal-Emotional Adjustment, and Goal Commitment and Institutional Attachment. The SPSS is a 100-item questionnaire with participants rating the frequency of specific social behaviors in the natural environment. Self-esteem was assessed using the Social Self-Esteem Inventory (SSEI) and the Rosenberg Self-Esteem Scale. The SSEI is a 30-item Likert scale inventory with negatively phrased items reversed scored with higher scores reflecting higher self-esteem. The Rosenberg Scale is a 10-item Likert scale inventory.

It was hypothesized that students with ADHD symptoms would report lower levels of college adjustment, as well as lower levels of self-esteem and social skills than their non-ADHD peers. ANOVAs revealed all three hypotheses to be correct based on the sample. It was noted that within the ADHD group females reported better social skills on average than males. The

findings indicate that young adults from a nonclinical sample experience similar ADHD symptoms, but perhaps not similar severity as clinical samples (Shaw-Zirt et al., 2005).

The majority of research regarding psychosocial adjustment in college students and adults with ADHD has involved completing general self-report inventories of their symptoms, such as the above study, very rarely examining differences experimental or by subtype. A recent study by Canu and Carlson (2003) sought to examine the friendship and romantic relationship outcomes in a college aged male sample by ADHD subtype. The experiment began by placing heterosexual male participants in a realistic, ambiguous social situation with a female confederate known as the Heterosocial Initiation Task (HIT). Once the social situation was complete both the female confederate and the male participant were asked to rate the other individual's assertiveness, appropriateness in, and own desire to continue the interaction. Once the HIT was completed, participants were asked to complete a demographic questionnaire, a Dating Questionnaire assessing dating preferences and history, the Sexual Experience Questionnaire (SEQ), as well as the Social Response Questionnaire. The Dating Questionnaire consisted of six factors: Relationship Experience, Dating Milestones, Sexual Escalation in Dating, Short-term Dating Orientation, Dissatisfaction with Seeking Short-term Partners, and Overall Dating Drive. The SEQ consisted of a Sexual Functioning Inventory, Experience and Drive Scales, and the Sociosexual Orientation Inventory.

The ADHD participants were divided into three groups, ADHD-C (high hyperactivity/impulsivity and high inattention screening scores), ADHD-IA (high inattention screening scores) and non-ADHD control. The female confederates rated the ADHD-IA men as less assertive and initiating conversation less than their ADHD-C or non-ADHD peers. Comparisons revealed significant differences between the ADHD-IA and ADHD-C groups with

the ADHD-C group achieving Dating Milestones sooner (14.6 vs. 16.2 years of age) and scoring significantly higher on the Sexual Drive subscale of the SEQ. These findings appear to indicate that male individuals with ADHD-IA may experience more impairment in relationships with females, known as heterosocial impairment.

Canu and Carlson (2007) have identified a social psychology based cognitive-behavioral factor, rejection sensitivity (RS), which may be responsible for the poor social adjustment of individuals with ADHD. RS was first described by Karen Horney and was redefined by Downey and Feldman (1996) as the, "disposition to anxiously expect, readily perceive, and overact to rejection" (p. 1338). It has been proposed that frequent rejection from and negative interactions with peers, and even parents, can lead to elevated RS in adulthood. It has been shown that adults with high levels of RS exhibit jealousy and hostility in their romantic relationships, and it is correlated with partner dissatisfaction and ending of the relationship within a one year period (Downey & Feldman, 1996). Thus, individuals with ADHD would appear more likely to develop high RS and its associated negative social outcomes due to their frequent rejection from peers (Stormont, 2001).

In a follow up to the previously described 2003 study, Canu and Carlson (2007) examined whether RS level differentiates between ADHD subtypes and non-ADHD controls in relation to long-term social outcomes in male heterosexual college students. Differences in group outcomes on romantic, friendship, and self-esteem were also examined, as well as the possibility that low RS serves as a buffer from negative relationship outcomes.

Participants were first screened via telephone for any previous diagnosis of ADHD or other psychiatric disorder, as well as given supplemental demographic questions including age, sexual preference, and student status. The Conners Adult ADHD Scale-Self Report: Screen

Version (CAARS-S: SV) and the WURS were given to the participants to determine the presence of hyperactive/impulsive or inattentive symptoms. The Beck Anxiety Inventory (BAI) and the Beck Depression Inventory (BDI) were given to assess for possible depressive, anxious, or somatic symptoms. The Rejection Sensitivity Questionnaire (RSQ) was given to assess the students' RS level. The RSQ is a 36-item self-report of anxious expectation of rejection in 18 social situations rated on a 6-point Likert scale. A Dating and Sexual Inventory (which included a Dating Milestones and Sexual Milestones subscale), Investment in Romantic Relationships Index, Locke-Wallace Adjustment Index (LWMAT), Friendships Questionnaire, and the Rosenberg Self-Esteem Questionnaire were given as well.

As in the previous study, groups were divided into ADHD-C, ADHD-IA, and non-ADHD control groups. As expected based on previously discussed research indicating higher rates of depressive symptoms among college students with ADHD, both ADHD-C and ADHD-IA had significantly higher BDI and BAI scores compared to the control group. The ADHD-C group reported dating a larger number of women, greater number of lifetime partners, and a longer percentage of time since dating began compared to control participants. ANOVAs also revealed a significant difference between both ADHD groups and the control group in regards to self-esteem, with the control group scoring higher. No significant differences were found between groups regarding friendships.

An ANOVA was conducted to examine differences on the RSQ, but surprisingly found none, counter to the hypothesis that ADHD subjects would have different levels of RS compared to non-ADHD control subjects. However, a multiple regression analysis of RS using Dating Milestones completed (1), time in relationships (2), number of women asked on dates in past year (3), ratio of success in dating attempts in past years (4), and Sexual Milestones complete (5)

as variables revealed no significant differences between groups, but several interesting interactions.

First, low RS among control participants predicted more positive social outcomes on the Sexual Milestones completed and the number of women asked on dates while low RS among ADHD-IA participants predicted more positive social outcomes on the Sexual Milestones completed and the Dating Milestones completed. Second, high RS predicted a more positive relational outcome for the ADHD-C participants on the Sexual Milestones completed and the number of women asked on dates. This finding is particularly surprising given that low RS is hypothesized to play a buffering role against negative social outcomes in ADHD and nonclinical adult populations in general, and in the ADHD-IA and control groups it appears to do so. Perhaps there is some specific buffering action of high RS in combination with the presence of hyperactive/impulsive symptoms such that high RS allows an individual to inhibit the impulsive response in a given social situation, thus allowing for better peer interactions and relationships (Canu & Carlson, 2007).

Interactional Description

There are several disorders, including Major Depression Disorder (MDD) and Paranoid Schizophrenia, which have gained attention due to the interactional nature of the individual's behavior and the environment, specifically Coyne's (1976) interactional description of depression. Coyne's description of depression emphasizes the importance of negative feedback from the environment in influencing the development and progression of the disorder.

Particularly relevant to the disorder of ADHD is Coyne's suggestion that the oftentimes "annoying" behavior of the depressed individual invokes negative reactions from significant others and the social environment in general, thus leading to negative feedback and poor social

outcomes. Of note, the uninhibited behavior of children and adults with ADHD is often described as annoying and as eliciting negative reactions in peers and caregivers as well (Young & Gudjonsson, 2008). Taking into consideration the similar reactions reported by individual's interacting with individual's with ADHD and depression, an interactional interpretation that the 'annoying' behavior elicits negative reactions from peers and caregivers is readily extendable to the development and progression of the social deficits reported among individual's with ADHD.

Rationale for Current Study

Overall, the literature regarding the academic and social outcomes of college students with ADHD is broad, with research focused primarily on narrow, diverse self-report outcome measures ranging from GPA in some studies to primarily self-esteem in others. Unfortunately, until recently very little of the research has focused on the deficits and negative outcomes associated with ADHD in the college population. With the passage of the Section 504 law in the 1970s, the Americans with Disabilities Act (ADA) in 1990, and specifically the Individuals with Disabilities Education Act (IDEA; renewed in 2004) awareness has increased regarding the presence of individuals with disabilities in the college setting with special needs and, perhaps, capabilities. Because individuals with ADHD have such unique deficits with executive functioning and self-regulation as Barkley (2006) describes, academic achievement is hampered and they are at a higher risk for psychosocial adversity. Thus, outcomes for individuals with ADHD who are in college warrant greater investigation in order to understand and better serve their needs.

The studies examining academic achievement as a function of self-reported GPA (Advokat et al., 2008; DuPaul et al., 2001; Fraizer et al., 2007; Grenwald-Mayes, 2001; Heiligenstein et al., 1999; Rabiner et al., 2008; Reaser et al., 2007; Spinella & Miley, 2003) have

reported somewhat mixed findings in that consistent negative correlations between GPA and ADHD status have been found but not of consistent strength, and one study found no relationship (Sparks et al., 2005). The majority of the studies examining the relationship between ADHD status and GPA have relied on self-report (Advokat et al., 2008; DuPaul et al., 2001; Fraizer et al., 2007; Grenwald-Mayes, 2001; Heiligenstein et al., 1999; Rabiner et al., 2008; Reaser et al., 2007), and have reported low to moderate correlation coefficients (e.g., $r = -.11, p < .001$) between GPA and ADHD symptomatology. Few studies have included more than one self-report measure of academic achievement such as GPA and number of semesters in college; Spinella and Miley (2003) is the only study that used a verifiable GPA as an outcome variable, and only two studies (Fraizer et al., 2007 and Heiligenstein et al., 1999) used academic probation as a verifiable indicator of GPA.

Studies examining social outcomes have also reported mixed findings. Most studies have found a negative correlation between ADHD status and a social outcome measure, but these measures range considerably between studies with some examining social outcome as a measure of self-esteem (Dooling-Litfin & Rosen, 1997; Shaw-Zirt, 2005) while others have used various measures of current relationships, quality of life, and rejection sensitivity (Canu & Carlson, 2007; Grenwald-Mayes, 2001; Rabiner et al., 2008; Shaw-Zirt et al., 2005). Rabiner et al. (2008) reported no significant differences between the ADHD and control groups regarding social adjustment while several studies have found a negative correlation between ADHD status and reported social satisfaction or relationship status (e.g., Canu & Carlson, 2007; Greenwald-Mayes, 2001; Shaw-Zirt et al., 2005). Only one study was found to examine ADHD among college students with ADHD (Canu & Carlson, 2007) using an experimental measure of social outcome, the HIT. However, this study was conducted only in males, and included no measure of the

subject's academic outcome. It is also important to assess the social outcomes of female college students, particularly in light of Rabiner et al.'s (2008) finding that the majority of their ADHD college sample was female (65%).

The major goal of the current study is to examine the social and academic outcomes of both male and female college students with ADHD at the University of North Carolina Wilmington. Examining male and female college student outcomes via self-report measures of academic achievement, social relationship status and rejection sensitivity, and the use of an experimental procedure assessing heterosocial behavior will determine whether the academic and social deficits reported in children and adults with ADHD also occur in college students with attention problems.

Hypotheses

1. It was hypothesized that there would be differences between the ADHD group and the non-ADHD group on academic achievement. Specifically, the ADHD group would have a lower mean GPA, a higher ratio of semesters in college to class standing, and would be more likely to report being on academic warning on average than the non-ADHD group.

2. It was hypothesized that there would be differences between the ADHD group and the non-ADHD group on self-reported relationship status and success (as measured by the demographic questionnaire and the BASC-2, respectively), as well as the rejection sensitivity questionnaire (RSQ) score. Specifically, the ADHD group would report lower mean relationship satisfaction than the control group in regards to romantic, friendship, and familial relationships as well as higher mean levels of rejection sensitivity.

3. It was hypothesized that there would be differences between the ADHD and the non-ADHD groups on the Heterosocial Initiation Task (HIT). Specifically, the ADHD group would be scored more poorly by members of the opposite sex than the non-ADHD group.

## METHOD

### Participants

There were 91 undergraduate participants in this study (76 female, 15 male) who ranged in age from 18 to 24 years with a mean age of 19.29 (*SD* = 1.42). Participants were recruited using an online research sign-up system for credit in an introductory psychology course or for extra-credit in another psychology course at UNCW. Participants were restricted to the age range of 18-25 years as this was the target young adult developmental age group. The majority of participants self-identified their ethnicity as Caucasian (80.2%) with the rest self-identifying as African American (6.6%), Hispanic (4.4%), Multiracial (7.7%), or Other (1.1%). A majority of the sample (92.3%) reported their relationship status as either single (51.6%) or dating one person, i.e. steady boyfriend/girlfriend (40.7%). A small proportion of the sample (7.7%) reported their status as married (3.3%), engaged (3.3%), or dating multiple people (1.1%). A little more than half of the sample reported their class status as freshman (54.9%) with the rest of the sample comprised of sophomores (17.6%), juniors (17.6%), and seniors (9.9%).

### Measures

Demographic Questionnaire. The demographic questionnaire included items on sex, age, ethnicity, marital/romantic relationship status, high school and college GPA, number of semesters in college, residency status (on or off campus), class status (freshman, sophomore, junior, or senior), ACT score, SAT overall, math, verbal and writing scores, psychiatric status

(previous or current diagnosis), medication status, if they have been asked to sell or give away their medication, and criminal and academic probation and disciplinary status (Appendix A).

ADHD Rating Scale *(ADHDRS*; DuPaul, Power, Anastopoulos, & Reid, 1998). The ADHDRS is an 18-item self-report measure derived from the DSM-IV checklist of Inattentive and Hyperactive/Impulsive symptoms. Participants are asked to rate each item on a 4-point Likert scale ranging from zero to three (0=never, 3=very often) as it applies to them before age seven, between ages eight-12, ages 13-18, and in the past six months, and has been found to be useful for identification purposes based on the DSM-IV diagnostic criteria (DuPaul et al., 1998; DuPaul, Anastopoulos, McGoey, Power, Reid, & Ikeda, 1997). The ADHDRS has high reported internal consistency, $\alpha$ = *.88-.92*, and high test-retest reliability ranging from .78-.86, as well as adequate validity (DuPaul et al., 1998). The adult self-report version of this measure was used as it allows for assessment of current ADHD symptoms and for retrospective recall of childhood symptoms.

Behavior Assessment System for Children-2, Self-Report of Personality, College Version *(BASC-2/SRP-CV*; Reynolds & Kamphaus, 2004). The BASC-2/SRP-CV is a 185-item self-report measure of personality and psychopathology normed for college adults between the ages of 18-25. The first half of the items are rated on a true-false response format, and the second half is rated on a 4-point Likert-style response format ranging from *never* to *almost always*. The items are divided into 20 primary and content scales. The primary scales include Alcohol Abuse, Anxiety, Attention Problems, Atypicality, Depression, Hyperactivity, Interpersonal Relations, Locus of Control, Relations with Parents, Self-Esteem, Self Reliance, Sensation Seeking, Sense of Inadequacy, Social Stress, School Maladjustment, and Somatization. The content scales include Anger Control, Ego Strength, Mania, and Test Anxiety. The 16 clinical scales are then

combined to obtain composite scores. The Inattention/Hyperactivity composite score is comprised of the Attention Problems and Hyperactivity clinical scales. The Internalizing Problems composite score is comprised of the Atypicality, Locus of Control, Social Stress, Anxiety, Depression, Sense of Inadequacy and Somatization clinical scales. The Personal Adjustment composite score consists of the Relations with Parents, Interpersonal Relations, Self-Esteem, and Self Reliance clinical scales. The fourth composite score is the Emotional Symptoms Index. Alpha measures of internal consistency range from .71 to .96. Test-retest reliability measures were moderate to strong, with alphas ranging from .74 to .99 (Reynolds & Kamphaus, 2004). High convergent validity has been reported with the Personality Assessment Inventory (PAI) and the Adult Self-Report (ARS) with r values ranging from .51-.61 with the PAI and .59 with the ARS (Nowinski, Furlon, Rahban, & Smith, 2008).

Rejection Sensitivity Questionnaire *(RSQ*; Downey & Feldman, 1996). The RSQ is a 36-item self-report measure of anxious expectations of rejection in 18 separate social situations relevant to adult situations and interactions. Participants indicate their expected level of anxiety regarding each situation on a 6-point Likert scale (1 = very unconcerned, 6 = very concerned). Participants then indicate their expectancy that the other person (or persons) would not respond in a positive and accepting way in each situation on a 6-point Likert scale (1 = very unlikely, 6 = very likely). The rejection sensitivity (RS) score for each of the 18 situations is calculated by multiplying the expectancy of rejection (seven minus the expectancy of acceptance) by the associated degree of anxiety. The overall RS score is calculated by obtaining the mean of the 18 RS situation scores. Reported psychometric data indicates the RSQ has high reported internal consistency and 4-month test-retest reliability ($\alpha = .78$) (Downey & Feldman, 1996) (Appendix B).

The Multiple Affect Adjective Checklist *(MAACL;* Zuckerman & Lubin, 1985). The MAACL-R is a 132 item checklist consisting of different adjectives describing mood states. Participants are asked to circle adjectives only that describe how they are feeling at the moment. The scale is comprised of five subscales (Depression, Anxiety, Hostility, Sensation Seeking and Positive Affect) and two composite scales. The Dysphoria composite scale is the summation of the Depression, Anxiety and Hostility scores while the Positive Affect and Sensation Seeking composite scale is the summation of both respective scales. Psychometric data reported across multiple samples indicates coefficient alphas ranging from .49 to .81 ($M$ = .65) (Zuckerman & Lubin, 1985).

Estimating Physical Attractiveness Scale *(EPAS;* Viren, Furnham, Georgiades, & Pang, 2007). The EPAS is a scale that has participants rate 31 various physical areas ranging from overall physical attractiveness, to body weight and skin, for themselves, their mother, their father and their partner based on a normal bell curve ($M$ = 100, $SD$ = 15) with 100 corresponding with a rating of average. The scale can be easily modified, and for the purposes of this study was reduced to accommodate ratings for only the participants themselves and their partner in the experimental task (Appendix C).

Personal Rating Sheet *(PRS;* Hammen & Peters, 1978). The PRS is a 14 item scale derived from Hammen and Peters (1978) research on J.C. Coyne's (1976) interactional description of depression. Their 38 item questionnaire was pared down to just 14 items with 6 items addressing the quality of the interaction, 3 items assessing personal acceptance and rejection, and 5 items assessing perceived impairment of functioning. Each item is rated on a 5-point Likert scale. This questionnaire was given to both the participant and the RA in order to

assess both individuals' interpersonal reactions to the experimental Heterosocial Initiation Task procedure (Appendix D).

## Procedure

Survey Study. Following approval by UNCW's Institutional Review Board, participants were allowed to sign-up online for a survey-style study where they were given informed consent forms to read over and sign followed by verbal debriefing of the informed consent form to ensure understanding. Participants then completed the ADHDRS, which was then scored by the experimenter and a research assistant to screen participants for the follow-up study such that a total symptom count was obtained for each of the Inattention and Hyperactivity/Impulsivity subscales reported in the last six months. Any participant with a total of two or fewer symptoms for both subscales was invited to participate as a control subject, and any participant with a total of five or more symptoms for either subscale was invited to participate as an ADHD participant making this an analogue sample (i.e., it is not known whether the participant actually has the disorder). Participants invited back for the follow-up study were then given the demographic form, the BASC-2, and the RSQ to complete. All other participants were given credit for filling out the ADHDRS and were allowed to leave.

Heterosocial Initiation Task. The follow-up study consisted of the HIT, as well as completing the MAACL, the EPAS, and the PRS. Research participants returned for the follow-up study one at a time in a small laboratory office located on-campus similar to the task protocols as described by Canu and Carlson (2003). Male and female research assistants (RAs) were used. When a participant arrived, an RA of the opposite sex posing as the participant and the participant completed the informed consent procedure in the hallway. The participant was told that some parts of the experiment may be filmed, but the video camera was not directly

mentioned. The experimenter then took the participant and the RA into the lab room, briefly explaining that this is the room for the experiment, and then the experimenter asked the RA and the participant to take a seat in one of four chairs around a small table. Next, the experimenter introduced the participant and the RA by first name then explained that the experimenter needed to get forms from their office for the participant so they would need to leave for a few minutes and then left the room. The RA was instructed to sit in a specific chair before the participant was seated so that the chair position taken by each participant could be coded for proximity to the RA in a standardized manner.

This entire setup was filmed using a video-camera in plain but not obvious sight. No mention of the video camera was made, although the consent form stated that some tasks would be videotaped. This seemingly spontaneous interaction of the opposite sex RA and the participant was taped for five minutes. After the five minutes elapsed, the experimenter returned and said that the measures were ready for both "participants" (i.e., the opposite sex RA and the participant). The opposite sex RA was told (in front of the participant) that they were going to be led to another lab room to complete their questionnaires (to make it seem fair and "real"). Both the experimenter and RA then left in order for the RA to complete the PRS. Then the experimenter returned and gave the participant the MAACL, the EPAS, and the PRS. In addition to completing the PRS, RAs also recorded an attractiveness rating of the participant on a 10-point Likert scale (with 1 corresponding to extremely unattractive and 10 extremely attractive). Participants were debriefed upon completion of the questionnaires as to the true nature of the task and were then re-consented to use the videotaped material, as they did not explicitly know that the concealed interaction was the "task" mentioned in the original consent. After this re-

consent procedure, the experimenter answered any questions the participant had. No participants refused the use of their videotaped interaction.

Immediately after the interaction, the opposite sex RA completed the PRS. At a later date, other opposite sex research assistants who were blind to the ADHD status of the participants in question rated the participants (via watching the video) on Appropriateness, Assertiveness, Comfort, and Interest in Partner, and coded what position around the table the participant took (a chair beside confederate or across the table), total number of conversation initiations, face contact (total number of times a participant initiates steady, direct visual contact in the direction of the face of the RA for three seconds or longer), duration of face contact, as well as verbosity (the total number of words spoken to confederate during the interaction).

Each conversation initiation was also coded for what type of verbal operant the statement functioned as based on B.F. Skinner's analysis of verbal behavior (1957). Skinner's verbal operants include mand, tact, intraverbal, echoic, textual, and transcription responses. A mand is a verbal statement that functions to gain an item or information while a tact is a verbal statement that functions to name something. Intraverbal operants include responses that function as conversational responses. Textual and transcription operants include responses that function to read or transcribe the verbal responses of a speaker, respectively. Video coders also completed Likert questions assessing their desire to continue the interaction, and their likelihood to want to be friends with as well as date the participant.

Inter-rater Reliability. Inter-rater reliability (IRR) was calculated for the HIT variables for 24 videos (26.37%) by having research assistants who did not participate in the HIT videos and were blind to the participants' group status watch and then code the videos. Participants were trained first by being given reading material compiled by the experimenter regarding the

verbal operants. Coders then watched and coded pilot videos after having read and reviewed with the experimenter coding guidelines from the HIT coding form (See Appendix E for coding forms). The codes from pilot videos were then reviewed by the experimenter and any questions answered or discrepancies resolved by the experimenter and the coder. Videos coders then coded a master video which had been previously coded by the experimenter. Reliability was determined when the coders reached at least 80% agreement with the experimenter's video codes for the master video (actual reliability was calculated at 100% for all variables).

Reliability was calculated by obtaining a zero-order correlation for continuous variables and was found to be .80 for face contact, .94 for duration of face contact, .91 for conversation initiations, .99 for verbosity, .98 for mands, .80 for tacts, .86 for intraverbals, and .81 for textuals. Reliability was calculated using Cohen's kappa for noncontinuous variables and was found to be 1.0 for chair position, .91 for appropriateness, 1.0 for assertiveness, .92 for comfort, 1.0 for interest, .92 for desire to continue the interaction, .80 for likelihood to consider for friendship and .80 for likelihood to consider for dating.

## RESULTS

### Demographic Variables

To test differences in the categorical variables of the first hypothesis, a series of chi square analyses were run on academic and social outcome variables to determine if differences exist between the ADHD and non-ADHD groups. The two groups significantly differed with respect to class standing, $\chi^2(3, N = 91) = 8.50$, $p = .037$, such that the ADHD group was more likely to be of freshman class standing. The ADHD group was also found to be more likely to have been asked to sell or give away their medication, $\chi^2(1, N = 91) = 3.95$, $p < .05$. However, none of the other non-parametric variables tested for the first and second hypotheses were found

to be significantly different by ADHD group including relationship status ($\chi^2(4, N = 91) = 4.01$, $p = .40$), past academic warning ($\chi^2(1, N = 87) = .50$, $p = .48$), current academic warning ($\chi^2(1, N = 91) = 1.64$, $p = .20$), past arrest ($\chi^2(1, N = 89) = .49$, $p = .49$), accusation of a substance related offense ($\chi^2(1, N = 85) = .28$, $p = .60$), referral to Dean for violation of Code of Student Life ($\chi^2(1, N = 85) = .01$, $p = .92$), or receiving university discipline in the form of a peer conduct review board or a judicial committee ($\chi^2(2, N = 87) = 3.32$, $p = .19$). In fact, very few students endorsed having been arrested (ADHD $n = 1$, non-ADHD $n = 1$), being on current or past academic warning (ADHD $n = 2$, non-ADHD $n = 3$), or receiving university discipline in any form (ADHD $n = 2$, non-ADHD $n = 6$).

Academic Outcome Variables

A series of one-way ANOVAs were also conducted to determine if mean differences existed between the ADHD and non-ADHD groups regarding academic achievement. None of the variables tested differed significantly including number of semesters in college, $F(1, 89) = .001$, $p = .98$), number of semester hours completed, $F(1, 81) = 1.60$, $p = .21$, high school GPA, $F(1, 85) = .83$, $p = .37$, college GPA, $F(1, 81) = 2.48$, $p = .12$, overall SAT score, $F(1, 62) = .40$, $p = .53$, ACT score, $F(1, 17) = .95$, $p = .34$, SAT math score, $F(1, 31) = 1.36$, $p = .25$, SAT verbal score, $F(1, 30) = .48$, $p = .49$, and SAT writing scores, $F(1, 27) = .55$, $p = .46$. A one-way ANOVA test of the ratio of semesters in college to hours completed proved to be non-significant as well, $F(1, 80) = .11$, $p = .74$. Thus, none of the academic outcome variables differed by ADHD status. See Table 1 for means and standard deviations.

Table 1. Means and standard deviations of academic outcome variables.

| | ADHD | | Non-ADHD | |
|---|---|---|---|---|
| Academic Outcome Variable | Mean | SD | Mean | SD |
| Semesters in College | 4.52 | 3.63 | 4.48 | 7.43 |
| Number of Hours Completed | 47.73 | 44.43 | 37.18 | 28.67 |

Table 1 cont.

| | | | | |
|---|---|---|---|---|
| College GPA | 3.01 | .73 | 3.22 | .43 |
| High School GPA | 3.69 | .44 | 3.61 | .29 |
| Overall SAT | 1578.82 | 327.51 | 1630.00 | 268.21 |
| SAT Verbal | 623.00 | 90.56 | 592.27 | 125.81 |
| SAT Math | 560.00 | 46.43 | 607.39 | 123.92 |
| SAT Writing | 573.25 | 260.58 | 501.71 | 220.76 |
| ACT | 26.12 | 4.73 | 24.27 | 3.58 |
| Ratio of Semesters to Hours | .15 | .22 | .41 | 2.41 |

RSQ Analyses

In order to examine RSQ score differences between groups in accordance with hypothesis two a one-way ANOVA was conducted. The ADHD group did score higher ($M$ = 10.47, $SD$ = 4.98) than the non-ADHD group ($M$ = 8.71, $SD$ = 3.51) on the RSQ, indicating higher levels of rejection sensitivity, but this trend did not reach significance, $F(1, 89) = 3.58$, $p = .06$. Also noteworthy is that both groups' scores were within the normal range and not clinically meaningful. Thus, rejection sensitivity did not differ by ADHD status.

BASC-2 Analyses

To test the second hypothesis a MANOVA was run on the four BASC-2 composite scores by ADHD status, and the Wilks' Lambda test was found to be significant, $F(1, 89) = 11.51$, $p < .001$, $\eta^2 = .35$. Follow-up between-groups comparisons indicated that the ADHD group specifically scored higher on the Inattentive/Hyperactivity composite as well as the Internalizing Problems and the Emotional Symptoms composite scores. Only for the Inattentive/Hyperactivity composite was the ADHD group's mean clinically meaningful (i.e., there was a difference of at least 1 standard deviation between the ADHD and non-ADHD groups' mean t-scores, and the ADHD group's average approached 60 which indicates the presence of some impairment). The effect size was large for the omnibus test, meaning ADHD status demonstrated a large effect across the BASC-2 composite scores. A large effect size was

found for the Inattention/Hyperactivity composite score. The effect size was moderate for the Internalizing Problems and the Emotional Symptoms composite scores, and the effect size was small for the Personal Adjustment composite scores. The groups did not significantly differ on the Personal Adjustment composite score. See Table 2 for means, standard deviations, F-ratios, and measures of effect size.

Table 2. Means, standard deviations, F-ratios, and eta squared values for BASC-2 composite scales.

| | ADHD | | Non-ADHD | | | |
|---|---|---|---|---|---|---|
| Composite Score | Mean | SD | Mean | SD | F | $\eta^2$ |
| Internalizing Problems | 54.36 | 8.84 | 47.73 | 8.26 | 11.26*** | .11 |
| Emotional Symptoms | 53.72 | 9.11 | 48.68 | 8.84 | 5.80* | .06 |
| Inattention/Hyperactivity | 59.96 | 10.56 | 43.82 | 9.83 | 46.96*** | .35 |
| Personal Adjustment | 48.96 | 9.25 | 51.00 | 9.15 | .90 | .01 |

* $p < .05$. *** $p < .001$.

A second MANOVA was run on the individual clinical scales of the BASC-2 by ADHD group and was found to be significant with a large effect size, meaning the multivariate analysis accounted for a large amount of the variance between groups, Wilks' Lambda $F(1, 89) = 2.77$, $p = .001$, $\eta^2 = .44$. The ADHD group was found to score higher on the Atypicality, Locus of Control, Anxiety, Depression, Sense of Inadequacy, Somatization, Attention Problems, Hyperactivity, School Maladjustment, Test Anxiety, Anger Control and Mania scales of the BASC-2. The ADHD group was found to score significantly lower than the non-ADHD group on Self Reliance. Sensation Seeking was found to be higher in the ADHD group, but the trend did not reach significance ($p = .053$). The differences between the ADHD groups on the Social Stress ($p = .25$), Alcohol Abuse ($p = .36$), Relations with Parents ($p = .32$), Interpersonal Relations ($p = .85$), Self Esteem ($p = .92$), and Ego Strength ($p = .13$) clinical scales did not reach statistical significance. Only for the Attention Problems and Hyperactivity clinical scales were the differences clinically meaningful. The effect size was large for the Attention Problems,

Hyperactivity, and Mania clinical scales meaning the ADHD status of individuals produced a powerful effect on variance differences. Moderate effect sizes were encountered for the Atypicality, Locus of Control, Sense of Inadequacy, Somatization, Test Anxiety and Anger Control clinical scales. Small effect sizes were found for the Anxiety, Depression, Self Reliance, Social Stress, Alcohol Abuse, Relations with Parents, Interpersonal Relations, Self Esteem and Ego Strength clinical scales. See Table 3 for means, standard deviations, F-ratios, and measures of effect size.

Table 3. Means, standard deviations, F-ratios, and eta squared values for BASC-2 clinical scales.

| | ADHD | | Non-ADHD | | | |
|---|---|---|---|---|---|---|
| Clinical Scale | Mean | SD | Mean | SD | F | $\eta^2$ |
| Atypicality | 52.56 | 9.76 | 47.50 | 6.62 | 8.04* | .08 |
| Locus of Control | 51.44 | 10.90 | 46.80 | 8.11 | 4.87* | .08 |
| Social Stress | 52.84 | 9.42 | 49.92 | 11.30 | 1.32 | .02 |
| Anxiety | 57.88 | 12.27 | 50.94 | 10.88 | 6.88** | .05 |
| Depression | 51.04 | 9.44 | 7.42 | 6.77 | 4.12* | .05 |
| Sense of Inadequacy | 52.08 | 8.19 | 46.15 | 7.83 | 10.14** | .10 |
| Somatization | 55.92 | 10.67 | 49.03 | 9.29 | 9.19** | .09 |
| Attention Problems | 58.84 | 10.50 | 45.21 | 9.01 | 37.84*** | .30 |
| Hyperactivity | 58.56 | 11.16 | 43.89 | 10.07 | 36.23*** | .30 |
| Sensation Seeking | 51.96 | 12.23 | 47.14 | 9.74 | 3.85 | .04 |
| Alcohol Abuse | 52.72 | 9.42 | 50.79 | 8.76 | .85 | .01 |
| School Maladjustment | 51.72 | 10.16 | 47.56 | 8.78 | 3.73* | .35 |
| Relations with Parents | 49.16 | 10.40 | 51.52 | 9.81 | 1.01 | .01 |
| Interpersonal Relations | 50.96 | 7.95 | 51.39 | 9.96 | .04 | .00 |
| Self Esteem | 50.08 | 9.94 | 49.85 | 10.31 | .01 | .00 |
| Self Reliance | 44.20 | 12.49 | 49.82 | 9.90 | 5.03* | .05 |
| Test Anxiety | 56.16 | 9.54 | 50.26 | 10.89 | 5.68* | .06 |
| Anger Control | 52.84 | 9.66 | 47.02 | 7.41 | 9.42** | .10 |
| Mania | 60.56 | 13.09 | 46.64 | 11.65 | 24.20*** | .21 |
| Ego Strength | 48.24 | 10.86 | 51.44 | 8.01 | 2.36 | .03 |

*$p < .05$. ** $p < .01$. *** $p < .001$.

HIT Analyses

To test the third hypothesis, a MANOVA was conducted on the HIT variables by ADHD group; however, the Wilks' Lambda test was nonsignificant, $F(1, 89) = .79$, $p = .69$, $\eta^2 =$

.14. Several between groups trends approached significance including duration of face contact ($p$ = .13), number of conversation initiations ($p$ = .08), desire to continue the interaction ($p$ = .07), as well as the likelihood of considering participant for friendship ($p$ = .08). These trends were in the direction of the participants in the ADHD group having maintained longer durations, made more conversation initiations, and being rated as more desirable to continue the interaction with and more likely to be considered for friendship by the video coders. For the desire to continue the interaction and likelihood of considering for friendship variables video coder ratings were such that a rating of 1 corresponded with very much/very likely and 5 corresponded with not at all. See Table 4 for means, standard deviations, F-ratios, and estimates of effect size.

Table 4. Means, standard deviations, F-ratios, and eta squared values for the HIT variables.

| | ADHD | | Non-ADHD | | | |
|---|---|---|---|---|---|---|
| HIT Variable | Mean | SD | Mean | SD | F | $\eta^2$ |
| Face Contact | 8.96 | 6.19 | 7.60 | 7.87 | .60 | .01 |
| Duration of Contact | 47.00 | 49.16 | 32.11 | 37.89 | 2.35 | .03 |
| Conversation Initiation | 11.40 | 10.69 | 7.58 | 8.34 | 3.21 | .04 |
| Verbosity | 133.92 | 151.81 | 100.38 | 151.66 | .89 | .01 |
| Mands | 5.36 | 4.97 | 4.20 | 5.81 | .78 | .01 |
| Tacts | 3.88 | 3.79 | 3.02 | 4.07 | .85 | .01 |
| Intraverbals | 2.76 | 3.66 | 2.60 | 3.89 | .03 | .00 |
| Textuals | .80 | 1.23 | .88 | 1.02 | .09 | .001 |
| Appropriateness | 3.76 | .78 | 3.49 | .79 | 2.08 | .02 |
| Assertiveness | 2.40 | .82 | 2.26 | .92 | .43 | .01 |
| Comfort with Partner | 3.36 | .76 | 3.38 | .65 | .02 | .00 |
| Interest in Partner | 3.44 | 1.56 | 3.12 | 1.56 | .75 | .01 |
| Desire to Continue | 3.32 | .90 | 3.75 | 1.02 | 3.50 | .04 |
| Consider Friendship | 2.76 | .83 | 3.12 | .88 | 3.20 | .04 |
| Consider Dating | 3.48 | .59 | 3.68 | .75 | 1.39 | .02 |

Halo Effect Analyses

In order to rule-out group differences on the HIT due to halo effects the participants' EPAS self-ratings and HIT partner ratings, as well as the research assistants' Likert ratings of attractiveness were examined for group differences by ADHD status. The EPAS was scored to

obtain participant self-rated attractiveness by summing the first two items in the "You" column, overall physical and facial attractiveness, and obtaining the average. The participant self-ratings of attractiveness were then compared by ADHD status via a one-way ANOVA. No group differences were found for self-rated attractiveness, $F(1, 89) = 2.48$, $p = .12$. The EPAS was also scored to obtain a participant attractiveness rating of their HIT partner by summing the first two items in the "Your Partner" column, overall physical and facial attractiveness, and obtaining the average. The participant attractiveness ratings of the HIT partners were then compared by ADHD status via one-way ANOVA. The participant ratings of their HIT partners did not significantly differ by ADHD status, $F(1, 89) = .02$, $p = .89$. Research assistant 10-point Likert ratings of HIT participants' attractiveness were not collected for the first 9 participants as it had not been decided upon. However, an analysis of the mean rating of the remaining 82 participants in the ADHD ($n = 22$) and non-ADHD ($n = 60$) groups by the participating research assistant revealed no significant difference by ADHD status, $F(1, 80) = .72$, $p = .40$. Thus, ADHD group differences on the HIT do not appear to be due to halo effects. See Table 5 for means and standard deviations.

Table 5. Means and standard deviations of the participant EPAS and research assistant PRS attractiveness ratings.

| | ADHD | | Non-ADHD | |
|---|---|---|---|---|
| Attractiveness Rating | Mean | SD | Mean | SD |
| EPAS Self-rating | 115.00 | 16.07 | 109.11 | 15.88 |
| EPAS HIT partner rating | 104.40 | 17.76 | 103.85 | 16.03 |
| PRS research assistant rating | 5.55 | 1.54 | 5.18 | 1.77 |

PRS Analyses

To further investigate the third hypothesis the PRS was examined for differences by ADHD group. A total score for the PRS completed by the participant was calculated first by

summing the 14 items and obtaining the average. Participant ratings were then compared by ADHD status via a one-way ANOVA and were found to be non-significant, $F(1, 89) = .16$, $p = .70$. A total score was then calculated for the PRS completed by the opposite sex research assistant by summing the 14 items and obtaining the average. The research assistant ratings were than compared by ADHD status via a one-way ANOVA and were found to be non-significant, $F(1, 85) = .80$, $p = .37$.

MAACL Analyses

The MAACL was examined as an analysis secondary to the third hypothesis to determine if the ADHD groups differed regarding self-reported mood states following the HIT. For the purposes of this study only the Positive Affect scale, Sensation Seeking scale, and the Positive Affect Sensation Seeking (PASS) composite scale were calculated. The groups were not found to significantly differ on the Positive Affect scale, $F(1, 89) = .87$, $p = .35$, Sensation Seeking scale, $F(1, 89) = 1.52$, $p = .22$, or the PASS composite scale, $F(1, 89) = .45$, $p = .51$. See Table 6 for means and standard deviations.

Table 6. Means and standard deviations of the MAACL scales.

| | ADHD | | Non-ADHD | |
|---|---|---|---|---|
| MAACL Scale | Mean | SD | Mean | SD |
| Positive Affect | 56.52 | 10.40 | 59.80 | 11.65 |
| Sensation Seeking | 50.96 | 10.23 | 48.89 | 9.12 |
| Positive Affect + Sensation Seeking | 55.40 | 10.97 | 57.06 | 10.44 |

## DISCUSSION

Hypothesis 1

The first hypothesis predicted the ADHD group would self-report lower academic achievement than the non-ADHD group as measured by several questions on the demographic form. Specifically, the ADHD group was predicted to report lower mean GPAs, a higher ratio of

semesters in college to class standing, and to be more likely to be on current academic warning. Support was not found for this hypothesis despite several other studies reporting a negative correlation between self-report of attention problems and lower college GPAs (Advokat et al., 2008; DuPaul et al., 2001; Fraizer et al., 2007; Grenwald-Mayes, 2001; Heiligenstein et al., 1999; Rabiner et al., 2008; Reaser et al., 2007; Spinella & Miley, 2003). There are several factors that may contribute to the lack of findings for differences in the academic achievement of college students with and without attention problems in this sample including class standing, participant reactivity, and the nature of the sample.

First, it was noted that the response rate was somewhat low for self-reporting GPA for college (91.2%), as well as the overall SAT (70.30%), SAT Math (36.26%), SAT Verbal (35.16%), and SAT writing (31.87%) scores. When prompted by the experimenter or RA to give a best approximation, several participants said that they were truly unaware or could not remember. However, based on the finding that the majority of participants were of freshmen class standing it is possible no college GPA had been established for the participants who did not report GPA. It is also possible the nature of the questions led to participant reactivity and possibly the somewhat low response rate. The potential for participant reactivity also brings into question the validity of the scores reported as it increases the likelihood of false estimates being reported.

A third possibility is the nature of the sample. The sample used in this study was limited in size ($N$ = 91) which limits the statistical power to detect an effect. More importantly, the ADHD and non-ADHD groups were analogue groups based on the self-report of attention problems in the last 6 months. Because the ADHD group is an analogue group, it is possible they are less impaired than a real clinical sample (i.e., a sample where the clinical diagnosis and

subsequent impairment is known). Thus, the possible lack of true clinical impairment in the ADHD group may have contributed to the lack of significant findings regarding differences in academic achievement.

Interestingly, the BASC-2 School Maladjustment scale and the Test Anxiety scale were higher for the ADHD group which indicates higher levels of distress associated with adjusting to school demands and more anxiety regarding test taking, a particular demand of college, lending some support for self-reported academic problems among college students with self-reported attention problems. This is consistent with the report by Lewandowski et al., (2008) that even when succeeding academically, college students with attention problems report more distress. However, it is important to note that the differences between the ADHD and non-ADHD groups' mean t-scores was less than 1 standard deviation, indicating the difference may not be clinically meaningful.

Hypothesis 2

The results for the second hypothesis were somewhat mixed. It was predicted that social outcome differences would exist between the ADHD and the non-ADHD group such that the ADHD group would report higher rates of rejection sensitivity and lower rates of interpersonal and relationship success as measured by the demographic questionnaire, the BASC-2, and the RSQ. Examination of the demographic form revealed no group differences regarding relationship status. In fact, the majority of the participants in both groups reported their status as either single ($n$ = 47, 51.6%) or in a relationship with a steady boyfriend/girlfriend ($n$ = 37, 40.7%) with very few participants ($n$ = 7, 7.7%) in either group endorsing any of the other alternatives.

It had been reported previously that college students with ADHD endorsed a lower quality of life, poorer relations with their parents, and high rejection sensitivity being related to negative self-reported social outcomes in some college students with ADHD (Canu & Carlson, 2007; Grenwald-Mayes, 2001). The samples used in this study did not differ in regards to either the Parental Relations scale or the Interpersonal Relationship scale from the BASC-2 as an indicator of interpersonal and relationship success. However, a significant trend did emerge among the RSQ scores indicating higher rates of rejection sensitivity among the ADHD group, but was not clinically meaningful.

Rejection sensitivity has been examined in the context of ADHD once previously (Canu & Carlson, 2007). In the previous study, an ANOVA revealed no differences between RSQ score and self-reported attention problems, but a multiple regression analysis revealed that low RS among control and ADHD-Inattentive participants predicted positive social outcomes, and high RS negative outcomes. It was also found that high RS predicted positive social outcomes for the ADHD-Combined group only. Based on the small sample sizes in Canu & Carlson's (2007) study where the control ($n$ = 25), ADHD-Combined ($n$ = 31), and ADHD-Inattentive ($n$ = 22) groups were all relatively small, it was hypothesized that differences would emerge between the ADHD and non-ADHD groups on RSQ score in this study by creating only one ADHD group that included all subtypes. It was assumed that by creating only one ADHD group the sample size would be much larger than those in Canu & Carlson's (2007) study, thus the power to detect an effect would be larger. However, the current study was limited in sample size as well, particularly the ADHD group ($n$ = 25). Due to the fact the trend in this study is very close to statistical significance ($p$ = .053) and the fact the current study was limited in sample size as

well, this trend toward higher rejection sensitivity among college students reporting attention problems merits further investigation.

Hypothesis 3

Examination of the HIT variables revealed several interesting trends. No support was found for the third hypothesis which specifically predicted the ADHD group would be rated more poorly by the video coders on the desire to continue the interaction, interaction attractiveness, comfort with partner, assertiveness in interaction, interest in partner, likelihood to consider for friendship and likelihood to consider for dating. Trends did emerge for the duration of face contact, conversation initiations, desire to continue the interaction, and likelihood to consider for friendship such that the ADHD group maintained longer durations of face contact, made more conversation initiations, were rated as more desirable to continue the interaction with, and more likely to be considered for friendship than the non-ADHD group.

The first two trends are consistent with Barkley's (2006) characterization of ADHD as primarily deficits in behavioral inhibition. Because the deficits experienced by the group with attention problems can theoretically be attributed to deficiencies in behavioral inhibition, it would be predicted that the ADHD group participants would have greater difficulty regulating their behavioral and verbal fluencies in the form of conversation initiations/responses and eye/face contact during a waiting room situation such as the HIT. The HIT is unique in that the research assistant is specifically instructed not to make any conversation initiations so that the 5-minute period would not be stimulating without the participant making a response (it is important to note that every attempt was made to keep the room bare, with no posters or decorations). Thus, the interaction was designed to allow for an ample amount of time for the participant to

exhibit disinhibited behavior such as longer durations of face contact and frequent conversation initiations.

The latter two trends, desire to continue the interaction with and likelihood to consider for friendship were in the opposite direction as predicted, indicating the ADHD group's HIT interactions were more socially adept. This could be due to the creation of only one ADHD group. In Canu & Carlson's (2003) study utilizing the HIT it was found that the ADHD-Combined and control groups were rated as more likely to be considered as potential dating partners and were rated as more desirable to continue the HIT with than the ADHD-Inattentive group, a finding in line with the trends found in this experiment.

It is possible that a short, somewhat socially awkward interaction like the 5-minute long HIT provides the right amount of exposure to an individual with ADHD such that their uninhibited behavior is interpreted positively. It has previously been reported, often anecdotally, that the behavior of children, and even adults, with ADHD is interpreted as annoying by a non-ADHD individual (Young & Gudjonsson, 2008). An interactional approach to disorders, such as Coyne's (1976) interactional approach described previously, would predict individuals with ADHD to be more likely to elicit negative feedback from the external environment. Thus the ADHD group would be predicted to be rated as less desirable to continue the conversation with or consider for friendship, but this was not the case. With longer exposure or in a different social situation such uninhibited behavior could possibly be interpreted as an interactional approach would predict, negatively.

It is also possible that by lengthening the task from 1 to 5 minutes the original interaction was altered allowing for an optimum length of exposure to allow the uninhibited behavior of both individuals reporting more attention and hyperactivity problems more positively. Because

the HIT was reported by both participants and research assistants to be long, mostly silent and, to some degree "boring," one can hypothesize the task was more captivating when partnered with someone who made many conversation initiations. A third possibility is that college students with ADHD, particularly those reporting more hyperactivity problems such as the ADHD-Combined type in Canu & Carlson's (2003) study, have developed social coping skills that allow them to utilize their disinhibition in such social situations to their advantage. Anecdotally, the research assistants and video coders reported that many participants appeared bored after the first minute or two and stopped initiating conversation quickly. Perhaps by simply initiating conversation and maintaining face contact longer due to the aforementioned deficits in behavioral inhibition (regardless of the length of the task) the research assistants and video coders interpreted the behavior as more friendly and welcome versus a mostly silent interaction with a participant not reporting attention or hyperactivity problems.

Based on the similarity of Canu & Carlson's (2003) findings regarding the ADHD-Combined group and the positive social trends found in this experiment among the analogue ADHD group, more research is warranted to identify which college students with self-reported attention problems are succeeding socially and which are not. Specifically because an interaction was reported in their follow-up study (Canu & Carlson, 2007) such that ADHD-Combined participants reporting higher rejection sensitivity were not found to differ on social outcomes including frequency of contact with friends, and the current study found a very similar trend regarding the RSQ scores and positive social outcomes on the HIT of an analogue ADHD group containing both subtypes. It is possible that by not differentiating this sample by ADHD subtype the results are impacted. Thus, future investigations should investigate this relationship further.

BASC-2 Composite and Scale Scores

Of particular interest are the significant findings from MANOVA analysis of the BASC-2 composite and scale scores. There are several findings that were not directly predicted but would theoretically be predicted including higher scores on the Inattention/Hyperactivity, and Emotional Symptoms composite scores, as well as the Locus of Control, Attention Problems, Hyperactivity, and Anger Control scale scores. Individuals with ADHD did have higher scores on the Hyperactivity and Attention Problems scales which comprise the Inattention/Hyperactivity composite score indicating the analogue ADHD group did differ with regards to the amount of self-reported difficulties with inattention and hyperactivity symptoms. Higher scores on the Locus of Control scale indicate an external locus of control for the ADHD group, meaning the ADHD group is more likely to perceive external variables acting on them rather than their own behavior being effective which is consistent with Barkley's theory of ADHD (2006). This theory not only postulates deficits in behavioral inhibition but also executive functioning as causing ADHD which includes the ability to integrate ideas as well as plan ahead. It is important to note however, the locus of control score for the ADHD group is still within normal limits and within 1 standard deviation of the non-ADHD group.

It was also predicted by Barkley's theory (2006) that individuals with ADHD should have greater difficulty regulating their behavior including emotions; therefore, higher scores on the Emotional Symptoms and the Anger Control (indicating greater display of emotions and less control of their anger in response to adversity, respectively) are consistent with this characterization of ADHD. However, the ADHD group's scores on those scales were still within the average range but about ½ standard deviation above the non-ADHD group's scores. The difference between the groups on the Mania scale was found to be statistically and clinically

significant with the ADHD group reporting more manic behavior. The Mania scale, however, is also indicative of those with attention and hyperactivity problems such as ADHD as it is comprised of questions addressing feelings of heightened arousal and difficulty relaxing.

The ADHD group was also found to score significantly higher statistically, but not clinically, on the Atypicality, Anxiety, Depression and Sense of Inadequacy scales, all of which load onto the Internalizing Problems composite score, indicating they self-reported more unusual thoughts and perceptions, more anxiety, more depression, and a greater sense of inadequacy than the non-ADHD group. This is consistent with the study by Rabiner et al. (2008) that ADHD college students were more likely to report internalizing problems such as anxiety and depression, and the larger finding that adults and children with ADHD experience more internalizing problems such as depression and anxiety (Gaub & Carlson, 1997, Grenwald-Mayes, 2001, Young & Gudjonsson, 2006). Interestingly, the groups did not differ with regards to the Self Esteem clinical scale. It had been reported previously that college students with ADHD endorsed lower self-esteem on average than students without attention problems (Dooling-Litfin and Rosen, 1997; Shaw-Zirt et al., 2005).

It was also found that the ADHD group scored significantly lower statistically, but again not clinically, on the Self Reliance scale indicating they reported themselves as less confident in their ability to make decisions, solve problems and be dependable. Theoretically, this makes sense based on the characterization of ADHD as involving deficits in behavioral inhibition that result in poor executive functioning including planning and reintegration which would manifest itself as poor decision making and planning for upcoming tasks and responsibilities. Higher Sensation Seeking scores emerged as a trend for the ADHD group as well. This is also theoretically consistent with Barkley's theory of ADHD (2006) as primarily deficits in

behavioral inhibition as Sensation Seeking is regarded broadly as a personality trait characterized by risk taking behavior and disinhibition (Zuckerman, 2008). Specifically the BASC-2 Sensation Seeking scale is measured by the self-report of engaging in risky behaviors. Because a large component of Sensation Seeking involves disinhibited behavior, it is not surprising individuals with attention problems largely characterized by deficits in behavioral inhibition would score higher.

Limitations

A major limitation in this study was the relatively low number of participants ($N$ = 91), particularly the low number of ADHD participants ($n$ = 25). A greater number of subjects would have provided greater statistical power to detect differences and thus a higher likelihood of detecting an effect. The emergence of many near significance trends is somewhat illustrative of this problem. Another problem is the low response rate and self-report for academic variables such as GPA and SAT scores. By having participants rely solely on memory the accuracy of the results reported are unknown and thus the validity is questionable. This may have contributed to the low reporting of academic variables particularly as several participants indicated to the experimenter or the research assistant that they simply could not remember an item. The utilization of an online survey in future studies could allow access to a larger subject pool and could potentially reduce subject reactivity. Future investigations should explore this option.

Perhaps a better method could be designed to determine if academic differences really do exist between college students with and without self-reported attention and hyperactivity problems. Spinella and Miley (2003) utilized in-class exam grades to compare the academic achievement of college students with high and low self-reported impulsivity as measured by the Barratt Impulsiveness Scale (BIS-11). However this sample was limited to students within the

authors' classes. It could be possible to utilize a task that is similar to the HIT in that participants return one at a time to a lab room, but complete a short test of general knowledge involving mathematic and verbal components similar to an achievement test such as the Wechsler Individual Achievement Test (WIAT). Scores could then be compared to determine if academic achievement results differ between college students with and without self-reported attention and hyperactivity problems.

Another potential limitation is the lack of generalizability of the results. An analogue sample from a public university comprised entirely of students in psychology classes may not generalize beyond similar college populations. However several strengths exist. Because the HIT is an experimental task, it is easily replicable in other samples and has high internal validity. Also, by including both male and female college students, the results of this study can be generalized a bit further than those of other investigators including Canu & Carlson's HIT study (2003), the only other experimental study of college students with self-reported attention problems to date.

In conclusion, while little evidence was found for differences between the academic outcomes of college students with and without attention problems several areas emerged from the analysis of the RSQ and the BASC-2 in support of social outcome differences that call for further exploration. In particular, the experience of rejection sensitivity among college students with ADHD and the experience of internalizing problems such as depression and anxiety were notable differences. Based on the analysis of the HIT variables, specifically the desire to continue the interaction with and likelihood to consider for friendship variables, further investigation is warranted regarding the link between attention problems and social outcomes. The use of a survey and an experimental research paradigm yielded interesting results that would

not have been found without the use of both approaches. The HIT, with some further modification, looks to be a promising way to observe and measure the social behavior of not only individuals with ADHD, but other disorders such as depression and anxiety. Future research should focus on assessing the extent to which college students with ADHD experience internalizing problems, social success or failure, rejection sensitivity, as well as the potential link between rejection sensitivity and social outcome.

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APPENDIX

Appendix A. Demographic Questionnaire

Experiment ID Number:__ __ __ __ __ __ __ __

1. Age:_____
2. Sex:_____
3. What is your marital/romantic relationship status?
   ____Single ____Separated ____Dating multiple people
   ____Married ____Divorced ____Dating single person
   ____Widowed ____Engaged (boyfriend/girlfriend)
4. Ethnicity: (check only one)
   ____African American ____Caucasian/ European American
   ____Asian ____Native American
   ____Hispanic ____Multiracial
   ____Other
5. You self-identify as: (check only one)
   ____Heterosexual ____Bisexual ____Homosexual ____Transgendered
   ____Other ____Not Sure ____Confused ____Questioning
6. Residency Status:
   ____On Campus ____Off Campus
7. Class Status:
   ____Freshman _____Sophomore _____Junior ____Senior
8. Number of Semesters in College (count summer sessions I and II as separate semesters):_____
9. Number of hours completed (include hours completed during summer sessions):_____
10. College GPA (if established):_____
11. High School GPA [non-weighted (A=4.0)]:_____
12. Overall SAT score:____ **or** ACT score:_____
    SAT Verbal score:_____ SAT Quantitative score:_____ SAT Writing score:_____
13. Have you ever been diagnosed with a psychiatric disorder (such as Attention-Deficit/Hyperactivity Disorder or Depression)?
    ____Yes ____No
13. If you checked Yes to the question above, what was (were) your diagnosis (es)?

    _____
14. Have you ever taken medication for a psychiatric disorder (such as Zoloft)?
    ____Yes ____No
15. If you checked Yes to the question above, what medication(s) did you take?

    _____
16. Did you take any psychiatric medications today?
    ____Yes ____No
. 17. Have you ever been asked to sell or give away your medication?
    ____Yes ____No
18. Are you currently on academic warning?
    ____Yes ____No

19. Have you ever been on academic warning?
    ____Yes ____No
20. Are you currently on academic dismissal?
    ____Yes ____No
21. Have you ever been on academic dismissal?
    ____Yes ____No
22. Have you ever been arrested?
    ____Yes ____No
23. Have you ever been accused of a drug/alcohol related offense such as DWI/DUI, underage drinking, or possession of drugs/paraphernalia?
    ____Yes ____No
24. Have you ever received formal university disciplinary action from the Dean of Students?
    ____Yes ____No
25. Have you ever been referred to the Dean of Students for an Honor Code Violation?
    ____Yes ____No
26. Have you ever been referred to the Dean of Students for violation of the *Code of Student Life*?
    ____Yes ____No
27. Did you receive the disciplinary action in the form of an administrative hearing or an appearance before a peer conduct board?

    _____Administrative Hearing _____Peer Conduct Board (Campus Judicial Board)

Appendix B. Rejection Sensitivity Questionnaire

Each of the items below describes things college students sometimes ask of other people. Please imagine that you are in each situation. You will be asked to answer the following questions:

1) How concerned or anxious would you be about how the other person would respond?

2) How do you think the other person would be likely to respond?

1. You ask someone in class if you can borrow his/her notes.

How concerned or anxious would you be over whether or not the person would want to lend you his/her notes?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that the person would willingly give me his/her notes.

very unlikely very likely
1 2 3 4 5 6

2. You ask your boyfriend/girlfriend to move in with you.

How concerned or anxious would you be over whether or not he/she also would want to move in with you?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would want to move in with me.

very unlikely very likely
1 2 3 4 5 6

3. You ask your parents for help in deciding what programs to apply to.

How concerned or anxious would you be over whether or not your parents would want to help you?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that they would want to help me.

very unlikely very likely
1 2 3 4 5 6

4. You ask someone you don't know well out on a date.

How concerned or anxious would you be over whether or not the person would want to go out with you?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that the person would want to go out on a date with me.

very unlikely very likely
1 2 3 4 5 6

5. Your boyfriend/girlfriend has plans to go out with friends tonight, but you really want to spend the evening with him/her, and you tell him/her so.

How concerned or anxious would you be over whether

or not your boyfriend/girlfriend would decide to stay in?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would willingly choose to stay in with me.

very unlikely very likely
1 2 3 4 5 6

6. You ask your parents for extra money to cover living expenses.

How concerned or anxious would you be over whether or not your parents would help you out?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that my parents would not mind helping me out.

very unlikely very likely
1 2 3 4 5 6

7. After class, you tell your professor that you have been having some trouble with a section of the course and ask if he/she can give you some extra help.

How concerned or anxious would you be over whether or not your professor would want to help you out?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that the professor would want to help me.

very unlikely very likely
1 2 3 4 5 6

8. You approach a close friend to talk after doing or saying something that seriously upset him/her.

How concerned or anxious would you be over whether or not your friend would want to talk with you?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would want to talk with me to try to work things out.

very unlikely very likely
1 2 3 4 5 6

9. You ask someone in one of your classes to coffee.

How concerned or anxious would you be over whether or not the person would want to go?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would want to go with me.

very unlikely very likely
1 2 3 4 5 6

10. After graduation you can't find a job and you ask your parents if you can live at home for a while.

How concerned or anxious would you be over whether or not your parents would want you to come home?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that I would be welcome at home

very unlikely very likely
1 2 3 4 5 6

11. You ask your friend to go on vacation with you over Spring Break.

How concerned or anxious would you be over whether or not your friend would want to go with you?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would want to go with me.

very unlikely very likely
1 2 3 4 5 6

12. You call your boyfriend/girlfriend after a bitter argument and tell him/her you want to see him/her.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would want to see you?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would want to see me.

very unlikely very likely
1 2 3 4 5 6

13. You ask a friend if you can borrow something of his/hers.

How concerned or anxious would you be over whether or not your friend would want to loan it to you?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would willingly loan me it.

very unlikely very likely

14. You ask your parents to come to an occasion important to you.

How concerned or anxious would you be over whether or not your parents would want to come?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that they would want to come.

very unlikely very likely
1 2 3 4 5 6

15. You ask a friend to do you a big favor.

How concerned or anxious would you be over whether or not your friend would want to help you out?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would willingly agree to to help me out.

very unlikely very likely
1 2 3 4 5 6

16. You ask your boyfriend/girlfriend if he/she really loves you.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would say yes?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would answer yes sincerely.

very unlikely very likely

17. You go to a party and notice someone on the other side of the room, and then you ask them to dance.

How concerned would you be over whether or not the person would want to dance with you?

very unconcerned very concerned
1 2 3 4 5 6

I would expect that he/she would want to dance with me.

very unlikely very likely
1 2 3 4 5 6

18. You ask your boyfriend/girlfriend to come home to meet your parents.

How concerned would you be about whether or not your boyfriend/girlfriend would want to meet your parents?

very unconcerned very concerned
1 2 3 4 5 6

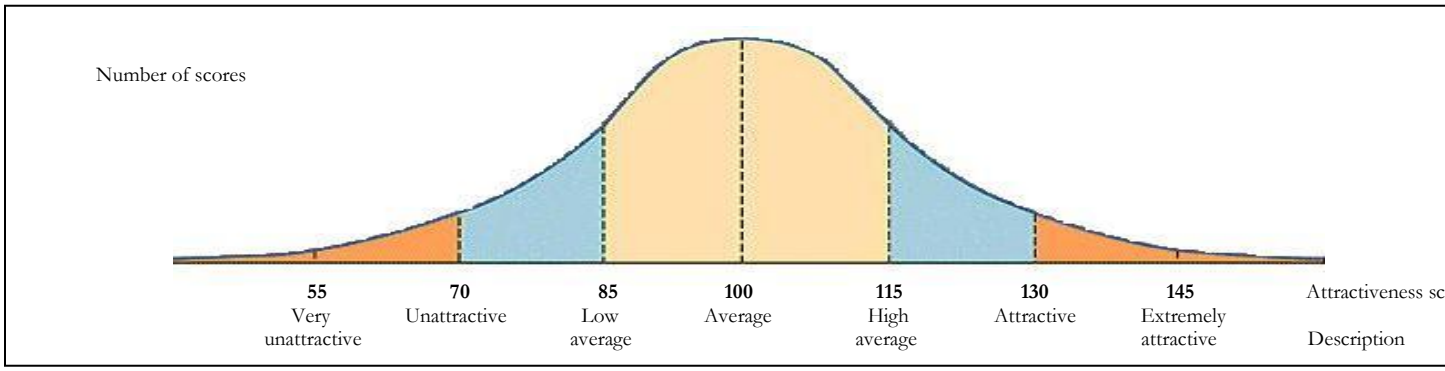
I would expect that he/she would want to meet my parents.

very unlikely very likely
1 2 3 4 5 6

Appendix C. Estimating Physical Attractiveness Scale

# How physically attractive are you?

For many years, psychologists have been studying physical attractiveness in an attempt to find out who is, and who is not, considered attractive. Most studies suggest that there are some very attractive individuals, but that most people are of average attractiveness. The following graph shows the typical (normal or bell-shaped) distribution of attractiveness scores.




Looking at the above graph, we would like you to estimate as honestly as possible your physical attractiveness. First, estimate your *overall* physical attractiveness, then the attractiveness of specific body parts. So, for example, if you give yourself a score of 115 this means that you think you are more attractive than average, while a score of 85 means you think you are less attractive than average. We would also like you to do the same for the individual you were just waiting with. Based on the scores in the figure above, the more attractive you think you are, the higher the score you should indicate. The less attractive you think you are, the lower the score.

| | You | | Your partner |
|---|---|---|---|
| 1. Overall physical attractiveness | | | |
| 2. Overall facial attractiveness | | | |
| 3. Overall body weight | | | |
| 4. Overall body shape | | | |
| 5. Overall height | | | |
| 6. Posture | | | |
| 7. Hair | | | |
| 8. Body hair | | | |
| 9. Breasts/chest | | | |
| 10. Eyes | | | |
| 11. Mouth | | | |
| 12. Ears | | | |
| 13. Cheeks | | | |
| 14. Chin | | | |
| 15. Voice | | | |
| 16. Nose | | | |
| 17. Teeth | | | |
| 18. Neck | | | |
| 19. Waist | | | |
| 20. Hips | | | |
| 21. Stomach | | | |

| | | | |
|---|---|---|---|
| 22. Arms | | | |
| 23. Hands | | | |
| 24. Buttocks | | | |
| 25. Legs | | | |
| 26. Thighs | | | |
| 27. Calves | | | |
| 28. Knees | | | |
| 29. Feet | | | |
| 30. Ankles | | | |
| 31. Skin | | | |

Appendix D. Personal Rating Sheet

Experiment ID Number_ _ _ _ _ _ _ _

| **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|
| Definitely not interested | Not interested | Neither | Interested | Definitely interested |

1. How interested would you be to meet this person again?

   1 2 3 4 5

2. How interested would you be in seeking advice from him/her?

   1 2 3 4 5

3. How interested would you be in sitting beside him/her on a 3-hour bus trip?

   1 2 3 4 5

4. How interested would you be in sharing an apartment or being a roommate with him/her?

   1 2 3 4 5

5. How interested would you be in inviting him/her to your home?

   1 2 3 4 5

| **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|
| Definitely not likely | Not likely | Neither | Likely | Definitely likely |

6. How likely would you approve of a relative marrying him/her?

   1 2 3 4 5

7. How likely are you to accept him/her as an acquaintance?

   1 2 3 4 5

8. How likely are you to accept him/her as a co-worker on a task or project?

   1 2 3 4 5

9. How likely are you to accept him/her as a close friend?

   1 2 3 4 5

10. How likely do you think he/she is able to function on a day-to-day basis?

    1 2 3 4 5

11. How likely do you think he/she is able to function successfully as a student?

    1 2 3 4 5

12. How likely do you think he/she is able to function successfully as an employee?

    1 2 3 4 5

13. How likely do you think he/she is able to function successfully as another persons' date?

    1 2 3 4 5

14. How likely do you think he/she is able to function successfully as a steady boyfriend/girlfriend in a committed relationship?

    1 2 3 4 5

Appendix E. Heterosocial Initiation Task Video Rating Sheet

**Rater: _____ Subject number:**

_____

**Heterosocial Initiation Task Coding:** code all items! So that every interaction will be considered equally, **make sure to only code the first 5 minutes after the experimenter stops speaking**.

**1) Chair position** (right next to confederate = 3; "middle" chair = 2; furthest chair = 1): _____
**2) Face contact** (number of times subject and confederate appear to look at each other)

_____
**3) Duraction of face contact** (total amount of time confederate and subject appear to look at each other) _____
**2) Conversation initiations** (# of times subject initiates response or new topic): _____
**3) Verbosity** (total # of words spoken to collaborator in 5 min. interval): _____
- **a. Mands** (total # of statements asking for/demanding items or info) _____
- **b. Tacts** (total # of statements naming things or actions) _____
- **c. Echoics** (total # of statements that repeat the confederate's) _____
- **d. Intraverbals** (total # of statements that are conversational responses) _____
- **e. Textuals** (total # of times subject engages in reading as defined by looking at written words with their eyes traveling across the page) _____
- **f. Transcriptions** (total # of times subjects writes words spoken by the confederate) _____

**4) Appropriateness & 5) Assertiveness** (indicate choice by circling your choice for each variable)

| | **Appropriateness** | **Assertiveness** |
|---|---|---|
| **1** | **"Very inappropriate"**:<br>1.) Disclosing or requesting personal & sensitive information<br>2.) Touches peer (other than hand shake)<br>3.) Stares at peer without talking or looks away constantly during any conversation<br>4.) Curses 2+ times ("Fuck," "Shit," etc.)<br>5.) Laughs at clearly inappropriate times<br>6.) Conversational responses clearly indicate not listening<br>7.) Pacing during video-taped interaction | **"Reserved"**:<br>• Silence… or only "hello"<br>• Eyes mostly averted from peer; downcast |
| **2** | **"Inappropriate"**:<br>• Disclosing or requesting personal information<br>• Gets up and inspects video or other equipment<br>• Looks frequently at peer without talking or looks away 60+% during conversation<br>• Makes eye contact but no comment<br>• Curses once<br>• Smiles at clearly inappropriate times<br>• Responses indicate may not be listening | **"Somewhat reserved"**:<br>• Minimal social engagement (little more than "hello")<br>• Low voice level, but audible<br>• No follow up or long lapses in conversation<br>• Neutral body posture<br>• Fairly "normal" for situation |
| **3** | **"Fairly appropriate"**:<br>• Brings up benign conversation topic not related to setting (something other than experiments, PSY 301, etc.)<br>• Looks at peer a little without talking or often looking away during conversation<br>• Silent and looking away during whole interaction<br>• Facial reactions neither encouraging or discouraging | **"Attractively assertive"**:<br>• Solicits benign information from peer<br>• Articulate<br>• Able to follow-up conversation with comments, questions (convers. ease)<br>• May initiate goodbye gesture at end of task (e.g., handshake, wave, pat on back) |

| | | |
|---|---|---|
| | • Decent conversation tracking clearly present | • Elicits laughter with a joke or gesture<br>• Voice level and posture are confident |
| **4** | **"Appropriate"**:<br>• Brings up benign topic related to situation<br>• Mostly looks at peer during conversation or otherwise glances at peer only once (unless makes eye contact on glance and says nothing—see #2)<br>• Most facial reactions to peer are encouraging<br>• Good conversation tracking clearly present | **"Somewhat overly assertive"**:<br>• Initiates conversation before researcher's introduction<br>• Stares at peer<br>• May interrupt peer<br>• Dominates conversation |
| **5** | **"Very Appropriate"**:<br>• Brings up benign conversation topic related to situation and is able to follow up<br>• Almost always regards peer during conversation<br>• All facial reactions to peer are encouraging<br>• Excellent conversation tracking | **"Overly Assertive"**:<br>• Interruptions frequent, perceived as rude<br>• Will not let peer get a word in edgewise<br>• Voice level is nearly a yell at times<br>• Bullying<br>• Asks for a date |

**6) Comfort & 7) Interest in Partner** (indicate choice by circling your choice for each variable)

| | **Comfort** | **Interest in Partner** |
|---|---|---|
| **1** | **"Uncomfortable":**<br>• Pacing<br>• Really fidgety (4+ ways)<br>• Notices camera and behavior changes markedly<br>• Sitting on edge of chair<br>• Makes a comment or question indicating discomfort with situation with matching affect | **"Disinterested":**<br>• Never really engages conversation partner at all<br>• Stares off into space the whole time |
| **2** | **"Somewhat Uncomfortable":**<br>• Notices camera and behavior changes (including any negative comments re: videotaping)<br>• Fidgety (2+ ways)<br>• Sits at furthest chair from confederate<br>• Makes a comment or question indicating discomfort with situation without matching affect | **"Marginal Interest":**<br>• Makes comments to confederate but no inquiries<br>• When initial conversation ends, does not pursue |
| **3** | **"Neutral" (or "Mixed"):**<br>• Notices camera and makes neutral comment (e.g.; "we're being taped")<br>• A little fidgety (just 1 way)<br>• (if possible given subject) keeps to self, involved in a task such as day planning | **"Neutral" (or "Mixed"):**<br>• Inquiries such as "Whose PSY 301 class are you in?" [solicits facts]<br>• When conversation ends, pursues further conversation only after substantial pause |
| **4** | **"Fairly Relaxed":**<br>• Posture indicates lack of tension<br>• Notices camera and makes positive comment (e.g.; "we're being taped—that's cool!") or notices camera with no behavior change or comment<br>• Voice shows no or very little nervousness | **"Friendly":**<br>• At least one inquiry such as "How do you *like* your PSY 301 class?" [solicits feeling/opinion]<br>• Switches topic of conversation at least once |
| **5** | **"Relaxed":**<br>• Arm outstretched on nearby chair back<br>• Voice shows no nervousness | **"Very Friendly":**<br>• Multiple inquiries such as the example listed above for Friendly<br>• Switches topic of conversation at least twice |

**Questions 8-10:** If you were in the confederate's place and this had been an ordinary conversation:

**8. …how much would you have liked to continue the conversation?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Very Much | Pretty Much | Sort of | Just a Little | Not at all |

**9. …how likely is it that you would have considered this person for friendship?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Very Likely | Pretty Likely | Sort of Likely | Not Likely | I would not! |

**10. …how likely is it that you would have considered this person for dating?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Very Likely | Pretty Likely | Sort of Likely | Not Likely | I would not! |

**Please note a short description (e.g.; appearance, attire, ethnicity) of subject in space below:**