Abstract

Title of Thesis: Risky Sexual Behavior in College Students with and without Attention-Deficit/Hyperactivity Disorder: Is a Positive Parent-Child Relationship Protective?

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College presents a novel context with decreased parental supervision, increased rates of alcohol and illicit drug use, and increased access to potential sexual partners. It may be especially challenging for students with Attention-Deficit/Hyperactivity Disorder (ADHD). Research has shown that young adult males with ADHD engage in risky sexual behaviors (RSB); however, little to no research has been done on females or college students with ADHD, nor have prior studies examined environmental factors that may moderate risk. We examined whether ADHD is associated with RSB among college students and whether parent-child relationship quality moderated that relationship. Participants included 92 undergraduates, approximately half with ADHD and half without. Results indicated that the interaction between gender and ADHD status was associated with condom use frequency and age of first sexual experience. Further, the interaction between parent-child relationship and ADHD accounted for significant variance in number of sexual partners in the past year.

Risky Sexual Behavior in College Students with and without Attention-Deficit/Hyperactivity Disorder: Is a Positive Parent-Child Relationship Protective?

By

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Chapter I: Introduction

College students comprise 39% of people aged 18 to 24 in the United States (Snyder, Dillow, & Hoffman, 2009). Because college students have moved from a parentally-supervised home environment to an unsupervised environment with increased access to alcohol and available sexual partners, it has been suggested that this contextual change increases the likelihood for these adolescents to engage in risky behaviors as compared to peers not attending college (Butcher, Thompson, & O'Neal, 1991). During this transition from a parentally-supervised home environment to the college environment, risky sexual behavior, heavy alcohol use, and substance use peak (Schulenberg & Maggs, 2001).

The National College Health Assessment conducted by the American College Health Association (2009) gathered epidemiological information on college students ranging from alcohol and drug use to sexual behaviors. After reviewing the statistics, we can conclude that college students do not adequately protect themselves when engaging in sexual behaviors. In a nationally representative college sample, the American College Health Association found that sexually active college students used condoms only 38.2% of the time when having sexual intercourse, and the last time respondents had intercourse only 53.5% used condoms for vaginal sex and as few as 27.7% used condoms for anal sex. As many as 15.1% of sexually active students reported using the withdrawal method, a method that is proven ineffective as a method of contraception and as a method to prevent the transmission of sexually transmitted infections. Among the

participants, 2.0% of female students unintentionally became pregnant, and 2.1% of male students unintentionally impregnated their partner. Across college campuses, the lack of consistent use of condoms and use of the withdrawal method indicate a lack of use of effective contraception and infection protection methods. The statistics from the American College Health Association (2009) further indicate that college students engage in sexual risk behaviors when at diminished capacity, or under the influence of drugs or alcohol. For instance, 14.5% of respondents reported that they had unprotected sex while intoxicated in the past school year.

According to Schulenberg, Sameroff, and Cicchetti (2004), though the reduced structure in the transition from adolescence to young adulthood can lead to positive outcomes in some individuals, for others, the reduction in structure can lead to a discrepancy between the individual's needs and what the context affords. This change can be particularly debilitating for students with particular vulnerabilities, such as those whose difficulties are best accommodated with structure. If the average college student engages in these risky sexual behaviors, it follows that students with a disorder characterized by impulsivity would be even more likely to engage in risky sexual behavior than college students without the disorder.

Attention-Deficit/Hyperactivity Disorder (ADHD) is a disorder characterized by developmentally-inappropriate levels of inattention, hyperactivity, and/or impulsivity which is often first diagnosed in childhood. ADHD affects between three and seven percent of elementary school-age children,

and typically persists into adolescence (Faraone, Biederman, & Monuteaux, 2002) and adulthood (Barkley, Fischer, Smallish, & Fletcher, 2002). The prevalence of adult ADHD is estimated to be around 4.4% (Kessler et al., 2006). As the individual with ADHD encounters novel social situations, differing academic and social expectations, and sexual maturation, the manifestation of her ADHD symptoms may change (Barkley et al., 2002; Biederman, Mick, & Faraone, 2000; Goldstein, 2002), but impairments in social and academic functioning remain.

The most widely tested and developed theory of ADHD is one concerned with executive functioning deficits: Barkley's theory of behavioral disinhibition (Barkley, 1985; 1997). Behavioral inhibition, defined by Barkley, is an individual's ability to inhibit a response to an event, the individual's ability to stop a response once it has started, and the individual's ability to limit interference from other stimuli in those response patterns. Barkley argues that for other executive functions to occur, the response to a stimulus must be inhibited for a sufficient amount of time (Barkley, 1997; 2001). The deficits associated with ADHD which have been theorized to arise from this underlying behavioral disinhibition include diminished ability to delay gratification, to discontinue desired activities, and to ignore distractions (Nigg, 2000; Olson, Schilling, & Bates, 1999). This tendency to be disinhibited is relatively stable in individuals with ADHD from childhood into adolescence and adulthood (Swensen et al., 2004).

This tendency to be disinhibited is manifested in children, adolescents, and young adults with ADHD as engagement in risk taking behaviors (Barkley,

Guevremont, Anastopoulos, DuPaul, & Shelton, 1993; Biederman, Wilens, Mick, Faraone, & Spencer, 1998; Leibson, Katusic, Barbaresi, Ransom, & O'Brien, 2001; Swensen et al., 2004). In children, risk taking is manifested as a greater likelihood of accidental injuries (Swensen et al., 2004). As the child with ADHD enters adolescence, their impulsive behavior is manifested as behaviors ranging from simply interrupting others in conversation to risky behaviors such as reckless driving and excessive speeding (Barkley & Cox, 2007; Barkley et al., 1993). Teens and young adults with ADHD have more alcohol-related problems than comparison peers (Molina & Pelham, 2003; Smith, Molina, & Pelham, 2002), a three-times higher likelihood of using an illicit drug (Molina & Pelham, 2003), increased likelihood of deviant peer affiliation (Marshal, Molina, & Pelham, 2003), and a four-times higher likelihood of driving without a valid permit or license (Thompson, Molina, Pelham, & Gnagy, 2007). Because ADHD is characterized by impulsivity and is associated with other risky behaviors, such as alcohol abuse, illicit drug use, and unsafe driving, we expect that ADHD is likely a risk factor for engagement in risky sexual behavior as well.

ADHD AND SEXUAL BEHAVIOR

Surprisingly little research has been conducted investigating the relationship between ADHD and risky sexual behavior. Using data from the Pittsburgh ADHD Longitudinal Study (PALS), Flory, Molina, Pelham, Gnagy, and Smith (2006) investigated risky sexual behavior in males aged 18-26 with ADHD and age-matched peers without ADHD. In their exclusively male sample,

they found that a childhood diagnosis of ADHD predicted earlier initiation of sexual behavior, a greater number of sexual partners, more casual sex, and more unexpected pregnancies with sexual partners relative to age-matched peers.

In the Milwaukee Young Adult Outcome Study (MYAOS), a study which followed hospital-referred children with ADHD and community comparisons into adulthood, young adults with ADHD aged 19 to 25 (87% males) had a rate of sexually-transmitted infection that was four times the rate of the control group (92% males; Barkley, 2002). The ADHD group was also significantly more likely to impregnate or become impregnated as compared to peers. This increased rate of infection and pregnancy among young adults with ADHD suggests that these participants did not adequately protect themselves from sexually transmitted infections, and indicates, more importantly, that they engage in more sexual risk-taking behaviors than the control participants. Given that females comprised only 10.5% of participants, analyses were underpowered to examine males and females separately. Together, findings from these two longitudinal studies indicate that the characteristic symptoms of ADHD are associated with an increase in sexual risk-taking behavior for young adults.

Since the two studies which have examined risky sexual behavior among young adults with ADHD have included almost exclusively males (Barkley, 2002; Barkley et al., 2006; Barkley, Murphy, & Fischer, 2008; Flory et al, 2006), we have no samples of females large enough, or powered enough, to compare their sexual risk behavior engagement to that of males with ADHD. Additionally, none of these studies of risky sexual behavior in ADHD (Barkley, 2002; Barkley et al.,

2006; Barkley et al., 2008; Flory et al, 2006), nor the studies of ADHD in college students, examined risky sexual behavior specifically within the college context, which as discussed previously is a unique developmental period during which risk taking in general is more prevalent. Young adults with ADHD, who are already more likely to engage in risky behaviors more generally, may be at particular risk for engagement in unsafe sexual behaviors within the college context for the reasons we have discussed. Thus, it is important to investigate the relationship between risky sexual behavior and ADHD diagnosis in college students.

COLLEGE STUDENTS WITH ADHD: A DISTINCT SUBSET

In college, the percentage of students with ADHD is estimated to be between 2-8% (DuPaul, Schaughency, et al., 2001; Lee, Oakland, Jackson, & Glutting, 2008; McKee, 2008; Weyandt, Linterman, & Rice, 1995). However, the exact prevalence of ADHD in college students is not known, in view of the fact that students are not required to report their disability and may not request educational support services. Among college students registered with on-campus disability support services, 25% receive accommodations for ADHD (Wolf, 2001). Though there has been greater recognition of individuals diagnosed with ADHD attending college in recent years, relatively little is known about this subset of students.

Researchers have found that fewer individuals with ADHD enter college compared to their non-ADHD peers (Barkley et al., 2002; Wolf, 2001). Barkley, Fischer, Smallish, and Fletcher (2006) reported that only 21% of ADHD probands

enrolled in college compared to 78% of the control group. This may be the case due to the fact that students with ADHD are more likely to be retained a grade level and significantly more likely to drop out of high school than students without ADHD (Barkley et al., 2008). Even fewer individuals with ADHD graduate from college. Dropout rates for college students with ADHD have been estimated to range between 75-95% (Barkley, 2006). Of the participants in the MYAOS, the researchers categorized the participants who met childhood diagnosis into two groups in adulthood: those who still met criteria, and those who no longer met criteria. Only 9.1% of the participants who still met criteria for ADHD in adulthood and 20% of those who no longer met criteria graduated from college, compared to 68% of the community comparison group (Barkley et al., 2008). This research demonstrates that very few individuals with ADHD enroll in college, and those who do enroll are far less likely to complete post-secondary education, regardless of whether they continue to meet criteria for ADHD.

Because of this, youth with ADHD who attend college are considered a distinct group from youth with ADHD who do not attend college. To have achieved acceptance to post-secondary education and to grapple with the challenges inherent in advanced education, a student with ADHD must have performed well in high school and must possess greater academic or executive ability than peers with ADHD who do not attend college (Frazier, Youngstrom, Glutting, & Watkins, 2007). Additionally, Heiligenstein and Keeling (1995) found that college students with ADHD demonstrated a capacity to compensate,

though only partially, for the deficits characteristic of ADHD and performed at a satisfactory level.

At the same time, college students with ADHD are likely a distinct group from college students without the disorder in that they continue to experience significant academic impairment. For instance, Blase and colleagues (2009) found that college students with a current diagnosis of ADHD had significantly lower grade point averages than never-diagnosed peers. Moreover, college students with ADHD exhibit study skill deficits, fewer academic coping behaviors, and procrastination (Weyandt & DuPaul, 2006) to a greater degree than other college students. In sum, despite the fact that college students with ADHD have performed well enough to achieve acceptance to post-secondary education, they continue to experience significant impairment in the academic domain.

Although the academic functioning of college students with ADHD is relatively well characterized, very few studies have investigated the *social* functioning of college students with ADHD.

COLLEGE STUDENTS WITH ADHD: THE COLLEGE CONTEXT

The transition from the parentally-supervised environment to the college environment may be especially problematic for students with ADHD. Because ADHD is characterized by deficits in behavioral inhibition, also known as deficits in self-regulation (Barkley, 1997), individuals with ADHD rely to a great extent on external supports (e.g., rules, consequences for desirable and undesirable behaviors) to control their behavior during childhood and adolescence (Barkley et

al., 2008; Chronis, Jones, & Raggi, 2006). Indeed, all of the evidence-based treatments for children and adolescents with ADHD rely on parents and teachers to create and maintain clear expectations, supervision, and consistent consequences in the environment, and no evidence-based treatments exist which do not rely on such environmental supports (Chronis et al., 2006; Pelham & Fabiano, 2008). Students with ADHD may therefore face a greater struggle to control their behavior during this developmental period, given the absence of these supports (Barkley, 2006). In other words, a discrepancy exists for college students with ADHD between the characteristics of the context and their particular needs (Schulenberg, Sameroff, & Cicchetti, 2004).

The college environment, away from parental supports, is also characterized by increased alcohol use. Alcohol abuse and binge drinking are more common among full-time college students than among age-matched peers not attending college (S.A.M.H.S.A., 2008), and this heavy drinking exacerbates the risk for risky sexual behavior in the general college population (Cooper, 2002; Perkins, 2002; Wechsler, Kuo, Lee, & Dowdall, 2000). This is noteworthy, because college students engage in binge-drinking significantly more often than other young adults not attending college (Johnson, O'Malley, Bachman, & Schulenberg, 2005).

Research specific to college students has found that college students are more likely to engage in risky sexual behavior when they engage in heavy episodic drinking (Brown & Vanable, 2007; Wechsler & Isaac, 1992). Research not specific to the college population has shown that young adults with ADHD

are significantly more likely to meet criteria for an alcohol use disorder or to abuse alcohol than peers (Smith, Molina, & Pelham, 2002; Weiss & Hechtman, 1993). Moreover, one study has found that ADHD in college students was associated with an increased risk for alcohol dependence and with higher incidence of alcohol-related negative consequences relative to a non-ADHD comparison group (Rooney, Chronis-Tuscano, & Yoon, 2011). Thus, it appears that college students with ADHD are likely to engage in more substance use within this challenging context.

This information suggests that college students with ADHD, who are likely at increased risk for engagement in risky substance use behaviors, may be at increased likelihood to engage in risky sexual behaviors within the college context where there is increased access to alcohol and decreased supervision from parents.

ADHD AND SEXUAL BEHAVIOR: RESEARCH ON FEMALES

Though one large longitudinal study of girls with ADHD is underway (Hinshaw, 2002; Hinshaw, Owens, Sami, & Fargeon, 2006), the published studies regarding risky sexual behavior and ADHD have not included (Flory et al., 2006) or have included proportionately few females in the statistical analyses (Barkley, 2002; Barkley et al., 2008). This is a problem, because at least one-fourth of individuals diagnosed with ADHD in childhood and adolescence are female (Barkley, 2003). Recent estimates of the male to female ratio of adult ADHD in the general population have been 1.5:1 (Biederman et al., 2005). Therefore

females should necessarily be included in research aimed to understand long-term consequences of the disorder.

Moreover, it is important to study women in an investigation of college students with and without ADHD because women accounted for over 56 percent of the 17.1 million undergraduate students enrolled in 2006 according to the U.S. Census Bureau's *School Enrollment in the United States: 2006* (Davis & Bauman, 2008). DuPaul and colleagues (2001) estimated the percentage of American female undergraduates with ADHD to be approximately 3.9%, versus 2.9% of male undergraduates. This indicates that within the college population, females may out-number males in general as well as among students with ADHD. Given that women make up the majority of college undergraduates and may constitute a significant portion of college students diagnosed with ADHD, it is critically important to include females in studies of college students with ADHD.

Finally, it may be particularly important to investigate female college students in studies of risky sexual behavior. Females between the ages of 15 and 24 had the highest rates of gonorrhea and chlamydia infections compared to any other age group, male or female, in 2008; the rates of all other age groups combined did not approach the incidence or reported infection for this age span (CDC, 2009, 2011). Therefore, it is critical that female participants be included in research investigating the link between ADHD and sexual risk behavior in college students.

PARENT-CHILD RELATIONSHIP QUALITY

Existing literature suggests that ADHD may be associated with risky sexual behavior, but to date, no studies have examined moderators, especially in the college population. Parent-child relationship quality is a predictor of many behavioral outcomes in children and adolescents (Bornstein, 2006; Steinberg & Silk, 2002). Buchanan and colleagues (1991) define a good quality parent-child relationship as one that is characterized by open communication, parental interest, and perceived support by the parent.

Most relevant to the proposed study, a satisfying mother-adolescent relationship is associated with more consistent use of birth control, abstinence from adolescent sexual activity, less frequent sexual intercourse (Jaccard, Dittus, & Gordon, 1996), lower levels of sexual activity (Jaccard, Dittus, & Gordon, 1998), higher probability of birth control usage, and a lower probability of pregnancy (Jaccard & Dittus, 2000) in unselected samples of adolescents. Additionally, a close mother-child relationship is associated with a delay in the initiation of sexual activity for both male and female adolescents (Sieving, McNeely, & Blum, 2000). Consistent with research focused on adolescents and their parents, a good quality relationship between the parent and college student has been shown to be associated with decreased sexual risk-taking behavior. Specifically, college students who report more open communication with their parents report delayed age at first intercourse and more consistent condom use (Lehr, Dilorio, Dudley, & Lipana, 2000).

It may be especially important to examine the parent-child relationship in individuals with ADHD since, in general, children and adolescents with ADHD

are more likely to have strained and combative relationships with their parents across the lifespan (Johnston & Mash, 2001). The theory is that parents of children with ADHD develop negative and maladaptive parenting practices in response to the increased stress of parenting a child with the impulsive, inattentive, and hyperactive behaviors which characterize ADHD (Patterson, DeBaryshe, & Ramsey, 1989; Fischer, 1986). As early as preschool, parents of children with ADHD already report elevated parenting stress and parent-child conflict (DuPaul, McGoey, et al., 2001). Indeed, observational studies consistently found increased negative and controlling interactions between parents and children with ADHD (Johnston & Mash, 2001). Furthermore, parents of children with ADHD feel more anger when in contact with their children, as opposed to parents of children without ADHD, who feel more anger when not with their children (Whalen et al., 2006). This negative parent-child relationship often continues into college. For instance, Grenwald-Mayes (2001) reported that college students with ADHD reported significantly poorer relationships with their parents than other college students.

Considering the longitudinal findings of Chronis and colleagues (2007), suggesting that positive parent-child relationships have protective effects for children ADHD, including the development of conduct problems (Chronis et al., 2007), it may be the case that if a parent and child with ADHD sustain a good quality and positive parent-child relationship from childhood into young adulthood, this relationship may be protective in terms of future engagement in risky behaviors. This relationship between parent-child relationship quality and

sexual behavior has not yet been investigated among college students with ADHD, however.

Chapter II: Purpose of the Current Study

The present study seeks to extend the literature on the sexual risk behavior of college students with ADHD by investigating: (1) whether college students with ADHD engage in more risky sexual behaviors than students without ADHD; (2) whether gender moderates the relationship between ADHD and sexual risk behavior; and (3) whether the quality of the parent-child relationship moderates the potential association between ADHD and risky sexual behavior. Specific aims are as follows:

AIM 1: ADHD AND RISKY SEXUAL BEHAVIOR

The primary aim of this study is to determine whether the presence of ADHD predicts engagement in risky sexual behavior in college students.

We hypothesize that ADHD status will be associated with a higher degree of engagement in risky sexual behavior among college students because of prior research indicating that college students are more likely to binge drink (S.A.M.H.S.A., 2008), individuals with ADHD are more risky in general (Barkley & Cox, 2007; Barkley et al., 1993), and more specifically, that young adults with ADHD engage in more sexual risk behaviors than controls (Barkley et al., 2008; Flory et al., 2006). We extend this work by investigating sexual risk behavior in college students with ADHD. College students are the population of interest because during this developmental transition, characteristics of the college environment likely contribute to increased sexual risk-taking, particularly among this subgroup of students. This risky sexual behavior may lead to negative

consequences, such us contraction and passage of sexually transmitted infections and increased risk of unwanted pregnancy.

AIM 2: ADHD AND RISKY SEXUAL BEHAVIOR MODERATED BY GENDER

As discussed previously, prior research in young adults with ADHD did not contain sufficient female participants to assess the differences in sexual risk behaviors between males and females (Barkley et al., 2008; Flory et al., 2006). Thus, it is important to determine whether the relationship between ADHD status and engagement in risky sexual behavior in college students holds for both genders. In this study, we sought to explore whether the potential relationship between risky sexual behavior and ADHD status is moderated by gender.

On one hand, we might hypothesize that the risk for engagement in unsafe sexual behavior in college students with ADHD may be increased among males; that is, males with ADHD will engage in more sexual risk-taking than their non-ADHD peers and female students with ADHD. In general, male college students engage in risk-taking behaviors more frequently than females (Harris, Jenkins, & Glaser, 2006). On the other hand, the CDC (2009, 2011) reported that females in this age group are at highest risk for contraction of sexually transmitted diseases or infections (STD/STI), compared to males in the same age group. As of yet, this possibility that females with ADHD may be at higher risk for engagement in risky sexual behavior has not been investigated due to the low rates of inclusion of females in studies of ADHD (Barkley et al., 2008).

As reviewed herein, there are more females than males in college (Davis & Bauman, 2008), and more females with ADHD in college than males with ADHD in college (DuPaul, Schaughency, et al., 2001). Thus, in this study, we attempted to recruit an equal number of males and females with and without ADHD.

AIM 3: ADHD AND RISKY SEXUAL BEHAVIOR MODERATED BY PARENT-CHILD RELATIONSHIP

Our third aim is to examine whether parent-child relationship quality moderates the relationship between ADHD status and risky sexual behavior among college students. To our knowledge, no studies exist which examine moderators of the association between ADHD and sexual risk behavior. Research conducted with unselected samples has shown that a positive or close mother-child relationship is associated with less sexual risk-taking behavior, such as delayed age of first intercourse and fewer sexual partners for both male and female adolescents (Dittus & Jaccard, 2001; Jaccard & Dittus, 2000; Jaccard, Dittus, & Gordon, 1998; Jaccard, Dittus, & Gordon, 1996; Sieving, McNeely, & Blum, 2000; Weinstein & Thornton, 1989). Thus, it is hypothesized that a high quality mother-child relationship will be related to lower engagement in risky sexual behavior in general.

We will then examine whether mother-child relationship moderates the relationship between ADHD and engagement in risky sexual behavior. Parent-child relationships are more strained between children with ADHD and their

parents, and therefore we expect more variability in the quality of mother-child relationships among students with ADHD (Barkley, 2006; Johnston & Mash, 2001). Also, prior research with a younger sample has suggested that positive parent-child relationships have protective effects on developmental outcomes of children with ADHD, including the development of conduct problems (Chronis et al., 2007). Thus, we expect that a high quality mother-child relationship may be even more protective in college students with ADHD (relative to college students without ADHD).

Chapter III: Methodology

PARTICIPANTS

Participants were recruited through the use of print advertisements on the University of Maryland, College Park campus and through the undergraduate research bank comprised of students completing research credits for undergraduate Psychology coursework. Flyers were posted around campus in an effort to contact students with and without ADHD. Those recruited through print advertisements, flyers, and the research participation for-pay link on the University of Maryland Psychology website were paid $25 for their participation, and participants who signed up through the undergraduate research bank were awarded class credit. All participants were required to be full-time undergraduate students at the University of Maryland, College Park. They were also required to be living away from their parents, and thus no longer under parental supervision, in either on-campus student housing or in residences off-campus.

To be included in the ADHD sample, participants were required to meet full DSM-IV-TR (American Psychiatric Association, 2000) diagnostic criteria based on interview and self-report measures described below. The participants were required to meet full criteria for ADHD in childhood, per self-report. Rather than using the DSM-IV-TR criteria requiring the symptoms of ADHD must be present before age seven, we used a cutoff of age 12. This decision was based on the fact that the age seven requirement is arbitrary (Applegate et al., 1997) and research suggesting that adult recall of childhood symptoms is most accurate prior to age 12 (Barkley & Biederman, 1997; Faraone et al., 2006; Kieling et al., 2010).

Additionally, to meet full current diagnostic criteria, the participants were required to meet the six-symptom threshold for diagnosis during childhood as specified by the DSM-IV-TR. Due to the fact that the criteria and threshold were developed from field trials conducted with elementary school-aged children (Lahey et al., 1994), there is much controversy about whether DSM criteria and thresholds are appropriate for adults. Based on the recommendation of McGough and Barkley (2004), we used a diagnostic threshold of four current symptoms in either the inattentive or hyperactive-impulsive category as done in previous studies of adult ADHD conducted by our lab and others (Biederman & Spencer, 2002; Chronis-Tuscano, Seymour, et al., 2008). In addition, participants in the ADHD group were required to have a T-score one standard deviation above the mean, or 60 and above, on the Conners Adult ADHD Rating Scale ADHD Index subscale (CAARS-LV; Conners, et al., 1999).[1]

To be included in the non-ADHD group, participants were required to receive a score of 50 or less on the CAARS-LV ADHD Index subscale, report fewer than four current symptoms in either the inattentive or hyperactive-impulsive category, and to not meet full diagnostic criteria for ADHD in childhood. Additionally, they must not have ever been prescribed medication to treat ADHD, and must have reported 2 or fewer current symptoms of ADHD per self-report on the K-SADS interview. Although participants were interviewed to determine diagnostic status for other disorders, participants were not excluded

[1] Those participants who scored within one standard deviation of the mean were excluded from data analyses.

from either the ADHD or non-ADHD group for other diagnoses or sub-threshold diagnoses.

The final sample included 92 undergraduate students recruited from the University of Maryland, College Park. Forty-four of those students were diagnosed with ADHD (20 males and 24 females), and forty-eight (20 males and 28 females) were in the non-ADHD comparison group. For more demographic characteristics, please refer to Table 1.

PROCEDURE

After an initial telephone screen to determine if the participant met basic entry criteria, participants were provided with a brief description of the project and were scheduled for an appointment to complete a diagnostic interview and self-report questionnaires in the laboratory. At the beginning of the visit, the interviewer obtained written informed consent from the participant. The interviewer then conducted two diagnostic interviews, an intelligence test screen, and instructed the participant on the completion of self-report measures, described below.

MEASURES

Diagnostic interview

ADHD and Other Diagnoses. Assessments were completed by two clinical Psychology doctoral students, closely supervised by Andrea Chronis-Tuscano, PhD, a licensed clinical psychologist. The doctoral students evaluated

the participants for adult ADHD symptoms using the Schedule for Affective Disorders and Schizophrenia for School Age Children (K-SADS; Ambrosini, 2000) modified ADHD Module assessing Past and Current Symptoms. The ADHD Module has been modified for self-report by adults for both current symptoms and those experienced in the past (Biederman & Spencer, 2002; Faraone, Biederman, & Milberger, 1995; Faraone, Biederman, & Monuteaux, 2002). This interview has been used in other studies of adult ADHD (Biederman & Spencer, 2002; Chronis-Tuscano, Raggi et al., 2008; Chronis-Tuscano, Seymour et al., 2008) and has established reliability for the diagnosis of childhood ADHD (Ambrosini, 2000).

Additionally, participants were administered the M.I.N.I. International Neuropsychiatric Structured Interview (M.I.N.I.; Sheehan et al., 1998). This interview was chosen because of its brief administration time and because Sheehan and colleagues (1998) found that it had good to very good kappa values when compared to the Structured Clinical Interview for the DSM-III-R (SCID; Spitzer, Williams, Gibbon, & First, 1992), which takes much longer to administer. Sections administered included: Major Depressive Episode (MDD); Dysthymia; Bipolar I and II; Panic Disorder; Agoraphobia; Social Phobia; Specific Phobia; Obsessive-Compulsive Disorder; Posttraumatic Stress Disorder; Alcohol Dependence and Abuse; Substance Dependence and Abuse; Anorexia and Bulimia Nervosa; Generalized Anxiety Disorder; Anti-Social Personality Disorder; Body Dysmorphic Disorder; and Conduct Disorder. Participants

determined to meet criteria for any current psychological disorder were referred for clinical services.

Questionnaire measures

Adult ADHD Symptoms. Participants completed the Conners Adult ADHD Rating Scale, Long version (CAARS-LV; Conners et al., 1999) to determine categorization into the control and ADHD groups. This self-report questionnaire has been found to be a valid and reliable measure of the core symptoms of ADHD for adults (Erhardt, Epstein, Conners, Parker, & Sitarenios, 1999). Respondents endorsed responses to the ninety-three items by choosing the frequency of occurrence for each item on a zero to three scale, ranging from "not at all" or "never" to "a lot" or "all the time". This questionnaire provides valid and reliable measurement of current ADHD symptoms (Conners, et al., 1999; Erhardt, et al., 1999). In our sample, the Cronbach's alpha was .87.

Risky Sexual Behavior. Participants were administered the Health and Sexual Behavior Questionnaire (HSBQ, Flory et al., 2006). The HSBQ was adapted for use in the PALS study from three measures: (1) the Sex and Dating Questionnaire from the Pittsburgh Adolescent Alcohol Research Center (PAARC, 1996); (2) a measure developed by Jessor, Jessor, and Donovan (1981); and (3) a measure developed for the Center for Education and Drug Abuse Research (Tarter, 1997). This measure asked for participant report of the frequency and onset of sexual contact and the frequency of use of condoms and other methods to prevent transmission of infection. Questions were added to the HSBQ to expand the

information gathered regarding sexually-transmitted infection. Questions also probed for frequency of sex with unfamiliar partners and sex under the influence of alcohol or drugs. This modified version was first used by Flory and colleagues (2006) in the previously-reviewed study examining risky sexual behavior in adult males with ADHD.

Specific questions from the HSBQ were analyzed to be consistent with data analysis and measurement of risky sexual behavior discussed in Flory and colleagues (2006). Individual items pertained to the following: age of initiation of sexual intercourse, frequency of sex with unknown partners in the past year, number of sexual partners in the past year, frequency of intercourse in the past year while using drugs or alcohol, frequency of use and method of pregnancy and sexually transmitted infection prevention, total number of unintentional pregnancies, and diagnosis of sexually transmitted infection. We also included two additional items, age of first sexual experience with a partner (more than kissing, but not intercourse), and contraction of a sexually transmitted infection in the past twelve months. Unlike Flory and colleagues, rather than dichotomizing participant responses to maintain cut-offs determined by Grunbaum and colleagues (2004), for our main analyses we maintained the original format of each item (either ordinal or continuous). Descriptive statistics for our outcome measures can be found in Table 2.

For our post-hoc analyses, we dichotomized the items based on the cut-offs determined by Flory and colleagues (2006) and completed χ^2 analyses to compare the behaviors of those with and without ADHD (see Table 3). This

entailed dummy coding the items based on the following cut-offs: first sexual intercourse before age 13, endorsing any sexual behavior with unfamiliar partners in the past year, more than four sexual partners in the past year, use of condoms less than "almost always," having sexual intercourse under the influence of drugs or alcohol, ever having contracted an STD/STI, infrequent or less than "almost always" use of reliable birth control methods (pill, condoms, foam, and/or diaphragms), and intercourse that resulted in pregnancy.

Parent-Child Relationship Quality. Participants completed a questionnaire, the Parent-Child Closeness Scale (PCCS; Buchanan et al., 1991) to determine the quality of relationship between the child and parent. Participants were asked questions regarding the openness, affection, interest, and trust they feel in their relationship with their biological or adoptive mother. Sample items may be found in appendices A. Participants indicate their choice by endorsing each item according to a 5-point Likert scale, ranging from "Not at all" to "Very". Buchanan and colleagues reported a Cronbach's alpha of .89 for mothers. This questionnaire has been used in studies of parent-child relationships in college students (also known as "emerging adults") (Padilla-Walker et al., 2008; Nelson et al., 2007) and in studies of adolescents and their parents (Dickerson & Crase, 2005). According to Padilla-Walker and colleagues (2008), when administered to college students between the ages of 18 and 25, the Cronbach's alpha for the participants' reports of maternal closeness was .88. In a study completed by Nelson and colleagues (2007) the Cronbach's alpha for the college student and graduate student reports of maternal closeness was .92. In this dataset, the

Cronbach's alpha for the student's report of closeness with his or her mother on the PCCS was .86.

Alcohol Consumption. The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De La Fuenta, & Grant, 1993) is a brief, self-report screening for excessive drinking and associated impairment (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). The AUDIT is a ten-item questionnaire with a 5-point Likert scale response format. Possible total scores range from 0 to 40. Studies have shown that college students who report binge drinking are at increased risk of engaging in risky sexual behaviors (Perkins, 2002; Cooper, 2002; Wechsler, Kuo, Lee, & Dowdall, 2000), and thus it is important to include a measure of problematic alcohol use in a study of risky sexual behavior. The Cronbach's alpha for the AUDIT in this sample was .79.

Intelligence Test Screening. The Wechsler Test of Adult Reading (WTAR; Wechsler, 2001) is a brief, 50-word standardized test of intellectual and cognitive abilities. Participants were asked to read the words aloud; the score is based on the number of words pronounced correctly. It has been used previously in University samples (Klassen, 2010) and samples of University students with ADHD (Sollman, Ranseen, & Berry, 2010), and is important to use in a sample of participants with ADHD due to the fact that samples with ADHD have been shown to have lower IQs than comparisons (Barkley et al., 2002). Further, it is important to tease apart whether engagement in risky sexual behavior may be better accounted for by ADHD status or IQ because lower IQ is associated among

adolescent samples with higher numbers of sexual partners after age 16 (Lansford et al., 2010).

DESIGN CONSIDERATIONS

For this study, we made several design decisions. One of the first decisions involved the population of interest. Although ADHD may contribute to the variance in risky sexual behavior engaged in by high school students, adolescents in general, and young adults in general, college students present a particularly interesting population. Indeed, all post-pubertal time points are developmentally important, but the college context represents a novel environment, coupled with a reduction in parental supervision and involvement, which may be especially challenging for students with ADHD who rely heavily on these external supports.

Although it has been recommended in the literature to gain reports from collateral informants to corroborate the diagnosis of ADHD, and parent report regarding childhood ADHD symptoms in particular would be desirable, we did not involve parents in the data gathering to ensure that participants were as forthcoming as possible regarding sexual behaviors and views of their parent-child relationships. Moreover, recent research conducted in our lab has found that, in a college sample of students with ADHD, the classification of students as either having ADHD or not did not change after inclusion of parent report (Rooney, Chronis-Tuscano, & Yoon, 2011). Compared to studies of adolescents with ADHD that show parent report to be more predictive of ADHD diagnosis than

child or adolescent report (Achenbach et al., 1987; Barkley et al., 2002; Bird et al., 1992; Loeber, Green, Lahey, & Stouthamer-Loeber, 1989; Smith, Pelham, Gnagy, Molina, & Evans, 2000), studies of college students with ADHD have shown parent and participant report are equally associated with likelihood of diagnosis, possibly depending on the criterion, and that college students with ADHD report higher average symptom scores than do parents (Frazier, Youngstrom, Glutting, & Watkins, 2007; Glutting, Youngstrom, & Watkins, 2005). In addition, Murphy and Schachar (2000) found that information gathered from adults with ADHD and collateral informants are highly correlated regarding both current and past ADHD symptoms. Thus, we can conclude that participants are adequate reporters of their own symptoms of ADHD. These findings may indicate increased self-awareness of individuals with ADHD once college-aged, or it may indicate the reduction in parent involvement in the student's life. For all of these reasons, we did not collect parent report to determine ADHD status in this study.

It should be noted that student affiliation with Greek associations on campus was not controlled as we have done in prior studies on alcohol use in this population (Rooney, Chronis-Tuscano, & Yoon, 2011), because engagement in risky sexual behaviors has not been found to be associated with Greek affiliation in prior studies (Eberhardt, Rice, & Smith, 2003; Scott-Sheldon, Carey, & Carey, 2008).

It should also be noted that we have decided to measure the students' perception of the quality of solely the mother-child relationship in this study. Although we initially planned to gather information regarding the students'

relationships with both parents, we ultimately decided to focus on mothers because of the propensity of literature supporting the importance of the mother-child relationship and adolescent's engagement in risky sexual behavior. As mentioned previously, most studies investigating the role of the parent-child relationship have focused on the mother-child relationship, rather than the father-child relationship (Dittus & Jaccard, 2001; Jaccard & Dittus, 2000; Jaccard, Dittus, & Gordon, 1998; Jaccard, Dittus, & Gordon, 1996; Sieving, McNeely, & Blum, 2000; Weinstein & Thornton, 1989). Thus our study represents a fair starting point for investigations of the parent-child relationship that expand on the current research on sexual risk behavior among young adults with ADHD. Future studies should extend this to examine the relationship between the college student and parents of the same and opposite gender to determine what the differential influence the father-child and mother-child relationship may have on the college student's sexual behaviors.

Chapter IV: Results

PRELIMINARY ANALYSES

Exploratory Factor Analysis

To determine variables indicating risky sexual behavior, an exploratory factor analysis was conducted to determine factor loadings of the following items, as mentioned previously: age of initiation of sexual intercourse, frequency of sex with unknown partners in the past year, lifetime number of sexual partners, frequency of intercourse in the past year while using drugs or alcohol, frequency of use and method of pregnancy and sexually transmitted infection prevention. After conducting the factor analysis using Mplus, no true factors could be identified due to dual loadings. Therefore, the analyses were conducted using the individual risky sexual behavior items identified previously. The analyses using these specific items are consistent with prior research on young adult ADHD samples conducted by Flory and colleagues (2006) and very similar to the items examined by Barkley and colleagues (2008).

Correlational Analyses

Prior to running the main analyses, correlational analyses were conducted to determine the extent to which the variables of age, gender, IQ score, and Caucasian race were associated with the individual HSBQ items (see Table 4). These specific items included age of first intercourse, number of sexual partners in the past year, times pregnant or impregnating a partner, frequency of use of sexually transmitted infection prevention or birth control methods, frequency of

sexual behavior under the influence of drugs or alcohol, frequency of sexual behavior with unfamiliar partners, and presence of a sexually transmitted infection diagnosis in their lifetime. Although not included in the analyses conducted by Flory et al (2006), we also examined the frequency with which the student forgot to use prophylactics due to substance use, the student's age at first sexual experience with a partner (i.e., more than kissing, but not intercourse), and contraction of a sexually transmitted infection within the past twelve months.

Correlational Analyses: Other Diagnoses

Additionally, because common comorbid psychological disorders in this population including Conduct Disorder and problematic alcohol use have been related to risky sexual behavior in prior research (Barthlow et al., 1995; Brown & Vanable, 2007; Cooper, 2002; Flory et al., 2006; Lavan & Johnson, 2002; Lux & Petosa, 1995; Morris, Baker, Valentine, & Pennisi, 1998), we ran correlations between the HSBQ items and psychological diagnoses determined using the M.I.N.I. (Sheehan et al., 1998; see Table 4). Those variables associated with the outcome variables at a significance level of $p<.05$ were considered on the first step of the primary analyses as control variables. Results indicated that past MDD and current Anxiety diagnosis was associated with a later age of first intercourse, but past MDD was also associated with a great number of sexual partners in the past year. Lastly, childhood CD was associated with a higher frequency of sex with unfamiliar partners in the past year.

Next, correlations were run between the dependent variables and the participant's diagnosis of alcohol use or substance use disorder as determined by the M.I.N.I, followed by the total score on the AUDIT (Saunders et al., 1993), a measure of problematic alcohol use. Alcohol and substance use are robust predictors of engagement in risky sexual behavior (Stueve & O'Donnell, 2005; Guo et al., 2002), thus it was imperative to control substance and alcohol use disorders in our analyses. It should be noted that AUDIT score and past or current alcohol or substance use disorder were not used as control variables for items 16 and 17 of the HSBQ, which request information regarding sexual behavior when under the influence of alcohol or drugs. Results of these analyses indicated that AUDIT total score was associated with outcome variables: age of first sexual experience, number of sexual partners within the past year, and frequency of condom use (Table 4). Additional analyses indicated that ADHD was associated with a higher score on the AUDIT (β=.265, p=.01).

Further, we ran χ^2 analyses to compare the ADHD and non-ADHD group on psychological diagnoses. Results indicated that past MDD was significantly more likely to be diagnosed with ADHD. The χ^2 analyses also indicated that participants in the ADHD group were significantly more likely to be diagnosed with Alcohol Abuse than those without ADHD (F=9.261, p=.002). Please refer to Table 5 for information regarding the presence of the other disorders in the ADHD and non-ADHD groups.

REGRESSION ANALYSES

Aim 1: ADHD and Risky Sexual Behavior

The primary aim was to examine the relationship between ADHD diagnosis and engagement in risky sexual behavior among college students.

Demographic variables, AUDIT score, and comorbid diagnoses identified from the preliminary analyses as significantly related to each HSBQ item were then entered on the first step of the regression analysis predicting engagement in risky sexual behavior. On the second step, ADHD diagnosis was entered to see how much variance in the engagement in risky sexual behavior was explained by ADHD diagnosis, above and beyond these control variables.

Contrary to our hypothesis, ADHD diagnosis did not account for a significant amount of variance in sexual risk behaviors beyond control variables. Results are presented in Table 6.[2]

Aim 2: ADHD and Risky Sexual Behavior Moderated by Gender

To examine the extent to which student gender moderates the relationship between college student ADHD status and the engagement in risky sexual behavior, we conducted analyses in three steps. First, any control variables that correlated significantly with the HSBQ outcome variables were included in the first step. In the second step, ADHD diagnostic status and gender were entered.

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[2] In addition, in order to replicate findings by Flory et al. (2006), the particular items identified in their analyses were dichotomized in accordance with the outlined procedure. These analyses similarly resulted in no significant associations between ADHD and risky sexual behavior (Table 3)

In the third step, we examined the extent to which the interaction between student ADHD status and gender contributed above and beyond steps one and two.

Results indicated there were significant interactions between gender and ADHD status for two items: age of first sexual experience and frequency of condom use. In accordance with our hypothesis, controlling for total score on the AUDIT, the interaction between ADHD status and gender was significant for age of first sexual experience (β=.996, p<.01). To probe the interaction, linear regressions were run separately within the ADHD and non-ADHD groups to determine if there was a difference between the genders. Results indicated non-ADHD females reported first sexual experience at a significantly younger age than non-ADHD males (β =-0.345, p=0.032). In the ADHD group, there was no significant difference between the two genders. Further, a final linear regression was run to determine if a significant difference existed between the females of both groups; results indicated that non-ADHD females' first sexual experience occurred at a significantly younger age than for females with ADHD (β =0.463, p=0.001).

The second significant interaction between gender and ADHD status pertained to frequency of condom use. After controlling for AUDIT score and WTAR Standard score, results indicated that sexually-active females with ADHD used condoms significantly less frequently than those without ADHD and less than males with ADHD (β=.937, p<.05). Results for these analyses are presented in Table 7. Next, linear regressions were run separately to determine if differences existed between the genders within the ADHD and non-ADHD groups.

Results indicated that ADHD females reported significantly less frequent use of condoms than males with ADHD (β=.492, *p*=.005). There was not a significant difference in between the two genders in the non-ADHD group.

A main effect for gender was also detected in our analyses. After controlling for IQ and AUDIT scores, student gender was significantly associated with frequency of sex with unfamiliar partners in the past year (β=-.322, p<.01) and ever having had sex (odds ratio=.314; 95% confidence interval .111-.890). Male students reported a significantly higher frequency of sex with unfamiliar partners compared with female students in the past year, but female students had a greater likelihood than males of reporting that they had ever had sex. For the remaining sexual risk variables, neither main effects of ADHD or gender nor interactions between ADHD and gender were detected.

Aim 3: ADHD and Risky Sexual Behavior Moderated by Parent-Child Relationship

For our third aim, to examine the extent to which parent-child relationship quality moderates the relationship between student ADHD status and the student's engagement in risky sexual behavior, we conducted analyses in three steps. As in the previous analyses, any significant control variables were included in the first step. For the second step, ADHD diagnostic status and quality of the mother-child relationship (i.e., PCCS score) were entered. In the third step, we examined the extent to which the interaction between student ADHD status and parent-child relationship quality contributed above and beyond steps one and two. Results are

presented in Table 8 for the continuous outcome variables and in Table 9 for the dichotomous outcome variables.

Results indicated that for one variable, frequency of sex with an unfamiliar partner in the past year, the ADHD x PCCS interaction term contributed significant variance to engagement in risky sexual behavior after controlling for gender, IQ score, and childhood CD (β=-1.705, p=.016). To probe the interaction, linear regressions were run separately within the ADHD and non-ADHD groups to determine if differences existed between those who scored high and low on the PCCS. The results indicated that among the ADHD group participants, those with a high PCCS score reported significantly fewer unfamiliar sexual partners than those with low PCCS scores (β=-.374, p=.015). There was not a significant difference in between those in the non-ADHD group. Thus, parent-child closeness was negatively related to number of unfamiliar sexual partners in the past year, but only for participants with ADHD. Interestingly, the range of scores included up to between six and 10 unfamiliar sexual partners in the past year for those with ADHD as compared to up to two for those without ADHD. For the remainder of the variables, no interactions and no main effects were detected.

Chapter V: Discussion

The present study contributes to the literature regarding college students with ADHD in three important ways. First, we examined whether college students with ADHD engage in sexual risk behaviors more so than college students without ADHD. Second, we examined whether gender moderated that relationship. Third, we examined whether parent-child relationship quality moderated the association between sexual risk behavior and ADHD.

Contrary to our primary hypothesis that ADHD would be associated with greater engagement in risky sexual behaviors, the results indicated that the college students with ADHD in this sample were not more likely to engage in risky sexual behaviors as compared to peers without ADHD. These findings are unexpected, but may be related to the low number of ADHD participants in our sample who received a childhood diagnosis of CD. This low base rate of childhood-onset CD is surprising in an ADHD sample (Biederman, Newcorn, & Sprich, 1991) and it highlights the potential differences between a college student sample and the MYAOS and PALS samples reported by Barkley (2008), Barkley and colleagues (2006, 2008), and Flory and colleagues (2006). In our sample, we also found very low base rates of current CD diagnosis. This is an important diagnosis to include in research regarding risky sexual behavior because, as reviewed before, there is a robust association between Conduct Disorder and risky sexual behavior. Furthermore, a symptom of CD, physical aggression in childhood, has been shown to predict risky sexual behavior in adolescents (Timmermans, van Lier, & Koot, 2008). Thus, our low base rate of Conduct Disorder may explain our low

base rates for risky sexual behavior and may highlight further the unique characteristics of a college population of young adults with ADHD.

It should also be noted that children with more severe symptoms of ADHD, lower IQ, and conduct problems function at a lower level in adolescence than comparison participants regardless of whether they have received treatment or not (Molina et al., 2009). The mean scores for participants in our sample ranged from 110.2 to 114.1. Although the studies mentioned did not report significant differences between their ADHD and non-ADHD samples in terms of IQ, previous research has indicated that individuals with ADHD score on average 7-10 points lower than control participants (Barkley, 1997). Barkley and colleagues (2002) reported that on an IQ screener administered to their participants, aged four to twelve, those with ADHD scored significantly lower than comparisons; in our group, there was no significant difference between those with and without ADHD (t=.416, p=.678). This may indicate that higher IQ scores are protective against engagement in risky sexual behaviors, due to our low base-rates of risky behaviors. Indeed, we found that IQ score was associated with more frequent use of condoms, less frequent sex with unfamiliar partners, and more frequent use of effective prevention methods (see Table 4). Again, this underscores the likelihood that college students with ADHD are a distinct subset of individuals with ADHD that experience reduced impairment.

These results from our first set of analyses, reporting no significant difference between sexual risk taking in college students with and without ADHD, can be interpreted as evidence supporting the contention that college students with

ADHD may be a distinct, higher-functioning subset of those with ADHD. Research thus far has shown a clear link between ADHD and engagement risky sexual behavior (Flory et al., 2006), but not among this subset of the ADHD population. As reviewed, individuals with ADHD are less likely to enter college, more likely to drop out, and less likely to graduate from college compared to their non-ADHD peers (Barkley, 2006; Barkley et al., 2002; Barkley et al., 2006; Barkley et al., 2008; Wolf, 2001). Thus, these results, in concert with the extant literature on ADHD, indicate that if a student with ADHD first desires higher education, achieves admission, and attends college, they are likely impaired differently than peers who did not attend college. It should also be noted that the entrance criteria for this Mid-Atlantic University are quite stringent, and thus this sample may differ from other Universities with more lax requirements.

We did find some interesting interactions between ADHD and gender in predicting sexual risk behaviors. The first interaction indicated that females with ADHD used condoms significantly less frequently than male ADHD participants and participants without ADHD. This is of public health concern. Failure to use condoms for intercourse puts both sexual partners at increased risk for transmitting and contracting sexually-transmitted diseases or infections (STD/STI). This is of particular concern in this sample because of the high rates of STI in this age group, particularly in females (CDC; 2009, 2011), and because of the number of potential sexual partners on a college campus. Lastly, this is of concern because, although we did not see significant differences between the

number of sexual partners reported by the ADHD and non-ADHD groups, we observed a greater range of sexual partners among ADHD participants.

The second interaction pertained to age of first sexual experience; results indicated that non-ADHD females reported significantly earlier ages than males without ADHD and females with ADHD. Though males with ADHD reported earlier ages, on average, compared to females with ADHD and males without ADHD, the difference was not significant. This is an interesting, and unexpected finding, which suggests that those with ADHD may engage in developmentally-appropriate sexual behaviors at a later age than their peers. Differences between college students with and without ADHD in terms of dating behavior have been found in previous research reviewed by Weyant and DuPaul (2006).[3] However, Barkley et al. (2006) indicated no difference between the ADHD and non-ADHD groups in terms of steady dating duration or percentage of participants who were currently dating. Thus it would be helpful to determine if differences do indeed exist in the age at which those with ADHD begin dating and if this is moderated by gender. These results should be considered in light of the fact that the item used in this analysis is rather general. The item, which includes the words "more than kissing but not intercourse," includes a wide range of behaviors, including behaviors such as heavy petting to oral sex, with varying degrees of health risk associated with them. Thus, we conservatively interpret the findings as risky

[3] Weyandt and Dupaul noted that those with ADHD, Predominantly Inattentive type began dating at later ages, and those with ADHD Combined type began dating at earlier ages than those without ADHD.

behavior and contend that further research in this topic should delineate sexual behaviors between the range of kissing and sexual intercourse.

These interactions between gender and ADHD, in conjunction, suggest further research. On the one hand, we found that males reported significantly more sex with unfamiliar partners in the last year, which is largely consistent with the literature. On the other hand, females in our sample significantly were more likely to report ever having had sex, as compared the males. This appears inconsistent with the literature on college sexual risk-taking in college students because Harris, Jenkins, and Glaser (2006) reported that male college students typically engage in more sexual risk taking than their female counterparts.

The finding that females with ADHD in this sample use condoms significantly less frequently during sex even though they report a significantly later age of first sexual experience (not intercourse) as compared to non-ADHD females is quite interesting. This information suggests research into a potential mechanism that may be fueling these results: assortative mating. Assortative mating theory posits people couple with those who share their preferences and characteristics (McPherson, Smith-Lovin, & Cook, 2001). Because research has shown that children with ADHD (Alessandri, 1992; De Wolfe et al., 2000; Whalen & Henker, 1991) and adolescents with ADHD have poor social skills relative to peers (Lee, Lahey, Owens, & Hinshaw, 2008), it may be the case that adolescent girls with ADHD have less developed social skills and are therefore less likely to be in developmentally-appropriate intimate relationships at the same age as females without ADHD. Thus, when this young woman with ADHD then

reaches late adolescence and enters college, by the theory of assortative mating, she may choose a sexual partner who experiences similar social difficulties associated with ADHD; she may forget to use a condom, and her partner may as well. Although risks and negative outcomes have been explored and well documented for adolescent girls who have sexual relationships with older men (Young & d'Arcy, 2005) and for individuals with conduct problems or substance use problems (Simons, Stewart, Gordon, Conger, & Elder, 2002; Vanyukov et al, 1996), little if any research has been conducted into assortative mating and the dating or sexual relationships of adolescent girls with ADHD.

Lastly, our third hypothesis was supported by one analysis that indicated a high quality parent-child relationship was associated with lower rates of sexual risk behaviors (specifically, the number of unfamiliar sexual partners in the past year), but only for college students with ADHD. These results suggest that parent-child closeness may play a role when an individual has a disorder that is often better managed with the involvement of external supports. As mentioned previously, individuals with ADHD, to achieve positive outcomes, rely greatly on external supports to control their behavior in childhood and adolescence (Barkley et al., 2008; Chronis, Jones, & Raggi, 2006). This is important to note, because parents provide a great deal of support in childhood and adolescence, and the parent-child relationship is often poorer for those children with ADHD. College students with ADHD reported significantly poorer relationships with their parents than peers do (Grenwald-Mayes, 2001), and relationships between children with ADHD and their parents are more likely to strained and combative than other

parent-child relationships (Johnston & Mash, 2001). Thus those students with ADHD who report positive parent-child relationships into the college years are likely more supported by their parents than those ADHD students with less positive parent-child relationships.

However, we did not find this relationship for any of the other HSBQ items; thus, our results did not provide conclusive support our third hypothesis that a high quality parent child relationship would serve as a protective factor against engagement in risky sexual behavior for college students with ADHD.

Although this project is not without limitations, it does extend the current literature in many ways. Our project extends the literature in that we are the first to collect information regarding sexual behavior among college students with ADHD. No study thus far has investigated the relationship between ADHD and risky sexual behavior in college students, and no study investigating this age group has included sufficient numbers of both male and female students to investigate gender differences. As discussed previously, it is necessary to include females in studies of college students with ADHD due to the higher proportion of females in college (Davis & Bauman, 2008), the higher percentage of females with ADHD attending college (DuPaul et al., 2001), and the high rates of sexual transmitted infection in late adolescent females (CDC, 2009; 2011).

On a related note, our study also extends the literature by providing more evidence of a relationship between problematic alcohol use (as measured by the AUDIT) and engagement in risky sexual behavior. Three of our outcome variables were significantly associated with AUDIT score, such that the higher a

student's reported problematic alcohol use, the more likely they were to engage in risky sexual behavior (Table 4). As mentioned in the introduction, the American College Health Association found that only 38.3% of the time do sexually active college students use condoms during sexual intercourse; reduced used of condoms has been shown to be related to alcohol use in college samples (American College Health Association, 2009). Our data suggests that college students, both male and female, with and without ADHD, use condoms "about half of the time" during sexual intercourse. This may either indicate that this population is using condoms more frequently compared to college students in general, or it may reflect the type of student who would participate in a research project as involved as this one. The American College Health Association gathered its information with a survey, whereas our participants scheduled appointments, arrived at our laboratory space, and complete interviews in addition to questionnaires.

Another way in which our project extends the literature is that we carefully considered other diagnoses and substance use. Our finding that past MDD is associated with current ADHD diagnosis (shown in Table 5) extends the current literature by confirming, in a college sample, the high level of comorbidity between ADHD and MDD (Angold, Costello, & Erkanli, 1999; Chronis-Tuscano et al. 2010; Jensen et al., 2001). We also found that past MDD is also associated with a later age of first sexual intercourse and a greater number of unfamiliar sexual partners in the last year (Table 4). Regardless of the direction of the association, this indicates that prior research on risky sexual behavior in individuals with ADHD should have considered diagnosis of current and past

MDD, particularly because MDD has been associated with sexual risk behavior in other studies (see review by Zimmer-Gembeck & Helfand, 2008). This is important to note that college students with ADHD and a past history of MDD may be at lower risk for engagement in risky sexual behavior, particularly earlier ages of first sexual intercourse.

LIMITATIONS

There are limitations of this project that should be noted when considering generalizability. First and foremost, our sample numbered 92 participants who were gathered from a single Mid-Atlantic University. Ideally, to examine risky sexual behavior in college students with ADHD, it would be ideal to collect a large sample from many different universities around the United States with varying admission standards. Second, it would be beneficial to limit the sample to students within their first year of attendance to the university in order to focus on those students who are adjusting to the novel college environment. Third, our sample was limited to students who either met or did not meet diagnostic criteria for ADHD. Thus, we did not gather information regarding the sexual behaviors among those who had subthreshold symptoms of ADHD or who met childhood but not current criteria. This may be a limitation because in our analyses would could not then examine continuous numbers of symptoms of ADHD and association with risky sexual behavior.

Another potential limitation of this project was our racial and ethnic breakdown. The rates of African American participants in the ADHD group did

not match those of national samples. According to Froehlich and colleagues (2007), in a nationally representative study of children aged 8 to 15 years, African Americans represented 14.7% of children with ADHD. This statistic indicates that our percentage of African Americans in the ADHD sample, 4.5%, is well below the rate expected. It is important to note that our sample, as depicted in Table 5, differed between the ADHD and non-ADHD group with respect to racial breakdown. As reported by the Office of University Communications (2011), African American students comprise 12.1% of the undergraduate population at this large mid-Atlantic university. In this project, African Americans accounted for 16.7% of control participants, which is consistent with the diversity of this University, whereas in the ADHD group, African Americans accounted for only 4.5% of participants. This racial breakdown in our sample may indicate that African Americans with ADHD are less likely to identify themselves for research projects due to the potential stigma associated with self-disclosure of mental illness. Among members of a minority group which is historically discriminated against, disclosure of mental illness, which can lead to both discrimination and self-discrimination (Corrigan, 2000), may be less likely than for racial groups that are not historically discriminated against. Thus African American college students with ADHD may be less likely to self-identify and participate in research studies. It would be important to explore these possibilities in future research, particularly because the behaviors associated with stigma of mental illness associated with ADHD may differ between racial and ethnic groups. Flory and colleagues (2006) reported that 85% of their participants, about 47% of the total

PALS sample, were Caucasian. Participants in the Barkley studies were also around 81-84% Caucasian or European American (Barkley et al., 2008). Neither of these studies reported analyses regarding racial identity and engagement in risky sexual behavior. Future studies of ADHD in adulthood and adolescence should match participants based on race and ethnicity.

Third, of the participants we recruited for our project, only 63 of the 92 participants (68%) reported having had sexual intercourse; thus, our analyses regarding condom and other prophylactic use, number of unfamiliar partners, and other questions asking about sexual intercourse were conducted with this smaller sample.

Fourth, the measure we used for risky sexual behavior should be refined to include more questions regarding sexual risk behavior and to include a total risk score. First, the question regarding pregnancy should be elaborated to inquire about "pregnancy scares" and use of the morning-after pill or other emergency contraception. Second, we also support the inclusion of items developed with particular attention to engagement in oral sex as these behaviors also lead to disease transmission. Lastly, establishment of a more uniform measurement scales for the component items would be beneficial for large-scale research so that a total risk score could be extracted.

CONCLUSIONS

Despite these limitations, this project expanded the current literature regarding engagement in risky sexual behavior in both college students and young

adults with ADHD. Our findings suggest that a college student's gender, particularly among students with ADHD, should be considered in future research regarding engagement in risky sexual behavior. Due to the fact that we found females with ADHD use condoms less often than other participants, we suggest targeted interventions among female students with ADHD to address this risky behavior because of the public health concern. Finally, our results regarding the potential moderation of parent-child relationship on ADHD and engagement in risky sexual behavior builds on prior studies and emphasizes the importance of the mother-child relationship well into the college years. Thus, from our results, we argue that fostering a positive parent-child relationship may be protective for those with ADHD. Therefore we conclude that this research indicates the development of targeted interventions to improve the relationship between parents and their teenagers with ADHD, thereby reducing sexual risk behaviors in this particular population.

Table 1: Demographic Characteristics

	Non-ADHD *n = 48*		ADHD *n = 44*	
	Male *n = 20* *N (%)*	*Female* *n = 28* *N (%)*	*Male* *n = 20* *N (%)*	*Female* *n = 24* *N (%)*
Age (*M, SD*)	*18.7 (.92)*	*19.4 (1.03)*	*20.3 (1.74)*	*20.3 (1.23)*
Year in School (*M, SD*)	*1.47 (.77)*	*2.0 (.92)*	*2.63 (1.21)*	*2.74 (1.01)*
Freshman (1)	13 (65)	9 (32.1)	5 (25)	2 (8.3)
Sophomore (2)	3 (15)	11 (39.3)	3 (15)	9 (37.5)
Junior (3)	3 (15)	5 (17.9)	5 (25)	5 (20.8)
Senior (4)	0 (0)	2 (7.1)	6 (30)	7 (29.2)
Prefer not to answer	1 (5)	1 (3.6)	1 (5)	1 (4.2)
Race/Ethnicity				
Non-Hispanic White	15 (75)	17 (60.7)	16 (80)	11 (45.8)
African American	3 (15)	5 (17.9)	0 (0)	2 (8.3)
Asian	1 (5)	4 (14.3)	1 (5)	4 (16.7)
Native American/ Pacific Islander	0 (0)	0 (0)	0 (0)	0 (0)
Biracial/Multiracial	0 (0)	0 (0)	1 (5)	5 (20.8)
Other	0 (0)	1 (3.6)	1 (5)	1 (4.2)
Prefer not to answer	1 (5)	1 (3.6)	1 (5)	1 (4.2)
Ethnicity				
Latino/Hispanic	0 (0)	4 (14.3)	0 (0)	2 (8.3)
Prefer not to answer	1 (5)	1 (3.6)	1 (5)	2 (8.3)
WTAR Standard Score	*114.1 (10.5)*	*111.5 (10.3)*	*110.2 (11.4)*	*112.8 (10.0)*
Parent-Child Closeness	*40.6 (7.44)*	*43.7 (9.74)*	*40.8 (5.64)*	*40.3 (11.1)*
AUDIT Total Score	*5.75 (4.02)*	*6.07 (5.01)*	*10.2 (5.26)*	*7.42 (5.46)*

Note. M = Mean, *SD* = Standard Deviation. DSM-IV = Diagnostic and Statistical Manual, Fourth Edition. ADHD=Attention-Deficit/Hyperactivity Disorder. AUDIT=Alcohol Use Disorders Identification Test. WTAR=Wechsler Test of Adult Reading.

Table 2: Descriptives for Study Variables

	Non-ADHD				ADHD			
	Male *n = 20*		*Female* *n = 28*		*Male* *n = 20*		*Female* *n = 24*	
	M (SD)	*Range*	*M (SD)*	*Range*	*M (SD)*	*Range*	*M (SD)*	*Range*
Age of first sex	16.8 (1.58)	14-19	16.8 (1.45)	15-20	17.1 (1.75)	13-20	17.5 (1.20)	15-20
Pasty year number of sexual partners	2.44 (1.13)	1-5	1.90 (1.62)	0-6	2.60 (2.20)	0-8	2.21 (1.40)	1-6
Failure to use effective prophylactic methods	1.22 (1.64)	0-4	.40 (1.10)	0-4	.27 (.80)	0-3	.58 (1.47)	0-5
Failure to use condoms	1.78 (1.56)	0-4	1.55 (1.82)	0-5	1.60 (1.68)	0-5	3.05 (1.78)	0-5
Frequency: Past year forgot to use prophylactic method due to substance use	.22 (.44)	0-1	.35 (.58)	0-2	.53 (1.06)	0-4	.47 (.77)	0-3
Frequency: Past year sex under influence of substance	1.67 (.87)	0-3	1.50 (1.23)	0-4	2.20 (1.37)	1-5	1.74 (1.15)	0-5
Frequency: Past year sex with unfamiliar partner	.56 (.73)	0-2	.15 (.37)	0-1	1.07 (1.28)	0-4	.32 (.75)	0-3
Age of first sexual experience (not intercourse)	16.41 (1.87)	13-19	15.2 (1.39)	12-18	15.4 (1.91)	12-19	16.4 (1.40)	14-19

Dichotomous outcome variables	Non-ADHD				ADHD			
	Male		Female		Male		Female	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Ever have sex	9	45	20	71.4	15	75	19	79.2
Ever pregnant?	0	0	1	3.6	1	5	0	0
Ever treated for STD?	0	0	5	17.9	0	0	2	8.3
Contracted STD in past 12 months?	0	0	2	7.1	0	0	0	0

Note. M = Mean, *SD* = Standard Deviation. ADHD=Attention-Deficit/Hyperactivity z Disorder. STD=Sexually Transmitted Disease. Ranges: For items that do not include age or number, 0 indicates lowest risk behavior.

Table 3: Risky Sexual Behavior from the HSBQ: Dichotomous Variables

Diagnosis	Non-ADHD $n = 48$		ADHD $n = 44$		Group Contrasts
	N	*(%)*	*N*	*(%)*	
Sex with ≥4 people in past 12 months	4	13.8	8	23.5	$\chi^2(1,N=63) = .962$, $p = .327$
Infrequent use of reliable birth control (pill, condoms, foam, and/or diaphragms)	8	27.6	5	14.7	$\chi^2(1,N=63) = 1.585$, $p = .208$
Infrequent use of Condoms	18	62.1	24	70.6	$\chi^2(1,N=63) = .511$, $p = .475$
Sex Under the Influence of Drugs or Alcohol	24	82.8	32	94.1	$\chi^2(1,N=63) = 2.045$, $p = .153$
Sex with Unfamiliar Partners, Past Year	7	24.1	12	35.3	$\chi^2(1,N=63) = .925$, $p = .336$
Contracted an STD/STI	5	10.4	2	4.7	$\chi^2(1,N=91) = 1.062$, $p = .303$

Note. STD/STI=Sexually Transmitted Disease or Infection. *Significant at $p<.05$. **Significant at $p<.01$. ***Significant at $p<.001$.

Table 4: Correlations between continuous HSBQ Items and Demographics & DSM-IV-TR Diagnoses

Variables	6	8	9	13i	13b	15	16	17
Demographic								
1. Age	.014	.253*	.173	-.103	.180	-.026	-.085	.191
2. Gender	-.005	.033	-.160	-.058	.188	-.006	-.161	-.458***
3. Ethnicity	-.148	-.135	.276*	-.072	-.055	.018	.110	.093
4. Race: Caucasian	-.082	-.127	-.030	-.079	-.023	.209	.242*	.159
5. WTAR Standard Score	-.138	.011	-.214	-.232*	-.265*	-.087	-.161	-.286*
Diagnosis								
1. Anxiety Current	.016	.233*	.030	.072	-.130	.111	.188	.136
2. Bulimia Current	.014	.055	-.085	-.078	-.005	.021	-.039	-.099
3. CD before 15	-.179	-.009	.139	-.006	.045	.021	-.039	.213*
4. CD after 15	-.118	-.098	.062	.014	-.040	.073	.009	.042
5. MDD Past	.003	.274*	.213*	--	--	--	--	--
Alcohol/Substance Use								
1. AUDIT Total Score	-.304**	-.170	.213*	.041	.213*	--	--	.115
2. Alcohol Use Disorder, Current	-.037	.040	.124	.045	.093	--	--	-.039
3. Substance Abuse Disorder, Current	-.081	-.109	.202	-.048	-.013	--	--	.153

Note. CD=Conduct Disorder. MDD=Major Depressive Disorder. STD=Sexually Transmitted Disease. AUDIT=Alcohol Use Disorders Identification Test. WTAR=Wechsler Test of Adult Reading. 6=Age of first sexual experience (more than kissing, not intercourse). 8=Age of first sex. 9=Number of sexual partners, past year. 13i=Failure to use effective prophylactic methods. 13b=Failure to use condoms. 15=Past year forgot to use prophylactic method due to substance use. 16=Past year sex under the influence of substance. 17=Frequency of sex with unfamiliar partner in the past year. *Significant at $p<.05$, **Significant at $p<.01$. ***Significant at $p<.001$.

Table 5: DSM-IV-TR Axis I Diagnosis by Group

Diagnosis	Non-ADHD $n = 48$		ADHD $n = 44$		Group Contrasts
	N	*(%)*	*N*	*(%)*	
CD: Childhood Onset	0	0	2	4.5	$\chi^2(1,N=92) = 2.230$, $p = .135$
CD: Adolescent Onset	0	0	6	13.6	$\chi^2(1,N=92) = 7.002$, $p = .008$**
MDD Current	0	0	0	0	*N/A*
MDD Past	6	12.5	26	60.5	$\chi^2(1,N=91) = 22.888$, $p = .000$***
Dysthymia Current	0	0	1	2.3	$\chi^2(1,N=92) = 1.103$, $p = .294$
Dysthymia Past	0	0	3	6.8	$\chi^2(1,N=92) = 3.383$, $p = .066$
Manic Episode Current	0	0	0	0	*N/A*
Manic Episode Past	0	0	0	0	*N/A*
Panic Current	3	6.3	6	13.6	$\chi^2(1,N=92) = 1.419$, $p = .234$
Social Phobia Current	4	8.3	11	25	$\chi^2(1,N=92) = 4.673$, $p = .031$*
Specific Phobia Current	8	16.7	14	31.8	$\chi^2(1,N=92) = 2.896$, $p = .089$
Generalized Anxiety Disorder	4	8.3	9	20.5	$\chi^2(1,N=92) = 2.780$, $p = .095$
OCD Current	0	0	0	0	*N/A*
Anorexia Current	0	0	0	0	*N/A*
Bulimia Current	1	2.1	1	2.3	$\chi^2(1,N=92) = .004$, $p = .950$
Alcohol Dependence Current	2	4.2	4	9.1	$\chi^2(1,N=92) = .913$, $p = .339$
Alcohol Dependence Lifetime	3	6.3	9	20.5	$\chi^2(1,N=92) = 4.084$, $p = .043$*
Alcohol Abuse Current	6	12.5	15	34.1	$\chi^2(1,N=92) = 6.075$, $p = .014$*
Alcohol Abuse Lifetime	7	14.6	19	43.2	$\chi^2(1,N=92) = 9.261$, $p = .002$**
Substance Dependence Current	1	2.1	5	11.4	$\chi^2(1,N=92) = 3.243$, $p = .072$
Substance Dependence Lifetime	1	2.1	5	11.4	$\chi^2(1,N=92) = 3.243$, $p = .072$
Substance Abuse Current	4	8.3	7	15.9	$\chi^2(1,N=92) = 1.252$, $p = .263$

Note. CD = Conduct Disorder. MDD = Major Depressive Disorder. OCD = Obsessive Compulsive Disorder. DSM-IV = Diagnostic and Statistical Manual, 4th revision. *Significant at $p<.05$. **Significant at $p<.01$. ***Significant at $p<.001$.

Table 6: ADHD and Individual HSBQ Items

Step and Variable						
Age of first sexual experience (not intercourse)	*df*	*F*	R^2	$R^2\Delta$	SE	B
Step 1	1, 75	7.631*	.092	092		
AUDIT Total Score					.038	-.304**
Step 2	2, 74	4.652*	.112	.019		
ADHD					.383	.208
Age of First Sex	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	3, 55	3.125*	.146	.146		
Current Age					.144	.182
Current Anxiety Diagnosis					.370	.194
Past MDD					.407	.188
Step 2	1, 54	2.302*	.146	.000		
ADHD					.452	.008
Number of Sexual Partners, Past Year	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 57	1.051*	.019	.019		
Ethnicity					.769	-.138
Step 2	1, 56	3.715	.061	.042		
ADHD					.391	.206
Failure to Use Effective Prophylactic methods	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 60	3.041	.048	.048		
WTAR Standard Score					.015	-.220
Step 2	1, 59	1.675	.054	.005		
ADHD					.318	-.074
Failure to Use Condoms	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	2, 59	4.829*	.141	.141		
WTAR Standard Score					.021	-.302*
AUDIT Total Score					.045	.263*
Step 2	1, 58	4.169*	.177	.037		
ADHD					.443	.197
Frequency: Past year forgot to use prophylactic due to substance use	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 61	.989	.016	.016		
ADHD					.191	.126
Frequency: Past year sex under the influence of	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 61	.105	.002	.002		
Race: Caucasian					.009	.041
Step 2	2, 60	.807	.026	.024		
ADHD					.312	.159

Table 6 Continued

Frequency: Past year sex with unfamiliar partner	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	3, 58	5.665*	.227	.227		
Gender					.218	-.305*
WTAR Standard Score					.010	-.266*
Childhood Conduct					.593	.160
Step 2	4, 57	4.887*	.255	.029		
ADHD					.204	.173

Dichotomous Outcome Variables
Step and Variable

Ever have sexual intercourse?	*df*	Wald	SE	β	Exp(β)	95% C.I.
Step 1	1					
AUDIT Total	1	10.364**	.062	.200	1.222	1.082-1.381*
Step 2	2					
ADHD	1	.794	.501	-.447	.640	.239-1.709
Ever pregnant?	***df***	**Wald**	**SE**	**β**	**Exp(β)**	**95% C.I.**
Step 1	1					
ADHD	1	.019	1.438	.201	1.222	.073-20.466
Ever treated for STD?	***df***	**Wald**	**SE**	**β**	**Exp(β)**	**95% C.I.**
Step 1	1					
ADHD	1	1.009	.865	.869	2.384	.438-12.980
Contracted STD in past 12 months?	***df***	**Wald**	**SE**	**β**	**Exp(β)**	**95% C.I.**
Step 1	1					
ADHD	1	.000	28420.721	-19.817	.000	.000

Note. ADHD=Attention-Deficit/Hyperactivity Disorder. STD=Sexually Transmitted Disease. AUDIT=Alcohol Use Disorders Identification Test. WTAR=Wechsler Test of Adult Reading. *Significant at $p<.05$, **Significant at $p<.01$. ***Significant at $p<.001$.

Table 7: Gender and ADHD

Step and Variable						
Age of first sexual experience (not intercourse)	*df*	*F*	R^2	$R^2\Delta$	SE	B
Step 1	1, 75	7.631**	.092	.092		
AUDIT Total Score					.038	-.304**
Step 2	3, 73	.890	.114	.022		
ADHD					.385	.144
Gender					.377	-.048
Step 3	4, 72	7.366**	.196	.082		
ADHDXGender					.730	.996**
Age of First Sex	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	3, 55	3.125*	.146	.146		
Current Age					.144	.182
Current Anxiety					.370	.194
Past MDD					.407	.188
Step 2	5, 53	.034*	.147	.001		
ADHD					.463	.015
Gender					.400	.034
Step 3	6, 52	1.245	.167	.020		
ADHDXGender					.821	.532
Number of Sexual Partners, Past Year	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 57	4.783*	.077	.077		
Ethnicity					.848	.278
Step 2	3, 55	2.683	.128	.050		
ADHD					.426	.091
Gender					.447	-.197
Step 2	4, 54	1.987	.128	.001		
ADHDXGender					.887	.089
Failure to Use Effective Prophylactic methods	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 60	3.041	.048	.048		
WTAR Standard Score					.015	-.220
Step 2	3, 60	.234	.056	.008		
ADHD					.323	-.080
Gender					.336	-.047
Step 2	4, 59	3.512	.111	.055		
ADHDXGender					.662	.856

Table 7 Continued

Failure to Use Condoms	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	2, 59	4.829*	.141	.141		
WTAR Standard Score					.021	-.302*
AUDIT Total Score					.045	.263*
Step 2	4, 57	3.729*	.240	.099		
ADHD					.431	.218
Gender					.445	.258*
Step 3	5, 56	5.267*	.305	.065		
ADHDXGender					.853	.937*
Frequency: Past year forgot to use prophylactic due to substance use	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	2, 60	.492	.016	.016		
ADHD					.194	.128
Gender					.199	.013
Step 2	3, 59	.214	.020	.004		
ADHDXGender					.405	-.215
Frequency: Past year sex under the influence of substances	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 61	.105	.002	.002		
Race: Caucasian					.009	.041
Step 2	3, 59	1.312	.044	.043		
ADHD					.314	.141
Gender					.319	-.136
Step 3	4, 58	.207	.048	.003		
ADHDXGender					.649	-.210
Frequency: Past year sex with unfamiliar partner	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	2, 59	4.823*	.141	.141		
WTAR Standard					.010	-.310*
Childhood Conduct					.600	.237
Step 2	4, 57	4.887**	.255	.115		
ADHD					.204	.173
Gender					.216	-.291*
Step 3	5, 56	3.923**	.259	.004		
ADHDXGender					.435	-.237

Table 7 Continued

Dichotomous Outcome Variables

Step and Variable						
Ever have sexual intercourse?	*df*	Wald	SE	β	Exp(β)	95% C.I.
Step 1	1					
AUDIT Total Score	1	10.364**	.062	.200	1.222	1.082-1.381*
Step 2	3					
ADHD	1	.625	.517	-.409	.664	.241-1.831
Gender	1	4.749	.531	-1.158	.314	.111-.890*
Step 3	4					
ADHDXGender	1	.152	1.024	-.400	.671	.090-4.988
Ever pregnant?	*df*	Wald	SE	β	Exp(β)	95% C.I.
Step 1	2					
ADHD	1	.042	1.461	.299	1.349	.077-23.654
Gender	1	.167	1.461	.597	1.817	.104-31.862
Step 2	3					
ADHDXGender	1	.000	29879.15	-36.822	.000	.000
Ever treated for STD?	*df*	Wald	SE	β	Exp(β)	95% C.I.
Step 1	2					
ADHD	1	.861	.889	.825	2.283	.399-13.047
Gender	1	.000	6291.857	-19.327	.000	.000
Step 2	3					
ADHDXGender	1	.000	12710.085	-.825	.438	.000
Contracted STD in past 12 months?	*df*	Wald	SE	β	Exp(β)	95% C.I.
Step 1	2					
ADHD	1	.000	5579.230	17.867	57466720.185	.000
Gender	1	.000	5790.863	-17.759	.000	.000
Step 2	3					
ADHDXGender	1	.000	15128.083	-18.638	.000	.000

Note. ADHD=Attention-Deficit/Hyperactivity Disorder. STD=Sexually Transmitted Disease. AUDIT=Alcohol Use Disorders Identification Test. WTAR=Wechsler Test of Adult Reading. *Significant at $p<.05$, **Significant at $p<.01$. ***Significant at $p<.001$.

Table 8: Parent Child Closeness and ADHD

Step and Variable						
Age of first sexual experience (not intercourse)	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 75	7.631	.092	.092		
AUDIT Total Score					.038	-.304**
Step 2	3, 73	2.201	.144	.052		
ADHD					.382	.118
PCCS					.024	-.182
Step 3	4, 72	2.269	.170	.026		
ADHDXPCCS					.050	.943
Age of First Sex	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	3, 55	3.125	.146	.146		
Current Age					.144	.182
Current Anxiety Diagnosis					.370	.194
Past MDD Diagnosis					.407	.188
Step 2	5, 53	.082	.148	.003		
ADHD					.466	-.005
PCCS					.027	-.053
Step 3	6, 52	2.766	.191	.043		
ADHDXPCCS					.054	1.310
Number of Sexual Partners, Past Year	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 57	4.783	.077	.077		
Ethnicity					.848	.278
Step 2	3, 55	1.902	.094	.017		
ADHD					.435	.124
PCCS					.035	.054
Step 3	4, 54	1.503	.100	.006		
ADHDXPCCS					.071	.553
Failure to Use Effective Prophylactic methods	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 60	3.041	.048	.048		
WTAR Standard Score					.015	-.027
Step 2	3, 58	.364	.060	.012		
ADHD					.324	-.061
PCCS					.023	.081
Step 3	4, 57	.175	.063	.003		
ADHDXPCCS					.035	.142

Table 8 Continued

Failure to Use Condoms	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	2, 59	4.829*	.141	.141		
WTAR Standard Score					.021	-.302*
AUDIT Total Score					.045	.263*
Step 2	4, 57	1.903	.194	.054		
ADHD					.448	.219
PCCS					.032	.133
Step 3	5, 56	.069	.195	.001		
ADHDXPCCS					.064	.197
Frequency: Past year forgot to use prophylactic due to substance use	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	2, 60	1.721	.054	..054		
ADHD					.192	.162
PCCS					.014	.199
Step 2	3, 59	.231	.058	..004		
ADHDXPCCS					.021	.129
Frequency: Past year sex under the influence of substances	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	1, 61	.105	.002	.002		
Race: Caucasian					.009	.041
Step 2	3, 59	.757	.027	.025		
ADHD					.317	.161
PCCS					.024	.024
Step 3	4, 58	.155	.029	.003		
ADHDXPCCS					.049	-.340
Frequency: Past year sex with unfamiliar partner	*df*	*F*	R^2	$R^2\Delta$	SE	β
Step 1	3, 58	5.665*	.227	.227		
Gender					.218	-.305*
WTAR Standard Score					.010	-.266*
Childhood Conduct					.593	.160
Step 2	5, 56	4.926*	.305	.079		
ADHD					.201	.137
PCCS					.015	-.237*
Step 3	4, 55	5.526*	.376	.071		
ADHDXPCCS					.028	-1.705*

Note. ADHD=Attention-Deficit/Hyperactivity Disorder, PCCS=Parent-Child Closeness Scale. WTAR=Wechsler Test of Adult Reading. *Significant at $p<.05$, **Significant at $p<.01$. ***Significant at $p<.001$.

Table 9: Parent Child Closeness and ADHD: Dichotomous Outcome Variables

Step and Variable	*df*	Wald	SE	β	Exp(β)	95% C.I.
Ever have sexual intercourse?						
Step 1	1					
AUDIT Total Score	1	10.364**	.062	.200	1.222	1.082-1.381
Step 2	3					
ADHD	1	.997	.511	-.510	.600	.221-1.635
PCCS	1	.606	.027	.021	1.021	.969-1.076
Step 3	4					
ADHDXPCCS	1	.035	.053	-.010	.990	.892-1.099
Ever pregnant?	*df*	Wald	SE	β	Exp(β)	95% C.I.
Step 1	2					
ADHD	1	.097	1.482	.461	1.586	.087-28.969
PCCS	1	1.365	.076	-.088	.915	.789-1.062
Step 2	3					
ADHDXPCCS	1	.829	.578	-.526	.591	.190-1.834
Ever treated for STD?	*df*	Wald	SE	β	Exp(β)	95% C.I.
Step 1	2					
ADHD	1	.285	.903	.483	1.620	.276-9.517
PCCS	1	3.078	.147	.258	1.295	.970-1.728
Step 2	3					
ADHDXPCCS	1	.016	.298	-.037	.963	.537-1.727
Contracted STD in past 12 months?	*df*	Wald	SE	β	Exp(β)	95% C.I.
Step 1	2					
ADHD	1	.000	5623.991	17.504	3986436	.000
PCCS	1	.776	.310	.273	1.314	.716-2.414
Step 2	3					
ADHDXPCCS	1	.000	686.786	-.273	.761	.000

Note. ADHD=Attention-Deficit/Hyperactivity Disorder. STD=Sexually Transmitted Disease. WTAR=Wechsler Test of Adult Reading. *Significant at $p<.05$, **Significant at $p<.01$. ***Significant at $p<.001$.

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