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Social Group Membership and Risk-Taking Behaviors Among College Students with ADHD Symptoms

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Social Group Membership and Risk-Taking Behaviors Among College Students with ADHD Symptoms

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Abstract

Young adults with attention-deficit/hyperactivity disorder (ADHD) symptoms are more likely than their peers to engage in risk-taking behaviors, including harmful alcohol use, consumption of illicit drugs, and risky sexual behaviors. These behaviors become more common in the general population of young adults as they enter college, particularly for those who join social groups such as Greek life and athletics. Currently, the literature regarding college students with ADHD is limited, and it is unclear whether college students with significant ADHD symptoms who participate in various social activities are more likely to engage in risky behaviors. The current study examined: (a) the degree to which inattentive and hyperactive-impulsive symptoms predict risk-taking behavior for a sample of 395 college students, and (b) whether the relationship between ADHD symptoms and risk-taking behavior is moderated by participation in social activities. Results indicated that more significant ADHD symptoms are associated with increased risk taking behaviors, including harmful alcohol consumption, illicit drug use, and risky sexual behavior. Additionally, social group membership was predictive of increased risk-taking in some cases, particularly for students affiliated with Greek organizations. Findings demonstrate the need for universities to implement preventive programs for students with ADHD symptoms and those in social groups, especially Greek life, to minimize the likelihood of negative outcomes associated with risk-taking. Universities should also continue providing services for students with ADHD to help them manage symptoms and find success in the college setting.

Social Group Membership and Risk-Taking Behaviors Among College Students with ADHD Symptoms

Chapter I

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a condition characterized by developmentally atypical levels of inattention, hyperactivity, and/or impulsivity (American Psychiatric Association [APA], 2013). ADHD is estimated to affect 5% of the population (APA; Willcutt, 2012). Behaviors associated with the disorder become apparent in early childhood, and symptoms tend to persist across adolescence and adulthood (Barkley, 2002; Biederman et al., 2006; Bussing, Mason, Bell, Porter, & Garvan, 2010).

Individuals with clinically significant ADHD symptoms experience difficulties across several domains of functioning. Differences in academic performance between children with and without ADHD are evident as early as the preschool years (DuPaul, McGoey, Eckert, & VanBrakle, 2001). Throughout their time in school, children and adolescents with ADHD are likely to be less productive and less attentive in the classroom and on homework, and more likely than their peers to have a language impairment or learning disability (Barkley, 2002). Further, compared to their peers, youth with ADHD are more often retained, less likely to graduate high school, and more often involved with the juvenile justice system. (Bussing et al., 2010).

Children and adolescents with ADHD symptoms also display social and emotional impairments. For example, research supports that they struggle to maintain prolonged reciprocal interactions, which is perceived as being unaware of their peers'

feelings and needs and leads to difficulties in developing friendships (Cordier, Bundy, Hocking, & Einfeld, 2010a, 2010b). Research has also demonstrated that young children with ADHD often have difficulty with sharing, cooperation, turn taking, and other interactive peer play behaviors, which is viewed by peers as intrusive, overbearing, or disinterested (Barkley, 2002). These social challenges in childhood often translate to more problematic social behaviors in young adulthood.

ADHD and Risk-Taking Behavior among Young Adults

Some of the common features of ADHD, such as failing to consider consequences before taking action or having difficulty following rules, are associated with risk-taking behaviors among children, adolescents, and young adults with ADHD. One such behavior is illegal and dangerous use of alcohol and other drugs. Research regarding alcohol and drug use among young adults with ADHD has yielded mixed results. Some studies, for example, have found that youth with ADHD initiate use of alcohol and drugs, such as marijuana or cocaine, earlier than their peers (Bidwell, Henry, Willcutt, Kinnear, & Ito, 2014; Dunne, Hearn, Rose, & Latimer, 2014). Other studies have demonstrated that adolescents and young adults with ADHD are more likely to report underage consumption of alcohol, use of marijuana, and experimentation with other illicit drugs (Bidwell et al., 2014; Dunne et al., 2014; Langley et al., 2010; Lee, Humphreys, Flory, Liu, & Glass, 2011). Estevez and colleagues (2016) also found that young adults with ADHD are more likely than their peers to develop substance use disorders. Further, research has demonstrated an association between symptom severity and alcohol and marijuana use, with individuals exhibiting greater ADHD symptom severity engaging in more substance use (Upadhyaya & Carpenter, 2008).

Alternatively, other research has found no differences in use of alcohol or drugs between young adults with and without ADHD (Baker, Prevatt, & Proctor, 2012; Bussing et al., 2010). Janusis and Weyandt (2010) found mixed results in a college student sample; students with ADHD were less likely to use alcohol, but more likely to use or misuse prescription stimulant medication than peers without significant ADHD symptoms.

Although it is unclear whether young adults with ADHD are more likely to consume alcohol underage or use drugs illegally, several studies have suggested that these individuals engage in more problematic drinking behaviors and have more negative alcohol-related consequences. College students with ADHD are more likely than their peers to have difficulty limiting their alcohol consumption after they have started, drink to the point of blacking out, drive after they have been drinking or using drugs, suffer an injury or get into a fight while under the influence, and have more alcohol-related conflict with their significant other (Baker et al., 2012; Glass & Flory, 2011; Lee et al., 2011; Rooney, Chronis-Tuscano, & Huggins, 2012; Rooney, Chronis-Tuscano, & Yoon, 2012; Wilens & Biederman, 2006). Also, heavier alcohol use among college students with ADHD is predictive of overall impairment, defined as total impairment across 15 domains of functioning (e.g., interactions with immediate family, educational activities) as well as problems with social relationships, ability to carry out daily activities, and in sexual interactions (Langberg, Dvorsky, Kipperman, Molitor, & Eddy, 2014). For college students in general, there is a positive association between engagement in risky sexual behavior and illicit drug and alcohol use (Brown & Vanable, 2007; Cooper, 2002; Jackson, Sher, & Park, 2005).

In addition to risk-taking by using illicit drugs and alcohol, adolescents and young adults with significant ADHD symptoms are more likely than their peers to engage in risky sexual behavior (Brown et al., 2010), defined by Cooper (2002) as "any behavior that increases the probability of negative consequences associated with sexual contact…and unplanned pregnancy" (pp. 101-102). Cooper places these behaviors in two categories: (1) indiscriminate behaviors such as having multiple or unknown partners and failing to discuss sexual risk with partners, and (2) failing to use protection against sexually transmitted infections (STIs) and unplanned pregnancy. As was the case for drug and alcohol use, ADHD symptoms are predictive of earlier initiation of sexual activity (Barkley, 2002; Flory, Molina, Pelham Jr., Gnagy, & Smith, 2006; Galera et al., 2010) as well as having a higher number of sexual partners and more frequent casual sexual encounters (Flory et al., 2006; Hosain, Berenson, Tennen, Bauer, & Wu, 2012).

By definition, risky sexual behavior places young adults at risk for facing several unwanted consequences. In 2013, the United States Centers for Disease Control and Prevention (CDC) reported an incidence rate of 20 million new STIs per year, with a prevalence rate of 110 million cases per year and a yearly national medical cost of 16 billion dollars. Individuals between the ages 15-24 comprise 50% of those new infections (CDC, 2013). Additionally, young adults who engage in risky sexual behavior have a greater likelihood of unexpected pregnancy (Flory et al., 2006). Because college students with ADHD are even more likely than their peers to encounter negative outcomes associated with sexual risk-taking, it is important to understand the factors that may influence their risk level.

Elevated Risk-Taking among College Students

College is a unique developmental period when young adults are expected to take on increased responsibility with decreased support from their parents and educators. In contrast to the highly structured routine of high school, the college setting allows individuals to make more choices about how much time they devote to academic, social, and personal activities. The college experience can be particularly difficult for students with ADHD, whose symptoms influence the way they cope with more intensive academic and social demands, less parental support, and higher expectations for self-management (Dvorsky & Langberg, 2014; Wolf, Simkowitz, & Carlson, 2009; Weyandt et al. 2013). Undergraduate students with ADHD report unique struggles upon beginning college, including challenges with the higher level of academic rigor, low motivation to complete academic and day-to-day tasks independently, and difficulties with organization and time management (Lefler, Sacchetti, & Del Carlo, 2016). In addition to the new academic world all college students face as they begin their undergraduate career, they enter a new social world as well. One choice all college students must make is the types of social commitments in which they would like to become involved, including Greek life, athletics, or other social groups.

Research has demonstrated an association between membership in particular college social groups and increased involvement in risk-taking behavior. Numerous studies have found that students in Greek organizations engage in underage alcohol use more frequently, drink more heavily, and are more likely to use illicit drugs than students who are not in Greek organizations (Bartholow, Sher, & Krull, 2003; Caudill et al., 2006; Dussault & Weyandt, 2013; Larimer, Anderson, Baer, & Marlatt, 2000; Park, Sher, &

Krull, 2008; Scott-Sheldon, Carey, & Carey, 2008; Wechsler, Kuh, & Davenport, 2009). Similarly, college athletes participate in underage binge drinking more often than non-athletes (Ford, 2007; Green, Nelson, & Hartmann, 2014; Lisha & Sussman, 2010; Martens, Dams-O'Connor, & Beck, 2006). Research regarding illicit drug use among college athletes is mixed, with some studies demonstrating that they are more likely than non-athletes to use drugs and others finding that they are less likely than their peers to do so (Lisha & Sussman, 2010). In contrast to research findings on Greek organizations and athletics, there is some evidence that being in a committed relationship can act as a protective factor against risk-taking behavior for college students. Those in committed relationships in college tend to binge drink less often, have fewer sexual partners, and report fewer mental health problems than college students who are not in committed relationships (Braithwaite, Delevi, & Fincham, 2010). It seems that some social activities in college encourage risk-taking, whereas others might deter students from engaging in possibly harmful activities. It is important for mental health professionals working in college settings to identify relationships between participation in certain social groups and dangerous student behavior so they are able to intervene and minimize the potential of negative outcomes for their students, particularly those in at-risk groups such as students with significant ADHD symptoms.

There may be differences in risk-taking behavior between males and females in college social groups. Studies have found that males in fraternities tend to drink more than females in sororities (Capone, Wood, Borsari, & Laird, 2007; Iwamoto, Cheng, Lee, Takamatsu, & Gordon, 2011; Larimer et al., 2000) and male athletes consume more alcohol and binge drink more frequently than female athletes (Yusko, Buckman, White,

& Pandina, 2008). It is also possible that college males drink more than college females regardless of social group. Gender effects must be explored further in research involving college students, including the degree to which social group membership influences the relationship between gender and risk-taking. The current study will examine the associations between gender, social group membership, and risk-taking behaviors in the context of the two categories of ADHD symptoms, inattention and hyperactivity/impulsivity.

Inattention versus Hyperactivity-Impulsivity Symptoms

It has been argued that the two subcategories of ADHD symptoms describe unique traits that cannot be combined to describe a single condition. Individuals displaying primarily hyperactive symptoms are more likely than those presenting with primarily inattentive symptoms to be impulsive, be assertive, and act without considering consequences, characteristics that are likely to be associated with risk-taking behaviors. Conversely, individuals with more inattentive symptoms tend to be more socially passive or withdrawn than those with more hyperactive-impulsive symptoms (Milich, 2001; Solanto, Pope-Boyd, Tryon, & Stepak, 2009); however, Diamond (2005) argues that individuals with high levels of inattention are distractible because they are often understimulated, and in turn may engage in thrill-seeking behaviors to help them feel engaged in a way they cannot typically attain through day-to-day activities.

Although limited, there is a growing research base regarding differences in the experiences of college students with varying presentations of ADHD symptoms. Glass and Flory (2012) surveyed a sample of 889 undergraduate students to explore the relationship between ADHD symptoms and substance use. Results suggested that the

presence of inattentive, but not hyperactive-impulsive, symptoms was positively associated with alcohol-related problems. Interestingly, ADHD symptoms were not significantly predictive of alcohol or drug use in general, but rather *problematic* alcohol consumption. These findings were later replicated by Mesman (2015), who surveyed 192 college students regarding ADHD symptoms and alcohol use. Again, Mesman found that only inattentive (not hyperactive-impulsive) symptoms were associated not with quantity of alcohol consumed, but with problematic alcohol use. Taken together, the research in this area suggests a need to study IN and HI symptom dimensions as separate and unique factors that influence behavior.

The Current Study

Although the research base concerning the experiences of college students with significant ADHD symptoms is growing, knowledge about this group is still limited. It is clear that participation in risky activities is a normative part of the college experience, especially for students in certain social groups (e.g., Greek life, athletics). Past research has demonstrated that adolescents and young adults with ADHD symptoms are prone to engaging in risk-taking behaviors, but it remains unclear what factors, other than their core symptoms, influence them to do so. Inattention and hyperactivity-impulsivity symptoms were examined separately because there is evidence that the two sets of symptoms impact behavior differently. It is important to identify the differences between symptom subcategories to provide a more complete understanding of the effects of ADHD symptoms and to better inform assessment, prevention, and treatment for individuals displaying significant ADHD symptoms. The current study aimed to address these gaps through three research questions:

1) How well does inattentive ADHD symptom frequency predict risk-taking behaviors (i.e., sexual risk-taking, alcohol use, and illicit drug use) among college students?

   Based on prior literature (e.g., Brown et al., 2010; Upadhyaya & Carpenter, 2008), it was hypothesized that that higher inattentive symptom frequency would be predictive of increased risk-taking.

2) How well does hyperactive-impulsive ADHD symptom frequency predict risk-taking behaviors (i.e., sexual risk-taking, alcohol use, and illicit drug use) among college students?

   Based on prior literature (e.g., Brown et al., 2010; Upadhyaya & Carpenter, 2008), it was hypothesized that that higher hyperactive-impulsive symptom frequency would be predictive of increased risk-taking.

3) How does participation in social activities (i.e., Greek life, sports teams, committed relationships) moderate the relationship between inattentive ADHD symptom frequency and risk-taking behaviors in college students?

   Based on existing research support (e.g., Bartholow, Sher, & Krull, 2003; Ford, 2007), it was hypothesized that higher inattention symptom frequency would interact with engagement in Greek life or sports teams to significantly predict increased risk-taking across all three risky behaviors of interest. Conversely, it was hypothesized that the interaction between being in a committed relationship and inattentive symptom frequency would be associated with lower risk-taking across all three risky behaviors based on prior research by Braithwaite and colleagues (2010).

4) How does participation in social activities (i.e., Greek life, sports teams, committed relationship) moderate the relationship between hyperactive-impulsive ADHD symptom frequency and risk-taking behaviors in college students?

   Based on existing research support (e.g., Bartholow, Sher, & Krull, 2003; Ford, 2007), it was hypothesized that higher hyperactive/impulsive symptom frequency would interact with engagement in Greek life or sports teams to be significantly associated with increased risk-taking across all three risky behaviors. Conversely, it was hypothesized that the interaction between being in a committed relationship and hyperactive/impulsive symptom frequency would be associated with lower risk-taking across all three risky behaviors based on prior research by Braithwaite et al. (2010).

Chapter II

Review of the Literature

ADHD among College Students

The estimated prevalence of ADHD in college students varies from 2% to 8% (DuPaul et al., 2001; Lee, Oakland, Jackson, & Glutting, 2008; Pryor, Hurtado, DeAngelo, Blake, & Tran, 2012; Simon, Czobor, Balint, Meszaros, & Bitter, 2009). Weyandt and colleagues (2013) note that it is challenging to determine the exact prevalence of ADHD in college settings because college students are not required to disclose their disability to the university, thus statistics are only based on the data made available voluntarily.

Young adults with ADHD are much less likely to attend college than their peers without ADHD. Barkley, Fischer, Smallish and Fletcher (2006) conducted a longitudinal assessment of hyperactive children and found that, at a mean follow-up age of 20, 32% of their participants with hyperactivity had not completed high school and significantly fewer hyperactive participants than controls had enrolled in college (21% versus 78%). In a review of the literature, Wolf, Simkowitz, and Carlson (2009) recognized that the demands placed on college students may be difficult for individuals with ADHD to manage. For example, increased academic demands are placed on students in university settings in conjunction with decreased support from parents and increased expectations for self-management. In addition, daily schedules are less structured in a way that provides more flexibility and freedom for students to decide how they want to use their time. Students who are struggling academically, socially, or emotionally must recognize that they are having difficulties and reach out for help from support systems without

being prompted by parents or teachers to do so. Wolf and colleagues note that executive functioning deficits (i.e., difficulty initiating and completing tasks) often demonstrated by individuals with ADHD could make these new responsibilities particularly challenging.

Research has supported the idea that college students with ADHD symptoms will experience more difficulties with adjustment and overall functioning than those without significant inattention or hyperactivity-impulsivity. Shaw-Zirt, Popali-Lehane, Chaplin, and Bergman (2005) found that students with ADHD symptoms self-reported significantly lower levels of college adjustment than their peers in several areas, including academic adjustment, social adjustment, personal-emotional adjustment, and attachment and goal affiliation. Shaw-Zirt et al.'s participants with ADHD symptoms also rated themselves as having lower self-esteem than control students. Similarly, Fedele, Lefler, Hartung, and Canu (2012) compared self-reported impairment between college students with and without ADHD and found that, as predicted, those with inattention and/or hyperactivity reported higher levels of impairment than controls.

Fedele and colleagues also examined sex differences within the ADHD group and were surprised to find that women with ADHD symptoms reported significantly more impairment than men with ADHD across several areas of functioning, including home life, social life, education, money, daily life, and overall impairment. The challenges these students face regarding adjustment, self-esteem, and impairment do seem to be problematic as college students with ADHD have reported a significantly lower overall quality of life than their peers (Grenwald-Mayes, 2002).

Social functioning is one area in which students with ADHD struggle when navigating a college environment. Meaux, Green, and Broussard (2009) used a qualitative

strategy to explore the social experiences of college students with ADHD symptoms and found that although peer relationships can be a beneficial coping factor for adjustment to the college setting for these individuals, they still find themselves having difficulties with maintaining positive peer relationships over time. Participants in Meaux and colleagues' interviews expressed having conflicts with peers related to their ADHD symptoms, such as interrupting others when they are talking, despite their attempts at self-management. In the study by Shaw-Zirt and colleagues (2009) described previously, participants with ADHD described themselves as having poorer social skills than typical students. Canu and Carlson (2003) explored differences in male-female interactions among college students with ADHD primarily inattentive type, ADHD combined type, and comparison students through questionnaires as well as a behavioral observation task. Participants with ADHD primarily inattentive type reported reaching dating milestones, such as their first date, later than those with ADHD combined type and comparison students; they also reported that they were less comfortable and were observed to be less assertive in the social interaction task. Finally, in contrast to most findings regarding the social functioning of college students with ADHD symptoms, Rabiner, Anastopoulos, Costello, Hoyle, and Swartzwelder (2008) found through a web-based survey that college students with ADHD symptoms did not report lower social satisfaction. The sample used by Rabiner and colleagues included only first-year students, allowing room for future research to examine social functioning among older students.

As college students with ADHD symptoms develop their social identities, they make choices about the social relationships they want to pursue and the social groups with which they become involved. It is necessary to explore the experiences of these

students as they join certain social groups. It is possible that their choices will result in positive outcomes, but their decisions may also be associated with negative consequences, such as risk-taking behaviors. Research must evaluate these experiences to determine what outcomes result from joining social groups for college students demonstrating inattention and/or hyperactivity-impulsivity. The current study sought to strengthen the research base on the social activities of college students with varying levels of ADHD symptoms.

Risk-Taking in College Social Groups

Substance use peaks during late adolescence and early adulthood (Schulenberg & Maggs, 2001), with major increases in substance use taking place during the transition from high school to college (Arria et al., 2008). These behaviors are viewed as "typical" for young adults, but are risky nonetheless. Similarly, college students view risky sexual behavior as part of the normal college experiences despite being knowledgeable about the potential negative consequences of their actions (Wills, 2013).

To learn more about factors leading to dangerous drinking behaviors in college and the associated consequences, White and Hingson (2013) conducted a review of recent literature on these topics and found that almost half of college students engage in binge drinking. The researchers also noted several negative consequences associated with heavy drinking, including physical injury, car accidents, memory loss ("blackouts"), impaired academic performance, sexual assault, alcohol overdose, and even death. These negative consequences were found to frequently occur during simultaneous consumption of both alcohol and illicit drugs.

Gender differences in risk-taking behavior among college students have been established. LaBrie, Lac, Kenney, and Mirza (2011) identified 1,592 "heavy drinking" college students via online surveys and used questionnaire responses to learn more about their sample's drinking behaviors. LaBrie and colleagues demonstrated that males tend to engage in alcohol consumption more frequently and more heavily than females. Additionally, females reported being more cautious when drinking by using more protective behavioral strategies such as planning how much alcohol they intend to consume before going out and alternating alcohol and nonalcoholic beverages.

It is clear that college is a developmental period during which young adults engage in relatively high levels of risk-taking behavior. There are likely social situations during which this behavior is more or less likely to occur. Further, there may be social groups that are more or less likely to encourage risk-taking in college. The present study explored the risk-taking behaviors of college students who participate in various social activities, such as membership to Greek life or athletics, or involvement in a committed relationship. The existing literature in this area is outlined below.

Greek life. Several studies have demonstrated that individuals in fraternities and sororities consume more alcohol than non-Greek students (Bartholow, Sher, & Krull, 2003; Larimer, Anderson, Baer, & Marlatt, 2000; Park, Sher, & Krull, 2008; Scott-Sheldon, Carey, & Carey, 2008). Virtually all Greek life members drink alcohol, and more than half report being frequent binge drinkers (i.e. drinking three or more times over two weeks) (Caudill et al., 2006; Wechsler, Kuh, & Davenport, 2009). Bartholow et al. (2003) found that these group differences are college-specific such that there are no significant differences in post-college drinking behaviors between individuals who were

in Greek life and those who were not, demonstrating that college is a period in which young adults are particularly prone to negative outcomes associated with alcohol use.

Wechsler and colleagues (2009) sought to compare the drinking behaviors of college students in Greek life versus those not involved in Greek life. Their large sample included 14,756 students across 140 colleges and universities. Results indicated that residents of fraternities and sororities were more likely than students in other living situations to state that partying and drinking were important activities to them. The survey found that 57% of fraternity members and 42% of sorority members met criteria for being a "frequent binge drinker"; however, only 21% of fraternity members and 10% of sorority members reported ever having a drinking problem, suggesting that binge drinking is perceived to be a normative behavior. Finally, Wechsler et al. found that students in Greek life were more likely than non-Greek students to have alcohol-related problems, including drinking before driving, arguments with friends while drunk, damaged property, physical injury, unplanned sexual activity, and sex without protection.

Scott-Sheldon et al. (2008) explored the health behaviors of college students, specifically the differences between those in Greek life compared with those outside of Greek life. Data were collected through questionnaires given to 1,595 undergraduate students in introductory psychology courses. Survey responses indicated that Greek members engaged in more risk-taking, including alcohol use, illicit drug use, number of sexual partners, and sex after using drugs or alcohol.

Janusis and Weyandt (2010) examined alcohol and stimulant medication use in a sample of 165 college students with and without disabilities, including ADHD. Students in the study completed surveys about self-reported stimulant use, perceived stress, and

self-reported sensation-seeking. Students in the sample with ADHD reported using less alcohol than those without ADHD; however, they reported more frequent use of stimulant medication, both prescribed and non-prescribed. It should be noted that this study only examined frequency of alcohol use rather than degree of problematic alcohol use. Additional research is needed to expand upon Janusis and Weyandt's findings.

Dussault and Weyandt (2013) explored stimulant misuse in fraternity and sorority members by surveying 1,033 undergraduate students in colleges and universities across the United States. Survey results demonstrated that Greek life members reported significantly higher rates of nonmedical stimulant use than students who were not in a fraternity or sorority. Further, findings of this study showed that Greek life members also reported a higher perceived rate of stimulant use among their peers, suggesting that fraternity and sorority members are more likely than their peers to believe stimulant misuse is typical for college students.

Finally, there may be gender differences in risk-taking among college students in fraternities and sororities. Capone, Wood, Borsari, and Laird (2007) collected self-report data from 388 college students, 21.3% of whom were involved in Greek life. The researchers found that male students who joined Greek life showed significantly higher levels of alcohol-related problems prior to attending college, as well as significantly greater increases in drinking over their first two years of college. It should be noted that the overall sample showed increases in drinking behaviors over their freshman and sophomore years, but this trend was the strongest for males in fraternities.

College athletics. Research findings concerning the drinking behaviors of athletes versus non-athletes is similar to research on Greek life, with athletes being significantly

more likely to engage in binge drinking behaviors at all and more likely to engage in frequent binge drinking than non-athletes (Ford, 2007; Green, Nelson, & Hartmann, 2014; Lisha & Sussman, 2010; Martens, Dams-O'Connor, & Beck, 2006). College athletes also experience more negative alcohol-related consequences similar to those described for students involved in Greek life, such as drinking and driving, "blacking out", and experiencing physical injury while drunk (Cadigan, Littlefield, Martens, & Sher, 2013; Martens et al., 2006).

Ford (2007) used data from a large-scale survey of college students to examine the drinking behaviors and perceived social norms related to alcohol. The sample included 12,109 students, 15% of whom were considered athletes. Results indicated that college student athletes were significantly more likely to participate in binge drinking than non-athletes. Additionally, the study found that college athletes are more likely than non-athletes to perceive binge drinking as normative, which was offered as an explanation for higher rates of consumption. Zhou and Heim (2016) obtained similar findings in the context of a qualitative study exploring alcohol use among college athletes. The researchers interviewed 22 college athletes and discovered that heavy drinking in social situations is viewed as necessary for university athletes to become members of the athlete social group, and that it is a way for college athletes to bond with teammates outside of team practice time.

The relationship between involvement in athletics and illicit drug use is unclear. Lisha and Sussman (2010) conducted a review of the studies examining the relationship between high school and college sports involvement and drug use. The researchers reviewed 15 studies evaluating illicit drug use among high school and college athletes.

The most common finding was an inverse relationship, in which sports participation was negatively associated with illicit drug use. Other studies either showed a positive association between athlete status and illicit drug use or mixed results depending on gender and type of sport (e.g., increased marijuana use for male hockey players and female soccer players). Additional research is needed to further explore this relationship.

Research regarding differences in risk-taking behaviors between male and female athletes is limited. Yusko, Buckman, White, and Pandina (2008) administered self-report questionnaires to athletes and non-athletes to learn about overall use of alcohol and illicit drugs. Among other findings, they noted that male athletes were particularly at-risk for engaging in binge drinking. Both genders, but females in particular, reported major changes in drug and alcohol use during their sports season, in which their off-season alcohol and drug use was quadruple the amount of their consumption during on-season.

Committed relationships. Only one study could be found analyzing the effects of involvement in committed relationships on risk-taking behavior among college students. Braithwaite, Delevi, and Fincham (2010) surveyed 1,621 college students about their romantic relationship status as well as their physical and mental wellbeing. Findings demonstrated that students in committed relationships, in comparison to their single peers, drank less often, were less likely to binge drink, and were less likely to engage in problematic alcohol-related behaviors such as driving while drunk. Also, as would be predicted, students in relationships had a lower number of sexual partners, and, in turn, were at a reduced risk for negative consequences related to sexual risk-taking. Finally, students who were involved in romantic relationships reported experiencing significantly fewer mental health problems. Because only one study could be found assessing the

effects of being in a committed relationship on college students' behavior, more research is needed to explore this area. The present study further examined whether involvement in a committed relationship serves as a protective factor against risk-taking behaviors for college students, with a particular focus on the effects of ADHD symptoms.

Chapter III

Method

Participants

Participants for the current study were recruited through the Trajectories Related to ADHD in College (TRAC) project, a longitudinal study examining the experiences of college students with ADHD. Two cohorts of students were assessed over four years of college. Data from Year 2 for each cohort were used for the current study because that is the year in which students typically have established their membership in certain social groups, such as Greek life. Students were from nine colleges and universities in North Carolina, Pennsylvania, and Rhode Island.

The original TRAC project sample included 456 college students across all nine colleges and universities involved in the study. There were 228 students each in the original ADHD and comparison groups. There were 395 students who returned to the TRAC Project in Year 2, who served as the participant sample for the current study. The present study's sample consisted of 207 females (52.4%) and was primarily Caucasian (71.9%). Participants ranged in age from 18 to 23 years old (M = 19.23; SD = 0.55).

Procedures

College students were recruited through fliers, Facebook posts, freshman orientation sessions, office of disability service referrals, and visits to speak with freshman classes. During Year 1 for each cohort, students who expressed interest in the study participated in a screening assessment with a graduate research assistant to determine eligibility for the ADHD or comparison group. Following screening assessments, a panel of four experts reviewed participant responses to determine group

designation. The panel consisted of the three primary investigators for the TRAC study as well as another researcher in the field with extensive knowledge of adult ADHD. Decisions about group status and comorbid diagnoses required unanimous agreement among all panel members. Group status was determined by three different measures (see Screening Measures section). Eligible students then met with a graduate research assistant two more times to complete additional questionnaires, interviews, and tasks. Finally, participants completed a series of online surveys over the span of two weeks intended to capture day-to-day life experiences of college students with and without ADHD. In Years 2, 3, and 4, each cohort completed (or will complete) assessment measures in meetings with a graduate research assistant as well as the online surveys.

Data accuracy was checked for 100% of data prior to data entry by a graduate research assistant other than the one who completed the assessment with a particular student. Additionally, 30% of data were double-checked for accuracy once again after being entered into the database.

Screening Measures

ADHD Rating Scales. Three different versions of the same questionnaire were administered to obtain the participant's ratings of his or her ADHD symptoms in childhood and over the past 6 months, as well as the participant's parent's ratings of the participant's ADHD symptoms as a child and over the past 6 months. The ADHD Rating Scale-IV (DuPaul, Power, Anastopoulos, & Reid, 1998) was originally developed to collect parent and teacher ratings of a child or adolescent's ADHD symptoms. The scale was adapted for the purposes of the current study to serve a new purpose as a self-report measure, in addition to one of its original purposes as a parent report measure. The

questionnaire includes 18 items to assess DSM-IV ADHD symptoms, including nine inattention and nine hyperactive-impulsive behaviors. Raters indicate the frequency with which the child or adolescent displays certain ADHD symptoms on a 4-point scale, ranging from 0 (*never or rarely*) to 3 (*very often*). The original ADHD Rating Scale-IV has adequate reliability and validity (DuPaul et al.).

The following sections outline the inclusion criteria for each of the ADHD Rating Scales. Please see Table 1 for an overview of all inclusion criteria.

Self-report: Childhood version. Individuals interested in the study first completed the self-report version of the ADHD rating scale to indicate symptom presentation as a child (i.e. prior to age 12). If the person took medication for behavior management purposes as a child, they completed the scale twice, once describing their behavior while on medication and another when they were not on medication. Eligibility for the ADHD group was indicated by endorsement of four or more symptoms of inattention, hyperactivity-impulsivity, or both. Students were eligible for the control group if they reported three or fewer symptoms in both categories.

Cronbach's alpha coefficients for the current sample on this scale ranged from 0.78 (inattention while on medication) to 0.94 (inattention while off medication). Correlations between inattention symptom ratings and ratings on the Conners' Adult ADHD Rating Scale- Self Report: Long Version (CAARS; Conners, Erhardt, & Sparrow, 1999) inattention subscale scores were 0.45 (on medication) and 0.89 (off medication). Correlations between hyperactivity-impulsivity ratings and the hyperactivity-impulsivity subscale of the CAARS were 0.68 (on medication) and 0.86 (off medication).

Self-report: Past 6 months. The screener also included a self-report ADHD rating scale regarding current (i.e. over the past 6 months) symptoms. This was completed in the same way as the childhood self-report version, with individuals taking medication for behavior management purposes over the past 6 months reporting on their behavior twice, rating their behavior both while on and off medication. Eligibility for both groups was the same as for the childhood scale.

Cronbach's alpha coefficients for the current sample on this scale ranged from 0.75 (hyperactivity-impulsivity while on medication) to 0.94 (inattention while off medication). Correlations between inattention symptom ratings and ratings on the CAARS inattention subscale scores were 0.27 (on medication) and 0.90 (off medication). Correlations between hyperactivity-impulsivity ratings and the hyperactivity-impulsivity subscale of the CAARS were 0.58 (on medication) and 0.92 (off medication).

Parent version. With participant permission, ADHD rating scales were mailed to parents following the screening meeting. One parent per student rated the potential participant's behavior both in childhood and over the past 6 months. If the potential participant was previously or currently taking medication for behavior management purposes, the parent completed ratings based on behaviors demonstrated while off medication. Parents had to endorse four or more symptoms on inattention, hyperactivity-impulsivity, or both for participants who rated themselves as having four or more symptoms to remain eligible for the ADHD group.

For the childhood scale, Cronbach's alpha coefficients were 0.96 for inattention and 0.92 for hyperactivity-impulsivity. The correlation between inattention symptom ratings and CAARS inattention subscale scores was 0.61, and the correlation between

hyperactivity-impulsivity ratings and the hyperactivity-impulsivity subscale of the CAARS was 0.49. For the current behavior ratings, Cronbach's alpha coefficients were 0.94 for inattention and 0.89 for hyperactivity-impulsivity. The correlation between current inattention symptom ratings and CAARS inattention subscale scores was 0.58, and the correlation between current hyperactivity-impulsivity ratings and the hyperactivity-impulsivity subscale of the CAARS was 0.50.

Semi-Structured ADHD Interview. A semi-structured interview was developed to evaluate the presence of ADHD symptoms and their impact on the student's life. The interview was initially developed based on DSM-IV-TR criteria for adult ADHD (American Psychiatric Association, 2000) and later adapted based on DSM-5 criteria (American Psychiatric Association, 2013) once the new criteria were introduced; participants completed the DSM-IV-TR version in their first year of the study during eligibility meetings, and the DSM-5 version during subsequent years as symptoms were reassessed. This measure consisted of two sets of nine questions, one assessing inattention symptoms and one assessing hyperactivity-impulsivity symptoms. Participants responded to questions with "yes" or "no", indicating whether they had often displayed that symptom over the past 12 months. If a symptom was endorsed, a follow-up question was asked to learn about the situations in which the symptom was present. Finally, participants who indicated they had four or more symptoms for a set of nine items were asked additional questions about the level of impairment caused by the symptoms and the age at which they began displaying symptoms. Initial criteria for the ADHD group were six or more symptoms in either or both categories, and the presence of symptoms prior to age 12.The criteria changed for the second cohort of participants when the DSM-5 was

released; at that point, participants were considered part of the ADHD group if they reported five or more symptoms and the presence of symptoms prior to age 12. Because DSM-5 criteria were less stringent than DSM-IV-TR criteria, all participants in the ADHD group met DSM-5 criteria for ADHD. The criterion for the control group was no more than 3 symptoms indicated on both sets of questions.

The internal consistency for symptom responses on the semi-structured interview was 0.90 for attention and 0.85 for hyperactivity-impulsivity. Correlations between responses on the interview and CAARS scores were 0.78 for inattention and 0.84 for hyperactivity-impulsivity.

Structured Clinical Interview for DSM Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1996). The SCID-I was used to examine the presence of clinical disorders other than ADHD. SCID-I modules administered for the current study included Mood Episodes, Mood Disorder, Anxiety Disorders, Somatoform Disorders, and Eating Disorders. Interview findings and supplemental notes from graduate student assistants were reviewed by a panel of four experts, including the three primary investigators and another expert in the field with extensive knowledge of adult ADHD. A potential participant would be excluded from the study if it was believed that their ADHD symptoms could be better explained by another disorder (e.g., generalized anxiety disorder, major depression).

The SCID-I has moderate test-retest reliability, ranging from 0.35 to 0.78 (Zanari et al., 2000). It also has good interrater reliability, ranging from 0.57 to 1.0 (Lobbestael et al., 2010). This measure has been considered the "gold standard" for obtaining clinically accurate diagnoses in adults (Shear et al., 2000; Steiner et al., 1995).

Independent and Dependent Variables

Demographic Form. Participants reported demographic information, including age, gender, race, and ethnicity during their initial assessments each year. Gender was included as a covariate in the current study.

Conners' Adult ADHD Rating Scale – Self Report: Long Version (CAARS). The CAARS (Conners, Erhardt, & Sparrow, 1999) is a rating scale designed to assess ADHD symptom frequency in adults. The measure contains 66 items rated by participants on a 4-point Likert scale, ranging from 0 (*not at all/never*) to 3 (*very much/very frequently*) intended to capture how often the rater demonstrates certain ADHD symptoms. According to the CAARS manual, the scale has adequate factorial, discriminant, and construct validity. The CAARS contains the following eight subscales with internal consistency reliability coefficient for males and females, respectively: Inattention/Memory Problems (0.89, 0.89), Hyperactivity/Restlessness (0.88, 0.89). Impulsivity/Emotional Lability (0.86, 0.87). Problems with Self-Concept (0.88, 0.87), *DSM-IV* Inattentive Symptoms (0.81, 0.84), *DSM-IV* Hyperactive-Impulsive Symptoms (0.64, 0.75), *DSM-IV* ADHD Symptoms Total (0.78, 0.86), and ADHD Index (0.82, 0.81). The *DSM-IV* Inattentive Symptoms and *DSM-IV* Hyperactive-Impulsive Symptoms subscales were used as independent variables for the current study.

Social History Interview. A social history interview developed by the researchers was used to learn about participants' involvement in social activities in college. Participants were asked two questions about each activity, including whether they were involved in the activity since the researchers last met with them (approximately one year prior) and whether they were currently involved in the activity. Activities

included in the interview that were assessed in the present study were participation in a fraternity/sorority and membership on a university sports team. Additionally, the students were asked whether they had been in a committed relationship since the prior wave of data collection, how many different committed relationships they had over that time period, and whether they were currently in a committed relationship. The answers to the "current" items (three separate responses of "yes" or "no", indicating presence or absence of participation in each activity over the past year) were included in this study as moderator variables.

Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST). The ASSIST (W. H. O. Group, 2002) is a structured interview designed to gather information regarding lifetime and current use of various types of drugs and alcohol. The interview contains eight questions, and the interviewee provides 10 separate answers for each question about their use of 10 different substances. All substances on the scale except tobacco were examined in the study as dependent variables. Two separate dependent variables were created using the ASSIST, the total score for all items related to alcohol and the sum of the seven total scores for illicit drugs measured on the ASSIST (cannabis, cocaine, amphetamine type stimulants, inhalants, sedatives, hallucinogens, and opioids). It should be noted that the ASSIST variables in the current study reflect not only the quantity and frequency substance use, but also the degree of problematic use of alcohol and illicit drugs. There are skip rules for substances never used or not currently being used by the interviewee. According to the ASSIST manual, the scale has high reliability. Of the substances included in the current study, data in the manual indicates that Cronbach's alpha coefficients range from 0.85 for cannabis and opioids to 0.92 for

alcohol. The scale has adequate concurrent, construct, and discriminative (i.e. the ability to discriminate between low-, moderate-, and high-risk substance users) validity (Humeniuk et al., 2008).

Sexual Risk Survey (SRS). The SRS (Turchik & Garske, 2009; Turchik, Walsh, & Marcus, 2015) is a 23-item questionnaire used to evaluate sexual risk-taking behaviors among college students. Respondents completing the scale report the number of times they have engaged in certain sexual risk behaviors over the past 6 months. Frequencies are coded into five ordinal categories of 0 to 4 using the coding procedures recommended by Turchik et al. (2015) to avoid positively skewed data. Total scores can range from 0 to 92, with higher scores indicating more frequent sexual risk-taking. A total risk score is calculated by totaling responses to all the items, with a higher score indicating more engagement in risky sexual behaviors. The total score was used as a dependent variable. The internal consistency for the scale is adequate, with a Cronbach's alpha of 0.90.

Data Analytic Procedure

First, descriptive statistics for all measures were calculated. Assumptions were checked before analyses, including normality using skewness and kurtosis, linearity using tolerance and VIF measures, and outliers using Cook's *D* and studentized residuals. A post-hoc power analysis using G-Power3 software (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that the sample size allowed sufficient power to detect a medium effect size ($r^2 = 0.15$).

Research Questions 1 and 2. Simultaneous multiple linear regression was used to answer the first and second research questions regarding the degree to which inattentive and hyperactive/impulsive symptoms predict risk-taking behaviors, including

risky alcohol use, illicit drug use, and sexual risk-taking. The hypothesis for the first research question was that higher inattentive symptom frequency would be predictive of higher risk-taking across all three risk behaviors being assessed. Similarly, the hypothesis for the second research question was that higher hyperactive/impulsive symptom frequency would be predictive of higher degrees of all three risk-taking behaviors.

The independent variables for this analysis were the CAARS *DSM-IV* Inattentive Symptoms and *DSM-IV* Hyperactive-Impulsive Symptoms subscale *T*-scores. The dependent variables were the total alcohol score from the ASSIST, the sum of the seven illicit drug total scores from the ASSIST, and the total score from the SRS. In addition, gender was included as a covariate based on prior research (e.g., Capone, Wood; Yusko, Buckman, White, & Pandina, 2008) supporting potential gender differences in risk-taking behavior. These analyses were examined at the .05 alpha level.

Research Questions 3 and 4. Next, hierarchical regression analyses were used to answer the third and fourth research questions regarding the extent to which participation in social activities (Greek life, sports teams, and committed relationships) moderates the relationship between ADHD symptom frequency and risk-taking behaviors. It was hypothesized that higher inattentive symptom frequency paired with participation in Greek life or sports teams would predict more alcohol use, more illicit drug use, and more frequent risky sexual behavior. The hypothesis for committed relationships predicted that the interaction between inattentive symptom frequency and involvement in a committed relationship would be significantly predictive of lower risk-taking. The hypotheses for research question four regarding hyperactive/impulsive symptoms aligned with those for inattentive symptoms in research question three. It was hypothesized that

higher hyperactive/impulsive symptom frequency paired with participation in Greek life or sports teams would predict more alcohol use, more illicit drug use, and more sexual risk-taking. Finally, it was hypothesized that the interaction between hyperactive/impulsive symptom frequency and involvement in a committed relationship would be significantly predictive of lower risk-taking. Six different analyses were conducted to evaluate the interaction between each of the two symptom categories with each of the three social activity moderators.

It is recommended by Aiken and West (1991) to use regression rather than analysis of variance (ANOVA) for moderation analyses because regression allows the researcher to examine a continuous independent variable (e.g., frequency of inattentive symptoms), which provides more detailed results to interpret. The independent and dependent variables were the same as those used for the first research question. Gender was also included as a covariate for analyses of research questions 3 and 4. Variables were entered in the following order: ADHD symptoms (CAARS inattentive or hyperactive/impulsive symptoms) and gender at Step 1, the moderating variable (Greek life, sports team, or committed relationship) at Step 2 to evaluate main effects, and the interaction term of each moderator (e.g., Greek life x inattentive symptoms) at Step 3. Six different interaction terms were created to reflect interactions between each of the two ADHD symptom categories and each of the three social activities. The independent variables were centered to ensure invariance of slope coefficients and reduce multicollinearity of predictor variables. All social activity participation responses were coded as a binary "yes" or "no" indicating whether the student was currently involved (at

the time of data collection) with a particular activity. These analyses were also examined at the .05 alpha level.

Chapter IV

Results

First, the distributional properties of all continuous independent and dependent variables were explored to evaluate the normality of the data. Descriptive statistics are provided in Table 2. Table 8 includes data regarding correlations between predictor variables. Skewness and kurtosis were in the recommended range of -2.00 to +2.00 (Lomax, 2001) for the CAARS IN T-score, CAARS HI T-score, and SRS total score. Skewness was outside of the recommended range for the ASSIST illicit drug score (2.88), and kurtosis was outside of the recommended range for both the ASSIST alcohol (3.71) and the ASSIST illicit drug (9.59) scores. Thus, a log+1 transformation, based on recommendations by Winer (1971), was used for both the ASSIST alcohol and ASSIST illicit drug scores. Skewness and kurtosis were in the acceptable range for both transformed variables, and the latter were used for all analyses.

Frequency data for each moderator variable are provided in Table 3. It should be noted that there were only 20 students, 5.3% of the sample, who reported current participation in varsity sports. Thus, a new variable was created including students who reported any current sports team involvement, including varsity, club, and intramural teams (n = 97). The latter variable was used in all analyses.

Linearity was examined for all predictor variables using tolerance and VIF measures. Based on recommendations by Studenmund (2001), it was determined that VIF statistics greater than 5 and tolerance statistics above 0.2 would be considered acceptable. VIF and tolerance were in the acceptable range for all predictor variables. Next, the data for the outcome variables (ASSIST alcohol total, ASSIST illicit drug total, and SRS total)

were tested for outliers, with Cook's *D* larger than 1.00 and studentized residuals outside of the -2.00 to +2.00 range considered indicative of outliers (Cook, 1977). All Cook's *D* statistics were in the acceptable range. There were studentized residuals outside of the recommended range for all three outcome variables, including six data points for the alcohol scores, 11 data points for the illicit drug scores, and 18 data points for SRS scores. Cases with outlier values remained included in the data set because there were so few relative to the larger sample, and because students with the most extreme scores of particular interest in the current study.

Research Questions 1 and 2

Simultaneous multiple linear regression analyses were used to answer the first and second research questions evaluating whether risk-taking behaviors, including risky alcohol consumption, illicit drug use, and sexual risk-taking, are predicted by inattentive and hyperactive/impulsive symptoms. Gender was included as a covariate for all analyses. See Table 4 for more detailed results of initial model regression analyses.

Risky alcohol consumption. The regression model including gender, IN, and HI as independent variables was found to predict 6.8% of the variance in risky alcohol use, which is a significant amount of the variance explained ($p < .001$). Gender was the only significant predictor ($p = .009$) when the other independent variables were held constant. Means were compared and males were found to engage in riskier alcohol consumption than females (transformed ASSIST alcohol total means: males = 0.72, females = 0.59; original ASSIST alcohol total means: males = 6.99, females = 4.67).

Illicit drug use. The regression model predicted 13.6% of the variance in risky illicit drug use, also a significant amount of variance explained ($p < .001$). IN symptom

frequency was a significant predictor of illicit drug use ($p = .012$) when HI and gender were held constant ($\beta = 0.176$; B = 0.006). This regression weight was statistically significant at the $p = .01$ level indicating that illicit drug use increased as a function of increased IN symptom frequency. HI was not a significant predictor of illicit drug use when IN and gender were held constant.

Gender was also a significant predictor of illicit drug use ($p < .001$) when IN and HI were held constant. Means were compared and males were found to engage in more risky illicit drug use than females (transformed ASSIST illicit drug total means: males = 0.56, females = 0.30; original ASSIST illicit drug total means: males = 7.19, females = 2.77).

Sexual risk-taking. The regression model predicted 15.4% of the variance in sexual risk-taking, which is a significant amount of variance explained ($p < .001$). IN symptom frequency did not significantly predict sexual risk-taking, but HI symptom frequency did ($p < .001$; $\beta = 0.319$; B = 0.277), which is significant at the $p = .01$ level indicating that sexual risk-taking behavior increased as HI symptoms were more frequent.

Gender also significantly predicted sexual risk-taking ($p < .001$) when IN and HI symptom scores were held constant. Males reported a higher mean of sexual risk-taking on the SRS than females (males = 17.11, females = 10.77).

Research Questions 3 and 4

Next, moderators were added to the model and evaluated using hierarchical regression analyses. The third and fourth research questions were used to explore the degree to which participation in social activities, including Greek life, sports teams, and committed relationships, moderated the relationship between ADHD symptom frequency

and risk-taking. The current section describes results of moderator analyses broken down by risk-taking behaviors within each social group.

Greek life. First, all three risk-taking behaviors were analyzed based on participation in Greek life along with the independent variables and covariate assessed in the first two research questions (IN, HI, and gender). The interaction terms between Greek life and each dependent variable were also created and used in these analyses. See Table 5 for more detailed results of Greek life analyses.

Risky alcohol consumption. For risky alcohol consumption analyses, there was no significant interaction effect of IN symptoms and Greek life participation. Without the interaction effect, the model including IN, gender, and Greek life participation significantly predicted risky alcohol consumption ($p < .001$), accounting for 13.7% of the variance, which is nearly twice the variance relative to the original model without Greek life included. Each independent variable also significantly predicted risky alcohol consumption when the other predictors were held constant (IN: $p < .001$; gender: $p = .028$; Greek life: $p < .001$).

There was also no significant interaction effect for HI symptoms and Greek life participation. The model including only HI, gender, and Greek life significantly predicted alcohol scores ($p < .001$), accounting for 13.0% of the variance. Again, this is almost twice the variance explained compared to the model without Greek life participation included. Each independent variable in the HI model also significantly predicted risky alcohol consumption when the other independent variables were held constant (HI: $p = .002$; gender: $p = .022$.; Greek life: $p < .001$).

When ASSIST alcohol total means were compared for those participating in Greek life versus those who were not, it was found that students in Greek life engaged in more risky alcohol consumption than those who were not in Greek life (transformed ASSIST alcohol total means: Greek = 0.84, non-Greek = 0.57; original ASSIST alcohol total means: Greek = 8.21, non-Greek = 4.65). Trends for the other predictors remained the same as in the original analyses, with being male and exhibiting more of both symptom dimensions being predictive of increased alcohol use.

Illicit drug use. The interaction effect of IN symptoms and Greek life participation was not found to significantly predict illicit drug use. The model excluding the interaction effect found that, taken together, IN, gender, and Greek life participation significantly predicted illicit drug use ($p < .001$), accounting for 14.9% of the variance. This is slightly higher than the variance accounted for in the model without Greek life. All of the predictors were also significant on their own when the other predictors were held constant, including IN symptom frequency ($p < .001$), gender ($p < .001$), and Greek life ($p = .004$).

The interaction between HI symptoms and Greek life status was not significantly predictive of illicit drug use. The model including only HI symptoms, gender, and Greek life participation significantly predicted 13.1% of the variance in illicit drug use ($p < .001$), slightly less variance accounted for compared with the model excluding Greek life. Within that model, each variable was also a unique significant predictor of illicit drug use, including HI symptoms ($p < .001$), gender ($p < .001$), and Greek life ($p = .007$).

Means were compared to evaluate illicit drug use differences between students in Greek life versus non-Greek students. Results showed that students participating in Greek

life reported more illicit drug use than those not in Greek life (transformed ASSIST illicit drug total means: Greek = 0.56, non-Greek = 0.37; original ASSIST illicit drug total means: Greek = 6.33, non-Greek = 4.15). Greater reported drug use was also predicted by males and those who exhibited higher IN and/or HI symptoms.

Sexual risk-taking. Analyses of Greek life participation and sexual risk-taking found no significant interaction between IN symptoms and Greek life status. Without the interaction effect, the model including IN, gender, and Greek life participation predicted 16.7% of the variance in sexual risk-taking. This is a significant amount of variance predicted ($p < .001$) and slightly higher than the variance accounted for without Greek life in the model. All three independent variables were significant at the $p < .001$ level for predicting sexual risk-taking when the other two independent variables were held constant.

The interaction between HI symptoms and Greek life was also not a significant predictor of sexual risk-taking. Excluding the interaction effect, the model with HI symptoms, gender, and Greek life significantly predicted sexual risk-taking ($p < .001$). This model predicted 20.0% of the variance, approximately a 5% increase in variance accounted for compared to the model without Greek life participation. Again, all three predictors were significant at the $p < .001$ level when the others were held constant.

A comparison of means found that students in Greek life reported more sexual risk-taking than those who were not members of the Greek life community, with SRS total means of 19.08 for students in Greek life and 11.75 for those who were not. Males and participants exhibiting more frequent ADHD symptoms reported engaging in more risky sexual behavior than females and participants less frequent symptoms.

Sports teams. Each risk-taking behavior was then evaluated in regard to ADHD symptom dimension (IN and HI), gender, and sports team participation. Interaction terms created between sports team status and each dependent variable were included in each model. See Table 6 for more detailed results of sports team analyses.

Risky alcohol consumption. The interaction between IN symptoms and sports team participation did not significantly predict risky alcohol consumption. In this model, gender was also not a significant predictor of alcohol use. The model with only IN symptoms, gender, and sports team status significantly predicted risky alcohol consumption ($p < .001$), accounting for 9.0% of the variance. IN symptoms and sports team participation were both unique predictors at the $p < .001$ level when other variables in the model were held constant.

The interaction between HI symptom frequency and sports team status also did not significantly predict risky alcohol consumption, nor did gender. The model including HI symptoms, gender, and sports team participation accounted for 8.4% of the variance in risky alcohol use, which is a significantly amount of variance explained ($p < .001$) and a slight increase in the variance predicted without sports team involvement in the model. HI symptoms and sports involvement both predicted alcohol use at the $p < .001$ level when the other predictors were held constant.

When means of responses on the ASSIST alcohol items were compared for students involved in sports teams versus those who were not, it was demonstrated that athletes engage in more risky alcohol consumption than non-athletes (transformed ASSIST alcohol total means: athletes = 0.79, non-athletes = 0.60; original ASSIST alcohol total means: athletes = 7.35, non-athletes = 5.11). Within this model, more

frequent IN and HI symptoms were associated with riskier alcohol use as was found in prior analyses.

Illicit drug use. The interaction between IN symptoms and sports involvement was not a significant predictor of illicit drug use. There was also no significant main effect of sports team participation on drug use. The model excluding the interaction term and sports involvement, including only IN symptoms and gender, significantly predicted illicit drug use ($p < .001$), accounting for 12.7% of the variance. This is less variance explained than in the original model with both symptom dimensions and gender. In the model with only the two significant predictors, IN symptom frequency and gender both significantly predicted illicit drug use when controlling for the other predictor.

Results for HI symptoms were similar. The interaction term for HI symptoms and sports participation was not significant for predicting illicit drug use. Sports participation alone was not a significant predictor. Without the interaction term or sports team status, the model including only HI symptoms and gender accounted for 10.6% of the variance in drug use, which is a significant amount of variance explained ($p < .001$). However, this is also less variance accounted for than in the original model with IN symptoms, HI symptoms, and gender. HI symptoms and gender were both found to uniquely predict illicit drug use at the $p < .001$ level.

Although sports team participation was not significantly associated with illicit drug use, prediction patterns for other variables remained the same as in prior analyses, with being male and exhibiting more frequent ADHD symptoms being associated with greater reported illicit drug use.

Sexual Risk-Taking. Findings for athletics and sexual-risk taking were similar to findings for athletics and illicit drug use. There was no significant interaction found between IN symptoms and sports involvement for predicting sexual-risk taking. Sports participation alone was also not a significant predictor of risky sexual behavior. The model with only IN symptoms and gender significantly predicted sexual risk-taking ($p <$ .001), accounting for 10.5% of the variance explained. This is about 5% less variance explained than in the original model including both symptom dimensions and gender. IN symptoms and gender were both significant predictors of risky sexual activity at the $p <$ .001 when controlling for the other predictor in the model.

The interaction term between HI symptom frequency and sports involvement, and sports involvement alone both did not significantly predict risky sexual behavior. The model including only HI symptoms and gender significantly predicted sexual risk-taking ($p < .001$), accounting for 14.5% of the variance, slightly less than the variance accounted for in the original model. HI symptoms and gender both significantly predicted sexual risk-taking ($p < .001$ for both variables) when the other predictor was held constant.

Again, although sports team membership was not associated with sexual risk-taking, previous patterns of higher risky sexual behavior by males and students exhibiting more frequent IN and HI symptoms remained the same.

Committed relationships. The final social activity that was evaluated as a moderator of ADHD symptoms and risk-taking behavior was involvement in committed relationships. The same data analytic procedures were used for this moderator as for Greek life participation and athletic involvement. See Table 7 for more detailed results of committed relationship analyses.

Risky alcohol consumption. The interaction term for IN symptoms and relationship status was not significant for predicting alcohol use. The model with only IN symptoms, gender, and relationship status significantly predicted risky alcohol consumption ($p < .001$), accounting for 7.7% of the variance. IN, gender, and relationship status were all significant predictors of alcohol use when controlling for the other variables (IN: $p < .001$; gender: $p = .042$.; relationship: $p = .005$).

The interaction between HI symptoms and relationship involvement was also not a significant predictor of risky alcohol use. The model excluding the interaction term, with only HI symptom frequency, gender, and relationship status predicted 7.6% of the variance in alcohol use, a significant proportion of variance explained ($p < .001$). Within that model, each variable was also a unique significant predictor of risky alcohol consumption, including HI symptoms ($p < .001$), gender ($p = .042$), and relationship status ($p = .005$).

A comparison of means found that single students reported more risky alcohol consumption on the ASSIST than students in relationships (transformed ASSIST alcohol total means: single = 0.69, relationship = 0.56; original ASSIST alcohol total means: single = 6.06, relationship = 4.82). Further, males and students exhibiting more frequent ADHD symptoms (both IN and HI) reported more risky alcohol use than females and students exhibiting less frequent ADHD symptoms.

Illicit drug use. The interaction between IN symptoms and relationship status was not found to significantly predict drug use. Relationship status alone was also not a significant predictor. Without the interaction effect or relationship status, the model including only IN symptoms and gender significantly predicted illicit drug use ($p < .001$),

accounting for 12.8% of the variance, a slight decrease from the model with IN symptoms, HI symptoms and gender. IN symptom frequency and gender were both uniquely significant predictors of drug use at the $p < .001$ when controlling for the other variable.

The interaction term for HI symptom frequency and relationship involvement, and relationship involvement alone both did not significantly predict illicit drug use. The model with only HI symptoms and gender accounted for 11.0% of the variance in drug use, a significant proportion of variance explained ($p < .001$). This was also a decrease in variance accounted for compared with the original model. HI symptoms and gender both individually predicted drug use at the $p < .001$ when the other predictor was held constant.

Again, relationship status alone did not significantly predict illicit drug use. However, the patterns from previous models for gender and ADHD symptoms remained the same. Being male and exhibiting higher frequency IN and HI symptoms were all predictive of increased illicit drug use.

Sexual risk-taking. The interaction between IN symptoms and relationship status was not a significant predictor of risky sexual behavior. There also was no significant main effect of relationship involvement alone. Without the interaction effect or relationship status, the model including only IN symptom frequency and gender significantly predicted sexual risk-taking ($p < .001$), accounting for 11.2% of the variance. IN symptoms and gender were both unique significant predictors ($p < .001$) when controlling for the other predictor, with being male and exhibiting higher IN symptoms being predictive of risky sexual behavior.

Finally, there was a significant interaction between HI symptoms and relationship status for predicting sexual risk-taking ($p = .015$; see Figure 1). A comparison of means found that single students with low HI symptoms reported engaging in less sexual risk-taking than students in relationships with low HI symptoms. However, single students with high HI symptoms reported more frequent risky sexual behavior than students in relationships with high HI symptoms.

Relationship status alone was not significantly predictive of sexual risk-taking when controlling for the HI X Relationship interaction, HI symptoms and gender. HI symptom frequency and gender were both independently predictive of risky sexual behavior at the $p < .001$ level when the other predictor variables were held constant. Males and students exhibiting more frequent HI symptoms reported more sexual risk-taking than females and students exhibiting less frequent HI symptoms.

Chapter V

Discussion

Research Questions 1 and 2

The model with the two ADHD symptom dimensions and gender predicted a significant amount of the variance in both alcohol consumption and illicit drug use. Overall, males reported more extreme use of alcohol and illicit substances. Having high IN symptoms was also a significant unique predictor of drug use. These findings expand upon the large body of research suggesting that adolescents with more ADHD symptoms engage in more risk-taking behaviors related to alcohol and illicit drug use than their peers without ADHD symptoms (Bidwell et al., 2014; Dunne et al., 2014; Langley et al., 2010; Lee, Humphreys, Flory, Liu, & Glass, 2011), indicating that this same risk-taking pattern persists into young adults' college years.

Alternatively, these findings only partially support findings by Upadhyaya and Carpenter (2008) suggesting that more severe ADHD symptoms are associated with increased alcohol and drug use. It appears that, for the college student sample in the current study, gender was a more significant predictor of risky alcohol consumption than ADHD symptoms, and only IN symptoms (not HI symptoms) were uniquely predictive of illicit drug use. This finding contradicts the expectation that individuals with high impulsivity would engage in more drug use because they would presumably act without considering the consequences of substance use. Perhaps the reason students with higher IN symptoms are more likely to use drugs is related to the theory offered by Diamond (2005), proposing that individuals with higher levels of inattention often feel

understimulated by their environment and seek ways to feel more stimulated, in this case through illicit drug use.

The model also accounted for a significant amount of the variance in sexual risk-taking, with gender and HI symptoms being two unique significant predictors. Being male and having more frequent HI symptoms were predictive of increased reported risky sexual behavior. This supports past findings by Flory et al. (2006) and Monawar Hosain et al. (2012) suggesting that higher ADHD symptoms are associated with increased sexual risk-taking. Additionally, the current study offers insight into the types of ADHD symptoms, HI symptoms in particular, that are most highly predictive of risky sexual behavior. Past research has examined the association between ADHD symptoms and sexual risk-taking in larger groups of young adults (ages 18-30), and the present study shows that this same pattern exists in a more focused group of college students, especially those with more frequent HI symptoms.

Research Questions 3 and 4

For risky alcohol consumption as an outcome, the percentage of variance accounted for increased by adding all three social moderators (Greek life participation, sports team involvement, and relationship status) to the original regression model. Students who reported higher alcohol use were those in Greek life, those playing on sports teams, and those who were single. When illicit drug use was added to each model, the percentage of variance accounted for slightly increased for Greek life, and decreased for sports team involvement and relationship status. Individuals in Greek life reported more illicit drug use than those not in Greek life.

The findings on Greek life confirm the large existing body of research on risky alcohol and illicit drug use in students with Greek life affiliations (Bartholow, Sher, & Krull, 2003; Caudill et al., 2006; Dussault & Weyandt, 2013; Larimer, Anderson, Baer, & Marlatt, 2000; Park, Sher, & Krull, 2008; Scott-Sheldon, Carey, & Carey, 2008; Wechsler, Kuh, & Davenport, 2009). The largest change in variance explained for moderators of alcohol use was for students in Greek life organizations, suggesting that although it is important to consider factors such as ADHD symptoms and gender as predictors of dangerous alcohol use, Greek life may play the largest role in predicting risky alcohol-related behaviors in college students. The importance of Greek life in predicting alcohol use is demonstrated by the larger standardized regression weights for Greek life relative to the standardized regression weights of other predictors (see Table 5). Conversely, regression weights for illicit drug use were smaller for Greek life than for ADHD symptoms or gender, indicating that Greek life is a less important factor to consider when predicting the likelihood of college students engaging in illicit drug use. Taking these results into consideration along with prior findings that students in Greek life use illicit substances more than their peers (Dussalt & Weyandt, 2013; Janusis & Weyandt, 2010; Scott-Sheldon et al., 2008), it seems that college students affiliated with Greek life are more still more likely than their peers to use illicit drugs, but that ADHD symptoms and gender are somewhat stronger predictors of this type of risk-taking.

Relative to the original models, Greek life affiliation increased the variance explained and sports team participation decreased the variance explained in sexual risk-taking. Students in Greek life reported more frequent risky sexual behavior than students not in Greek life. Sexual risk-taking analyses showed that Greek life, IN symptoms, HI

symptoms, and gender were all relatively equivalent in predicting risky sexual behavior. This is a new finding in the literature, as most existing studies have conceptualized sexual risk-taking as a negative outcome of alcohol and drug consumption, rather than as an outcome of other factors, such as ADHD symptoms, gender, and social group membership. It seems that there are more factors, other than alcohol and drug use, that university leaders should be aware of in developing initiatives for preventing risk-taking in college students.

Also, sexual-risk taking analyses demonstrated an interaction effect for HI symptoms and relationship status. Single participants with low HI reported engaging in less frequent risky sexual behavior than participants in committed relationships with low HI symptoms. Alternatively, single participants with high HI symptoms reported engaging in more sexual risk-taking than participants in relationships with high HI symptoms. This aligns with the hypothesis, based on findings by Braithwaite et al. (2010), that being in a committed relationship would serve as a protective factor against risky sexual behavior for students with significant ADHD symptoms. This demonstrates that Braithwaite and colleagues' research applies particularly well to students presenting with higher levels of hyperactive-impulsive symptoms. Professionals working with college students with ADHD symptoms can use these findings to recognize potential protective factors and potential "red flags" in assessing the likelihood of those students engaging in sexual risk-taking. Future research should seek to better understand risky sexual behaviors in college students with ADHD symptoms to determine the needs of these students and to encourage safe sex practices.

In sum, results of the current study suggest that having more ADHD symptoms is associated with increased risk-taking behavior in college students. Alcohol consumption is the major outcome most strongly impacted by social group participation, particularly for students in Greek life and single students. It appears that the association between Greek life affiliation and alcohol use is the exceptionally strong (see Table 5 standard regression weights), which could be a result of the assumption college students may have that heavy alcohol use is the norm for students in Greek life. Although Greek life participation was the strongest predictor of risky alcohol use, both types of ADHD symptoms and gender were still important predictors as well. Alternatively, illicit drug use was found to be more strongly predicted by ADHD symptoms (both IN and HI) and gender than by social group participation. Sexual risk-taking appears to be equally impacted by Greek life membership, ADHD symptoms, and gender.

A unique contribution of this study relative to other research regarding ADHD symptoms and risk-taking is the current study's consideration of the independent impact of IN and HI symptoms to behavior in the first and second research questions, versus the analysis of the two symptom types in tandem for the third and fourth research questions. Both symptom types presented as unique predictors of all types of risk-taking behaviors when analyzed separately in moderator analyses, as opposed to the first two research questions, which found that IN and HI symptoms were non-significant predictors of risk. Results suggest that ADHD as a unitary concept is more strongly predictive of alcohol use than the two symptom dimensions separately, whereas the opposite is the case for drug use and sexual risk-taking. This is an important distinction that represents the

necessity of evaluating IN and HI symptoms separately in research to allow for a more complete understanding of the unique impact of both symptom types on behavior.

Interestingly, only one significant interaction effect was found out of the 18 interaction effects that were analyzed for potential interaction between symptom dimension and social group as predictors of risk-taking behaviors. The high number of non-significant interactions suggests that the combinations between ADHD symptoms and social group membership do *not* serve as predictors of alcohol use, drug use, and risky sexual behavior. Rather, the unique presence of IN symptoms, HI symptoms, and membership to each social group should be considered individually when determining an individual's risk level.

Implications for Practice

College students with more frequent ADHD symptoms are at greater risk than their peers with less frequent ADHD symptoms for all risky behaviors evaluated in the current study, including harmful alcohol use, illicit drug use, and risky sexual activity. Thus, students who are recognized as having significant symptoms may benefit from risk prevention efforts or programs that teach safe practices for college students, similar to secondary level risk prevention practices universities currently use to target students affiliated with Greek life. Universities and researchers will need to work together to determine what prevention efforts are most effective and resource-efficient. This may include more targeted efforts such as incorporating interventions into one-on-one coaching or counseling, or universal efforts such as university-wide programs for incoming students. It should be acknowledged that universities across the United States are already implementing prevention programs with relatively little evidence

demonstrating effectiveness of those programs; this information can be taken into consideration along with findings of the current study and associated research to recognize that particular subsets of college students are continuing to engage in more risk-taking behavior than their peers. Perhaps the effectiveness of programs for certain subgroups can be evaluated and used to inform the development of new, more targeted interventions for those subgroups. Additionally, findings of this study demonstrate the importance of universities offering services to help students effectively manage their ADHD symptoms, which should in turn reduce dangerous alcohol use, drug use, and risky sexual behavior.

Notably, students affiliated with Greek life organizations are at greatest risk, even when controlling for ADHD symptom severity and gender. Although this is not a new finding, as it has been demonstrated in numerous prior studies, the current study demonstrates the ongoing need for universities to develop and test programs for preventing dangerous behaviors in Greek life communities at colleges and universities. For example, universities could implement screening for ADHD in Greek life organizations so students can receive the most intensive preventive support necessary. Further, it should be noted that ADHD symptoms and gender were also significant predictors of risk when controlling for Greek life status. Thus, efforts could also focus on these risk factors as well. For example, college-based service providers may want to give special consideration to preventing risky behaviors in students with ADHD, and university initiatives may focus more on male students than female students within Greek life communities.

Limitations and Future Directions

The findings of the current study should be interpreted in light of the study's limitations. First, it is important to recognize that the transformation of alcohol and illicit drug variables to allow for normality of data distribution limits the degree to which these results can be interpreted, though it can be noted that the non-transformed means were included in the comparison of means for each follow-up analysis for significant results and always aligned with the patterns found with the transformed data. (e.g., transformed and non-transformed alcohol variable means were both higher for males than for females).

Next, the TRAC Project, the larger study from which data for the current study were taken, dichotomized participants into ADHD and control groups. Students who were found to have only some ADHD symptoms, but not enough to be considered clinically significant, were ineligible for the TRAC Project. Thus, the sample excludes students with subclinical ADHD symptoms such that there is a gap in the continuum of symptom severity of participants. The present study's findings may not be applicable to that group of participants, which is a problem that must be addressed in future research. Further, the current study did not control for a wide range of factors that could serve as important predictors of risk-taking behaviors, such as comorbid disorders. It is likely that particular groups of college students presenting with psychopathology other than ADHD, such as anxiety or depression, either increase or decrease the likelihood that an individual will engage in alcohol use, drug use, or risky sexual behavior.

The current study only included cross-sectional data from students in their second year of college. This means that causation cannot be assumed from these data, as

causation can only be assumed when there is a temporal difference between the predictor and outcome in which the prediction event takes place earlier in time than the outcome event. Only associations between predictors and outcome variables can be assumed from the data used in the present study. Also, all data were self-report, which may impact the reliability and validity data based on the participants' understanding of interview questions and questionnaire items, and the degree to which participants were able to accurately remember their past behaviors. Recent research by Sibley and colleagues (2016) indicates that inclusion criteria used in the current study, which comprised of both self-report and parent-report, both of which were age-adjusted and norm-based, were based on methods that successfully optimize the evaluation of ADHD symptoms in adults. This suggests that initial inclusion criteria is a strength of the present study; however, data used in year two of the study were completely based on self-report, which in turn excludes the potential benefit of supplemental parent report of symptoms.

Additionally, the data only included students in their second year of college. The results can only be assumed to represent that group of students, not those who are new to college or those in their later years of college. Perhaps students who are new to social groups (often in their second year of college) behave differently than those who have been participating in social groups for a year or two. Differences in risk-taking among college students of different ages and patterns of these behaviors over time should be examined by researchers in the future. Further, researchers should continue to explore other potential predictors of risk-taking, including pre-college predictors (e.g., binge drinking in high school) and during college predictors (e.g., living in a fraternity/sorority house versus living in other campus housing).

Interpretation of athletics results is limited because data for students involved in two different levels of competition, intramural/club and varsity, were combined into one "Sports Team" variable. It is possible that the experiences of students in different types of sports teams varies. Recent research has found variations in drinking patterns of athletes based on competition level, with varsity athletes consuming higher quantities of alcohol, and intramural/club athletes drinking more frequently in more settings (Barry, Howell, Riplinger, & Piazza-Gardner, 2015; Marzell, Morrison, Mair, Moynihan, & Gruenewald, 2015). These potential differences in alcohol-related behaviors within the college athlete community have important implications for college initiatives and treatment, and should be further explored in future research.

Finally, specific differences in males versus females on the risk-taking variables should be examined to determine the specific risks associated with each gender. In general, the current study found that males are more at risk for a wide range of risk-taking behaviors. Perhaps there are certain sexual risk-taking behaviors that males or females are more likely to engage in, and having more detailed information in this area could be particularly useful to professionals seeking to develop effective prevention programs to target college students.

Conclusions

Prior research has demonstrated that young adults with significant ADHD symptoms are more likely than their peers without ADHD symptoms to engage in risk-taking behaviors, including high alcohol consumption, illicit drug use, and risky sexual behavior. This is the first study to focus specifically on ADHD symptoms as a predictor of risk-taking in college students, with an additional consideration of the effects of social

group membership on risky behavior. Findings demonstrated that IN symptoms, HI symptoms, gender, and social group participation are all major predictors of risky behavior among college students, with variation in the relative importance of each predictor for different outcomes. Greek life was shown to be the social group that has the most significant impact on risk-taking, particularly for alcohol use. Additionally, a surprising interaction was found in which being in a committed relationship was a protective factor against risky sexual behavior for students in relationships with low HI symptoms, but being in a committed relationship was associated with more sexual risk-taking for students with high HI symptoms. It is possible that students with high HI symptoms who are in committed relationships engage more than their peers in certain types of risky sexual behavior, such as frequent sexual activity without protection with their partner. Future research will need to explore what types of risky behaviors these students are engaging in the most so practitioners working with students with significant ADHD symptoms are able to provide targeted preventive interventions.

The findings of the current study can be applied to efforts by universities to prevent the likelihood of risk-taking behaviors and associated negative outcomes for students. Initiatives can be focused on the groups found to be at greatest risk, including those with high IN and HI symptoms, males, and students in Greek life. Future research should seek to replicate and expand upon findings of the current study and examine the best methods for preventing risky behaviors among college students, particularly those students with significant ADHD symptomology.

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Table 1

Screening Measures and Inclusion Criteria

Measure	ADHD Group	Control Group
ADHD Rating Scale-Childhood Version	≥4 symptoms of IN, H/I, or both	≤3 symptoms of IN and H/I
ADHD Rating Scale-Current (past 6 months)	≥4 symptoms of IN, H/I, or both	≤3 symptoms of IN and H/I
ADHD Rating Scale-Parent Version	≥4 symptoms of IN, H/I, or both	≤3 symptoms of IN and H/I
Semi-Structured ADHD Interview	≥5 symptoms of IN, H/I, or both prior to age 12	≤4 symptoms of IN and H/I
Structured Clinical Interview for DSM Disorders (SCID-I)	Exclusion criteria = symptoms better explained by another disorder	N/A

Note: IN = inattention; H/I = hyperactivity/impulsivity

Table 2
Descriptive Statistics for Independent and Dependent Variables

Variable	Mean(SD)	Skewness	Kurtosis
CAARS IN *T*-score	57.38 (16.34)	0.46	-0.87
CAARS HI *T*-score	48.64 (14.24)	0.77	-0.23
ASSIST Alcohol Total	5.77 (6.15)	1.81	3.71
Alcohol Transformed	0.66 (0.41)	-0.26	-0.75
ASSIST Illicit Drug Total	4.86 (9.13)	2.88	9.59
Illicit Drug Transformed	0.42 (0.51)	0.80	-0.68
SRS Total	13.75 (12.24)	1.19	1.65

Table 3

Frequencies of Participation for Social Activity Variables

Variable	Yes	No
Fraternity/Sorority	113 (29.7%)	268 (70.3%)
Sports Team	97 (25.6%)	282 (61.8%)
Committed Relationship	127 (33.5%)	252 (66.5%)

Note: "Sports Team" represents the variable including varsity, club, and intramural sports

Table 4
Results for Research Questions 1 and 2

Outcome	Multiple *R*	Multiple R^2	*F* (df)	*p*-value	Predictors	Unstandardized Regression Weight	Standardized Regression Weight	*p*-value
Alcohol Use	.261	.068	9.333 (3)	< .001	IN	.003	.109	.132
					HI	.003	.116	.107
					Gender	.108	.130	.009
Illicit Drug Use	.368	.136	20.073 (3)	< .001	IN	.006	.176	.012
					HI	.004	.121	.082
					Gender	.214	.209	< .001
Sexual Risk-Taking	.393	.154	23.055 (3)	< .001	IN	-.022	-.029	.671
					HI	.277	.319	< .001
					Gender	5.491	.224	< .001

Table 5

Results for Research Questions 3 and 4: Greek Life Analyses

Outcome	Multiple *R*	Multiple R^2	*F* (df)	*p*-value	Predictors	Unstd. Reg. Weight	Std. Reg. Weight	*p*-value
AlcoholxIN	.370	.137	19.615 (3)	< .001	Interaction	-.002	.003	.342
					Greek	.255	.283	< .001
					IN	.004	.171	< .001
					Gender	.089	.107	.028
AlcoholxHI	.361	.130	18.515 (3)	< .001	Interaction	-.004	-.087	.162
					Greek	.251	.278	< .001
					HI	.004	.151	.002
					Gender	.093	.112	.022
IllicitxIN	.386	.149	21.631 (3)	< .001	Interaction	-.006	-.105	.076
					Greek	.156	.140	.004
					IN	.008	.260	< .001
					Gender	.203	.199	< .001
IllicitxHI	.362	.131	18.629 (3)	< .001	Interaction	-.003	-.046	.461
					Greek	.148	.133	.007
					HI	.008	.223	< .001
					Gender	.211	.207	< .001
SRSxIN	.409	.167	24.528 (3)	< .001	Interaction	-.019	-.015	.798
					Greek	6.683	.248	< .001
					IN	.139	.186	< .001
					Gender	5.309	.216	< .001
SRSxHI	.447	.200	30.566 (3)	< .001	Interaction	-.021	-.015	.807
					Greek	6.197	.230	< .001
					HI	.227	.262	< .001
					Gender	5.187	.211	< .001

Note: The only data from Model 3 (which includes the interaction effect) of each analysis provided are the regression weights and *p*-value for the interaction effects. All other data are from Model 2 (which includes Greek life, IN/HI, and gender).

Table 6

Results for Research Questions 3 and 4: Sports Team Analyses

Outcome	Multiple *R*	Multiple R^2	*F* (df)	*p*-value	Predictors	Unstd. Reg. Weight	Std. Reg. Weight	*p*-value
AlcoholxIN	.300	.090	12.123 (3)	< .001	Interaction	< .001	-.002	.974
					Sports	.180	.191	< .001
					IN	.005	.205	< .001
					Gender	.069	.084	.101
AlcoholxHI	.289	.084	11.220 (3)	< .001	Interaction	-.002	-.033	.559
					Sports	.171	.181	< .001
					HI	.006	.188	< .001
					Gender	.074	.089	.082
IllicitxIN	.357	.128	18.020 (3)	< .001	Interaction	-.001	-.012	.830
					Sports	.021	.018	.711
					IN	.008	.271	< .001
					Gender	.206	.202	< .001
IllicitxHI	.326	.099	14.594 (3)	< .001	Interaction	-.001	-.013	.819
					Sports	.005	.004	.930
					HI	.008	.225	< .001
					Gender	.215	.212	< .001
SRSxIN	.333	.111	15.252 (3)	< .001	Interaction	-.052	-.034	.550
					Sports	2.284	.082	.102
					IN	.154	.211	< .001
					Gender	5.124	.212	< .001
SRSxHI	.388	.150	21.606 (3)	< .001	Interaction	.013	.007	.900
					Sports	2.156	.078	.113
					HI	.247	.290	< .001
					Gender	4.980	.206	< .001

Note: The only data from Model 3 (which includes the interaction effect) of each analysis provided are the regression weights and *p*-value for the interaction effects. All other data are from Model 2 (which includes sports team membership, IN/HI, and gender).

Table 7

Results for Research Questions 3 and 4: Committed Relationship Analyses

Outcome	Multiple *R*	Multiple R^2	*F* (df)	*p*-value	Predictors	Unstd. Reg. Weight	Std. Reg. Weight	*p*-value
AlcoholxIN	.278	.077	10.281 (3)	< .001	Interaction	.003	.066	.310
					Relationship	-.125	-.143	.005
					IN	.005	.204	< .001
					Gender	.086	.103	.042
AlcoholxHI	.276	.076	10.148 (3)	< .001	Interaction	.001	.014	.816
					Relationship	-.123	-.141	.005
					HI	.006	.201	< .001
					Gender	.086	.103	.042
IllicitxIN	.358	.128	18.121 (3)	< .001	Interaction	< .001	-.007	.907
					Relationship	-.026	-.024	.617
					IN	.008	.267	< .001
					Gender	.210	.206	< .001
IllicitxHI	.332	.110	15.202 (3)	< .001	Interaction	.001	.012	.840
					Relationship	-.022	-.020	.681
					HI	.008	.229	< .001
					Gender	.214	.211	< .001
SRSxIN	.338	.107	15.705 (3)	< .001	Interaction	-.051	-.045	.483
					Relationship	-1.099	-.044	.379
					IN	.153	.212	< .001
					Gender	5.557	.232	< .001
SRSxHI	.394	.155	18.495 (4)	< .001	Interaction	-.209	-.144	.015
					Relationship	-1.143	-.045	.345
					HI	.320	.378	< .001
					Gender	5.209	.218	< .001

Note: The only data from Model 3 (which includes the interaction effect) of each analysis provided are the regression weights and *p*-value for the interaction effects, in addition all to SRSxHI data. All other data are from Model 2 (which includes relationship status, IN/HI, and gender).

Table 8
Correlations between Predictor Variables

Variable	1	2	3	4	5	6
1. IN Symptoms						
2. HI Symptoms	.734**					
3. Gender	.137**	.127*				
4. Greek Life	.083	.124*	.045			
5. Sports Team	-.064	-.024	.175**	.155**		
6. Relationship	.042	.030	-.071	-.043	-.446**	

Note. $^{**}p < .01$, $^{*}p < .05$

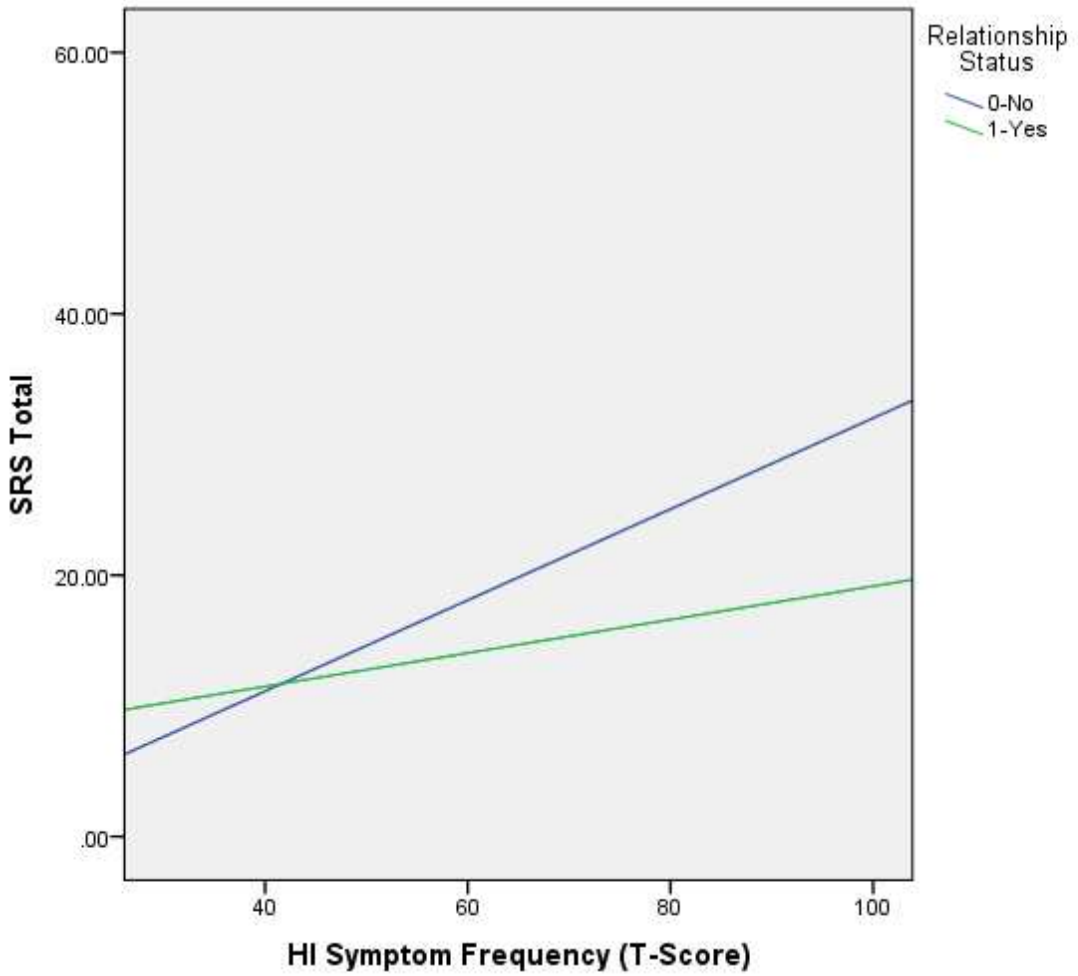

Figure 1. Interaction effect between relationship status and HI symptom frequency as a predictor of sexual risk-taking.

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Education

Ph.D. **School Psychology, Lehigh University.** Anticipated May 2017.
Major: School Psychology; Subspecialization: Pediatric School Psychology

M.Ed. **Human Development, Lehigh University.** December 2013.

B.S. **Family Science, University of Maryland, College Park.** May 2012.

B.A. **Psychology, University of Maryland, College Park.** May 2012.

Clinical Experience

Predoctoral Intern, *CORA Services*
CORA Services, September 2016 – Present
Supervisor: Paul Haughton, Psy.D. and Maureen Mintzer, Ph.D.
Serving as an intern for CORA Services, a non-profit agency that provides school psychological services to non-public schools in Philadelphia. Responsibilities include conducting comprehensive psychoeducational evaluations, providing consultation services to teachers and parents, and facilitating provision of interventions for students from kindergarten through twelfth grade.

Practicum Student, *Sleep Center*
Children's Hospital of Philadelphia, July 2015 – June 2016
Supervisors: Jodi Mindell, Ph.D. and Melisa Moore, Ph.D.
Served as a practicum student at the Children's Hospital of Philadelphia. Activities included conducting intake interviews with sleep patients, presenting cases to the behavioral health team, and providing ongoing consultation to families in person and over the phone.

Practicum Student, *Upper Darby High School*
Upper Darby School District, September 2015 – May 2016
Supervisor: Marie O'Donnell, Ph.D.
Served as a practicum student at a high school. Activities included conducting academic and behavioral assessments, participating in comprehensive special education and 504 evaluations, and assisting in designing and implementing school-based interventions.

Practicum Student, *Center for Management of ADHD*
Children's Hospital of Philadelphia, July 2014 – June 2015
Supervisors: Stephen Soffer, Ph.D. and Stephon Proctor, Ph.D.
Served as a practicum student at the Children's Hospital of Philadelphia. Activities included conducting multimethod evaluations of ADHD and other psychological and learning disorders, scoring assessments, writing reports, consulting with my supervisors regarding clinical decisions, and participating in feedback sessions to parents and their children.

Practicum Student, *Aronimink Elementary School*
Upper Darby School District, January 2015 – June 2015
Supervisor: Kristin Leren, Ph.D.
Served as a practicum student at an elementary school. Activities included conducting multimethod psychoeducational assessments at Aronimink Elementary School and approved private schools, writing reports, consulting with parents and teachers, participating in weekly response-to-Intervention meetings, and engaging in social skills interventions with students.

Practicum Student, *Bywood Elementary School*
Upper Darby School District, August 2014 – December 2014
Supervisor: Julie James, Ph.D.
Served as a practicum student at an elementary school. Activities included engaging in social skills and anti-aggression interventions with students, conducting multimethod psychoeducational assessments, writing reports, consulting with parents and teachers, and participating in weekly meetings as a member of the school's Student Support Team.

Practicum Student, *Fountain Hill Elementary School*
Bethlehem Area School District, September 2013 - June 2014
Supervisor: Alyssa Barasch, School Counselor
Served as a practicum student at an elementary school. Activities included conducting multimethod behavioral assessments, designing interventions, performing brief counseling with students, and advising parents and teacher on strategies for improving child behavior.

Undergraduate Intern, *Adoptions Together*
Adoptions Together Department of Education and Training, Summer 2011
Supervisor: Jennifer Kelman, Ph.D.
Assisted in planning for and facilitating a therapeutic summer camp for adopted children. Assisted in creating a curriculum developed specifically for adoptees with various mental challenges (e.g. ADHD, anxiety, depression, autism). Led campers through various activities and discussions.

Training Director and Peer Counselor, *Help Center Hotline*
University of Maryland, College Park, October 2008 - May 2012
Selected for a student-run peer counseling and crisis intervention hotline. Through this service, I provided telephone and walk-in counseling. As an on-the-job trainer, I worked with trainees to teach Rogerian and person-centered techniques to prepare them to become certified peer counselors. I helped to teach and test upwards of forty trainees. In my final year, I was elected as Training Director. I was responsible for recruiting, interviewing, selecting, and providing initial training for new members of the organization.

Research Experience

Project Coordinator, *Trajectories Related to ADHD in College Students*
Lehigh University, September 2012 – June 2016
Supervisor: George DuPaul, Ph.D.
Worked with Dr. DuPaul and fellow graduate students on a longitudinal study of the experiences of college students with and without ADHD. Duties included managing the tasks of graduate research assistants, conducting assessments with undergraduate student participants, entering and analyzing data, scheduling assessments, and preparing materials. I also contributed to several manuscripts and conference presentations conducted using data from the project.

Research Coordinator, *Validation Study for the ADHD Rating Scale-5*
Children's Hospital of Philadelphia, September 2014 – June 2015
Supervisor: Thomas Power, Ph.D.
Acted as research coordinator for a study to validate a new ADHD assessment scale. Activities included recruitment for the study, training other research assistants on the *Behavioral Observation of Students in Schools (BOSS)* classroom observation system, data collection, data entry, data analysis, and manuscript writing.

Data Collector, *Reading Achievement Multi-Component Program*
Lehigh University, April 2013 – June 2014
Supervisors: Edward Shapiro, Ph.D. and Mary Beth Calhoon, Ph.D.
Conducted pre- and post-test assessment for an intervention study aimed at improving reading outcomes for middle school students with reading disabilities. My primary responsibility was to assess students' reading abilities based on various measures of reading skills.

Data Collector, *Graduate Student Dissertation Research*
Lehigh University, December 2013 - June 2014
Supervisor: Kirra Guard, Ph.D.
Assisted with efforts to develop an oral reading fluency screening measure for first grade children by administering highly decodable reading passages to students.

Data Collector, *Graduate Student Dissertation Research*
Lehigh University, March 2013 - May 2013
Supervisor: Erin McCurdy, Ph.D.
Conducted classroom observations for a doctoral student's dissertation, which evaluated the effects of a peer-mediated intervention for elementary school students with autism. The primary data collection tool was the Behavioral Observation of Students in Schools.

Student Research Assistant, *Multi-Method Early Intervention Program for Socially Reticent, Inhibited Preschoolers*
University of Maryland, College Park, December 2010 - May 2012.
Supervisors: Andrea Chronis-Tuscano, Ph.D. and Kelly O'Brien, Ph.D.
Assisted with a study of an early intervention program for socially inhibited preschoolers. Tasks included recruiting participants, entering data using SPSS, and assisting with recording sessions of Parent-Child Interaction Therapy modified for group treatment and Social Skills Facilitated Play groups.

Student Research Assistant, *Couple's Abuse Prevention Program*
University of Maryland, College Park. January 2010 - December 2010
Supervisors: Norman Epstein, Ph.D. and Laura Evans, Ph.D.
Worked on a team of undergraduate students under the supervision of a doctoral candidate. Coded previously recorded videos of couples' therapy sessions and collaborated with other undergraduate coders to ensure reliability. Assisted in analyzing the coding scale and making revisions to achieve maximal validity.

Presentations and Publications

DuPaul, G. J., Fletcher, K. S., Jaffe, A. R., Franklin, M. K., **Pollack, B. L.**, Gormley, M.J., Anastopoulos, A. D., & Weyandt, L. L (2017, February). Trajectories and predictors of educational functioning in college students with and without ADHD. Poster presented at the National Association of School Psychologists 2017 Annual Convention, San Antonio, TX.

Gormley, M. J., DuPaul, G. J., **Pollack, B.**, Pinho, T., Franklin, M., Busch, C., Weyandt, L., Anastopoulos, A. D. (2015, November). Psychosocial and psychopharmacological treatment of ADHD in college students: Longitudinal associations with psychological and behavioral outcomes. Poster presented at the annual convention of the Association for Behavioral and Cognitive Therapies, Chicago, Il.

Pollack, B., Hojnoski, R., DuPaul, G. J., & Kern, L. (2015). Play behavior differences among preschoolers with ADHD: Impact of comorbid ODD and anxiety. *Journal of Psychopathology and Behavioral Assessment, 38*(1), 66-75.

Gormley, M. J., Pinho, T., **Pollack, B.**, Puzino, K., Franklin, M., Busch, C., DuPaul, G. J., Weyandt, L. L., & Anastopoulos, A.D. (2015). Impact of study skills and parent education on first-year GPA among college students with and without ADHD: A moderated mediation model. *Journal of Attention Disorders*.

DuPaul, G. J., **Pollack, B.**, Pinho, T. (In Press). Attention-deficit/hyperactivity disorder. In S. Goldstein & M. Devries (Eds.), *Handbook of DSM-5 childhood disorders.*

DuPaul, G. J., Pinho, T., **Pollack, B.**, Gormley, M., Laracy, S. (2015). First-year college students with ADHD and/or LD: Differences in self-concept, school preparation, and college expectations. *Journal of Learning Disabilities.*

Pollack, B., Gormley, M. J., Pinho, T., DuPaul, G. J., Oster, D. R., Puzino, K., … Anastopoulos, A. (2015, February). Service utilization among college students with ADHD and learning disorders. Poster presented at the National Association of School Psychologists 2015 Annual Convention, Orlando, FL.

Gormley, M. J., Pinho, T., **Pollack, B.**, Franklin, M., Busch, C., DuPaul, G. J., … Weyandt, L. (2014, August). Impact of study skills and parent education on first-year GPA among college students with and without ADHD: A moderated mediation model. Paper presented at the American Psychological Association 2014 Annual Convention, Washington, DC.

DuPaul, G. J., Laracy, S. D., Gormley, M. J., Pinho, T., & **Pollack, B.** (2014, August). Adolescents with ADHD transitioning to college: Self-concept and school preparation. Poster presented at the American Psychological Association 2014 Annual Convention, Washington, DC.

Pollack, B., Hojnoski, R., DuPaul, G., & Kern, L. (2014, February). Play behavior differences among preschoolers with ADHD and comorbid ODD and anxiety. Poster presented at the National Association of School Psychologists 2014 Annual Convention, Washington, DC.

Professional Affiliations

National Association of School Psychologists, Aug. 2013 – Present
American Psychological Association, Division 16, Aug. 2013 – Present
Lehigh University Student Affiliates of School Psychology, Sept. 2012 – Present
Psi Chi International Honor Society in Psychology, Sept. 2010 – Present

Honors and Certifications

School Psychology Club Community Outreach Coordinator, *Fall 2013 – Spring 2014*
School Psychology Club First Year Representative, *Fall 2012 – Spring 2013*
Trained Mandated Reporter, *September 2013*
Certified Positive Discipline Parent Educator, *Summer 2013*
Psi Chi: International Honor Society in Psychology, *Inducted 2009*
University of Maryland Scholars - Advocates for Children Program, *Fall 2008 – Spring 2009*