Substance Use in Adolescents with Illegal Sexual Behavior

by

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Abstract

The purpose of the current study is to address some of the limitations of the existing literature on adolescents with illegal sexual behavior (AISB) substance use. As the existing literature is small in scope and has been focused largely on comparisons of rates of substance use between AISB and their juvenile delinquent (JD) peers, the current study will focus on identifying potential predicates and correlates of use among AISB. The ultimate goal of the present study is to gain clarity on whether substance-using AISB more closely resemble the general juvenile delinquent population, substance-using JDs more specifically, or reflect a relatively unique subgroup. We expected substance use among AISB would be linked to several factors tied to antisocial tendencies as well as a range of variables commonly linked to increases in substance use (e.g., impulsivity). Our hypotheses were largely supported, providing further evidence that antisocial tendencies significantly influence substance use among AISB. Further, several characteristics generally tied to substance use more broadly were predictive of substance abuse scores within this population, as we expected. However, several key findings did not fit into the broader picture we anticipated of a combination of antisocial tendencies and factors typically associated with substance use, but rather appeared to better fit borderline tendencies.

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Within the literature on adolescents with illegal sexual behavior (AISB), little attention has been paid to substance use behaviors. This lack of empirical study appears to be largely due to the fact that AISB have been viewed predominately as a special population within the larger juvenile delinquent population and, in comparison with their delinquent peers, AISB engage in significantly less substance use overall (Seto & Lalumiere, 2010). However, as fewer individuals with substance use problems do not equate with a lack of problematic substance use altogether, empirical research is needed to determine the extent, dynamics, and role of substance use among AISB. The present study seeks to identify psychological and demographic predicates that distinguish the subset of substance using/abusing AISB from their peers and, in so doing, begin to clarify the role of substance use in relation to sexual offending behaviors. In order to identify potential conceptual themes, the existing literature on substance use among AISB will be reviewed and compared and contrasted with the literature on substance use among juvenile delinquents (JDs).

General Overview of AISB Population

The population of AISB is a heterogeneous group, particularly as this group is defined much differently from other clinical populations. Namely, inclusion or exclusion from the AISB population is, by definition, dependent upon the commission of an "illegal sexual behavior;" therefore, empirical examination of this population is inextricably tied to the criminal justice system's view of what constitutes "acceptable" or "unacceptable" sexual behaviors. In addition, there is a high degree of variability across state laws within the United States, not to mention across different countries, in how illegal sexual behavior is defined. For example, the age of consent varies between the 16-18 years of age across the United States, which means that a 17-

year-old male engaging in sexual intercourse with his 16-year-old girlfriend would be perpetrating an illegal sexual behavior in some states, while other state laws would classify this behavior as unobjectionable provided no undue coercion took place. While those conducting research on AISB would almost certainly acknowledge that there is no meaningful difference between these two, hypothetical 17 year-old males with regard to factors such as sexual deviance or delinquency, the field often relies upon details of individuals' criminal histories in order to classify the diagnostic groups. Thus, these distinctions make their way into the literature used to understand this population.

Additionally, a wide range of offense types are included within the AISB label, encompassing both assaultive and non-assaultive offenses of varying degrees of severity (Rich, 2011). Assaultive offenses involve some form of physical contact between victim and perpetrator, including offenses most lay-persons would identify as illegal sexual behaviors, such as molestation, oral sex, and various penetrative offenses. The non-assaultive charges do not involve direct physical contact and are less likely to involve violence. There is also greater variability within this category with regard to whether the offense is consistently classified as a crime in differing state and national legal codes. Included in the category of non-assaultive offenses are behaviors such as public indecency, voyeurism, possession of child pornography, making or sending obscene phone calls, texts, or emails, stealing clothing for sexual purposes, flashing, and making threats of sexual harm (Rich, 2011). A final note on the connection between empirical research on AISB and the legal system: identification of problem behavior primarily through involvement with the legal system or, even if formal charges are avoided, admission to a formal treatment program after others have tagged an adolescent's behavior as inappropriate, highlights that much of our understanding of AISB relies on what we know of

those individuals who have been caught. Thus, the distinct possibility exists that those who remain undetected differ in important ways from those who are detected.

This fact becomes more intriguing when combined with the knowledge that, likely due at least in part to the above-mentioned ambiguity of this term and the variability within how certain offenses are classified, there is no well-defined set of variables that allows us to describe an "average" AISB (Rich, 2008). Thus, even with the constraints of examining only those AISB who are identified by the legal system or enrolled in treatment programs by an authority figure—be they tied to the legal system or the individual's parent or guardian—identifying a prototypical pattern of demographic characteristics or risk factors that effectively predict engagement in illegal sexual behaviors is not possible with the exception of gender.

Though the population of AISB contains both male and female perpetrators, statistics available from the Department of Justice consistently indicate that males constitute an overwhelming majority. For example, arrest data reported for 2008 shows that 91.8% of arrests for sexual crimes involved a male perpetrator (Rich, 2011). Again, though, the reliance on classifications made by judicial law becomes apparent. Given the extent of the gap between numbers of female perpetrators and male perpetrators as well as the fact that arrest statistics also demonstrate higher rates of non-sexual crime committed by males, it is highly likely that some genuine difference in rates of perpetration across gender does exist. However, given the reliance on arrest and conviction rates, the extent of this gender difference is impossible to determine, as these rates incorporate a number of sources of known bias (i.e., stigma associated with a male victim reporting assault by a female perpetrator and general societal bias regarding whether certain forms of sexual coercion can be perpetrated against males).

Connection between Adolescent and Adult Literatures

Much of what is known about AISB, generally speaking, developed out of efforts to research adult populations of sexual offenders. Early research seeking to explore deviant and illegal sexual behaviors among adults highlighted that a significant portion of sexual assaults were perpetrated by adolescents. Recent estimates suggest that adolescent males perpetrate approximately 20% of all rapes and between 30-50% of child molestations (Barbaree & Marshall, 2006). Additionally, retrospective studies of adult sexual offenders have suggested that a significant portion of these individual committed their first act of illegal sexual behavior in adolescence (Abel, Mittelman, & Becker, 1985; Groth, Longo, & McFadin, 1982; Knight & Prentky, 1993). These findings made clear the importance of understanding AISB in order to fully understand the etiology of impulses to engage in illegal sexual behaviors as well as in developing effective treatments for these individuals. With regard specifically to substance use, there is clear evidence of widespread substance use, particularly alcohol use, among adult sexual offenders (e.g., Abbey, Clinton-Sherrod, McAuslan, Zawacki, & Buck, 2003; Dunsieth, et al., 2004; Langevin et al., 1988; Testa, 2002). While the exact role of substance use in relation to engagement in illegal sexual behaviors among adults remains uncertain, there is a growing consensus that substance use does not play a direct role in facilitating or encouraging illegal sexual behavior. While approximately half of the adult, convicted offenders included in the Sixth Special Report of the U.S. Congress (US Department of Health and Human Services, 1987)—in which 4017 cases of rape and sexual assault were examined—had consumed alcohol immediately prior to completing their offense, these individuals also had significantly higher rates of alcohol abuse than the general population. Thus, it seems likely that at, among those offenders with an alcohol use disorder at least, alcohol plays more of an indirect role than classic

disinhibition models would suggest. The authors also report these findings are consistent with previous research, which lends further support for the concept that it is unlikely that drinking for the purpose of disinhibition is the primary, or at least the sole, explanation for high rates of alcohol use within this population.

An alternative explanation for the high rate of alcohol abuse within adult offenders is that these individuals may be engaging in various antisocial behaviors, including substance use and sexual offending. Several studies have highlighted the possible role of general antisocial tendencies in explaining the co-occurrence of substance use problems and engagement in illegal sexual behaviors among adults. Langevin and Lang (1990) examined 461 adult, male sexual offenders, finding that those with a history of alcohol abuse, as measured by the Michigan Alcoholism Screening Test (MAST), not only had more extensive criminal histories but also were more "prone to violent behavior." Though the authors do not specifically clarify the source of their information regarding episodes of violent behavior, it is likely this information was drawn from examinations of the types of previous offenses listed within the criminal histories of the study participants. In 2001, Peugh and Belenko utilized data from the national Bureau of Justice Survey of Inmates in State Correctional Facilities in order to examine substance use among convicted, adult sexual offenders (n = 1273) compared with that of violent offenders (*n* = 4933). It is worth noting that the study participants were classified into the sexual or violent offender group on the basis of the charges tied to their current conviction; thus, it is likely that some individuals with a history of engaging in illegal sexual behavior were included as violent offenders instead of the sexual offender group. According to their results, a significant portion of adult sexual offenders had a history of committing non-sexual offenses, which suggests that—for those sexual offenders with a documented history of general criminal behavior—illegal sexual

behaviors are simply one aspect of a larger picture of antisocial behaviors. Additionally, the sexual offenders who reported a history of using both drugs and alcohol had significantly higher rates of involvement in the criminal justice system and had been charged with a greater variety of types of criminal activity. Meanwhile, the authors noted that sexual offenders without a history of substance use reported a more extensive criminal record of sexual crime, specifically (Peugh & Belenko, 2001). These results lend further support for the theory that a portion of adult sexual offenders, at least, are engaging in a generally antisocial pattern of behavior that includes their illegal sexual behavior as well as significant substance use.

Providing additional evidence for the potential role of general antisocial tendencies in adult engagement in illegal sexual behavior, Langevin and colleagues noted the connection between alcohol use and violence during illegal sexual behavior among adult sexual offenders in two separate studies (Langevin, Paitich, & Russon, 1985; Langevin and Lang, 1990). In the first, the authors examined the role of "sexual anomaly" and aggression in rapes perpetrated by males being seen for pre-trial assessment through the forensic department of a psychiatric hospital. A total of 145 individuals were included in the study, which included a control group of 40 community volunteers without history of criminal activity and with no reported history of violence, psychiatric illness, or sexual anomaly. The remaining participants were divided into the following groups: (a) rapists (n = 40), who were charged with the rape or attempted rape of a female victim of at least 16 years of age; (b) non-violent sex offenders (n = 40), who were charged with (or concerned about) "sexual anomalies," such as exhibitionism and voyeurism; and (c) non-sexual assaultives, who were charged with various forms of physical assault (excluding cases of homicide and cases involving a significant other that may have been sexually motivated). The authors found that those classified as rapists were far more similar to the non-

sexual assaulters than the non-violent sex offenders across multiple variables examined, such as personality profile—measured by the Minnesota Multiphasic Personality Inventory (MMPI)—, parent-child relations, and degree of prior criminal history. Additionally, the authors note that a significant portion of individuals in both the rapist and non-sexual assaulter groups were diagnosed with a personality disorder (78% and 68%, respectively), with 20% of rapists and 24% of non-sexual assaulters meeting criteria for Antisocial Personality Disorder, specifically. In comparison, only 33% of the non-violent sex offenders were diagnosed with any personality disorder, with 3% meeting criteria for Antisocial Personality Disorder. Finally, with respect to substance use, the authors report that none of the non-violent sexual offenders had any diagnosis related to alcohol or drug use, while rapists and non-sexual assaultives, again, showed similarities. Both of these groups appeared to have fewer difficulties with drug use than with alcohol use, as 8% of non-sexual assaulters and 3% of rapists had a drug use related diagnosis compared with 28% and 10%, respectively, having a diagnosis related to alcohol-use. Though the authors do not provide clear information with regard to how the following category was defined, they also report that 75% of non-sexual assaulters and 54% of rapists had a "chronic drinking problem" as compared to just 28% of non-violent sex offenders (Langevin et al., 1985). Despite the lack of definitional clarity provided for this last category, these results as a whole do suggest that some adults engaging in illegal sexual behaviors share significant commonalities with other violent offenders and that these commonalities include patterns of significant substance use.

In their 1990 study, Langevin and Lang found similar connections between substance use disorders and violence during illegal sexual behaviors. In their sample of 461 adult, male sexual offenders, almost all participants had some history of alcohol use, but those with an alcohol use

disorder were significantly more likely to utilize some form of violence in the commission of their conviction offense. Additionally, those with alcohol addiction were more likely to have a history of non-sexual criminal convictions, though there were no significant differences found between alcohol abusing and non-abusing participants with regard to previous arrests or convictions for sexual crimes (Langevin & Lang, 1990). Again, these findings suggest that general antisocial tendencies could mediate the relationship between substance use and engagement in illegal sexual behaviors.

Seto & Barbaree's 1997 chapter consolidated previous research on the connection between sexual aggression and antisocial behavior among adult rapists and posited a developmental model of sexual aggression that incorporated the role of antisocial tendencies. The authors note the ample evidence in the existing literature of the time that a significant portion of those who commit sexual offenses also exhibit a history of engagement in delinquency that includes nonsexual crimes. In fact, they report that a study examining longitudinal self-report data from a national probability sample of 1,725 individuals who were between the ages of 11 and 17 when first interviewed, which found that sexual aggression typically emerged after a fairly extensive history of offending that appeared to escalate in severity over time, with charges of aggravated assault and robbery preceding those of rape in 92% and 72% of cases, respectively (Elliott, 1994). Charges involving more minor delinquencies also typically preceded all violent offenses. Additionally, Seto and Barbaree (1997) highlight several studies demonstrating that psychopathy predicts both sexual and nonsexual recidivism and appears particularly effective at predicting violent recidivism in general criminal samples. In particular, one study found that scores on the Psychopathy Checklist, which will also be utilized in the present study, predicted both sexual and nonsexual recidivism over and above other commonly examine variables, such

as offense history, perpetrator age, and psychiatric history (Rice, Harris, & Quinsey, 1990). The chapter authors posit that psychopathy and sexual deviance may interact, such that individuals who score high on both factors are most likely to have histories of serious offenses, with higher numbers of victims and increased degree of violence (Seto & Barbaree, 1997).

Within this chapter, the authors also posit a developmental model of sexual aggression among adult males, based upon examinations of existing conceptual models and offender typologies, in which there are at least two distinct developmental courses that account for a large portion of the heterogeneity among perpetrators of sexual aggression. The first accounts for a smaller proportion of adult male perpetrators of sexual aggression, though they are the most likely to have more chronic and extensive patterns of sexual aggression, including more extreme levels of violence. These individuals exhibit an earlier onset of problem behaviors, both with regard to sexual aggression and other antisocial behavior, such as substance abuse and engagement in various non-sexual crimes. Thus, the authors describe this group as "persistently antisocial" and as being more likely to display a chronic, relatively stable pattern of sexual aggression and other antisocial behaviors. The second includes the majority of perpetrators of sexual aggression, who are largely older adolescents and young adults engaging in opportunistic sexual coercion, most commonly against acquaintances rather than strangers. These individuals do not show the same early onset and more chronic pattern of engagement in general antisocial behaviors.

However, the authors note that sexual deviance, meaning sexually deviant fantasies and thoughts as well as urges to engage in and sexual arousal to depictions of sexual aggression, can be present in either group. The presence of sexual deviance, regardless of which developmental course was present, would indicate greater likelihood of a more extensive history of sexual

offenses and a greater risk for recidivism. Thus, those individuals in the antisocial group with co-occurring sexual deviance would likely display the greatest risk for recidivism and the highest degree of severity of offense, on average. With regard to substance use, the authors note the possibility for use within either of the two groups—however, for largely different reasons. The opportunistic group would be significantly more likely to utilize alcohol or drugs for disinhibition or as an intoxicant for a prospective victim, as they are less likely to use more direct, violent forms of coercion such as the use of a weapon. The antisocial group, consistent with their general antisocial tendencies, would be more likely to meet criteria for Substance Use Disorders and have general difficulties with impulsivity that informed their pattern of substance use. While no published studies were found in the current review that empirically examined this proposed developmental model of sexual aggression among adult males, the model nonetheless serves as a thought-provoking consolidation of the extant research at the time and appears consistent with the literature that followed, sparse as it is.

Taken together, the information available on adult male sexual offenders provides support for the potential role of antisocial tendencies in understanding the connection between substance use and engagement in illegal sexual behavior. There is clear evidence of a link between higher rates of alcohol and drug use and higher rates of engagement in non-sexual crime, as well as increased use of violence during commission of index offenses, within the literature on adult perpetrators of sexual offenses. Therefore, much as early research into the sexual offending behaviors of adult perpetrators highlighted the need for examination of AISB, so too does the research on the connections between substance use, antisocial behavior, and sexual offending among adults suggest an area of further study among AISB. Specifically, if substance use behaviors are similarly tied to general antisocial tendencies among AISB, this

knowledge has the potential to significantly inform not only decision-making surrounding risk for recidivism, but also interventions for those with such co-morbidities.

AISB Substance Use

Examinations of substance use among AISB have been largely limited to studies of the overall rates and patterns of use, with emphasis on comparisons between AISB and their juvenile delinquent peers who have not engaged in illegal sexual behaviors. Two early studies reported that, in comparison with juvenile delinquent peers, AISB engaged in significantly less alcohol and drug use (e.g., Awad & Saunders, 1991; Fagan & Wexler, 1988). In the first, Awad and Saunders (1991) examined 108 male AISB, all under the age of 16, who were referred to the Toronto Family Court Clinic between 1980 and 1988 in an effort to determine whether factors such as substance use played a role in engagement in illegal sexual behaviors. The published study reports two phases, with the first comparing 24 AISB—termed "sexual assaulters" by the authors—with a sample of 24 juvenile delinquents, matched for age and socioeconomic status and the second comparing the remaining 25 AISB with a non-matched sample of 45 adolescent child molesters, which the authors defined as an AISB who was at least four years older than their victim (Awad & Saunders, 1989). While the authors were not specific as to how data were collected on substance use behaviors, substance use history appears to have been assessed during the course of a series of participant, parent, and family interviews. The authors found no significant differences between the two samples of AISB with regard to drug or alcohol use. However, they reported the sexual assaulter group was significantly less likely to have a history of alcohol abuse than their juvenile delinquent peers, with 12% of assaulters and 39% of delinquents reporting alcohol abuse ($p < .02$). While the authors noted similar "marginally significant" results with regard to likelihood of drug abuse between these two groups, with 18%

of assaulters and 42% of delinquents reporting some form of drug abuse ($p < .06$), their findings did not meet the criteria for statistical significance (Awad & Saunders, 1991).

While the first study provided limited information regarding the nature of the substance use assessment conducted, Fagan and Wexler (1988) provided a more complete description of an, unfortunately, rather limited examination of use within their sample of violent, male juvenile offenders—including both AISB and those with non-sexual offenses. The authors collected information on self-reported substance use and self-reported "drug problems" (i.e., self-reported fights or other crimes while intoxicated, problems with friends or in school or at home due to drug or alcohol use, self-identification as being in need of substance use treatment, or self-reports of being "alcoholic" or "addicted to drugs"). Based on this limited data, the authors noted that substance use was lower among AISB than among their violent offender peers without sexual offenses (Fagan & Wexler, 1988).

One additional, early study initially appears to contradict these findings, as the authors report similar patterns of substance use within AISB and juvenile delinquents in their sample of 293 offenders incarcerated in a moderate security youth prison between 1973 and 1977 (Tinklenberg, Murphy, Murphy, & Pfefferbaum, 1981). However, their comparisons between the three subgroups—physically assaultive offenders ($n = 95$), sexually assaultive offenders ($n = 63$), and non-assaultive offenders ($n = 135$), who were matched for age and race with the two previous groups—appear to have been made without the assistance of any statistical analyses, as none are reported in any of the text or tables included in the article. Thus, it is impossible to draw firm conclusions with regard to whether the groups demonstrated statistically significant differences in rates of use for any given substance. What can be gleaned from the frequency tables provided in the article is that, for each group, cannabis and alcohol were the most

frequently reported substances used, with most individuals who reported some level of substance use endorsing episodes of binge use rather than regular use. With respect to the influence of substance use on illegal sexual behavior, the authors state that drug use was a reported factor in 48 of the 67 rapes attempted or committed. Of the drug-related sexual assaults, alcohol and cannabis were the most frequently reported substances used, with alcohol use—either by itself or in combination with other drug(s)—reported in 37 cases and cannabis use in 29 cases. The authors note there were a total of 27 cases in which multiple drug use was reported (Tinklenberg et al., 1981).

While these initial studies suggest that substance use, particularly alcohol use, occurs much less frequently in AISBs than it does among general juvenile delinquent populations, the literature appears to have made few advances since that time in understanding the role substance use plays for those AISB who do have significant patterns and histories of use. In their 2010 meta-analysis of research conducted on the etiology of sexual offending behaviors among juvenile males, Seto and Lalumiere identified a total of 20 studies, only seven of which were published, that included examination of substance use problems. This meta-analysis represents a thorough review of the available literature of English-language studies between 1975 and 2008, as it included published studies as well as studies presented at conferences and unpublished theses and dissertations. Unsurprisingly, the current literature review found only a handful of published studies occurring after 2008 that could be added to the list of empirical examinations of substance use among AISB. In addition to the small quantity of research available, the picture of substance use by AISB is further complicated by methodological issues, such as limitations in measurement of substance use behaviors.

For instance, two separate studies examine substance use solely through the Substance-Abuse Proneness scale on the Millon Adolescent Clinical Inventory (MACI). While the MACI is intended to examine a range of psychological problems and provides useful information with respect to substance abuse problems and associated behaviors, the use of this scale does not provide information regarding current patterns and rates of use for specific substances or how any substance use is connected to the individual's offense history (e.g., whether they use substances regularly or just prior to committing offenses). In their 2008 study, Zakireh, Ronis, and Knight examined 100 adolescent males, aged 13-19, who were recruited from both residential and outpatient facilities. They divided their sample into four equal-sized groups, based on type of treatment (i.e., residential or outpatient) and referral offense (i.e., sexual or non-sexual). The only significant difference found with regard to scores on the Substance-Abuse Proneness scale was that residential non-sexual offenders reported significantly more substance abuse behaviors than did outpatient sexual offenders (Zakireh et al., 2008).

The second study was conducted by Glowacz and Born (2013) and examined a sample of only 67 males, aged 13-18, recruited from those referred to three separate Youth Courts in Wallonia, Belgium from 2008-2009. Within their sample, 20 were adjudicated for non-sexual offenses while the remaining 47 were adjudicated for sexual offenses. This later group was sub-divided into two categories depending on whether their index offense was peer-abuse or child-abuse—defined as having a victim who was both younger than 10 years of age and at least four years younger than the perpetrator. Based on MACI profiles, the authors report that the peer-abusing AISB demonstrated significant similarities to non-sexual offenders with regard to substance use as well as impulsive propensity and antisocial tendencies, while the child-abusers demonstrated significantly lower scores in all three of these areas that might indicate a

propensity for engagement in generally delinquent activity (Glowacz & Born, 2013). While these results should be interpreted cautiously, due to both the small sample size and the reliance on the MACI alone, these findings do suggest similarities to patterns found within the adult literature of a connection between substance use and antisocial tendencies among individuals engaging in illegal sexual behaviors.

A further example of the methodological limitations within this literature is provided by a 2007 study (Van Wijk, Vreugdenhil, Van Horn, Vermeiren, & Doreleijers) comparing AISB and non-sexual offenders with regard to family background, personality, psychopathology, socio-demographic characteristics, and trauma exposure. The study included 798 adolescent males in the Netherlands, ages 12-18, who were either sentenced to detention or detained on remand and sent home after trial between December 1998 and December 1999. Participants were categorized into sex offending and non-sex offending groups based on their index offense. The first area of concern is that the authors report the two groups differed in that the sexually offending youth were significantly younger when perpetrating their index offense than their non-sexually offending counterparts, which introduces potential confounds into the results. The authors reported that sexual offenders exhibited significantly lower scores on disinhibition (i.e., non-conformist lifestyle, use of drugs and alcohol, parties, and a "free sexual moral") than did non-sexual offenders, as measured by a measure of personality traits, the Adolescent Temperament Questionnaire. Additionally, they found sexual offenders reported significantly fewer substance use disorders than non-sex offenders, though there were no differences found for other psychiatric disorders. It is worth noting that paraphilic disorders were not assessed. The authors found no differences between sexually and non-sexually offending youth with regard to participant-reported parent characteristics, such as psychopathology, use of drugs, marital

conflict, and crime (Van Wijk, Vreugdenhil, et al., 2007). However, it is difficult to determine whether group differences in substance use disorders provide further evidence for lower rates of problematic substance use among AISB, generally or are simply a result of the younger age of the AISB group. This is particularly true due to the authors' use of substance use disorders, the diagnosis of which relies upon factors such as the development of physical dependence to a substance and/or factors such as mounting negative consequences and repeated, failed efforts to stop or reduce use. These factors, by nature, all develop over time; therefore, the age difference between groups becomes of critical importance. Nonetheless, while many of their findings should be interpreted with caution, the report of lower disinhibition among AISB than non-sexually offending youth does suggest more of a characterological difference—one that includes a predilection for increased substance use—between the two groups that is less likely to be influenced by age.

Butler and Seto (2002) conducted a comparison of AISB, both with and without additional nonsexual offense histories, to their non-sex offending juvenile delinquent peers in order to assess whether the two groups of AISB were distinct. Similar to the above-mentioned studies, their examination of substance use problems within this sample was limited to a single subscale (i.e., the Substance Abuse subscale) from the Young Offender-Level of Services Inventory (YO-LSI)—a semi-structured clinical interview designed to assess an individual's propensity to reoffend. The authors reported only one significant result: AISB who also had a history of nonsexual offenses demonstrated significantly higher scores on the Substance Abuse scale than AISB with only sexual offenses (Butler & Seto, 2002). This study suggests that, in addition to different patterns of substance use between AISB and non-sexually offending peers, that AISB are themselves heterogeneous with regard to substance use behaviors. Specifically, the

same pattern found within the adult sexual offenders is highlighted here with regard to possible antisocial tendencies—in this case, a co-occurring history of non-sexual offenses—appears tied to substance use behaviors.

Providing some additional evidence for a possible connection between substance use and antisocial behavior among AISB, a 2007 study (Van Wijk, Blokland, Duits, Vermeiren, & Harkink) compared AISB with other non-sex offending juvenile delinquents with regard to psychiatric diagnoses and a range of individual factors, including alcohol and drug use. This sample included all adolescent males (N = 5480) ages 12-20 years old who underwent diagnostic court assessment in the Netherlands from 1999-2003. As the authors were interested in examining differences between not only sexually and non-sexually offending youth but also between violent and non-violent offenders in both categories, the sample was split into 5 groups based on index offense: (a) violent sex offenders (n = 308), defined as having committed rape or sexual assault against peers or adult women; (b) non-violent sex offenders (n = 134), defined as having committed sexual offenses without violence (e.g., indecency and exhibitionism) against peers or adults; (c) child molesters (n = 270), defined as having committed sexual offenses against children at least 5 years younger than the perpetrator; (d) violent non-sex offenders (n = 3148), defined as having committed at least one violent index offense (e.g., manslaughter or grievous bodily harm); and (e) non-violent, non-sex offenders (n = 1620), defined as including all index crimes that did not contain an element of interpersonal body contact (i.e., could include violent against property, such as arson and vandalism, or acquisitive crimes, such as shoplifting or breaking and entering). The authors reported those in the child molester category were least likely to use drugs or alcohol (84.8% reported no substance use), followed by the two sex offender groups (69% of non-violent sex offenders and 66% of violent sex offenders) and the

two non-sex offender groups (57.8% of violent offenders and 53.2% of non-violent offenders). Consistent with previous research, the most commonly used substances across all groups were cannabis and alcohol. Significant to note, was the pattern of "other/poly-substance" use, which appeared to be defined as the use of either any single substance other than alcohol or cannabis or endorsement of any history of using more than one substance—even if this use was not concurrent. Neither the child molester group nor the non-violent sex offender group contained any individuals who endorsed use of substances other than alcohol and cannabis (or, by extension, poly-substance use). However, the violent sex offender group more closely resembled the two groups of non-sexually offending youth, with 5.8% of individuals reporting other or poly-substance use as compared to 8.4% among violent non-sex offenders and 12.5% of non-violent non-sex offenders. (Van Wijk, Blokland, et al., 2007).

While these results indicate clear group differences with regard to overall patterns of substance use as well as similarities between the violent AISB group and both non-sexually offending groups with respect to engagement in more extensive substance use, some caution is in order due to the use of index offense to classify participants. Because this method does not account for the participants' possible history of offenses that fall into other categories, the true rates of substance use in each group may not be accurately assessed. Even utilizing full criminal histories would not provide a completely accurate picture, due to the fact that not every crime—of any kind—is detected or prosecuted successfully; however, utilizing only the index offense ignores even other known offenses. Nonetheless, should these distinctions hold when other methods of classification are employed, the similarities in more extensive substance use—both with regard to endorsement of any use as well as use of a greater number of substances—between AISB employing violence and general juvenile delinquent populations provide strong

evidence of a potential link between antisocial tendencies and substance use among AISB. The fact that use of force appears to distinguish these AISB from their sexually-offending peers does, indeed, seem to support such a role for antisocial tendencies.

Further support of a link between level of force utilized and substance use among AISB is found in Marini, Leibowitz, Burton, and Stickle's 2014 study on the connections between history of childhood abuse, substance use—specifically, substance use prior to commission of an illegal sexual behavior—, and the level of force utilized during the offense. The authors examined data collected from 406 residentially incarcerated AISB located at facilities in two separate U.S. states and used information collected from the Self-Report Delinquency measure, which assessed for non-sexual criminal behavior in the year before the individual's current arrest. This measure contains 6 items specific to substance use, which were summed to create an overall substance use scale. Participants endorsed similar rates of drug and alcohol use (i.e., 56.5% and 56.6%, respectively). It is important to remember that this information was gathered based solely on self-report data and does not provide reliable indications of the average amount or frequency of use.

Additionally, the authors included two items on a self-report questionnaire seeking a range of demographic and criminal history information that asked participants to rate—on a 5-point Likert scale, with a rating of 1 meaning "never" and a rating of 5 meaning "always,"—the following statements: "I used drugs before my criminal offenses," and "I used alcohol before my criminal offenses." While the authors report that these items were asked within a series of questions specific to the participants' sexual offenses, it is easy to imagine these items being misinterpreted to mean before *any* of their criminal offenses, sexual or otherwise. With that caveat in mind, the authors reported 40.1% of participants endorsed using drugs prior to their

offense and 37.4% endorsed alcohol use prior to their offense, with 32.4% of these individuals endorsing both items—though the authors note that there is no way to determine whether the drug and alcohol use was concurrent. They further report that those individuals who endorsed either drug or alcohol use prior to the commission of their offenses reported increased use of force compared with those who did not endorse substance use prior to offending, with the highest use of force among those who endorsed use of both drugs and alcohol. Though an exact figure was not reported in the article, the authors indicate the effect size for the later finding was small. Again, these findings highlight the importance of understanding the potential differences between AISB who engage in regular substance use, perhaps particularly among those who use just prior to committing their offense, and AISB who do not use drugs or alcohol regularly. While other interpretations of these findings are quite plausible—such as alcohol and drugs being used for the purpose of disinhibition prior to offending—it is also possible that these results point to the importance of understanding the role of antisocial behavior among substance-using AISB, particularly when one considers the research indicating that many of the adult offenders who endorsed use just prior to their sexual offenses displayed chronic alcohol use disorders (US Department of Health and Human Services, 1987).

One final study in the AISB literature on substance use provides additional information on the link between substance use and antisocial behavior within this population, though it is similar to the previous studies in that there are methodological limitations. Driemeyer, Spehr, Yoon, Richter-Appelt, and Briken (2013) compared alleged AISB and alleged violent, non-sexual offenders (VNOs) with regard to aggression, antisocial behavior—including substance use—, and deviant sexuality. Their sample was recruited from adolescent males referred by police to the Family Intervention Team, which is a department in the youth welfare office in

Hamburg, Germany, dealing with juvenile delinquents. The first methodological concern stems from this referral source. Specifically, while all juveniles who are charged a sexual crime are referred to this program, those charged with a non-sexual crime are only referred after being charged with multiple offenses or charged with a single but exceptionally violent crime. This introduces a significant source of bias into the sample, particularly as the authors report that almost half of their sample of AISB was referred for largely milder offenses, such as voyeurism and making obscene phone calls. They further state that the number of mild offenses within this sample of AISB appeared lower than numbers reported in several previous studies that reported offense type data. Additionally, the sample size is only 64 individuals: 32 alleged AISB and 32 age-matched, alleged violent offenders without a known history of sexual offenses. Perhaps unsurprisingly, given the composition of the sample, the authors reported VNOs scored higher in aggressive and antisocial behavior, had higher rates of previous delinquency, and reported higher rates of substance use. However, even with the potential bias in favor of including more severe offenders in the VNO group, a significant number of the AISB participants had a history of being accused of a non-sexual crime. Thus, even in a sample of AISB that contained a high percentage of milder sexual offenses, there were some with additional, non-sexual criminal histories.

In sum, the extant literature on substance use among AISB is of limited scope and depth. Much of what does exist includes significant methodological problems, including a heavy reliance on self-report data. In addition, a number of studies collected only limited data on individual substance use rates and patterns by utilizing a single scale, which does not allow for any conclusions to be drawn related to the predictive power of an individual's drug of choice or whether they use immediately prior to a sexual offense versus engaging in a more consistent pattern of heavy use, just to name a few examples. The literature is further limited by the heavy

reliance on an individual's index offense to determine whether they are categorized as AISB or non-sexually offending juvenile delinquents for data analysis. While this method of categorization may sometimes be necessary due to inability to gain accurate information on prior offense histories, it introduces considerable error into any subsequent analyses, as it has been well-documented that many AISB have also committed nonsexual offenses (Barbaree & Marshall, 2006; Rich, 2011). Thus, the classification of these individuals would be entirely dependent upon whether their last known offense was sexual or nonsexual in nature. Finally, there has been little examination of intragroup differences between subgroups of AISB (e.g., child versus peer assaulters or violent versus non-violent offenders), though the few studies that have included such analyses have consistently found significant differences in patterns of substance use between subgroups of AISB (Butler & Seto, 2002; Glowacz & Born, 2013; Van Wijk, Blokland et al., 2007), suggesting the need for further examination.

Given the number of methodological concerns, particularly when combined with the severely limited number of published studies, it is difficult to draw many firm conclusions from the extant literature on substance use among AISB. One area of consensus is that samples of AISB have consistently demonstrated lower rates of substance use than their non-sexually offending peers; however, there is clear documentation of some use within these samples of AISB nonetheless. In addition, there do appear to be indications of similarities with the adult offender literature on substance use with regard to a possible role of increases in antisocial behaviors, generally, being associated with increases in substance use behaviors, specifically. It is unclear whether there is a clear link between these sets of behaviors at the present, due to lack of available empirical study as well as the overlap inherent as problematic substance use is one set of behaviors typically included under the label of antisocial behaviors. Thus, additional

research in this area could significantly clarify the factors and characteristics that distinguish substance-using and non-using AISB. As so little information is available regarding these variables within AISB samples, a review of what is known from general juvenile delinquent samples, where substance use has been much more amply researched, provides a framework for identifying possible variables of interest for the present study.

Juvenile Delinquent Substance Use

While the connection between antisocial behavior and substance use among AISB may be unclear, the literature on substance use within juvenile delinquent populations more clearly demonstrates high rates of co-occurrence between antisocial behaviors and substance use. With respect to overall rates of substance use, a 2001 study (Wilson, Rojas, Haapanen, Duxbury, & Steiner) examined a sample of 134 male adolescents, ages 13 to 19, housed in a California Youth Authority campus. Within this sample, 33.6% screened positive for a Substance Use Disorder (SUD), as determined by scores on the Substance Abuse Subtle Screening Inventory (SASSI). The authors note that this percentage is substantially higher than rates of abuse and dependence within general community samples, which ranged 3-10% in previous empirical studies (Wilson et al., 2001). However, given the information provided by the authors, it is unclear what the criteria utilized in these previous examinations of community samples entailed. Thus, the extent of the difference in rates of SUDs between this sample and community samples is not completely clear. If previous studies utilized a more extensive assessment of SUDs, which would then exclude some of the false positives one expects to obtain when utilizing a screener such as the SASSI, the author's comparison may be artificially inflated. Regardless, as this factor almost certainly would not account for the entire increase in SUDs, the author's results do provide evidence for increased, problematic substance use among juvenile delinquent populations.

A second study (Prinz & Kerns, 2003) examining the prevalence of early initiation of substance use among 189 adolescents—ages 13 to 19—incarcerated within the South Carolina Department of Juvenile Justice system. The authors note 79% of both the males and females reported having used at least one substance, including cigarettes, by the age of 13. This percentage drops only to 66% for males and 73% for females when cigarettes were excluded. Additionally, the authors report that earlier initiation of substance use was associated with earlier onset of frequent substance use (Prinz & Kerns, 2003). Finally, a study by Ho, Kingree, and Thompson (2007) highlights results from the 2002 National Survey on Drug Use and Health (NSDUH), indicating that 44% of juvenile arrestees met criteria for either substance abuse or dependence, which reflected a rate of use that was six time higher than among non-arrestees. While it is important to note that the label of "juvenile arrestees" would include those arrested for sexual crimes, the already-reported higher rates of substance use among JDs than AISB suggests that this substance use is occurring largely among JDs without a history of sexual offending. The authors also examined demographic differences in substance use between delinquent and non-delinquent adolescents within two community samples: the 2002 NSDUH and the National Longitudinal Study of Adolescent Health. The later included only alcohol use problems, but indicated that such difficulties were significantly more likely among those adolescents who had engaged in three or more delinquent behaviors in the past year. Similarly, the NSDUH results indicated that both alcohol and marijuana problems were significantly more likely among those who had engaged in at least one out of five delinquent behaviors, such as stealing or fighting, as well as among those with increased risk-taking tendencies—based on two Likert scale items. Both studies also found that older adolescents were more likely to have substance use problems, with the NSDUH also reporting an interaction between age and

delinquency such that the effect of age on both alcohol and marijuana use was more than twice as strong among the delinquent adolescents compared with the non-delinquent (Ho et al., 2007).

Providing additional information specific to a link between antisocial behaviors and substance use, "deviant" behaviors have long been linked to increased rates of substance use and abuse (see Newcomb & Bentler, 1989) and there is evidence of the predictive role of externalizing behaviors in childhood being tied to increased rates of substance use in adolescence (Windle & Windle, 1993). To further examine the relationship between delinquency and substance use, including rates of use-related negative consequences (i.e., "problematic substance use"), Stice, Myers, and Brown (1998) conducted a one-year, prospective study of 140 adolescents recruited from two separate inpatient alcohol and drug treatment programs. The authors utilized the Conduct Disorder Questionnaire in order to assess for the problematic behaviors associated with both Conduct Disorder and Antisocial Personality Disorder, as defined by the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). Of note, an additional methodological strength of this study is that the authors did not rely solely upon self-report data, but also gathered independent reports from parents/guardians. The authors reported that the full delinquency scale score predicted substance use as well as problematic substance use, which they note is consistent with several previous studies (Stice et al., 1998).

One additional study (Yeater, Lenberg, & Bryan, 2012) provides evidence for a link between substance use and sexual aggression, more specifically. The study included 404 adolescent males between the ages of 14 and 17 who were recruited from juvenile probation offices. Individuals who were on probation specifically for a sexual offense were excluded from the study. The measure of sexual aggression was somewhat limited, as it inquired about the frequency of sexually aggressive behaviors only within the previous 6 months and that were

committed against “a girl about their age” (Yeater et al., 2012, p.1247). However, this later restriction was likely intended to restrict positive responses solely to the forms of peer-aged sexual aggression that are a closer correlate to a rape or attempted rape by an adult perpetrator—as opposed to also including those offending against significantly younger children. The authors reported that those participants who endorsed hard drug use (i.e., drugs other than tobacco, alcohol, and marijuana) as well as those who endorse more frequent alcohol and marijuana use were more likely to report engagement in greater sexual aggression. Individuals who reported higher levels of sensation seeking, impulsivity, and externalizing behaviors were also more likely to report more sexual aggression. They noted that hard drug use and marijuana use, as well as higher rates of externalizing behaviors, were associated with higher rates of forced sex, while more frequent alcohol use was related to sexual harassment—but not to unwanted contact or forced sex (Yeater et al., 2012). Thus, there is evidence for a link between sexual aggression and substance use that appears consistent with the literature already presented on adult sexual offender substance use.

In summation, there is clear evidence within the literature on substance use among JDs of high rates of substance use—and problematic use, specifically—in comparison to their non-delinquent peers (Ho et al., 2007; Prinz & Kerns, 2003; Wilson et al., 2001) as well as in comparison to their AISB peers, as previously discussed. Further, there is significant support for a connection between antisocial behaviors and increased substance use (Newcomb & Bentler, 1989; Stice et al., 1998). Finally, substance use appears tied to sexual aggression, even within a sample in which specific effort was made to exclude AISB (Yeater et al., 2012). This final study also highlighted factors such as impulsivity and sensation seeking—in addition to externalizing behaviors—that were correlated with both substance use and sexual aggression.

Current Study

The purpose of the current study is to address some of the limitations of the existing literature on AISB substance use. As the existing literature is small in scope and has been focused largely on comparisons of rates of substance use between AISB and JD, the current study will focus on identifying potential predicates and correlates of use among AISB. Specific analyses are detailed more fully in the Method section below, but will include examinations of a range of variables drawn from the above literatures. Particular emphasis will be placed on factors tied to the potential link between antisocial tendencies and substance use behaviors, such as externalizing behaviors, internalizing behaviors, and risk of recidivism. Additionally, factors such as impulsivity, sensation-seeking, level of familial dysfunction, and deficits in parental attachment will also be examined, as these factors are likely to be associated with substance use, more broadly. The ultimate goal of the present study is to gain clarity on whether substance-using AISB more closely resemble the general juvenile delinquent population, substance-using JDs more specifically, or reflect a relatively unique subgroup with regard to predicates and correlates of substance use behaviors. This information has the potential to significantly influence the provision of treatment services for AISB for whom substance use is a concern.

Method

Sample and Procedure

The present study utilized data collected through the Alabama Department of Youth Services (DYS) Mt. Meigs correctional complex in Mt. Meigs, Alabama, which was designated as the state treatment facility for all juvenile males incarcerated for sexual offense in 2000. The complex also houses juvenile males convicted of non-sexual offenses, with the two populations being housed in separate dormitories after 2004. While the two populations of juvenile males are

allowed to have limited contact with each other during academic or extracurricular activities, the groups do not share living space, treatment programs, or treatment providers. Thus, two separate programs exist within the confines of the Mt. Meigs complex, the Accountability Based Sex Offender Program (ABSOP), consisting of adolescents with illegal sexual behavior (AISB), and the General Adolescent Population (GAP), consisting of the general juvenile delinquent (JD) residents. As part of an ongoing grant-funded research program intended to assess treatment outcome and rates of recidivism for ABSOP, each individual who entered ABSOP—along with a sample of the GAP residents—was given a pre-treatment assessment battery.

The pre-treatment battery was typically initiated within five to seven days after entry and typically took approximately nine to ten hours to administer. Prior to administration, each potential participant was provided with a consent form, which outlined the nature of the assessment to be competed and the ways in which the resulting data may be utilized. Additionally, each individual was informed of the efforts taken to preserve confidentiality, including assignment of identification numbers in place of their name and secure storage of all assessment materials post-collection. Participants were informed of their ability to withdraw from the research component of the assessment at any time, with no consequences tied to their withdrawal. Pre- and post-treatment batteries were still completed for those individuals who chose to withdraw in order to facilitate treatment, but their data were not included for use in the research database. The full pre-treatment and post-treatment batteries for ABSOP participants are described below; the GAP participants completed a similar battery, excluding the rating scales and self-report measures specific to sexual offending behaviors.

The pre-treatment battery included a semi-structured interview—conducted by graduate students in clinical psychology—which assessed for general demographics, home environment

(e.g., with whom did the individual primarily live, number of people residing in the home, were the individual's biological parents currently or previously married to each other), previous education, medical history, and other clinically-relevant information, such as criminal history, mental health history, history of substance use, history of physical or sexual abuse, and history of sexual behaviors. Participants' previous psychiatric evaluations, education records, medical records, and criminal records were examined as well, in order to confirm self-reported information. Clinicians were trained to highlight any inconsistencies in a non-confrontational manner in order to encourage honest reporting. Graduate level clinicians also administered intelligence and academic achievement testing, a diagnostic interview, an evaluation of executive functioning, and—for ABSOP only—two clinician-administered rating scales. Finally, the pre-treatment battery included several self-report measures administered by undergraduate research assistants. Prior to their release from the program, residents in ABSOP were given a post-treatment battery, which included re-administrations of several clinician-administered rating scales and self-report measures from the pre-treatment battery as well as a clinical interview focused largely on assessment of factors pertinent to the individual's re-entry into the community, such as response to treatment and risk for recidivism. All measures of interest for the present study are described in additional detail below.

The research database, at the time of the current study, included data for a total of 1414 adolescent males, ranging in age from 10 to 20 years. With regard to ethnic background, 49.9% (n = 706) identified as Black/African American, 46.9% (n = 664) identified as White/Caucasian, 1.6% (n = 22) identified as Biracial, 1% (n = 14) identified as Hispanic, and 0.6% (n = 8) identified as either Asian American or "Other" (groups combined in order to protect confidentiality). Only the two predominate ethnic groups (i.e., White/Caucasian and

Black/African American) were included in the current study, due to insufficient sample size within the remaining categories. Thus, the sample size for the current study was reduced to 1370 participants. ABSOP participants comprised 63.2% (n = 866) of this sample, with 36.8% (n = 504) belonging to GAP. All data analyses excluded individuals with missing data on measures of interest.

Measures

Specific measures of interest were the Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (K-SADS-PL), the Millon Adolescent Clinical Inventory (MACI), the Hare Psychopathy Checklist – Revised (PCL-R), and the Inventory of Parent and Peer Attachment – Revised (IPPA-R).

K-SADS-PL. The Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (K-SADS-PL; Kaufman, Birmaher, Brent, Rao, & Ryan, 1996) is a semi-structured, diagnostic interview designed to assess for psychopathology, current and past episodes, among children ages 6 through 18. An early psychometric study of the K-SADS-PL reported inter-rater reliability ranging from 93% to 100% agreement across all categories of clinical disorders, with an overall inter-rater reliability of 98% agreement in assignment of present and lifetime diagnoses (Kaufman et al., 1997). Additionally, the authors noted generally strong test-retest across diagnostic categories, with κ coefficients for the scales of interest in the present study ranging from .55 to .83 for both present and lifetime diagnoses (Kaufman et al., 1997). The K-SADS-PL provides diagnostic information on a range of clinical disorders, based on the Third Edition-Revised and the Fourth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R and DSM-IV, respectively), including the following scales utilized in the present study: (a) past Attention-Deficit/Hyperactivity Disorder

(ADHD), (b) past Conduct Disorder, (c) past Oppositional Defiant Disorder, and (d) past Depressive Disorder. The present study also included one additional variable, created to summarize several scales of the K-SADS-PL related to past anxiety disorders (i.e., Panic Disorder, Generalized Anxiety Disorder, Separation Anxiety, Social Phobia, Phobia and OCD). All K-SADS-PL variables in the larger Mt. Meigs database, as well as the anxiety disorder variable created for the present study, have been coded dichotomously to indicate either the presence or absence of clinically significant symptoms.

MACI. The Millon Adolescent Clinical Inventory (MACI, Millon, Millon, Davis, & Grossman, 1993, 2006) is a 160-item, self-report measure specifically developed for use with clinical, residential, and correctional populations, which is designed to assess a broad range of psychological problems among adolescents aged 13 to 19 years old. The MACI was developed out of the theoretical framework provided by Millon's biosocial and evolutionary theories of personality and psychopathology (Millon, 1969; Millon, 1990) and contains 31 scales in all: (a) one reliability scale, (b) three Modified Indices scales (i.e., validity scales), and (c) 27 content scales. The 27 content scales are broken down into three categories: (a) seven Clinical Syndromes scales, intended to assess for syndromes associated with Axis I diagnoses of the DSM-IV; (b) 12 Personality Patterns scales, intended to assess for syndromes associated with Axis II diagnoses of the DSM-IV; (c) eight Expressed Concerns scales, intended to assess for personal concerns that may be experienced by individual but that are not based on diagnostic criteria. During the initial, multistage validation process undertaken by Millon et al. (1993, 2006), the MACI demonstrated acceptable internal consistency and test-retest reliability, with individual scale coefficients ranging from 0.73 to 0.91 and 0.57 to 0.92, respectively. Independent examination of the psychometric properties of the MACI is limited; however, Pinto

and Grilo (2004) examined the internal consistencies of the 27 content scales, finding Cronbach's alpha scores ranging from 0.71 to 0.93, which the authors note were "strikingly similar" to the results originally reported by Millon. Additionally, little published research examines the underlying factor structure of the MACI. A recent study (Newman, Larsen, Cunningham, & Burkhart, 2015) examined four previously published factor structures using confirmatory factor analysis (CFA), but found support for none of these existing exploratory factor analysis (EFA) models in their sample of detained adolescent males. The authors split their sample randomly, without replacement, in order to conduct their own EFA, and subsequent CFA. The results supported a two-factor model—Internalizing and Externalizing—for the Personality Patterns and Clinical Syndromes scales of the MACI (Newman et al, 2015). The present study utilized the Clinical Syndromes scale of Substance Abuse Proneness as a measure of participants' engagement in substance use behaviors. Other Clinical Syndromes scales included as dependent variables were Delinquent Predisposition, Impulsive Propensity, Anxious Feelings, Depressive Affect, and Suicidal Tendency. The Personality Patterns scales of Unruly, Oppositional, and Borderline Tendency, as well as the Expressed Concerns scales of Family Discord and Childhood Abuse were included as additional dependent variables of interest.

PCL:YV. The Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) is a semi-structured interview and 20-item clinical rating scale designed to assess for psychopathic characteristics and behaviors among adolescents ages 12 to 18. Each item is scored on a 0-3 scale with the following anchors: (a) 2 = item applies to the youth, (b) 1 = item applies to a certain extent but not to the degree required for a score of 2, (c) 0 = item does not apply to the youth. Item scoring is based not only on responses from the semi-structured interview, but also from a thorough review of the individual's file. The PCL:YV has been shown to have good

internal consistency (O'Neill, Lidz, & Heilburn, 2003), interrater reliability (O'Neill, Lidz, & Heilburn, 2003; Skeem & Cauffman, 2003), and test-retest reliability (Skeem & Cauffman, 2003). The present study utilized simply the PCL:YV total score as a measure of overall psychopathy.

IPPA. The Inventory of Parent and Peer Attachment: (IPPA; Armsden & Greenberg, 1987) is a self-report measure designed to measure positive and negative affective and cognitive dimensions of an individual's relationships with their parents and close friends. The IPPA contains 53 total items—28 items comprising the Parent scale and 25 items comprising the Peer scale. Individuals rate each item with regard to how true the statement is for them on a 5-point Likert scale, with item responses ranging from 1 (Never) to 5 (Always). Each of the three sections measures the following dimensions of attachment within the specified relationship: (1) degree of mutual trust (Trust scale), (2) quality of communication (Communication scale), and (3) extent of anger and alienation (Alienation scale). Higher scale scores indicate greater attachment. Armsden & Greenberg (1987) reported good internal consistencies (Cronbach's α ranging from 0.72 to 0.91) and test-retest reliability correlation coefficients for parent and peer scales (0.93 and 0.86, respectively). While the IPPA subscales were considered for inclusion, the significant item overlap across subscales resulted in problematic multicollinearity. Therefore, only the total scores for parental and peer attachment, respectively, were used in the present study.

Recidivism Rates

Re-arrest data for AISB participants, recorded by the National Crime Information Center (NCIC) and the Automated Fingerprint Identification System (AFIS), was collected through the Alabama Crime Information Center (ACIC). The current investigation examined whether a re-

arrest had been reported and, if so, whether the crime was further illegal sexual behavior or a non-sexual offense. As there is often a significant delay before information is made available through the ACIC regarding re-arrest of a given individual, partially due to the simple necessity of waiting to see whether a re-arrest occurs, a separate and smaller dataset was used for these analyses. Analyses were limited to participants who entered Mt. Meigs' ABSOP prior to 2010, as recidivism data was largely unavailable for participants who entered the program within the past seven years. Within the recidivism dataset, the age range was similar to the larger database, with participants ranging from 10 to 19 years of age. The ethnic make-up of the sample was slightly different in that those identifying as White/Caucasian represented 57.9% (n = 367) of the sample, while those identifying as Black/African American comprised 42.1% (n = 267).

Data Analyses and Hypotheses

A series of two-way analysis of variance (ANOVA) and one-way analysis of covariance (ANCOVA) tests were conducted in order to examine correlates and predicates of substance use for AISB and, in the case of the two-way ANOVAs, for JDs. For all analyses utilizing the primary dataset, the MACI Substance Abuse Proneness scale was utilized as the dependent variable. The continuous nature of this variable allowed for greater depth of information regarding the connection between substance use and other variables of interest—particularly given the relatively low base rate of any substance use behavior among AISB participants as compared with their JD peers. However, analyses were limited to the AISB participants only for all ANCOVA analyses, so that the impact of each covariate on AISB substance use, specifically, could be examined. Based upon the available research, the several hypotheses related to the variables of interest were developed.

1. As the existing literature on substance use among AISB supports a possible role of antisocial tendencies in explaining substance use, the following factors related to antisocial behaviors were developed:
    a. There would be significant differences in antisocial tendencies for AISB participants—as measured by PCL:YV total score—across substance abuse score, with increases in PCL:YV total score associated with increased MACI Substance Abuse Proneness score.
    b. Externalizing behaviors were expected to predict higher scores on the MACI Substance Abuse Proneness scale.
        i. For the dichotomous measures of externalizing included in the present study (i.e., K-SADS-PL Conduct Disorder, Oppositional Defiant Disorder, and ADHD scales), significant interaction effects were expected between group membership and externalizing, such that less variability in substance abuse scores was expected within the JD group, across level of externalizing, than within the AISB group.
        ii. As only the AISB participants were included in the analyses for the continuous measures of externalizing included (i.e., MACI Unruly, Oppositional, Delinquent Predisposition scales), a significant main effect for externalizing was anticipated, in which increases in externalizing behavior scale scores would be associated with increases in substance abuse score.
    c. Internalizing behaviors also would predict Substance Abuse Proneness.

i. With regard to the dichotomous measures examined (i.e., K-SADS-PL Depressive Disorder scale and K-SADS-PL anxiety disorder summary variable), significant interaction effects were expected, indicating greater variability in substance use scores among AISB participants than JD participants across degree of internalizing.

ii. For the continuous variables examined within the AISB group (i.e., MACI Anxious Feelings, Depressive Affect, and Suicidal Tendency), we expected higher scores on measures of internalizing behaviors to be associated with increased MACI Substance Abuse Proneness scores.

d. With regard to recidivism rates among AISB, higher rates of re-arrest for all categories of non-sexual crimes examined (i.e., violent, nonviolent, property, and drug offenses) would be associated with increased MACI Substance Abuse Proneness scores, while a non-significant relationship between substance abuse score and re-arrests for further illegal sexual behaviors was expected.

2. Additional hypotheses were included to encompass other factors commonly associated with substance use across populations as follows:

a. Higher rates of impulsivity among AISB participants—as measured by the MACI Impulsive Propensity scale—would be tied to increases in MACI Substance Abuse Proneness scores.

b. Within the AISB group, familial dysfunction—as measured by the MACI Family Discord and Childhood Abuse scales—was expected to predict substance use, with increased dysfunction being associated with increased substance abuse.

c. Relatedly, the MACI Borderline Tendency scale also was expected to predict substance use among AISB participants. Higher scores on the Borderline Tendency scale were expected to be tied to higher scores on the Substance Abuse Proneness scale.

d. Among substance-using AISB participants, we expected to find greater deficits in parental attachment (i.e., lower scores on IPPA Parent Attachment). However, we expected to find stronger peer attachments (i.e., higher scores on IPPA Peer Attachment) with increased substance use within this group.

Results

Examination of Dichotomous Predictors

A series of two-way ANOVAs were run in order to examine the relationships between all potential, dichotomous predictors of substance use included in the present study, with the MACI Substance Abuse Proneness scale utilized as the outcome variable across all ANOVAs conducted. Three of the six variables examined by two-way ANOVA demonstrated significant interaction effects, with two of those interaction effects being statistically highly significant. For each of these three analyses, only the interaction effect will be interpreted, with additional statistical detail available in the corresponding tables and figures (see Appendices A and B respectively). First, the interaction of race and group membership on MACI Substance Abuse Proneness scale score (Table 1; Figure 1) yielded an F ratio of $F(1,1304) = 18.03$, $p < .001$. Specifically, the Black and White participants in the AISB group demonstrated smaller differences in substance abuse (Black, $M = 40.40$, $SD = 1.51$; White, $M = 45.77$, $SD = 1.28$) than did those in the juvenile delinquent group (Black, $M = 61.32$, $SD = 1.58$; White $M = 81.32$, $SD = 2.34$). While statistically highly significant, the effect size for this interaction effect was small

($_p\eta^2$ = .01), indicating it accounted for a relatively small portion of the overall variance. Second, there was a significant interaction effect between group and K-SADS-PL ODD (Table 2; F(1,1276) = 9.04, p = .003). As illustrated in Figure 2, substance abuse scores were more similar between AISB (M = 55.12, SD = 1.54) and JD participants (M = 71.35, SD = 1.76) who met criteria for ODD on the K-SADS-PL than between those who did not meet ODD criteria (AISB, M = 36.12, SD = 1.25; JD, M = 62.21, SD = 1.93). As with the group by race interaction effect, the effect size was small ($_p\eta^2$ = .01). Finally, the interaction between group and K-SADS-PL ADHD was significant (Table 3; Figure 3), yielding an F ration of F(1, 1281) = 4.00, p = .046. While substance abuse scores were higher among participants who met criteria for ADHD across group membership (AISB, M = 52.84, SD = 1.35; JD, M = 72.23, SD = 1.69), the difference was more pronounced for AISB than JD participants (AISB, M = 34.15, SD = 1.37; JD, M = 60.04, SD = 2.01). Thus, the interaction effects of race and of ODD symptoms with group membership, respectively, were small but significant, with the interaction of ADHD symptoms and group also reaching significance.

For each of the three remaining ANOVA tests, the main effect of group membership was statistically highly significant at the $p < .001$ level (see Tables 4-6 for full results), indicating significantly higher scores on the MACI Substance Abuse Proneness scale for JD participants than for AISB participants, as was expected. Each of the three main effects for group demonstrated medium effect sizes, indicating a moderate portion of variance was explained by the effect of group membership. Specifically, the effect size for both the depressive and anxiety symptom scales was $_p\eta^2$ = .13, while the effect size for CD was only slightly smaller ($_p\eta^2$ = .08). Further, for the analysis examining K-SADS-PL CD scale (Table 4), there was a statistically highly significant main effect for CD, $F(1,1280) = 65.62$, $p < .001$, meaning participants who

met criteria for CD demonstrated higher substance abuse scores (M = 61.32, SD = 1.02) than did participants who did not meet criteria for CD (M = 46.28, SD = 1.55). This main effect, similar to the effects for group membership noted above, was significant but small in terms of effect size ($_p\eta^2$ = .05). The main effect of K-SADS-PL Depressive Disorder (Table 5) yielded an F ratio of $F(1, 1279) = 36.34$, $p < .000$, indicating participants with symptoms of depression demonstrated significantly higher scores on the MACI Substance Abuse scale (M = 62.37, SD = 1.45) than participants without clinically significant symptoms of depression (M = 51.69, SD = 1.02). The effect size was, again, somewhat small ($_p\eta^2$ = .05). In contrast, the main effect for the summary variable of all K-SADS-PL anxiety scales (Table 6) yielded an F ratio of $F(1, 1278) = 0.81$, p = .37, meaning there was no significant difference in substance abuse score based on whether clinically significant symptoms of anxiety were present (M = 56.25, SD = 1.31) or absent (M = 54.72, SD = 1.10). Therefore, while symptoms of CD and Depression appear to be moderately strong predictors of substance abuse behaviors, symptoms of anxiety did not predict such substance use problems.

Examination of Continuous Predictors

Analyses of predictors within main dataset. A series of one-way ANCOVA tests were run in order to examine the predictive potential of all continuous dependent variables, such as age and each MACI subscale included. As previously noted, ANCOVAs were run using only AISB participants. Again, MACI Substance Abuse Proneness served as outcome variable for each analysis. The majority of the ANCOVAs yielded statistically highly significant covariate effects, with the one exception being age, $F(1, 837) = 1.20$, p = .275, indicating that age did not predict MACI Substance Abuse Proneness score. A more complete statistical summary for the

remaining ANCOVAs has been included in Table 7, but the findings are discussed briefly here as well.

First, MACI Impulsive Propensity significantly predicted Substance Abuse Proneness, with increases in impulsivity tied to increases in substance abuse. Not only was this effect highly significant, the effect size was notably large ($\eta^2 = .50$), indicating a substantial portion of variance was accounted for by Impulsive Propensity score for this ANCOVA. With regard to measures of externalizing behaviors, all three MACI scales examined (i.e., Delinquent Predisposition, Unruly, and Oppositional) predicted substance abuse. In each analysis, there was a positive relationship between the variables, indicating that higher scores on the externalizing measures were associated with higher substance abuse scores. As with impulsivity, the effect sizes for each of the externalizing scales were striking, ranging from $\eta^2 = .33$ for the Delinquent Predisposition and Oppositional scales to $\eta^2 = .55$ for Unruly. Findings were similar for two of the three internalizing behavior scales. Specifically, MACI Depressive Affect and Suicidal Tendency both were statistically highly significant predictors of substance abuse score, with each demonstrating a positive correlation (i.e., increases in depressive symptoms or suicidality were tied to higher substance abuse scores). Notably, when effect sizes were examined, the effect of Suicidal Tendency demonstrated a moderately large effect on substance use ($\eta^2 = .19$), while the effect of Depressive Affect was a good deal smaller ($\eta^2 = .05$). Another intriguing finding among the internalizing scales was that, while MACI Anxious Feelings scores also predicted substance abuse scores at a statistically highly significant level, the inverse relationship was found. This means higher levels of anxiety were tied to lower substance abuse scores, with the effect size reflecting a large amount of variance accounted for by anxious symptoms ($\eta^2 = .47$). Thus, both impulsivity and externalizing behaviors appeared to demonstrate strong, positive correlations

with substance abuse behaviors, internalizing behaviors provided a more complex picture. Depressive symptoms, particularly suicidal tendencies, had more modest effect sizes but remained highly statistically significant and positively related to substance abuse. Anxiety, on the other hand, demonstrated a strongly negative relationship with substance abuse among AISB.

With regard to measures of attachment, both the IPPA Parent and Peer scales predicted substance abuse score, with higher IPPA scores (i.e., greater attachment) being associated with lower substance abuse score. For both the parent and peer attachment scales, results were highly significant but effect sizes were small (Parent, $\eta^2 = .05$; Peer, $\eta^2 = .01$). Larger scores on the MACI Family Discord and Childhood Abuse scales—for which larger scores indicate higher levels of familial conflict and increased presence of childhood abuse, respectively—also were associated with increased substance abuse scores, with childhood abuse history demonstrating a medium effect ($\eta^2 = .14$) and family discord yielding a large effect ($\eta^2 = .39$). MACI Borderline Tendency also predicted substance abuse scores, with increased borderline tendency being associated with increased substance abuse score. Not only was this relationship statistically highly significant, but also the effect size was robust ($\eta^2 = .31$). Finally, antisocial tendencies—as measured by PCL:YV total score—demonstrated a highly significant relationship with substance abuse score, with increased antisocial tendencies correlating with increased substance abuse. A moderately strong portion of the variance was accounted for by antisocial tendency ($\eta^2 = .21$). In sum, while there was significant variability of effect size across the abovementioned predictors, each of them—peer and parent attachment, history of family conflict and of childhood abuse, and both borderline and antisocial tendencies—evidenced a statistically highly significant, positive relationship with substance abuse.

Analyses of recidivism dataset. Several categories of recidivism were examined, also utilizing one-way ANCOVA, in order to determine whether MACI Substance Abuse Proneness scores predicted various kinds of recidivism. As noted previously, these analyses were conducted with a reduced sample that included only AISB participants, due to the limited re-arrest data available. While the statistical results will be provided in the text, this information will also be summarized in Table 8 for ease of reference and inclusion of additional detail. Substance Abuse Proneness score significantly predicted three of the five categories of recidivism. Specifically, substance abuse score predicted later arrests for both non-violent offenses, $F(1, 580) = 4.21$, $p = .04$, and property offenses, $F(1, 580) = 5.02$, $p = .03$. Unsurprisingly, the third category of recidivism significantly related to substance abuse score was that of drug offenses, $F(1, 580) = 4.83$, $p = .03$. For each of these three statistically significant relationships, the effect size was small, $\eta^2 = .01$. However, effect size estimates may have been influenced by the relatively small percentage of AISB participants, across each category of recidivism examined, who had been charged with any crime following their release from Mt. Meigs. The relationship between substance abuse score and later violent-offense arrests was non-significant $F(1, 581) = 1.00$, $p = .32$, nor did substance abuse score predict sexual recidivism, $F(1, 581) = 1.90$, $p = .17$. Thus, Substance Abuse Proneness significantly predicted most types of recidivism, except for violent crime and sexual misconduct, indicating the latter two categories of recidivism have weaker ties to substance abuse behaviors than other types of illegal behaviors.

Discussion

The present study sought to examine potential predicates and correlates of substance use behaviors among AISB and, where possible, compare AISB with their JD peers in order to gain understanding of the small but clinically significant subset of AISB for whom substance use is a

concern. Variables of interest were chosen based upon a thorough review of the empirical literatures on substance use within both AISB and JD populations, as well as the literature on substance use among adult perpetrators of sexual crimes. Support was found for two broad categories of variables: (1) factors associated with increased antisocial tendencies, and (2) factors commonly associated with higher rates of problematic substance use. Additionally, while no specific hypotheses were generated regarding age-related and ethnic group differences in substance use, these variables were examined as well. Age was included due to the fact that the extent of substance use within adolescent populations is naturally tied to age to at least a degree, as one would expect older adolescents to be more likely to have had histories of use extensive enough to allow for the development of the more severe symptoms of a substance use disorder (e.g., physical dependence or repeated efforts to stop using without success). As we made the decision to retain age as a categorical variable, as opposed to imposing arbitrary categories, we were unable to contrast JD and AISB participants; however, with regard to AISB participants age was not significantly related to substance use. This finding is rather surprising within an adolescent population such as this one, perhaps pointing to a unique nature of the small sub-group of AISB who use alcohol and drugs. With respect to ethnicity, only two, broad ethnic categories were included in the present analyses due to exceedingly small sample sizes within other ethnic groups represented in the larger Mt. Meig's research database. Nonetheless, it is important to include an examination of group differences based on these two ethnic groups, particularly as previous research has demonstrated reliable group differences such that White individuals average heavier use than other ethnic groups, with Black individuals averaging significantly lower rates of use (adolescent substance use, see Johnston, O'Malley, Bachman, & Schulenberg, 2007; adult substance use, see Mericle, Ta Park, Holck, & Arria, 2012). When

examined through two-way ANOVA, a highly significant interaction effect between ethnicity and group membership was evident such that AISB participants were more similar across ethnic group than were JD participants. (It is worth noting that the general pattern of increased use among White versus Black participants is in keeping with the abovementioned literature on ethnic group differences in rates of substance use.) More interestingly, the general pattern among AISB participants for both ethnicity and age was for a smaller impact of each of these two well-established factors that typically play a larger role. Again, this would seem to suggest that substance-using AISB are not only a distinct subgroup within the larger AISB population, but also that this subgroup may differ somewhat from typical substance-using populations.

With regard to the first group of variables examined, we hypothesized a positive relationship between our most direct measure of antisocial tendency—PCL:YV total score—and MACI Substance Abuse Proneness score among AISB, meaning that we expected to find increased antisocial tendency to be associated with increased substance abuse scores. Our results supported this hypothesis, with the relationship being statistically highly significant and with a moderately large effect size. Therefore, based on this initial variable of interest, antisocial tendency does appear strongly related to substance use within the AISB portion of our sample. Subsequently, we examined the remaining variables associated with antisocial tendency.

The first of these remaining hypotheses was related to externalizing behaviors and was two pronged: (1) For all continuous measures examined, externalizing behaviors would be associated with increased substance abuse scores; (2) For all dichotomous measures included, significant interaction effects between group membership and externalizing would be found such that presence of clinically significant externalizing behaviors would result in greater intragroup differences in substance use for AISB participants than for JD participants. The first portion of

our hypothesis regarding externalizing behaviors was fully supported, with larger scores on each of three MACI scales tied to externalizing (i.e., Delinquent Predisposition, Unruly, and Oppositional) predicting larger MACI Substance Abuse Proneness scores. Furthermore, each of these relationships was statistically highly significant with large effect sizes—meaning we can have a high degree of confidence that externalizing behaviors do account for a significant portion of the variance in substance use among AISB participants. These findings suggest that externalizing behaviors meaningfully predict which AISB are likely to struggle with problematic substance use.

The second half of our externalizing behaviors hypothesis was largely supported as well, with both the ODD and ADHD scales of the K-SADS-PL demonstrating significant interaction effects consistent with our hypothesis. Specifically, clinically significant symptoms of either ODD or ADHD—as measured by the K-SADS-PL—were associated with more dramatic increases in substance abuse score among AISB participants when compared with the increases in substance abuse among JD participants. These findings further support the predictive utility of externalizing behaviors in determining likelihood of substance use problems among AISB. However, in a departure from the abovementioned findings as well as from our hypothesis, the final externalizing behavior scale examined—the K-SADS-PL CD scale—did not evidence a similar interaction effect. For this externalizing scale, a main effect for group membership was the only significant finding, with JD participants meeting criteria for CD more often than AISB participants. It is unsurprising that, in the absence of a significant interaction effect, this main effect for group membership would be evident, as JD participants were expected to average higher substance abuse scores than did AISB. It is interesting, however, that the interaction effect of group and CD was non-significant when the interaction of group and ODD was highly

significant. CD is typically considered the more severe diagnostic label—associated with higher levels of interpersonal conflict and incorporating additional diagnostic requirements such as physical aggression towards people or animals and destruction of property— (American Psychiatric Association [APA], 2013). Therefore, one would expect to find a similar interaction effect for CD if antisocial tendencies are, indeed, a driving force in substance use among AISB. The implications of this departure from the remaining results related to externalizing behaviors will be explored further below, as they appear to tie into several findings regarding internalizing behaviors as well.

Our hypothesis regarding internalizing behaviors was similarly two-pronged: (1) For all continuous measures, we anticipated internalizing behaviors being associated with increased substance abuse score; (2) For all dichotomous measures, we expected significant interaction effects between group membership and internalizing, such that presence of clinically significant internalizing behaviors would be associated with greater intragroup differences in substance use among AISB participants than among JD participants. With respect to the latter portion of this hypothesis, our results failed to support expectations. For both the K-SADS-PL Depressive Disorder scale and the variable created to summarize the various anxiety disorder scales of the K-SADS-PL, the only significant result was a main effect for group membership. While these two results do provide further support for increased use among JD participants, compared to AISB participants, the lack of a significant main effect for either depressive or anxiety symptoms and, in particular lack of a significant interaction effect runs counter to our expectations that we would find greater levels of internalizing among substance users, generally, with this effect being particularly important among AISB, specifically. The results tied to the first portion of our internalizing behaviors hypothesis were mixed. As with our findings related to externalizing

behaviors, all continuous measures of internalizing (i.e., MACI Depressive Affect, Suicidal Tendency, and Anxious Feelings scales) were statistically highly significant. Closer examination, however, yields some interesting additional information. Specifically, the Anxious Feelings and Substance Abuse Proneness scales were inversely correlated—meaning, lower anxiety scores were associated with higher substance abuse scores and vice versa. The associated effect size was a striking $\eta^2 = .47$. Taken in isolation, this finding appears to provide support for a connection between antisocial tendency and substance use among AISB; however, when taken in context with the full set of analyses run, the picture is less clear—as will be discussed in greater detail below. With regard to the effect sizes noted for the Depressive Affect and Suicidal Tendency scales, the broader measure of Depressive Affect yielded a small effect size ($\eta^2 = .05$), while the effect size for Suicidal Tendency was more robust ($\eta^2 = .19$). Initially, this seems to be a curious result, as suicidal ideation is most commonly thought of as a symptom of Major Depressive Disorder. One potential explanation is that depressive symptoms may display a more strongly positive relationship with substance use when they are at the more severe end of the spectrum—when one would also expect to see an increase in reporting of related suicidal ideation. As the MACI Depressive Affect scale includes the full range of depressive symptoms, including those of milder severity, this could explain the reduced effect size for Depressive Affect as compared to Suicidal Tendency.

However, another interpretation may better explain not only the degree of difference in these two effect sizes but also the other unexpected findings within our analyses of externalizing and internalizing behavior variables. Namely, a tendency towards an alternative Cluster B Personality Disorder—Borderline Personality Disorder (BPD)—may be associated with increased substance use among AISB instead of or in addition to a tendency towards Antisocial

Personality Disorder (APD). The MACI Borderline Tendency scale initially was included in the present analyses within the second group of variables—those examining factors commonly associated with increased substance use across populations—as a measure of general instability and impulsivity in an individual's style of living, as well as an indirect measure of familial conflict or dysfunction. We hypothesized that increased borderline tendencies would be associated with higher scores on the MACI Substance Abuse Proneness scale for AISB participants, and our hypothesis was supported, with the relationship reaching a high level of statistical significance and with a large effect size ($\eta^2 = 0.31$). This result supports the idea that borderline tendency plays a meaningful role in substance use among AISB. Additionally, this result helps to clarify the abovementioned results that otherwise seem puzzling when looked at from the lens of examining these factors solely as indicators of antisocial tendency.

First, suicidality is a symptom not commonly associated with APD. Therefore, in order to explain our finding of a highly significant relationship—with a moderate effect size—between the MACI Suicidal Tendency and Substance Abuse Proneness scales, one would expect similarly impactful findings tied to the measures of depressive symptoms included. Our results, however, were mixed with regard to depression, with a non-significant interaction effect of K-SADS-PL Depressive Disorder and group membership and a non-significant main effect for the Depressive Disorder scale. While the MACI Depressive Affect scale ANCOVA did demonstrate a highly significant result, the effect size was small. Taken together, this does not appear sufficient to explain the relationship of suicidality and substance use among AISB. However, engagement in suicidal behaviors, gestures, or threats is listed as a symptom of BPD in the fifth and current edition of The Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013). This diagnostic criterion does not include a requirement for suicidal ideation, as does Major

Depressive Disorder, individuals with BPD sometimes engage in suicidal behaviors or threats in the absences of true suicidal ideation, for reasons such as an effort to prevent another individual from distancing or leaving a relationship. Thus, it is possible the stronger findings regarding the Suicidal Tendency scale as opposed to the measures of depressive symptoms are due, at least in part, to suicidal behaviors or gestures stemming from borderline tendencies.

Furthermore, consideration of borderline tendencies could explain our findings related to the K-SADS-PL ODD and CD scales as well. As was noted previously, CD is thought of a the more severe of the two diagnostic labels. It also has the closer connection to APD, as the diagnostic criteria for APD includes the requirement of "evidence of conduct disorder with onset before age 15 years" (APA, 2013). Additionally, while both CD and APD can be associated with depressed mood and anxiety according to the description of each provided in the DSM-5, such mood-related symptoms are not included in the diagnostic criteria for either disorder. Mood-related symptoms play a much larger role, however, for both ODD and BDP, as each has specific diagnostic criteria tied to mood-related symptoms. Specifically, ODD includes a requirement of emotional dysregulation in the form of "a pattern of angry/irritable mood," while the symptom list for BPD includes three possible symptoms of emotion- or mood-related difficulty: (1) "affective instability due to a marked reactivity of mood," (2) "chronic feelings of emptiness," and (3) "inappropriate, intense anger or difficulty controlling anger" (APA, 2013). Based on these factors, it appears our findings with respect to the K-SADS-PL ODD and CD scales align more closely with borderline tendencies as opposed to antisocial tendencies.

One additional finding of importance in this discussion relates to the analyses conducted on recidivism rates among AISB participants. We hypothesized that each category of non-sexual recidivism examined would be significantly associated with increased Substance Abuse

Proneness scores, whereas recidivism due to sexual crimes would demonstrate a non-significant relationship. Our hypothesis was largely supported, with one key exception—recidivism due to violent crime was not significantly related to substance abuse scores. Again, if these analyses are viewed solely as factors associated with antisocial tendencies, the lack of a significant relationship between violent crime and substance abuse scores seems to provide evidence against the impact of antisocial tendencies. However, one would not necessarily expect to see as strong a connection to violent crimes if borderline tendencies were driving, at least in part, problematic substance use among AISB.

None of this is to say that antisocial tendencies, therefore, do play any role in understanding substance use among AISB. On the contrary, several specific results from the present study appear to support the role of antisocial behaviors in substance use among AISB in a manner consistent with the limited, extant literature. Specifically, the significant rates of recidivism due to drug, property, and other non-violent crimes—particularly with regard to the latter two categories—continue to suggest antisocial tendencies as such criminal behavior is associated strongly as antisocial behavior, without a similarly clear connection to borderline tendencies. These recidivism results support earlier studies highlighting increased rates of non-sexual crime among substance using AISB as compared to non-using AISB (Butler & Seto, 2002; Driemeyer et al., 2013). In addition, our findings that those with fewer symptoms of anxiety—as measured by the MACI Anxious Feelings scale—were associated with increased substance use problems appears to provide exceptionally strong support for the role of antisocial tendencies. A lack of remorse for the consequences of one's actions is a hallmark of APD, which would align with lessened symptoms of overall anxiety. In contrast, the affective instability and fear of abandonment that characterize individuals with BPD would not appear naturally

connected to this finding. Therefore, as both antisocial and borderline tendencies each appear to support some, but not all, of our findings, the simplest explanation seems to be that it is possible both are at play. Specifically, it is possible that, while some substance-using AISB display the pattern commonly noted among adult offenders who engage in sexual crime of antisocial tendencies, others may be more accurately described as tending towards borderline. Further research would be required to draw firm conclusions in this matter.

With regard to the variables examining general factors commonly associated with substance use across populations, the majority of our hypotheses again were supported. First, we hypothesized higher levels of impulsivity—measured by the MACI Impulsive Propensity scale—would be tied to higher substance abuse scores among AISB, which was strongly supported by a statistically highly significant result and quite large effect size ($\eta^2 = .50$). The robust nature of this finding is striking, though not surprising given the long-known connection between impulsivity and increased substance use across multiple populations (e.g., Fergusson, Boden, & Horwood, 2008; Shin, Chung, & Jeon, 2013). Second, we expected to find familial dysfunction would predict substance use, meaning we anticipated larger scores on both the MACI Family Discord and Childhood Abuse scales would be significantly related to MACI Substance Abuse Proneness scores among AISB. Again, our results firmly supported this hypothesis, with each scale demonstrating a statistically highly significant relationship with substance abuse score. While the effect size for the Childhood Abuse scale was moderate ($\eta^2 = .14$), the more direct measure of Family Discord displayed a much larger effect size ($\eta^2 = .39$). Thus, heightened levels of instability and conflict within the family unit also appear to increase the likelihood that a given AISB will engage in substance use.

Relatedly, we hypothesized parental and peer attachment—as measured by the IPPA Parent and Peer total scores, respectively—would each be connected to substance use among AISB, though in differing ways. We expected lower overall parent attachment scores (i.e., reflecting poor attachment) but higher peer attachment scores (i.e., stronger peer attachments), respectively, to be associated with increased substance use among AISB. While both results were statistically highly significant, our findings differed somewhat from our hypotheses in that both parent and peer attachment scales displayed the same pattern of poorer attachment being related to increased substance abuse scores. Thus, in contrast to our expectations that the influence of attachment on substance use would follow the common pattern for adolescents with substance use problems in which one sees a weaker relationship with parents and a strong peer influence (e.g., Wills, Resko, Ainette, & Mendoza, 2004), among AISB in our sample it appears those individuals without strong attachments with either parental figures or peers are most at risk of substance use problems.

In conclusion, the present study provided a much needed addition to the existing literature on substance use among AISB by improving our understanding of several predicates and correlates believed to be associated with problematic use in this small but clinically important subgroup of AISB. Within our sample, substance-using AISB appear to represent not only a relatively unique subgroup within AISB but also within the larger substance use literature to a degree. Specifically, when ethnic group and age were examined, our results ran counter to common findings among other adolescent populations, as we found no significant effect of age among AISB and that AISB demonstrated smaller ethnic group differences in substance abuse scores than did their JD peers. Additionally, the pattern of parental and peer attachment was somewhat different from expectations in that, while substance-using AISB in our sample

displayed poorer parental attachment in accordance with the common adolescent pattern, they also displayed poorer peer attachment. These results suggest that, in comparison with other adolescent populations, commonly-expected demographic influences may have less influence among substance-using AISB and that the role of peer influence in developing substance use problems is relatively small. In other ways, however, substance-using AISB in our sample did present a familiar pattern, as our results indicated increased impulsivity and heightened levels of familial dysfunction were both significantly tied to increased substance abuse scores. Taken together, these results suggest that substance-using AISB may share common ties with other adolescent populations, such as substance-using JDs, in some of the underlying, root causes of problematic substance use. Namely, that a chaotic and/or abusive upbringing, the lack of a strong, positive attachment with a caregiver, and a tendency towards increased impulsivity—as compared to other adolescent peers—all encourage the development of problematic substance use among AISB in the same way that these factors are tied to substance use among other adolescent populations.

Increased antisocial tendencies were expected to be tied strongly to substance use within this subgroup of AISB, as we expected them to share similarities with their substance-using JD peers. A similar overall pattern was evident in which substance-using AISB followed our expectations to a degree but in other ways differed from the set of expectations derived from the existing literature on JD substance use. With respect to the factors that did support our hypotheses that substance-using AISB would demonstrated increased antisocial tendencies, we found higher total scores on the PCL:YV—a measure of psychopathy—as well as higher scores on the MACI scales tied to externalizing behaviors (i.e., Delinquent Predisposition, Unruly, and Oppositional) all were associated with increased substance abuse scores among AISB. Two

additional scales included to examine externalizing behaviors—the K-SADS-PL ODD and ADHD scales—each demonstrated statistically highly significant interactions with group membership, indicating that AISB with significant ODD and ADHD symptoms, respectively, were more similar to their JD peers with regard to substance abuse scores. With regard to internalizing, our results indicated lower levels of anxiety were associated with increased substance abuse scores—a finding that provides rather strong support for the role of antisocial tendencies as callous disregard for others and the judgments of society are a hallmark of APD. Finally, we found that substance-using AISB were significantly more likely to recidivate than their non-using AISB peers across drug, property, and other non-violent crimes—again, supporting a possible link to antisocial tendencies.

The final category of recidivism—that of violent crimes—was not significantly related to substance abuse scores among AISB, however, nor was the final measure of externalizing behaviors included (i.e., K-SADS-PL CD). When the remaining results related to measures of internalizing also did not align fully with our expectations, the weight of evidence began to suggest antisocial tendencies alone likely were not sufficient to explain substance use among AISB within our sample. We propose that, as the MACI Borderline Tendency scale also reached a high level of statistical significance with a robust effect size in predicting substance abuse score, an additional factor of borderline tendencies may help to complete the picture of predicates and correlates of substance use among AISB. The addition of this factor of borderline tendencies would appear to explain the abovementioned unexpected findings within our examination of factors initially included due to their connection with antisocial tendencies. Furthermore, borderline tendencies may also explain our findings with regard to parental and

peer attachment, as we would expect adolescents displaying early signs of BPD to display a general pattern of insufficient and chaotic attachment to others.

Limitations and Future Directions

One primary limitation of this study is that the bulk of analyses conducted utilized a cross-sectional design, making any causal inferences impossible. While the inclusion of recidivism data for AISB participants means that portion of the current study contains more than one time-point per individual, causal interpretations remain inappropriate, given the lack of specific examination of patterns of non-sexual criminality prior to admission to Mt. Meigs. An additional limitation is the lack of diversity in our sample with regard to ethnicity. While the overwhelming predominance of Black and White participants appears due to the general makeup of the larger statewide population of juvenile criminal offenders, it nonetheless reduces the generalizability of our findings. Without additional research, it is unclear whether the patterns of predicates and correlates found within our sample would hold true for substance-using AISB of other ethnic backgrounds. An additional limitation related to generalizability is that, due to the nature of the present sample as consisting entirely of court-ordered, institutionalized AISB, our results do not generalize beyond such a setting. Again, further research with substance-using AISB in residential treatment programs that include individuals admitted without court order as well as those being treated in outpatient settings could determine whether our findings hold for AISB in other settings. Finally, with regard to the methodology of the current study, while the MACI Substance Abuse Proneness scale was the best available measure of substance use within the existing database, there are limitations inherent in its use. Indeed, as was discussed briefly in the review of the extant literature, the use of a single measure focused on the symptoms of substance use disorders and associated characteristics and behaviors does not allow for

examination of factors such as the role of drug of choice, timing of use in relation to the commission of illegal sexual behavior, and extent of use—with regard to both number of substances used and frequency of use. While several face-valid measures of substance use were available, each had its own limitations as well. The MACI scale was chosen largely to avoid potentially significant sources of bias inherent in utilizing self-report data, particularly within the present sample of incarcerated youth and, perhaps more importantly, to mitigate the influence of low base rates of substance use among AISB as a whole. The increased depth of information provided by a continuous scale measure appeared to be the more heavily weighted consideration, particularly given the foundational nature of the present study.

Conclusion

Based on the results of the present study, substance-using AISB appear to represent a somewhat distinct subgroup—not only among their non-using AISB peers but also within other substance-using populations. Several findings did neatly align with expectations drawn from reviewing the literatures on substance use among adult sexual offenders and among juvenile delinquent populations. Specifically, the links between substance abuse proneness and heightened impulsivity and familial dysfunction aligned with expectations regarding factors generally tied to increases in problematic substance use in other populations. Further, findings that larger substance abuse scores were related to increased scores on the PCL, scores on the two of three measures of externalizing behaviors, lower scores on a measure of anxiety, and rates of recidivism for the majority of categories included also were related to increases in substance abuse proneness, clearly supporting previous research indicating a connection between antisocial tendencies and substance use among AISB. However, other findings suggested an unanticipated role for borderline tendencies as well. Not only was a direct measure of borderline tendency

positively correlated with substance abuse scores, but also findings such as a non-significant effect found for a measure of Conduct Disorder, a non-significant effect found for recidivism due to violent crime, and a significant relationship between deficits in both parental and peer attachment and substance abuse scores further suggest significant borderline tendencies among substance-using AISB. Two additional—and unexpected—findings were not tied specifically to borderline tendencies but also suggested substance-using AISB differ from other substance-using populations. Namely, age did not significantly predict substance abuse scores among AISB and ethnic group differences in substance abuse proneness were significantly smaller among AISB than among their JD peers, suggesting factors such as age and cultural subgroup may have less influence on substance use among AISB than is commonly seen in other adolescent populations, in particular. The current study adds significantly to the existing literature on substance-using AISB, which has been limited in scope, by confirming some previous findings regarding the connection between substance use and antisocial tendencies as well as by expanding our understanding of additional factors related to substance use within this population. These results suggest the need for future research on substance-using AISB, in order to gain clarity on the relative importance of antisocial and borderline tendencies on substance use behaviors, as well as to gather additional information on how substance-using AISB may differ from substance-using adolescents more generally.

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Appendix A

Table 1
ANOVA Summary for Group Membership by Race

Source	Sum of Squares	df	Mean Square	*F*	*p*	Partial η^2
Group	214727.13	1	214727.12	268.82	.000	.17
Race	43327.02	1	43327.02	54.24	.000	.04
Group * Race	14399.74	1	14399.74	18.03	.000	.01
Error	1041591.24	1304	798.77			

Note: R^2 = .174 (Adjusted R^2 = .172); *n* = 1308

Table 2
ANOVA Summary for Group Membership by K-SADS ODD

Source	Sum of Squares	df	Mean Square	*F*	*p*	Partial η^2
Group	128656.41	1	128656.41	166.51	.000	.12
ODD	56888.67	1	56888.67	73.62	.000	.05
Group * ODD	6984.84	1	6984.84	9.04	.003	.01
Error	985945.41	1276	772.68			

Note: R^2 = .198 (Adjusted R^2 = .196); *n* = 1280

Table 3
ANOVA Summary for Group Membership by K-SADS ADHD

Source	Sum of Squares	df	Mean Square	*F*	*p*	Partial η^2
Group	148293.47	1	148293.47	193.81	.000	.13
ADHD	68931.99	1	68931.99	90.09	.000	.07
Group * ADHD	3056.82	1	3056.82	4.00	.046	.00
Error	980164.35	1281	765.16			

Note: R^2 = .204 (Adjusted R^2 = .203); *n* = 1285

Table 4
ANOVA Summary for Group Membership by K-SADS CD

Source	Sum of Squares	df	Mean Square	*F*	*p*	Partial η^2
Group	84270.71	1	84270.71	108.47	.000	.08
CD	50982.48	1	50982.48	65.62	.000	.05
Group * CD	871.11	1	871.11	1.12	.290	.00
Error	994457.74	1280	776.92			

Note: R^2 = .192 (Adjusted R^2 = .190); *n* = 1284

Table 5
ANOVA Summary for Group Membership by K-SADS Depressive Disorder

Source	Sum of Squares	df	Mean Square	*F*	*p*	Partial η^2
Group	155746.57	1	155746.57	192.67	.000	.13
Depressive	29371.16	1	29371.16	36.34	.000	.03
Group * Depressive	17.15	1	17.15	0.02	.884	.00
Error	1033879.72	1279	808.35			

Note: R^2 = .160 (Adjusted R^2 = .158); *n* = 1283

Table 6
ANOVA Summary for Group Membership by K-SADS Anxiety

Source	Sum of Squares	df	Mean Square	*F*	*p*	Partial η^2
Group	154682.75	1	154682.75	185.84	.000	.13
Anxiety	670.35	1	670.35	0.81	.370	.00
Group * Anxiety	129.88	1	129.88	0.16	.693	.00
Error	1063732.30	1278	832.34			

Note: R^2 = .132 (Adjusted R^2 = .130); *n* = 1282

Table 7
Summary of Main Analysis ANCOVA Results

Source	*n*	Sum of Squares	df	Mean Square	*F*	η^2	β	Standard Error
Age	1307	1011.46	1	1011.46	1.20	.00	0.73	.67
Impulsive Propensity	1308	354093.98	1	354093.98	834.50*	.50	0.84	.03
Delinquent Predisposition	1308	235448.99	1	235448.99	416.06*	.33	0.89	.04
Unruly	1308	386717.50	1	386717.50	1003.46*	.55	1.08	.03
Oppositional	1308	231560.76	1	231560.76	405.86*	.33	0.91	.05
Anxious Feelings	1308	333150.13	1	333150.13	741.47*	.47	-0.90	.03
Depressive Affect	1308	38173.81	1	38173.81	47.64*	.05	0.26	.04
Suicidal Tendency	1308	132889.85	1	132889.85	193.07*	.19	0.55	.04
Borderline Tendency	1308	222577.59	1	222577.59	382.93*	.31	0.73	.04
Family Discord	1308	274055.40	1	274055.40	527.20*	.39	0.88	.04
Childhood Abuse	1308	96916.18	1	96916.18	132.54*	.14	0.38	.03
PCL Total	1293	145348.87	1	145348.87	215.78*	.21	1.69	.12
IPPA Parent	1127	27744.45	1	27744.45	33.62*	.05	-0.28	.05
IPPA Peer	1137	4870.91	1	4870.91	5.78*	.01	-0.14	.06

Note: $*p < .001$

Table 8
Summary of Recidivism ANCOVA Results

Type of Re-offense	*n*	Sum of Squares	df	Mean Square	*F*	η^2	β	Standard Error
Sexual	581	0.20	1	0.20	1.90	.00	.00	.00
Violent	581	1.63	1	1.63	1.00	.00	.00	.00
Non-Violent	582	46.36	1	46.36	4.21*	.01	.01	.01
Property	582	10.09	1	10.09	5.02*	.01	.00	.00
Drug	582	1.16	1	1.16	4.83*	.01	.00	.00

Note: $*p < .05$

Appendix B

Figure 1
Substance Abuse Proneness, Race by Group Membership

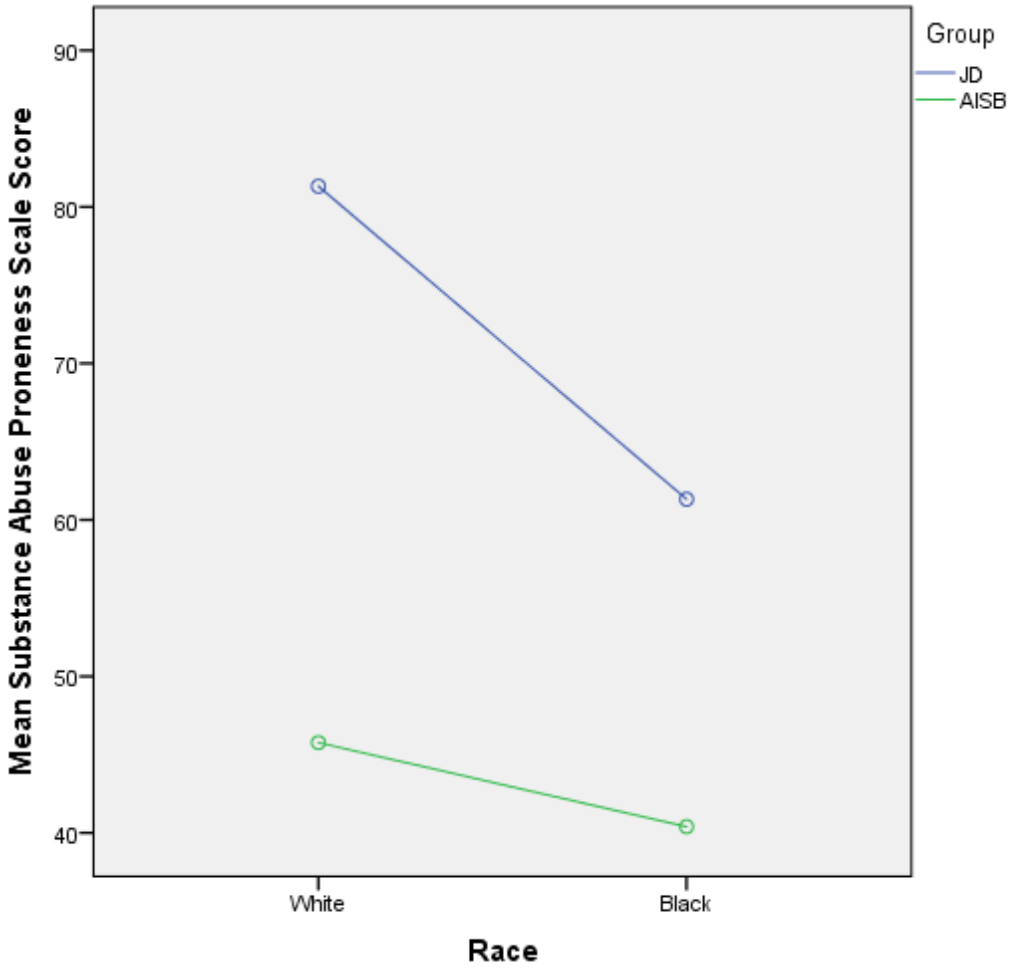

Figure 2
Substance Abuse Proneness, KSADS ODD by Group Membership

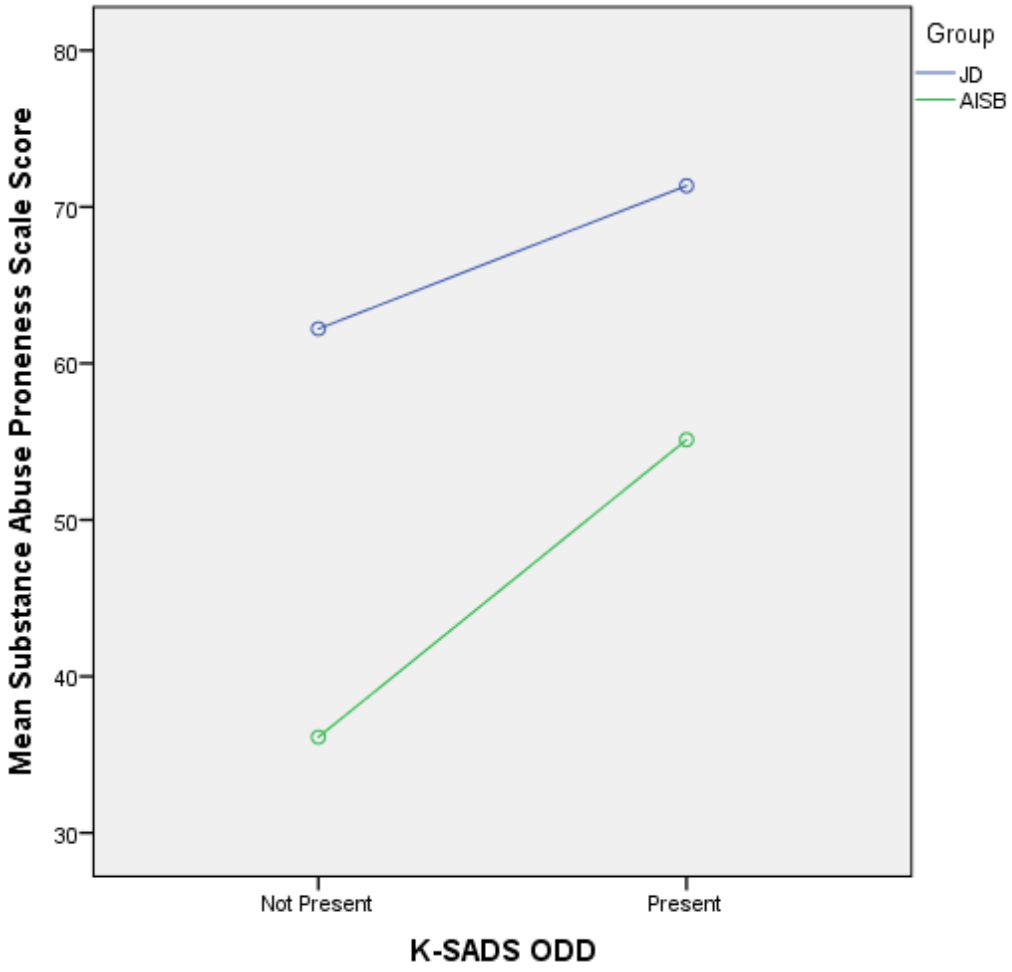

Figure 3
Substance Abuse Proneness, KSADS ADHD by Group Membership