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**Explaining Adolescent Alcohol, Tobacco, & Marijuana Use through  
the Application of Routine Activities Theory**

A Thesis in

Criminal Justice

by

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## Abstract

Routine activities theory states that crime occurs when a motivated offender encounters a suitable target in the absence of capable guardianship. Adolescent substance use is promoted by an increase in the access to the target substance and a decrease in capable guardianship. Data for the present study was obtained from Health Behavior in School-Aged Children (HBSC), 2005-2006, administered in the United States. The results demonstrated that adolescents were more likely to smoke cigarettes, drink alcohol, and use marijuana if they were older, if maternal monitoring was low, if paternal monitoring was low, if more siblings were present in the home, if the adolescent hung out with friends more frequently, and if more friends used the respective substance. When gender and race were included, age was associated with increased substance use for females. Maternal monitoring had a stronger effect than paternal monitoring on substance use. Peer use and frequency of association were significant regardless of race and gender. Policy implications include implementing prevention programs that target at-risk youth who report a high number of friends using substances. Programming should also target non-White parents of large families and mothers, teaching these individuals parenting skills.

*Keywords: routine activities theory, target availability, parental monitoring, cigarette, alcohol, marijuana, adolescent substance use*

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## Chapter I: Introduction

It is not uncommon for adolescents to experiment with drugs and/or alcohol. Many adolescents have their first alcoholic drink before the age of 12, and age 14 is the average age of marijuana initiation (Facts for Families, 2013). According to Siegel and Welsh (2015), 64 percent of high school seniors have drunk in the past year, 69 percent report using alcohol at least once in their lifetime, and 54 percent report being “drunk” by the twelfth grade. After experimenting with drugs, adolescents will cease use altogether, continue to use moderately, or develop dependency, advancing to more serious, and dangerous, drugs. Alcohol is known as a gateway substance, leading to marijuana use, and eventually, to more serious drugs, such as heroin and cocaine (Siegel & Welsh, 2015). This does not imply that everyone who starts to drink at a young age will advance to marijuana or other drugs. However, the majority of individuals who use drugs report starting with alcohol. Also, youth who abstain from alcohol are unlikely to use other drugs. Approximately 95 percent of serious drug users (i.e., heroin and cocaine users) report using marijuana before using more serious drugs; only 5 percent of serious drug users reported never smoking pot (Siegel & Welsh, 2015). In addition, adolescents feel indestructible, and even if they acknowledge the consequences of using drugs, they think that they are immune to those consequences (Facts for Families, 2013).

The following statistics demonstrate the need to study adolescent substance use to determine what influences an adolescent’s decision to use substances. From 2008 to 2011, the percentage of adolescents drinking alcohol, smoking cigarettes, and using illicit drugs decreased (Substance Abuse and Mental Health Services Administration, 2013). According to the Substance Abuse and Mental Health Services Administration (2013), there were roughly 25.1 million adolescents ages 12 to 17 in 2011. That same year, more than one-quarter of those

adolescents consumed at least one alcoholic beverage and almost one-eighth smoked a cigarette. Also, during 2011, 7,639 adolescents partook of their first alcoholic drink, 4,000 used marijuana for the first time, and 3,701 smoked their first cigarette. Taking into account all drug use by adolescents, in 2011, 881,684 adolescents smoked cigarettes, 646,702 used marijuana, and 457,672 drank alcohol. Although the use of cocaine and heroin was less common than the use of alcohol, tobacco, and marijuana, the use of either heroin or cocaine was over 5,000 each. The Office of Adolescent Health (n.d.), an organization that reports national and state-level statistics of substance use, reported that, in the past month, 39 percent of high school seniors reported drinking at least one alcoholic beverage, 23 percent reported using marijuana, and 16 percent reported cigarette smoking. While almost 4 in 10 high school seniors reported consuming alcohol in the past month, 1 in 5 reported binge drinking within the past two weeks.

Since 2011, drug use has continued to decline. The National Survey on Drug Use and Health (n.d.) studies the prevalence of drug use among individuals ages 12 and older, breaking them into three age groups: 12 to 17, 18 to 25, and 26 and older. Focusing specifically on adolescents ages 12 to 17, the percentage of individuals using alcohol, cigarettes, smokeless tobacco, and marijuana has declined from 2011 through 2013 for lifetime use, and for use within the past year and past month. From 2011 to 2013, alcohol use declined from 34.5 percent to 30.8 percent for lifetime use, 27.8 to 24.6 percent for use in the past year, and 13.3 to 11.6 percent for the past month. Cigarette use declined from 19.1 to 15.7 percent for the lifetime, 13.2 to 10.3 for the past year, and 7.8 to 5.6 for the past month. Smokeless tobacco use declined from 6.8 to 6.0 percent for the lifetime, 4.5 to 4.1 for the past year, and 2.1 to 2.0 for the past month. Marijuana use declined from 17.5 to 16.4 percent for the lifetime, 14.2 to 13.4 for the past year, and 7.9 to 7.1 for the past month.

Along with the National Survey on Drug Use and Health (n.d.), Monitoring the Future (n.d.) also measures the percentage of adolescents using various drugs; however, instead of examining adolescents, ages 12 to 17 as a whole, their data examined middle and high school students in three different grades. Monitoring the Future (n.d.) gathers data on the prevalence of drug use for the lifetime, past year, past month, and daily among eighth, tenth, and twelfth grade students in the United States. Their findings show that from 2010 to 2013, alcohol use, cigarette smoking, and smokeless tobacco use have declined for the lifetime, past year, past month, and daily. Marijuana use among eighth graders has also declined, but has increased among tenth and twelfth graders. Notice that marijuana statistics are different for Monitoring the Future (n.d.) and the National Survey on Drug Use and Health (n.d.). The reason for this is that the National Survey on Drug Use and Health (n.d.) studies overall adolescent drug use trends and cannot identify discrepancies between different ages, whereas Monitoring the Future (n.d.) can identify these discrepancies.

Although substance use is declining, it is still important to study this topic because substance use and substance abuse, by adolescents and adults, are associated with various consequences. These consequences impact users, as well as others around them, such as family, friends, and the community. Focusing specifically on adolescents, substance use can lead to problems associated with personal wellbeing, academic achievement, family and peer relationships, and delinquency (Crowe & Bilchik, 1998; Office of Adolescent Health, n.d.).

Substance use may cause, increase symptoms of, or increase risk of: depression, personality disorders, conduct problems, suicidal thoughts or attempts, suicides, and accidental overdoses (Crowe & Bilchik, 1998). Long-term effects of alcohol use include heart disease and cirrhosis of the liver (Siegel & Welsh, 2015). Alcohol can also lead to death. Each year, there

are 100,000 alcohol-related deaths; this number is more than all other drug-related deaths combined (Siegel & Welsh, 2015). Marijuana use leads to a decrease in sperm count among males, and disrupts ovulation and increases the risk of having a miscarriage among females (Crowe & Bilchik, 1998). Marijuana use increases the risk of different diseases, among them, lung cancer and chronic bronchitis (Crowe & Bilchik, 1998).

Another contributor to physical health is driving while under the influence of alcohol. According to the Office of Adolescent Health (n.d.), in the month prior to study participation, 9 percent of high school students reported drinking and then driving; 24 percent reported riding in a car driven by someone who had been drinking. Each year, 9,300 teens are arrested for driving under the influence (Siegel & Welsh, 2015). Driving while under the influence of alcohol can lead to a traffic violation, an automobile accident, or worse, vehicular homicide. Each year, 800 people die as a result of underage drinking and driving (Siegel & Welsh, 2015). An accident may cause injury or death to the driver, passengers, people in another automobile, or someone walking down the sidewalk or crossing the street on foot. Underage drinking and driving may seem harmless and fun, but in reality, it could cost an innocent life or cause serious injury as tragedy unfolds.

Substance use can also lead to academic failure. Substance users withdraw from school and absenteeism becomes routine as they cease to attend classes (Crowe & Bilchik, 1998). When substance users do attend class, they may be under the influence of substances, causing a disruption to classmates. Therefore, classmates may alienate or stigmatize substance users (Crowe & Bilchik, 1998)

Individuals who use or abuse substances may have difficulty maintaining positive relationships with people. Within the family, substance use drains emotional and financial

resources that affects everyone; the parent-child relation is strained, but the relationship between siblings is also affected (Crowe & Bilchik, 1998).

There is a well-established link between substance use and delinquency. Substance use may be associated with gang involvement, drug trafficking, or prostitution (Crowe & Bilchik, 1998). Adolescents sell drugs or sell themselves for prostitution to gain substances for personal use or money to buy substances. Adolescents may also engage in burglary, robbery, or theft to obtain property to sell for drugs, or cash to purchase drugs. Adolescents may join a gang for protection. Other crimes associated with substance use include but are not limited to: assault, homicide, weapon charges, and destruction of property (Crowe & Bilchik, 1998).

While the prevalence of adolescent drug use, particularly tobacco, alcohol, and marijuana use have been declining in recent years, these behaviors are still common among adolescents and lead to various negative consequences. Previously, social learning theory has been used to explain why adolescents initiate, continue, or cease substance use. However, more recently, studies have been conducted that demonstrate that it is the peers present, or audience, in a specific situation, rather than one's overall peer group, that influences substance use. Therefore, it is more practical to apply routine activities theory, rather than social learning theory, to the study of adolescent substance use. For this reason, the current study seeks to apply routine activities theory to adolescent tobacco, alcohol, and marijuana use to explain why certain adolescents are more likely to initiate or use alcohol, tobacco, and marijuana while other adolescents are more likely to abstain from using these substances. The current study will focus on a suitable target, (i.e., peers who smoke cigarettes, drink alcohol, or use marijuana, and therefore can supply cigarettes, alcohol, or marijuana to others), and guardianship (i.e., parental monitoring) in explaining adolescent substance use.

## Chapter II: Literature Review

In the late 1700s and most of the 1800s, criminological theories focused on classical criminology. Classical theories explained crime in terms of individuals rationally considering the costs and benefits associated with committing crime. Then, in the late 1800s, the focus shifted to a deterministic view of crime. Crime was believed to result from forces beyond an individual's control (Cullen, Agnew, & Wilcox, 2013). Prior to the 1970s, criminological theories were based on environmental and biological factors and ignored the ideology of criminals being rational and responsible for their behaviors. By the 1970s, public policies and programs that were developed based on criminological theories were showing to be ineffective (Lee, 2014). In the 1970s, some criminologists started to challenge the notion that environmental factors contributed to crime. As a result, deterrence theory and rational choice theory emerged in the criminological literature (Lee, 2014) to better explain why crime occurred and how to prevent future criminal acts.

Rational choice theory is based on the notion that offenders are rational people who desire to maximize their pleasure and minimize their pain. This theory does not assume that people are perfectly rational; rather, when an individual is considering the costs and benefits of engaging in crime, he or she may be hurried in their decision, or the decision may be based on incomplete or inaccurate information. Also, people are influenced differently and therefore, the factors that influence one person may influence another person differently, or not all (Cullen, 2013).

Cohen and Felson (1979) developed a criminological theory that was based on one's routine activities. Routine activities theory focuses on the circumstances surrounding a criminal event rather than focusing on the offender. According to this theory, crime occurs because

motivated offenders encounter suitable targets in the absence of capable guardianship. The absence of any one of these three components is enough to prevent the successful completion of a criminal act. Therefore, changes in routine activities can influence crime rates by removing a suitable target or adding guardianship; motivation is thought to be inherent in everyone (Cohen & Felson, 1979). Individuals go to work and/or school, thus creating a routine of being home and being away. When individuals are away from the home, there is a lack of guardianship and the home becomes a suitable target and therefore crime is more likely to occur (Cohen & Felson, 1979). Or, individuals are more likely to be victimized when they are out of the home, on the street or in public places (Cullen, 2013). Engaging in activities away from the home, and family, decreases guardianship and increases the number of opportunities to engage in criminal acts (Cohen & Felson, 1979). Previous theories were biologically or environmentally based, however, routine activities theory shifted the focus away from the offender and the community and focused on the situation in which the crime occurred.

Expanding routine activities theory, Osgood, Wilson, O'Malley, Bachman, and Johnston (1996) applied routine activities theory to individual offenses and to a wider range of deviant behaviors. Whereas Cohen and Felson (1979) developed routine activities theory to explain predatory crimes, Osgood and colleagues (1996) expanded the theory to include deviant acts, such as substance use. Osgood and colleagues (1996) studied individuals, ages 18 to 26, by utilizing data obtained from the Monitoring the Future study. Monitoring the Future utilized a national sample of high school seniors who completed a self-report questionnaire. Following graduation, the same participants were asked to complete follow-up questionnaires, and five waves of data were collected in all. Half of the sample completed their follow-up questionnaires on even years and the other half completed the questionnaires on odd years. Osgood and

colleagues (1996) were interested in an individual's routine activities and subsequent deviant behavior. Deviant behavior included: criminal behavior, alcohol use, marijuana use, and other illicit drug use. The study found that criminal behavior was significantly positively associated with riding in a car for fun, going to parties, and spending evenings out. Heavy alcohol use was significantly positively associated with riding in a car for fun, visiting friends, going to parties, spending evenings out, going on dates, working around the house, and relaxing alone. Marijuana use was significantly positively associated with riding in a car for fun, visiting friends, going to parties, spending evenings out, community affairs, working around the house, watching television, and relaxing alone. Other drug use was significantly positively associated with visiting friends, going to parties, spending evenings out, community affairs, and relaxing alone.

Continuing with the theory of Cohen and Felson (1979) and Osgood et al. (1996), crime and delinquency are explained by the opportunities that arise in everyday life. Therefore, the routine activities that people engage in influence crime rates. The rate of a specific type of crime depends on the frequency with which a motivated offender and a suitable target meet in the absence of a capable guardian through routine activities. Since motivation is thought to be inherent in any situation, studies normally ignore the third component of routine activities theory – motivation. However, Bernburg and Thorlindsson (2001) argue the importance of motivation and how meaning is produced by the social context of a situation. Things change over time. People enter the workforce, marry, and have children, thus social bonds and peer associations change.

Therefore, Bernburg and Thorlindsson (2001) studied how motivation changes over time and is not constant as suggested by other criminologists. Bernburg and Thorlindsson (2001) utilized data from a national survey of Icelandic adolescents attending the compulsory ninth and

tenth grade (15- and 16-year-olds) in the Icelandic secondary school. Two different versions of a questionnaire were used and only one version contained the variables of interest to their study. Therefore, 3,260 questionnaires (excluding those with missing variables) were used out of the 7,785 administered. Bernburg and Thorlindsson (2001) examined routine activities, association with deviant peers, attachment to conventional social agents, favorable definitions, and offending. The results demonstrated that associating with deviant peers and having definitions favorable to deviance were positively related to unstructured peer interaction, while attachment to conventional social agents, such as bonds to school and family, was negatively related to unstructured peer interaction. Also, routine activities helped to explain violent and property offending, but violent and property offending were better explained when social relations, i.e. motivation, were considered in addition to routine activities. These results added credit to the notion that motivation is not static, but rather changes from one situation to the next (Bernburg & Thorlindsson, 2001). However, no other research on routine activities theory considers motivation, and therefore, these results have not been further validated.

Several studies examine multiple criminological theories simultaneously to determine which theories help explain adolescent substance use. The most common theories used to explain adolescent substance use are social learning theory and social bond theory. First, Sun and Longazel (2008) examined the relationship between self-control, social bonding, and routine activities on alcohol-related behaviors. They studied 558 students, ages 18 to 26, during the 2006 spring semester at a state university in the eastern United States. Students who indicated they never drank were removed from the study. Self-control was measured using 23 items adopted from Grasmick et al.'s scale for self-control. Social bonding included only commitment and involvement. Commitment was measured using GPA. Involvement was measured by

attending campus events, sports, community activities, and Greek organizations. Routine activities was measured by asking how often one goes to parties or get-togethers with friends. Alcohol-related behaviors included: binge drinking, driving while intoxicated, and negative behaviors that resulted from drinking (i.e., police involvement, late or missed class, fighting, or potential to harm self or others). Results indicated that being with friends decreased driving under the influence while attending parties increased driving under the influence, both measures of routine activities theory. Second, Miller (2013) conducted a study of 3,065 15-year-olds from Scotland's capital. Data came from the fourth wave of the Edinburgh Study of Youth Transitions and Crime. The study examined the influences of routine activities (hanging with friends, shopping, nightlife, clubs, and sports) on assault, fare evasion, shoplifting, vandalism, and drug use. Miller (2013) found that different situations supported different forms of deviance. In particular, club and sport involvement were positively associated with assault and fare evasion, while nightlife involvement was positively associated with assault and drug use. Additionally, Miller (2013) considered the results in terms of social learning and self-control theory. Miller (2013) pointed out that when studying routine activities theory and substance use, it is important to also examine substance use in terms of social learning theory and social bond theory because both share common measurement variables with routine activities theory.

Traditionally, research has focused on using social learning theory to explain substance use by focusing on one's peer group and how one's peers influence drug use. Contrarily, a more current approach involves routine activities theory and taking a situational approach to explaining drug use through one's immediate environment and the situation in which one is more likely to use drugs. Multiple studies have researched the influence of one's overall peer group versus peers present. (One's overall peer group refers to all of one's friends, whereas peers

present refers to only those friends who are present in a specific situation.) Gallupe and Bouchard (2013) gathered data from 829 tenth grade students in a large Canadian city. The survey was retrospective and asked students about their own behavior and the behavior of their friends at the last two parties attended (excluding family gatherings) where alcohol was present. The study found that the number of friends using and quantity used were strongly positively related to personal substance use. An increase in the number of friends drinking/smoking at a party was related to an increase in personal use. Also, the peers who were present and their behavior had a stronger influence than either the general audience in attendance or the individual's overall peer group. Thus, the audience at a specific time and place has more impact on drug use than one's overall peer group. Similarly, Lau-Barraco and Linden (2014) examined the effects of alcohol use among peers and "drinking buddies" on one's own alcohol use. Lau-Barraco and Linden (2014) gathered data from 250 college students enrolled in a psychology class at a public university. Students were asked to identify up to ten individuals in their social network, whether or not those individuals used alcohol or drugs, and whether or not those individuals approved or disapproved of particular drinking behaviors. Students were also asked about their own drinking behavior, to include: number of drinks consumed and frequency of drinking. The study concluded that "drinking buddies" had a stronger effect on one's own drinking behavior than one's overall peer network. Similar to Gallupe and Bouchard's (2013) findings, particular friends at a particular time are more influential on one's behavior than one's overall peer network in general. These results demonstrate that drug use is situational and therefore routine activities theory is more appropriate to studying adolescent drug use than social learning theory.

In a like manner, Gallupe and Bouchard (2013) and Lau-Barraco and Linden (2014) found that substance use is better explained through routine activities theory than social learning theory. These studies lend support to the current study of explaining substance use by applying routine activities theory rather than the traditional approach of using social learning theory to explain substance use. Although both social learning theory and routine activities theory measure peer substance use, they do so differently. Social learning theory often measures substance use among one's age group or among one's overall peer network. Social learning theory theorizes that one learns behaviors from their friends and therefore the more substance-using friends one has, the more likely one is to use themselves. On the other hand, routine activities theory measures peer substance use to gauge how readily available substances are. The more substance-using friends one has, the more readily available substances are, as friends can supply substances.

It is also important to mention that the measurements of social learning theory and routine activities theory may overlap. The same is true for social bond theory. Sun and Longazel (2008) measured the effects of social bond theory and routine activities theory. In their study, the measurement for social bond theory, specifically family attachment, could also be used as a measurement for routine activities theory, specifically guardianship. Vazsonyi, Pickering, Belliston, Helsing, and Junger (2002) state this exact concept when explaining how parental attachment/guardianship can be operationalized for both social bond theory and routine activities theory. In the current study, a lack of guardianship is measured using the extent to which parents monitor the adolescent's behavior and whether or not rules are established that allow or prohibit the use of substances. These same variables could be, and often are, used as a measurement for other theories and arise in studies of social learning and social bond theory. Thus, research

including social learning theory and social bond theory are included below to further emphasize the relationship between peer substance use and subsequent supply (i.e., suitable target) and increased substance use, or the relationship between a lack of parental monitoring (i.e., lack of guardianship) and increased substance use. In fact, a suitable target and a lack of guardianship are key components of routine activities theory.

### **A Breakdown of Routine Activities Theory**

**Suitable target.** The first aspect to consider when examining suitable targets is how adolescents spend their leisure time. In another study, Thorlindsson and Bernburg (2006) analyzed 3,431 questionnaires completed by Icelandic adolescents. Their research focused on leisure activity patterns, peer substance use, positive peer attitudes toward substance use, and one's own substance use. Thorlindsson and Bernburg (2006) found that sport involvement and social club participation reduced drinking, while partying increased alcohol use. Additionally, how one spends their leisure time influences drinking behavior. More specifically, one is more likely to use substances if he/she engages in unstructured leisure activities versus structured activities (Thorlindsson & Bernburg, 2006). Also, Vazsonyi et al. (2002) identified similarities and differences among routine activities and deviance. The study examined 6,914 youth ages 15 to 19 from Hungary, the Netherlands, Switzerland, and the United States through the International Study of Adolescent Development (ISAD). The results demonstrated that the overall rates of deviance were similar among American, Dutch, and Swiss youth; Hungarian youth reported substantially lower rates of deviance. The study found that spending time with family buffers against norm-violating behavior while spending time with peers in unstructured and unsupervised situations positively predicts deviant behavior. Thus, youth with weak

attachments and/or greater propensity to violate norms spend their time differently than youth with stronger attachments and/or weaker propensity to commit deviant acts.

Another aspect to consider is peers. Although peers often refers to one's friends, peers can also refer to those individuals in one's societal group, including both friends and acquaintances. Duan, Andreeva, and Pentz (2009) studied 1,040 students in grades six and seven who were randomly assigned to intervention or control (delayed intervention) as part of the Midwestern Prevention Project (MPP). Data was gathered at baseline, six months, and then yearly. The study examined how friends' substance use and perceived peer use influences cigarette, alcohol, and marijuana use. Adolescents were asked how many of their close friends use cigarettes, alcohol, and marijuana and how many out of 100 students their age they think smoke cigarettes, drink alcohol, and use marijuana at least once a month. Adolescents were also asked about their own cigarette, alcohol, and marijuana use in the last week. The findings demonstrated that as adolescents age, perceived peer and friend substance use increases. Also, peer and friend substance use are positively associated with an adolescent's own substance use, although friend substance use has a stronger effect.

Equally important is the argument of peer selection versus peer socialization. In terms of supply, adolescents may select certain friends because they can supply substances; on the other hand, adolescents may use because their friends use and the supply is there. Burk, van der Vorst, Kerr, and Stattin (2012), studied 950 adolescents in three age cohorts, grades four, seven, and ten, from a single community in Sweden, attending public school, for three consecutive years. The purpose of the study was to determine when peer selection and peer socialization impact adolescent drinking. Peer socialization is the adaptation of peers beliefs, attitudes, and behaviors. On the contrary, peer selection is the choosing of friends based on similar beliefs,

attitudes, and behaviors to one's own. Burk et al. (2012) found that in grade six, a similarity emerges between friends' drinking behaviors, peaks in grade eight, and decreases throughout late adolescence. Peer selection related to alcohol use emerges in grade five and six, particularly for males, and remains significant throughout middle and late adolescence. Peer socialization predicts drinking in middle and late adolescence; despite this, peer socialization did not differ significantly between early, middle, and late adolescence. Like Burk et al., Becker and Curry (2014), studied peer socialization and peer selection. Becker and Curry (2014) studied 106 youth, ages 13 to 21, one year after intervention in an Effective Adolescent Treatment (EAT) program. Individuals in the program had to meet diagnostic criteria for substance abuse or dependence, meet outpatient placement criteria, and be willing to initiate treatment. Becker and Curry (2014) found that alcohol use was positively associated with both peer socialization and peer selection; marijuana use was only associated with peer selection. Also, since participation in treatment was voluntary, it suggested that friends had a great impact on substance use, an impact greater than the effects of initiating treatment.

While not as commonly studied, family members can also be role models for substance use or be a source of supply and thereby act as a suitable target. Kelly et al. (2011) gathered data from 7,314 adolescents in grades six and eight from 231 schools in 30 communities to measure social learning. To measure social learning theory, Kelly et al. (2011) asked respondents: whether their mother, father, brothers, or sisters smoke; how many of their best friends have smoked in the last year; and if they have ever consumed more than a few sips of alcohol. Respondents were also asked if they had ever smoked. Kelly et al. (2011) found that while parental smoking and having friends who smoke both increase one's likelihood to smoke, friends have a greater impact on smoking than parents. The study also found that non-smoking siblings

decreased smoking more than having no siblings, suggesting that non-smoking siblings can act as a protective factor. Likewise, Gilligan, Kypri, Johnson, and Lynagh (2012) studied 530 students, ages 13 to 17, from seven high schools in New South Wales, Australia, between July and October 2010. Students were given a questionnaire that included questions about source of alcohol and alcohol consumption. Source of alcohol was further divided into parental supply, parental monitoring, and peer consumption. Risky drinking was defined as consuming more than four drinks on a single occasion. Results illustrated that 48 percent of risky drinkers obtained alcohol from their friends, while only 19 percent obtained alcohol from their parents. A strong positive association was found between the number of friends presumed to have drunk and risky drinking. Risky drinking among 13- and 17-year-olds was also positively associated with parental supply for unsupervised situations. Lastly, Desmond, Bruce, and Stacer (2012) gathered data from 200 students from 80 high schools through the National Longitudinal Study of Adolescent Health (Add Health). The results demonstrated that low self-control was associated with a higher likelihood of smoking, drinking, and using marijuana. Friends' use was positively associated with own use for all three substances. Additionally, adolescents were more likely to smoke and drink if cigarettes and alcohol were easily available in the home.

**Lack of guardianship.** A parent's ability to monitor their adolescent's behavior is influenced by multiple factors, such as single- versus two-parent household and number of children in the household. Multiple studies have shown that parental monitoring decreases substance use and deviance, but first, the following study found no support for parental monitoring. Wagner, Ritt-Olson, Soto, and Unger (2008) studied 255 ninth grade students in a Los Angeles high school during the 2004-2005 school year. Students answered an open-ended question asking them to list everyone who lived in their home at least part time and whom they

considered family, along with each individual's age and their relationship to the student.

Students were also asked questions about their own cigarette, alcohol, and marijuana use in the past 30 days and lifetime. The study found that alcohol initiation and an increase in alcohol and marijuana use were associated with having older siblings living in the home; cousins residing in the home was significantly associated with increased marijuana use. Students living in single-parent households were no more likely than students in two-parent households to have ever used cigarettes, alcohol, or marijuana. Therefore, Wagner et al. (2008) concluded that parental monitoring may have little impact on substance use since living in a single-parent or two-parent household does not have an effect on substance use.

While Wagner et al. (2008) found no support for parental monitoring, other studies have concluded that parental monitoring protects against adolescent substance use. Van den Eijnden, van de Mheen, Vet, and Vermulst (2011) studied 537 youth, ages 12 to 15, who completed wave II of a questionnaire administered in the Netherlands. Adolescents were asked questions about: parental alcohol use (both mother and father), alcohol-specific rule enforcement, frequency of alcohol availability in the home, frequency of communication with parents, and quality of communication with parents. The study found that the quality of communication and alcohol-specific rules were negatively associated with alcohol consumption, while frequency of communication was positively associated, for both mothers and fathers. Therefore, the study found that it is important that parents set rules on drinking and have quality conversations with their children; however, parents talking to their adolescent too frequently can have negative effects on alcohol-related behavior. Similarly, De Looze et al. (2012) researched parenting practices and risk behaviors. Data was obtained from 5,642 adolescents, ages 12 to 16, in the Netherlands by utilizing the Health Behavior in School-aged Children (HBSC). Parenting

practices included parental support, control, and alcohol-specific and smoking-specific rules.

Risky behaviors included: smoking, binge drinking, marijuana use, and early sexual intercourse.

The study concluded that parental control was greater for females than males. Parental support and control were negatively associated with smoking, binge drinking, marijuana use, and sexual intercourse. Rules on alcohol and smoking predicted a lower prevalence of risky behaviors.

Independent of adolescent smoking and drinking, parental rules on smoking reduced the use of marijuana and early sexual intercourse; parental rules on drinking also lowered the prevalence of sexual intercourse. In a like manner, Jiménez-Iglesias, Moreno, Rivera, and García-Moya (2013) studied 14,825 youth in Spain, ages 13-14, 15-16, and 17-18. Data was gathered using the HBSC. The study examined how parental affection and family activities impact adolescent substance use. The findings indicated that as adolescents age, their use of tobacco, alcohol, and marijuana increase. Tobacco use was negatively influenced by adolescent disclosure to mother and family activities. Alcohol use was negatively influenced by adolescent disclosure. Marijuana use was negatively influenced by adolescent disclosure and family activities. Also, maternal variables had a slightly stronger effect than paternal variables.

**Suitable target and lack of guardianship combined.** Routine activities theory is based on the availability of a suitable target and the lack of a capable guardian; therefore, both influence whether or not a crime will occur. To determine whether or not parents or peers have a stronger influence than the other, literature on social learning theory and social bond theory are examined. For instance, Bahr, Hoffman, and Yang (2005) gathered data from 4,230 adolescents in grades seven to twelve in an intermountain state. In terms of social learning theory, Bahr et al. (2005) asked questions about peer drug use, parental drug attitudes, sibling drug use, and adult drug use. In terms of social bond theory, the study asked questions about parental attachment

and parental monitoring. Bahr et al. (2005) found that peer drug use had relatively strong effects on adolescent drug use. The strongest predictor of binge drinking was peer alcohol use. Peer drug use strongly affected adolescent drug use. Parental drug attitudes, sibling drug use, and adult drug use also affected adolescent drug use. Parental monitoring and parental attachment were also statistically significant.

In addition to Bahr et al. (2005), other studies have also examined the impact of parents and peers on adolescent substance use. Tomcikova, Veselska, Geckova, Van Dijk, and Reijneveld (2013) studied 3,694 eighth and ninth grade students in Slovak elementary schools in Bratislava, Zilina, and Kosice. Tomcikova et al. (2013) examined adolescent leisure time, parental monitoring, and subsequent adolescent drunkenness. The study found that participation in risky leisure time activities increased the likelihood of drunkenness while parental monitoring decreased the likelihood of drunkenness. Moreover, West et al. (2013) examined school, peer and parental influences on substance use. West et al. (2013) studied 252 Latinos with latent tuberculosis infection (LTBI) along the San Diego-Tijuana border. School influence was measured by asking about skipping school in the past year. To determine peer influence, participants were asked how many of their close friends used cigarettes or alcohol. The measure of parental influence asked about parents' consistent use of rewards and punishments. The study found that parental consistency in administering awards and punishments was negatively associated with alcohol and tobacco use. Additionally, peer use of alcohol and tobacco and skipping school were positively associated with alcohol and tobacco use. Further, Kiesner, Poulin, and Dishion (2010) examined parental monitoring, youth substance use, substance co-use with friends, and peer context in explaining adolescent substance use. Kiesner et al. (2010) studied 152 North Italian and 151 French Canadian adolescents who were recruited in the eighth

grade and questioned again in the ninth grade; parents were also asked to complete a questionnaire. The results indicated that adolescents who hung out with friends in the street/park had higher levels of substance use than adolescents who hung out with friends in the school context; street/park was also associated with lower levels of parental monitoring. The data also suggested that boys were more influenced by peers than girls in terms of substance use. Additionally, parental rules decreased individual substance use for girls, but not for boys.

In addition, Schwinn and Schinke (2014) studied the effects of peers and parents on alcohol use and related consequences. Schwinn and Schinke (2014) randomly assigned 400 urban youth from New York City, Delaware, and New Jersey to an alcohol abuse prevention program or control group. Data gathered came from the sixth annual follow-up survey when the youth were between the ages of 15 and 20. The findings suggested that increases in peer alcohol use and offers were associated with an increase in the youth's drinking, binge drinking, and alcohol-related consequences. In terms of parents, rules against drinking were associated with decreased drinking, binge drinking, and intentions to drink in the future; increased family support was associated with decreased alcohol-related consequences and intentions to drink in the future.

In addition to determining whether parents or peers have a stronger influence on adolescent substance use, it is also important to determine when parents and peers influence adolescent substance use and whether that influence gets stronger or weaker throughout adolescence. Tang and Orwin (2009) conducted a nationally representative survey of 4,607 adolescents, who reported no prior use of marijuana, between the ages of 10 and 17, and their parents. Four rounds of data were gathered from 1999-2004 using the National Survey of Parents and Youth. Tang and Orwin (2009) examined 16 risk factors, but of these, six emerged

as most important: youth alcohol and/or tobacco experience, youth being offered marijuana, having friends who use cigarettes/marijuana, school grades, parental monitoring, and parental drug use. The study found that parents had an influence on marijuana initiation in early adolescence, but this influence waned by late adolescence, whereas, peers who smoked cigarettes and/or marijuana started to have an influence in early to middle adolescence and continued throughout late adolescence. The likelihood of marijuana initiation also increased if the youth drank alcohol or smoked cigarettes, received marijuana offers, or received poor grades in school. Additionally, Van der Vorst, Meeus, Deković, and Engels (2009) studied adolescent substance use longitudinally, but examined drinking trajectories of adolescents in early- and mid-adolescence. The study included 401 families from 20 municipalities in the Netherlands. The results demonstrated four drinking trajectories for early adolescents and five for mid-adolescents. Among early adolescents, 115 abstained from alcohol (28.7%; 53% male and 47% female), 178 were light drinkers (44.4%; 38% male and 62% female), 93 strongly increased their drinking (23.2%; 54% male and 46% female), and 15 were heavy drinkers (3.74%; 80% male and 20% female). Among mid-adolescents, 42 abstained (10.5%; 45% male and 55% female), 162 were light drinkers (42.3%; 40% male and 60% female), 97 increased (24.2%; 68% male and 32% female), 37 were heavy drinkers (9.7%; 84% male and 16% female), and 63 were stable drinkers (16.5%; 54% male and 46% female). Boys were more likely to be increasers or heavy drinkers, while girls were more likely to abstain or be light drinkers for both early- and mid-adolescence. Parents were more permissive towards older adolescents or adolescents who drank heavily or increased rather than drank lightly or abstained. Being male, having a father or best friend who drank heavily, and having permissive parents increased the risk of being a heavy drinker.

Studies may also focus on how an adolescent spends their time: whether they are alone, with friends, or with family, and how that influences subsequent substance use. Barnes, Hoffman, Welte, Farrell, and Dintcheff (2007) utilized wave three of a study on the development of alcohol misuse and related behaviors. Barnes et al. (2007) examined 606 adolescents, ages 15 to 18 from western New York. In a face-to-face interview, adolescents were asked questions about their time use. Time use included: homework, extracurricular activities, sports, alone time, paid work, housework, television viewing, family time and peer time. The study concluded that family time and peer time were the most predictive factors of problem behaviors; family time is a protective factor while peer time is a risk factor. Of the remaining time use variables, homework reduced smoking, illicit drug use, and delinquency, while the others had minimal or no impact on problem behaviors. Similarly, Anderson and Hughes (2009) examined youth time use, income, and private transportation and subsequent offending and substance use. The study utilized data gathered from students and female head of households during the first wave of Add Health between September 1994 and December 1995. Wave 1 included 17,890 adolescents in grades seven to twelve and their mothers/female guardians. Offending and substance use included: violent and property offending, heavy alcohol consumption (5 or more drinks) and marijuana use. Time use asked about the number of times one hung out with friends in the past week. Income was money gained from allowance or paycheck that could be used to purchase drugs, alcohol, or tools. Transportation asked about private transportation and mobility. (Private transportation allows a youth to move around without their parents' knowledge of their current whereabouts). To determine family structure, participants were asked whether they lived in a one- or two-parent household. Parental availability was measured by asking if parents were home before and after school. Anderson and Hughes (2009) mainly focused on time use,

income, and private transportation, and found that access to private transportation and high income increased the likelihood of offending and alcohol and marijuana use. Likewise, Bergh, Hagquist, and Starrin (2011) surveyed approximately 9,900 15- and 16-year-olds in Sweden between 1995 and 2005. Their study was repeated cross-sectionally with a questionnaire being administered to students each year. The findings of the study concluded that a higher level of peer activity was associated with a higher frequency of alcohol use, whereas, high parental monitoring was significantly associated with a lower frequency of alcohol use.

Peer substance use and parental monitoring also impact initiation of substance use among adolescents. Bohnert, Anthony, and Breslau (2012) studied 638 adolescents, after excluding adolescents who used marijuana prior to age 11. The study was conducted in Michigan and utilized the newborn discharge lists from two hospitals (one inner-city and one suburban) to generate a list of potential participants. Participants were first studied at age six and then follow-ups were conducted at ages 11 and 17. The findings suggested that higher parental monitoring at age 11 reduced the likelihood of marijuana initiation between the ages of 11 and 17. Contrarily, peers' substance use predicted initiation. However, the study also found that peers did not replace parents, but rather, both parents and peers influenced marijuana initiation.

### **Summary**

There are two common trends among the literature. First, the likelihood of adolescent substance use increases when an adolescent associates with peers who use substances. Multiple studies have illustrated that when adolescents spend time with peers who use substances, particularly in informal, unsupervised situations, adolescents are more likely to use. Second, the likelihood of adolescent substance use decreases when the adolescent's parents have rules concerning substance use and monitor the adolescent's behavior. The literature demonstrates

that when parents are proactive and set rules about substance use and monitor behavior, youth are significantly less likely to use substances than when parents do not set clear rules about substance use or do not monitor their son/daughter's behavior. Furthermore, studies have examined substance use initiation and source of supply.

Extending this to the current study, peer and parental influences can be translated into target suitability and parental guardianship. In terms of substance use, the substance is the suitable target. Adolescents can acquire substances from substance-using friends, especially when hanging out with these friends informally, for instance, at parties. A lack of guardianship refers to the lack of police presence but also parental monitoring. Adolescents are more likely to use substances when parents do not have rules concerning substance use and when their parents do not monitor their behavior.

Therefore, based on the literature, there is support that routine activities theory can be used to explain cigarette, tobacco, and marijuana use among adolescents.

### **Hypotheses**

H1: Increases in access to the target substance promotes adolescents' use of the corresponding substance, while controlling for gender, age, and race.

H2: Decreases in capable guardianship encourages adolescents' substance use, while controlling for gender, age, and race.

## Chapter III: Methodology

### Sample

The present study utilizes data from Health Behavior in School-Aged Children (HBSC), 2005-2006. Since 1982, the World Health Organization (WHO) has sponsored a cross-national, school-based study of health-related attitudes and behaviors of young people. Since 1985-1986, the study has been conducted every four years, with more countries agreeing to participate. The United States starting participating in the HBSC survey in 1996. The HBSC study has two main objectives. The first is to monitor health-risk behaviors and attitudes in youth over time to provide background data. The second is to provide researchers with relevant information in order to understand and explain the development of health attitudes and behaviors through early-adolescence.

Data for the present study came from the United States survey conducted in 2005-2006, in which a nationally representative sample of students in grades six through ten completed a survey. The population for this survey was all students in grades six, seven, eight, nine, and ten in the United States and the District of Columbia. Sampling occurred over three stages. In the first stage of sampling, Primary Sampling Units (PSUs) were stratified within each Census Division. Districts were classified as urban or rural based on Quality Education Data, Inc. (QED). PSUs were formed by grouping rural school districts within a county together, ensuring each PSU had at least 10 schools. School districts with large enrollments were a separate PSU. Urban school districts were also grouped into PSUs, ensuring each PSU had at least 10 schools. Private and Catholic schools were assigned to a PSU based on their location. The probability of selecting a private or Catholic school was the same as the probability of selecting a public school. A sample of 100 PSUs was obtained from the 1,540 PSUs created. In the second stage,

individual schools were selected from the PSUs sampled. In the end, 227 schools participated in the study. In the third stage, a class for a specific grade was selected from the schools sampled. For example, in a school in which grade 6 students were to be sampled, a class was selected at random, and all students in that class were included in the sample.

Students completed a survey that took approximately 45 minutes to complete. Surveys were administered in the regular classroom setting by a school representative (i.e., teacher, nurse, or guidance counselor). Four versions of the questionnaire were administered: two for sixth graders; one for seventh, eighth, and ninth graders; and one for tenth graders. Participants were asked questions about alcohol, tobacco, and marijuana use; nutrition; physical health; violence and bullying; and relationships with family and friends.

From the original sampling frame, 529 schools were selected and solicited to participate in the HBSC survey. Of the 529 selected, 302 did not respond or were not eligible to participate in the survey. Within the remaining 227 schools, 10,577 students were selected for participation in the HBSC survey, and 9,227 actually participated, creating a response rate of 87.2 percent. Among the 1,350 students who did not participate, 565 declined participation and 785 were absent the day the questionnaire was administered and did not make-up the questionnaire upon their return to school.

## **Measurements**

**Dependent variables.** Cigarettes, alcohol, and marijuana were the substances of interest in the current study. The use of these substances was measured in terms of the frequency of using the target substance in the 30 days prior to survey participation, except for marijuana. Due to relatively scarce experience with marijuana, the current study decided to utilize the data on marijuana use in the last 12 months. The frequency was not a raw number, but an ordinal

classification that included: never, once or twice, three to five times, six to nine times, 10 to 19 times, 20 to 39 times, and 40 times or more.

**Independent variables.** Guardianship was one of the main explanatory variables in the current study. Considering adolescents' limited exposure to social networks other than family and friends, and the fact that substance use entails residual effects that are easily noticeable, parental supervision would warrant capable guardianship against adolescents' experience with tobacco, alcohol, and marijuana. Two dimensions of parental supervision that were proposed for the current study were parental monitoring and number of siblings. For a possible gender-specific effect, parental monitoring was further classified into maternal and paternal monitoring. For both maternal and paternal monitoring, the following questions were asked: how much does your mother/father really know about "who your friends are," "how you spend your money," "where you are after school," "where you go at night," and "what you do with your free time." Principle axis factor analysis identified a single factor for all these variables.<sup>1</sup> Next, concerning the number of siblings, only the raw number of brothers and sisters that were cohabiting in the main home was used for the current study. Only a few respondents reported having siblings residing in a second home, and second home siblings would have little effect on parental supervision.

Target availability was another primary explanatory variable. Substances such as tobacco, alcohol, and marijuana were considered target substances for underage tobacco use, underage drinking, and marijuana use, respectively. From the dataset, several items were identified to measure the extent of access to the target substance through association with peers using a particular substance. Specifically, two aspects of peer association were examined: the number of

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<sup>1</sup> The factor is a scale in the psychometric sense of multiple questions sharing a latent factor.

peers using a particular substance and the magnitude of association with peers. Questions such as “how many of your friends would you estimate smoke cigarettes,” “how many of your friends would you estimate drink alcohol,” and “how many of your friends would you estimate smoke/use marijuana, (pot, weed, hash, joint)” were used to measure the number of substance-using peers. Responses were recorded using a Likert scale, ranging from “none” through “a few,” “some,” “most,” to “all.” The magnitude of peer association was obtained from a factor analysis of two variables, including “how many days a week do you usually spend time with friends right after school” and “how many evenings per week do you usually spend out with your friends.” Regression was used to extract a common factor, which was in turn rounded to the nearest integer.

Further consideration was given to the possible interaction effect between the number of peers using a substance and the magnitude of association with peers. The two variables originate from the same conceptual basis that peer association not only escalates the availability of the substance but also promotes collective sense of belonging through mutual reinforcement for the use of the substance. In other words, the two variables are indicative of the magnitude of peer association that can promote one’s exposure to the substance. Therefore, there may be an interaction effect between the two variables such that more frequent association with more friends that use may increase exponentially the availability of the target substance. The variables for target availability are different than parental supervision. Parental supervision utilizes the number of siblings and parental monitoring. These two variables account for distinct dimensions and thus contribute additively, rather than interactively, to the overall magnitude of parental supervision. Whereas, target availability incorporates the interaction effect between the number of peers who use and the frequency of peer association.

**Demographics.** Demographic variables, such as gender, race, and age, were included for control purposes. In the HBSC data set, race was grouped into White, Black, Asian, American Indian, Native Hawaiian, and other. With the exception of White and Black, the other racial groups contained few adolescents. Since there was a lack of theoretical grounding for further racial classification, race became a dichotomous variable that included White and non-White. Gender was a dichotomous variable of male and female. Age was a raw figure.

### **Analytic Strategy**

Descriptive statistics for all variables used are reviewed. Next, the bivariate correlations between variables are examined. Last, ordinary least square regression analysis is the prime method of statistical analysis in this study. Specifically, substance use is regressed against age, mother's monitoring, father's monitoring, number of siblings, peer association, number of substance-using peers, and interaction between frequency of peer association and number of peers.

Considering the large sample size, a decision was made to differentiate between male and female and between White and non-White. Accordingly, models were first broken into three groups: underage smoking, underage drinking, and marijuana use. Each group was further broken into: White male, non-White male, White female, and non-White female.

## Chapter IV: Results

### Descriptive Statistics

For all three types of substance use, the value ranged from 1 (Never) to 7 (40 or more times). The mean for cigarette and alcohol use in the last 30 days were 1.41 and 1.65, respectively (Table 1). The mean of marijuana use in the past year was 1.38. Marijuana use showed the lowest mean, suggesting relatively little prevalence of marijuana use among adolescents when compared to underage cigarette or alcohol use. Across all three types of substances, the distributions were severely and positively skewed with a disproportionate number of “never” responses. Three analytical methods were considered as solutions. First, making substance use a dichotomous variable of “never” and “at least once” would dismiss the concern for skewedness and allow the use of logistic regression. However, limiting the responses to “never” and “at least once” would reduce the value of having varying degrees of substance use. Second, Poisson regression analysis is generally recommended for severe skewedness, but it is only applicable to count variables. The last and chosen method was natural-log transformation of the continuous variable. It substantially diminished skewedness in all three types of substances, warranting the use of ordinary least squares regression analysis.

In terms of the sample, a little more than half (51.5%) of the adolescents were female (Table 1). Age ranged from 11 to 17, with a mean of 13.42. About 44 percent of the sampled adolescents identified themselves as White. Concerning parental guardianship over an adolescent’s routine life, the lack of maternal monitoring ranged from -6 to 2, with a mean of -0.02. The lack of paternal monitoring ranged from -5 to 1, with the mean of 0.07. The number of siblings ranged from 0 to 10, with a mean of 2.13.

Concerning target substance availability, the standardized scale of peer association ranged from -0.9 to 2.1. The standardized scales for number of peers using cigarettes, alcohol, and marijuana appeared similar to each other. However, the widest range and highest value were observed for the number of peers using cigarettes, suggesting that smoking cigarettes is more prevalent than drinking alcohol or using marijuana.

### **Bivariate Correlation**

Bivariate correlations between the three substances and all independent variables were examined. In terms of underage smoking, no difference existed between male and female, or White and non-White adolescents; however, older adolescents were more likely to smoke cigarettes (Table 2). An adolescent with relatively little maternal and paternal monitoring, more siblings, higher frequency of peer association, and more peers using cigarettes were also more likely to smoke cigarettes.

In terms of underage drinking, no difference existed among gender or race. Older adolescents were more likely to drink alcohol. A lack of maternal monitoring, paternal monitoring, more siblings, higher frequency of peer association, and more peers drinking alcohol were also associated with drinking alcohol.

In terms of marijuana use, being male or being older was associated with a greater use of marijuana; however, no difference existed among White or non-White. Similar to cigarette and alcohol use, an increase in marijuana use was associated with an increase in the lack of maternal monitoring, lack of paternal monitoring, more siblings, greater frequency of peer association, and more peers using marijuana.

## Multivariate Analysis

### Underage smoking.

*White males.* First, underage smoking by White males was examined. Age did not produce a significant variation in smoking cigarettes (Table 3). Regarding parental supervision, the only variable that appeared to have an impact on smoking cigarettes was maternal monitoring ( $b = 0.06$ ). Paternal monitoring and number of siblings appeared to have no effect. By contrast, all of the proxy measures of cigarette availability had a significant effect on underage smoking. Specifically, both the number of peers using cigarettes ( $b = 0.25$ ) and the frequency of peer association ( $b = 0.06$ ) increased smoking. Moreover, there appeared to be a positive interaction effect ( $b = 0.09$ ) such that the number of peers smoking had a stronger positive effect on one's own cigarette use for those with a greater frequency of peer association. Alternatively, the interaction effect suggested that the frequency of peer association had a larger positive effect on one's own cigarette use for those with a greater number of cigarette smoking peers.

*Non-White males.* The next model examined cigarette use by non-White males. Similar to White males, age had no significant impact on cigarette smoking. Concerning parental supervision, lack of maternal monitoring ( $b = 0.05$ ) and more siblings ( $b = 0.02$ ) promoted cigarette use. Paternal monitoring appeared to have no effect. Concerning cigarette availability, the number of peers smoking cigarettes ( $b = 0.24$ ) increased underage smoking. Frequency of peer association appeared to have no effect on cigarette smoking at the average level of number of smoking peers. Furthermore, there appeared to be a positive interaction effect ( $b = 0.03$ ) such that the number of cigarette smoking peers had a stronger positive effect on one's own cigarette smoking for those with more frequent peer association. Alternatively, the interaction effect

suggested that the frequency of peer association had a larger positive effect on one's own smoking for those with more cigarette smoking peers.

**White females.** The next model examined cigarette use by White females. Similar to both male groups, age was not significantly associated with cigarette smoking. Regarding parental supervision, both lack of maternal monitoring ( $b = 0.11$ ) and lack of paternal monitoring ( $b = 0.07$ ) appeared to promote cigarette smoking. The number of siblings had no effect. In terms of availability, the number of peers smoking cigarettes ( $b = 0.25$ ) increased cigarette smoking. Frequency of peer association had no effect at the average level of number of smoking peers. However, there appeared to be a positive interaction effect ( $b = 0.04$ ) such that the number of cigarette smoking peers had a stronger positive effect on one's own cigarette smoking for those with a higher frequency of peer association. Alternatively, the interaction effect suggested that the frequency of peer association had a larger positive effect on one's own smoking for those with more cigarette smoking peers.

**Non-White females.** The last model examined cigarette smoking by non-White females. Unlike both male groups and White females, older non-White females tended to smoke more than their younger counterparts ( $b = 0.01$ ). In terms of parental supervision, none of the variables appeared to effect underage cigarette smoking. On the contrary, all of the proxy measures of cigarette availability had a significant effect on cigarette smoking. Both the number of peers using cigarettes ( $b = 0.20$ ) and the frequency of peer association ( $b = 0.02$ ) increased underage cigarette smoking. Also, there appeared to be a positive interaction effect ( $b = 0.05$ ) such that the number of cigarette smoking peers had a stronger positive effect on one's own cigarette smoking for those with a higher frequency of peer association. Alternatively, the

interaction effect suggested that the frequency of peer association had a larger positive effect on one's own smoking for those with a greater number of cigarette smoking peers.

### **Underage drinking.**

*White males.* The first model examined alcohol use by White males. In terms of age, there was no significant variation in alcohol use (Table 4). Concerning parental supervision, none of the variables appeared to have an impact on alcohol use. By contrast, all of the proxy measures of alcohol availability had a significant effect on alcohol use. Specifically, both the number of peers using alcohol ( $b = 0.28$ ) and the frequency of peer association ( $b = 0.06$ ) increased alcohol use. Also, there appeared to be a positive interaction effect ( $b = 0.03$ ) such that the number of alcohol-using peers had a stronger positive effect on one's own alcohol use for those with more frequent peer association. Alternatively, the interaction effect suggested that the frequency of peer association had a larger positive effect on one's own alcohol use for those with more alcohol-using peers.

*Non-White males.* The second model examined alcohol use by non-White males. Similar to White males, age did not produce a significant variation in alcohol use. Concerning parental supervision, lack of maternal monitoring ( $b = 0.03$ ) and more siblings ( $b = 0.01$ ) appeared to promote alcohol use. Paternal monitoring had no effect. In terms of alcohol availability, all proxy measures had a significant effect on alcohol use. Specifically, the number of peers using alcohol ( $b = 0.25$ ) and the frequency of peer association ( $b = 0.02$ ) increased alcohol use. Moreover, there appeared to be a positive interaction effect ( $b = 0.03$ ) such that the number of alcohol-using peers had a stronger positive effect on one's own alcohol use for those with a higher frequency of peer association. Alternatively, the interaction effect suggested that

the frequency of peer association had a larger positive effect on one's own alcohol use for those with more alcohol-using peers.

**White females.** The third model examined alcohol use by White females. Unlike either male group, age was significantly associated with alcohol use for White females. Specifically, younger White females tended to drink more than their older counterparts ( $b = -0.02$ ). Concerning parental supervision, lack of maternal monitoring ( $b = 0.13$ ) appeared to promote alcohol use. On the contrary, the level of paternal monitoring had no effect. Number of siblings also had no effect. Regarding alcohol availability, the number of peers using alcohol ( $b = 0.26$ ) and the frequency of peer association ( $b = 0.04$ ) increased alcohol use. However, no interaction effect was found between the number of peers using alcohol and the frequency of peer association for White females.

**Non-White females.** The fourth model examined alcohol use by non-White females. Unlike both male groups and contrary to White females, older non-White females tended to drink more than their younger counterparts ( $b = 0.03$ ). Concerning parental supervision, lack of maternal monitoring ( $b = 0.04$ ) again promoted alcohol use. However, having more siblings seemed to increase alcohol use ( $b = 0.01$ ) among non-White females. Additionally, all of the proxy measures of alcohol availability had a significant effect on alcohol use. Both the number of peers using alcohol ( $b = 0.24$ ) and the frequency of peer association ( $b = 0.04$ ) increased alcohol use. Also, there appeared to be a positive interaction effect ( $b = 0.04$ ) such that the number of alcohol-using peers had a stronger positive effect on one's own alcohol use for those with more frequent peer association. Alternatively, the interaction effect suggested that the frequency of peer association had a larger positive effect on one's own alcohol use for those with more alcohol-using peers.

**Marijuana use.**

**White males.** The first model examined marijuana use by White males. Age had no significant effect on marijuana use (Table 5). Concerning parental supervision, the only variable that appeared to have an impact on marijuana use was maternal monitoring ( $b = 0.10$ ). On the contrary, paternal monitoring had no effect on marijuana use. Number of siblings also had no effect. In terms of marijuana availability, all of the proxy measures had a significant effect on marijuana use. Specifically, both the number of peers using marijuana ( $b = 0.29$ ) and the frequency of peer association ( $b = 0.04$ ) increased marijuana use. Moreover, there seemed to be a positive interaction effect ( $b = 0.05$ ) such that the number of peers using marijuana had a stronger positive effect on one's own marijuana use for those with a higher frequency of peer association. Alternatively, the interaction effect suggested that the frequency of peer association had a larger positive effect on one's own marijuana use for those with a greater number of marijuana-using peers.

**Non-White males.** The second model examined marijuana use by non-White males. Like White males, age did not affect marijuana use among non-White males. Concerning parental supervision, lack of maternal monitoring ( $b = 0.04$ ) appeared to promote marijuana use. Paternal monitoring and number of siblings appeared to have no effect. Concerning marijuana availability, all proxy measures influenced marijuana use. Specifically, the number of peers using marijuana ( $b = 0.24$ ) and the frequency of peer association ( $b = 0.03$ ) promoted marijuana use. Also, there appeared to be a positive interaction effect ( $b = 0.03$ ) such that the number of marijuana-using peers had a stronger positive effect on one's own marijuana use for those with a higher frequency of peer association. Alternatively, the interaction effect suggested that the

frequency of peer association had a larger positive effect on one's own marijuana use for those with more marijuana-using peers.

**White females.** The third model examined marijuana use by White females. Similar to both male groups, age was not significantly associated with marijuana use. Concerning parental supervision, lack of maternal monitoring ( $b = 0.05$ ) appeared to promote cigarette smoking. Parental monitoring and number of siblings had no effect on marijuana use. In terms of availability, number of peers using marijuana ( $b = 0.22$ ) and the frequency of peer association ( $b = .04$ ) increased marijuana use. Furthermore, there appeared to be a positive interaction effect ( $b = 0.08$ ) such that the number of marijuana-using peers had a stronger positive effect on one's own marijuana use for those with a higher frequency of peer association. Alternatively, the interaction effect suggested that the frequency of peer association had a larger positive effect on one's own marijuana use for those with more marijuana-using peers.

**Non-White females.** The fourth model examined marijuana use by non-White females. Unlike both male groups and the White females, older non-White females tended to use more marijuana than their younger counterparts ( $b = 0.01$ ). Regarding parental supervision, a lack of maternal monitoring ( $b = 0.05$ ) and having more siblings ( $b = .01$ ) increased marijuana use. In terms of marijuana availability, all of the proxy measures significantly affected marijuana use. Both the number of peers using cigarettes ( $b = 0.18$ ) and the frequency of peer association ( $b = 0.03$ ) increased marijuana use. Moreover, there seemed to be a positive interaction effect ( $b = 0.04$ ) such that the number of marijuana-using peers had a stronger positive effect on one's own marijuana use for those with more frequent peer association. Alternatively, the interaction effect suggested that the frequency of peer association had a larger positive effect on one's own marijuana use for those with a greater number of marijuana-using peers.

Table 1. Descriptive Statistics of Variables: Health Behavior of School-Aged Children, 2005-2006.

<b>Variable</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>
<b>Cigarette</b>	.172	.468	.000	1.950
<b>Alcohol</b>	.315	.538	.000	1.950
<b>Marijuana</b>	.165	.460	.000	1.950
<b>Male</b>	.485	.450	.000	1.000
<b>Age</b>	13.420	1.541	.110	17.000
<b>Non-White</b>	.556	.497	.000	1.000
<b>M Monitoring</b>	-.020	.974	-6.000	2.000
<b>P Monitoring</b>	.068	.953	-5.000	1.000
<b>Siblings</b>	2.133	1.722	.000	10.000
<b>Hang Out</b>	.000	.880	-.900	2.100
<b>Cig Peers</b>	.000	.944	-.640	3.360
<b>Alcohol Peers</b>	.000	1.160	-.930	3.070
<b>Marijuana Peers</b>	.000	1.105	-.710	3.290

Table 2. Correlation among Variables: Health Behavior in School-Aged Children (HBSC), 2005-2006.

Variables	4	5	6	7	8	9	10	11
<b>1 Cigarette</b>	-.002	.176**	-.009	-.120**	.073**	.060**	.123**	.510**
<b>2 Alcohol</b>	-.002	.290**	-.013	.117**	.070**	.040**	.148**	.585**
<b>3 Marijuana</b>	.048**	.269**	.004	.132**	.082**	.036**	.155**	.592**
<b>4 Male</b>	-	.028**	-.016	-.021*	-.062**	-.008**	.086**	-.001
<b>5 Age</b>	-	-	-.060**	.064**	.081**	-.031**	.039**	.349**
<b>6 Non-White</b>	-	-	-	-.038**	.001	.213**	.052**	-.018
<b>7 M Monitor</b>	-	-	-	-	.684**	.007	.045**	.117**
<b>8 P Monitor</b>	-	-	-	-	-	-.004	.034**	.113**
<b>9 Siblings</b>	-	-	-	-	-	-	.057**	.024*
<b>10 Hang Out</b>	-	-	-	-	-	-	-	.127**
<b>11 Number Peers</b>	-	-	-	-	-	-	-	-

\*\*p &lt; 0.01 (2-tailed)

\* p &lt; 0.05 (2-tailed)

Table 3. Unstandardized Regression Coefficients and Variance of Adolescent Cigarette Smoking Based on Gender and Race: Health Behavior in School-Aged Children (HBSC), 2005-2006.

<b>Routine Activity</b>	<b>White Male B (S.E.)</b>	<b>Non-White Male B (S.E.)</b>	<b>White Female B (S.E.)</b>	<b>Non-White Females B (S.E.)</b>
Age	-.008 (.006)	-.002 (.006)	-.011 (.007)	.013* (.005)
<i>Suitable Target</i>				
Lack Maternal Monitoring	.058* (.019)	.051** (.014)	.108** (.024)	.025 (.013)
Lack Paternal Monitoring	.025 (.017)	-.020 (.013)	.071** (.020)	-.002 (.012)
Number of Siblings	.009 (.007)	.016* (.005)	.011 (.007)	.008 (.004)
<i>Target Availability</i>				
Number of Friends using Cigarettes	.250** (.011)	.237** (.010)	.248** (.011)	.203** (.009)
Frequency of Hanging Out	.055** (.011)	.009 (.010)	.020 (.012)	.022* (.009)
Number x Frequency	.088** (.011)	.034** (.009)	.038* (.012)	.047** (.009)

\*\* p &lt; 0.01

\* p &lt; 0.05

Table 4. Unstandardized Regression Coefficients and Variance of Adolescent Alcohol Use Based on Gender and Race: Health Behavior in School-Aged Children (HBSC), 2005-2006.

<b>Routine Activity</b>	<b>White Male B (S.E.)</b>	<b>Non-White Male B (S.E.)</b>	<b>White Female B (S.E.)</b>	<b>Non-White Females B (S.E.)</b>
Age	-.003 (.007)	.013 (.007)	-.016* (.008)	.025** (.007)
<i>Suitable Target</i>				
Lack Maternal Monitoring	.023 (.021)	.032* (.015)	.125** (.025)	.042* (.016)
Lack Paternal Monitoring	.012 (.018)	-.012 (.014)	.024 (.020)	-.017 (.014)
Number of Siblings	.013 (.007)	.012* (.005)	.001 (.007)	.012* (.005)
<i>Target Availability</i>				
Number of Friends using Alcohol	.276** (.010)	.251** (.010)	.261** (.010)	.238** (.009)
Frequency of Hanging Out	.057** (.012)	.022* (.011)	.040* (.013)	.041** (.010)
Number x Frequency	.030* (.009)	.025* (.009)	.011 (.010)	.044** (.008)

\*\* p &lt; 0.01

\* p &lt; 0.05

Table 5. Unstandardized Regression Coefficients and Variance of Adolescent Marijuana Use Based on Gender and Race: Health Behavior in School-Aged Children (HBSC), 2005-2006.

<b>Routine Activity</b>	<b>White Male B (S.E.)</b>	<b>Non-White Male B (S.E.)</b>	<b>White Female B (S.E.)</b>	<b>Non-White Females B (S.E.)</b>
Age	.007 (.006)	.011 (.006)	.008 (.005)	.014* (.005)
<i>Suitable Target</i>				
Lack Maternal Monitoring	.096** (.020)	.035* (.014)	.045* (.020)	.047** (.013)
Lack Paternal Monitoring	.004 (.017)	-.019 (.012)	.028 (.016)	-.001 (.011)
Number of Siblings	.003 (.007)	.009 (.005)	.007 (.005)	.008* (.004)
<i>Target Availability</i>				
Number of Friends using Marijuana	.286** (.010)	.239** (.009)	.224** (.008)	.178** (.007)
Frequency of Hanging Out	.035* (.010)	.024* (.009)	.041** (.010)	.029* (.008)
Number x Frequency	.048** (.009)	.030** (.008)	.079** (.008)	.035** (.007)

\*\* p < 0.01

\* p < 0.05

## Chapter V: Discussion and Conclusion

Even though the rates of adolescent substance use have been declining in recent years (Substance Abuse and Mental Health Services Administration, 2013; National Survey on Drug Use and Health, n.d; Monitoring the Future, n.d.), it is still important to understand what leads an adolescent to smoke cigarettes, drink alcohol, or use marijuana because using these substances contribute to numerous consequences for the adolescent, their peers, and their family. These consequences include mental and physical health, academic failure, poor interpersonal relationships, and delinquency (Crowe & Bilchik, 1998; Office of Adolescent Health, n.d.).

Previous research demonstrates that drug use is significantly positively associated with the frequency of visiting friends (Osgood et al., 1996; Bergh et al., 2011). Peer alcohol use and offers are positively associated with an increase in adolescent alcohol use (Gilligan et al., 2012; Schwinn & Schinke, 2012). In terms of parents, parental monitoring is statistically significant in reducing adolescent substance use (Bahr et al., 2005; Bergh et al., 2011; De Looze et al., 2012; Tomcikova et al., 2013). These results were validated in the current study.

The present study applied routine activities to the explanation of adolescent cigarette, alcohol, and marijuana use in order to determine what influences adolescents to smoke cigarettes, drink alcohol, or use marijuana. Routine activities theory was broken down into parental supervision (i.e. lack of maternal monitoring, lack of paternal monitoring, and number of siblings) and substance availability (i.e. frequency of hanging out with peers, number of peers that use respective substance, and the interaction effect of quantity of peers and frequency of hanging out).

The results of the bivariate analysis concluded that race was not significantly related to any of the three substances, and being male was only significant for marijuana use. Being older,

experiencing a lack of maternal monitoring or paternal monitoring, living with more siblings, having more friends who used the respective substance, and hanging out frequently with those friends are associated with using cigarettes, alcohol, and marijuana.

Multivariate analysis determined that age was not significantly related to substance use in males. However, age was positively associated with substance use for non-White females and negatively associated with alcohol drinking for White females.

Parental supervision varied in significance by substance as well as race and gender. Lack of maternal monitoring increased alcohol use for non-White males and both White and non-White females; increased cigarette smoking for both White and non-White males and White females; and increased marijuana use for all White and non-White males and females. Lack of paternal monitoring was not significantly related to alcohol use or marijuana use for all White and non-White males and females. However, lack of paternal monitoring increased cigarette smoking for White females. Number of siblings was only an important factor for non-White adolescents. For non-White males, number of siblings was positively related to alcohol use and cigarette smoking. For non-White females, number of siblings was positively related to alcohol and marijuana use.

The variables for target availability predicted substance use in most circumstances. Hanging out with peers was positively associated with alcohol and marijuana use for all White and non-White males and females. In terms of smoking, hanging out with peers was positively significant for White males and non-White females. The number of one's peers who used the corresponding substance positively affected cigarette smoking, alcohol drinking, and marijuana use for all White and non-White males and females. The interaction effect of quantity of peers

using and frequency of hanging out promoted alcohol, cigarette, and marijuana use for all White and non-White males and females with the exception of alcohol drinking among White females.

### **Limitations**

**Internal validity.** The current study applied routine activities to adolescent substance use while incorporating components of social bond and social learning theory. The study attempted to explain adolescent substance use in terms of two factors, parental monitoring and substance availability through peer substance use. However, this model leaves out numerous other factors that may influence adolescent substance use. A few omitted factors that may influence adolescent substance use include: environmental factors, such as socioeconomic status or residential mobility; parental employment; the adolescent being labeled a substance user; and parental or sibling drug use.

Additionally, based on the questionnaire, causality is questionable. The data for the current study is cross-sectional, but so is the overwhelming majority of the literature on adolescent substance use. In the present study, substance use referred to the respondents' use of alcohol and cigarettes in the past month, and marijuana use in the past year. However, parental monitoring and peer drug use are interpreted to be within the last few weeks; a clear time frame is not stated in the question. Therefore, based on the questionnaire, adolescent drug use occurred prior to parental monitoring or peer drug use. However, parental monitoring is fairly static and does not fluctuate greatly over time. On the other hand, the nature and scope of association with friends may change, but still, this generally happens over time, not rapidly. Longitudinal data would produce stronger causality, but based on the static nature of the independent variables, causality can still be inferred with cross-sectional data.

**Construct validity.** Finding a dataset that perfectly matches the researcher's needs is a challenge, and while not perfect, HBSC does fit the current study design fairly well. However, there are a few shortcomings in the current research design. First, parental supervision is believed to decrease as the number of children increases, and therefore the present study included the number of siblings. However, the questionnaire asked about the number of brothers and the number of sisters. Respondents were asked to include everyone in the home, including: half-, step-, and foster brothers and sisters. No differentiation was made between how many were biologically related, related through marriage, or un-related. Also, no differentiation was made as to the age gap between siblings or whether the respondent was the oldest, middle, or youngest child. This may be important because children are treated differently based on how they rank in relation to other siblings. Children are also treated differently if they are not biologically related to their mother and/or father; step-parents may be harsher towards step-children than their biological children. Additionally, older siblings are expected to be role models for younger children, and the youngest is believed to get away with more. Since the dataset grouped all brothers and all sisters together, it cannot be determined how different sibling statuses may impact adolescent substance use.

Second, target availability was measured by asking respondents how many of their friends use a particular substance and how often they hang out with their friends after school and in the evenings. These questions are not the best measurement of target availability, but based on the questionnaire, these questions were the most optimized solution for measuring target availability. Future research should instead measure target availability by asking respondents about "hanging out with friends when their friends are using," or "being offered substances by friends."

Third, the sequence in which questions were presented is problematic. Respondents were asked about hanging out with peers after school and in the evening. Multiple questions later, respondents were asked about their own alcohol and cigarette use, friend substance use, and then their own marijuana use. Since friend substance use is asked after hanging out with peers, and in fact presented multiple questions later, the number of friends who use substances may not refer to the same group of friends whom the respondent hangs out with. Unfortunately, since the present study utilized the HBSC dataset, the sequencing of questions and the detail of responses could not be controlled. Thus, the frequency of hanging out with friends was intended to measure the frequency of hanging out with substance-using friends but in fact may not even include substance-using peers.

### **Implications**

Based on the limitations of this study, future research should be longitudinal and considerable attention should be given to the sequencing of questions and richness of information obtained from respondents. However, given the limitations present in the current study, the results obtained still contribute considerable information to the literature on adolescent substance use. The results also help to make recommendations for future policies and programs.

The results of the present study helped to validate prior research (Osgood et al., 1996; Bahr et al., 2005; Bergh et al., 2011; Gilligan et al., 2012; Tomcikova et al., 2013) but also contributed additional information. The result of the current study demonstrate that the mechanisms by which parental monitoring and target availability influence adolescent cigarette, alcohol, and marijuana use varies by gender and race.

Rather than responding to adolescent substance use, prevention programs should be implemented in order to prevent adolescent cigarette, alcohol, and marijuana use. First,

prevention programs should be implemented that specifically target at-risk adolescents who report high numbers of friends that use substances. Duan et al. (2009) suggest prevention programs that start during middle school and are further tailored for high-risk adolescents. Lau-Barraco and Linden (2014) examined adolescent alcohol drinking and found that adolescent drinking buddies were most commonly peers (76 percent), and that 44 percent had contact with drinking buddies daily and 29 percent had weekly contact. The present study found that regardless of gender or race, peer substance availability has a significant association with adolescent substance use. Thus, programming should emphasize skills to resist peer pressure and facilitating positive friend selection (Becker & Curry, 2014), along with creating substance-free environments where adolescents can hang out with their friends without being pressured to use substances (Tomcikova et al., 2012).

Second, programs need to be established that provide parents with the necessary skills to raise their children. Parenting classes are often associated with learning how to care for a newborn child, but parenting goes well beyond the first few months of life. Besides training parents how to care for their newborn, parenting classes need to focus on training parents how to discipline their children, set rules, and have open communication. All of these factors were examined by De Looze et al. (2012) and were found to impact adolescent substance use. Wagner et al. (2008) dismissed the notion that parental monitoring impacts substance use since no difference was found between living in a single-parent versus two-parent household; however, most single-parent households are female headed and maternal monitoring is what matters. Parenting classes should target mothers specifically since maternal monitoring has a more significant effect on substance use than paternal monitoring, as shown in the results obtained from the present study and by Jiménez-Iglesias et al. (2013). For non-White families, parents

of larger families should also be targeted since having more siblings is associated with non-White adolescent substance use. It is also important that parenting classes start early on. As the child ages, it will become harder and harder for the parent to regain control.

Third, another approach of prevention programming is to incorporate a myriad of variables that influence adolescent substance use. Instead of focusing specifically on peer substance use, or parental monitoring, prevention programs may choose to focus on both peers and parents, along with other factors as well. For these programs, it is important to know how each factor individually influences substance use, but also how the factors interact to increase or decrease adolescent substance use. For example, peer substance use increases adolescent substance use, while parental monitoring decreases adolescent substance use (Barnes et al., 2005; Kiesner et al., 2010; Bergh et al., 2011; Schwinn & Schinke, 2014). Therefore, it is important to know how strong of an effect each factor has on substance use and whether or not that effect size changes with age, gender, or race, variables that the present study explored. A few longitudinal studies exist (Osgood et al., 1996; Van der Vorst et al., 2009; Tang & Orwin, 2009), but future research should focus on when, how, and to what extent different factors influence adolescent substance use, to include cigarette, alcohol, and marijuana use, throughout adolescence. A cross-sequential study performed by Burk et al. (2011) is a step towards determining the when, how, and to what extent, but future research designs should be longitudinal.

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