

ADOLESCENT SUBSTANCE USE: RISK AND PROTECTIVE FACTORS OF  
FAMILY, SCHOOL, PEER, AND LEISURE

by

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## ABSTRACT

### BACKGROUND

Adolescent substance use has long been a global public health issue. In this study, we explored developmental contexts that correspond with protective and risk factors associated with adolescent substance use. The developmental contexts of interest are the family domain, the school domain, the peer domain, and the structured and unstructured leisure domains. The leisure domain is of particular interest as it often corresponds with protective and risk factors different from those associated with the other domains. The purpose of this study was to assess whether the identified domains are associated with adolescent alcohol use and cannabis use.

### METHODS

This study used previously collected adolescent health and behavior surveillance data from ( $N = \sim 3,500$ ) 7<sup>th</sup>-12<sup>th</sup> graders in a Northeastern state in the fall of 2019. The data was used to assess whether the identified domains are associated with adolescent alcohol use and cannabis use. We analyzed each outcome variable using separate hierarchical multiple regression models.

### RESULTS

Each of the selected variables in our analysis: family, school, peer, structured and unstructured leisure domains were significantly associated with one or both of the dependent variables (alcohol or cannabis use). In our model, the peer domain was the strongest risk factor for adolescent substance use in our study, followed by the

unstructured leisure domain. Family, structured leisure, and school offered similar levels of protection against substance use in per unit change.

## CONCLUSIONS

Implications for utilizing the peer and leisure developmental contexts to prevent adolescent substance use and recommendations for further research and investment are discussed.

## TABLE OF CONTENTS

ACKNOWLEDGMENTS .....	iv
ABSTRACT .....	v
LIST OF TABLES .....	x
CHAPTER I: INTRODUCTION .....	1
Background.....	1
State of the Problem.....	1
Purpose .....	2
Rationale.....	5
Research Question .....	7
Study Limitations and Rationale.....	7
Delimitations .....	7
Limitations .....	8
Assumptions.....	8
Summary .....	9
Definition of Terms (Common Terms).....	11
CHAPTER II: LITERATURE REVIEW .....	14
Introduction .....	14
Adolescent Substance Use is a Global Health Burden .....	14
Theory .....	18

Social Ecological Theory .....	18
Bioecological Model.....	20
Social Cognitive Theory.....	21
Theories of Social Deviance.....	23
Theory Summary .....	25
Developmental Contexts.....	25
Family Domain .....	26
School Domain .....	28
Peer Domain .....	30
Leisure Domain.....	33
Summary of Developmental Contexts .....	38
Leisure as a Substance Use Prevention Strategy.....	39
Summary .....	45
CHAPTER III: METHODS.....	47
Brief Introduction .....	47
Participants.....	47
Research Design .....	48
Research Question .....	48
Data Collection Procedures .....	49
Measures .....	51
Dependent Variables .....	51
Independent Variables.....	51
Control Variables .....	53



Data Analysis Procedures.....	54
Summary of Methods.....	55
CHAPTER IV: RESULTS.....	56
Associations of Key Study Variables with Alcohol .....	56
Associations of Key Study Variables with Cannabis.....	58
CHAPTER V: DISCUSSION.....	61
Summary of Key Results.....	61
Implications for Public Health Practice .....	64
Recommendations for Future Research .....	66
Conclusion.....	67
REFERENCES.....	68
APPENDIX A.....	77
APPENDIX B .....	83

## LIST OF TABLES

Table 4.1	Descriptive Statistics for Adolescent Alcohol Use.....	57
Table 4.2	Multiple Hierarchical Regression Model for Adolescent Alcohol Use ....	57
Table 4.3	Descriptive Statistics for Adolescent Cannabis Use .....	59
Table 4.4	Multiple Hierarchical Regression Model for Adolescent Cannabis Use ..	59
Table 4.5	Pearson Correlations Among Key Variables.....	60
Table A.1	Leisure Domain Factors .....	78
Table A.2	Family Domain Factors.....	79
Table A.3	School Domain Factors.....	80
Table A.4	Peer Domain Factors.....	82
Table B.1	Variable Table .....	84

## CHAPTER I: INTRODUCTION

### **Background**

Adolescent substance use rates are an ongoing worldwide health issue. (Sigfusdottir, Kristjansson, Thorlindsson, & Allegrante, 2008). Literature suggests that adolescent substance use not only has negative health effects but also that its impact will become increasingly important in our changing society (Degenhardt et al., 2016). Adolescent substance use can extend negatively to the social and emotional health of an adolescent and is associated with the quality of the parent-adolescent relationship, peer group, and society. Negative effects of adolescent use can include juvenile delinquency, detriment of interpersonal relationships, impaired psychological development, decreased academic success, and higher financial costs to society (Hall et al., 2016; McCann et al., 2016). Adolescent use strains relationships, including those with parents. It is often found to coincide with juvenile delinquency, which has negative effects on societies' productivity, economy, and overall wellbeing. Due to these compounding adverse effects, use is one of the leading causes of global health burden (Degenhardt et al., 2016). In many cultures across the globe, professionals, policy makers, and parents try to prevent the adoption of substance use among their youth. Despite efforts to increase awareness of adverse effects; use rates globally are still a prominent issue (Degenhardt et al., 2016).

### **State of the Problem**

The scientific literature related to substance use suggests that adolescent use is one of the leading causes of global health burden due to its short-term and long-term

adverse health effects. Risk for participation increases in early to middle adolescence (Degenhardt et al., 2016; National Research Council and Institute of Medicine, 2002). Research suggests that children ranging from 10-15 years old are one of the groups at highest risk of adopting these behaviors (National Research Council and Institute of Medicine, 2002). Short-term negative effects include increased incidence of high-risk behaviors such as risky sexual behavior, hazardous actions resulting in injury, and school, social, and legal problems (Centers for Disease Control and Prevention, 2020). Long-term, early-onset adolescent substance use can lead to not only a higher likelihood of addiction but also the development of non-communicable diseases like “heart disease, high blood pressure, and sleep disorders” (Centers for Disease Control and Prevention, 2020). Use of substances has been found to coincide with familial problems as higher rates of use are commonly seen in adolescents with strained parental relationships (McCann et al., 2016). Research on the impact of substance use suggests that changing family dynamics, including the delay of marriage and birth of children, will result in longer-term use thereby increasing the long-term effects of recreational use in later adolescent years (Hall et al., 2016).

### **Purpose**

Adolescents develop in multiple environmental contexts. Research surrounding this development suggests that there are risk and protective factors in each context that can contribute to substance use. Among others, four contexts that largely influence adolescent substance use include: (1) the family, (2) schools, (3) peers, and (4) leisure time domains. The multiple contexts that influence adolescent development are important as each contributes unique risk and protective factors. These varying contexts serve as

possible intervention points. Researchers have recommended continued investigation into these contexts in an effort to (a) discover which are most influential when preventing substance use, and (b) discern how to best use resources and make a positive impact on adolescents. In order to understand how these contexts influence substance use, research recommends “further research into the trends in risk and protective factors associated with substance use” (Sigfusdottir et al., 2008, p. 8). This investigation seeks to (a) continue to produce work that advocates for increased adolescent participation in leisure activities and (b) satisfy the need for “more dialogue focused on the needs of under scheduled youth” (Sharp, Tucker, Baril, Van Gundy, Rebellon, Cesar., 2015, p. 74). Additionally, there are recommendations to continue investigating the broader relationship between adolescent substance use and structured leisure in order to both gain support for programs and understand if prevention models implemented in other cultures are effective in the United States (Bartko & Eccles, 2003; Sigfusdottir et al., 2008). To date, there have been no extensive reviews or studies in the United States that directly compare structured leisure and the broader contexts of (1) the family, (2) schools, (3) peers, and (4) leisure time domains with their potential impacts on adolescent use of alcohol and cannabis.

Leisure has long been an interest of research. It is acknowledged both as an important context for development throughout the life course and as a domain that may provide unique protective factors (Caldwell, 2011). It is especially important for adolescents as a means for developing identity, practicing autonomy, and providing a unique environment with a “greater freedom to experiment with social roles, behaviors, and ideas than many other developmental contexts” (Darling, 2005, p. 493). Research regarding leisure and adolescent development seeks to decipher not only which types of leisure are most

important, but also to identify the protective and risk factors provided in different contexts. Because it can be a time of increased independence and experimentation, unstructured leisure time has been associated with increased risk factors when compared to structured leisure time, which seems to lead to more protective factors (Reisner et al., 2007). There is a rich literature on leisure that seeks to understand the relationship between the duration and frequency of engagement, the type of leisure (structured vs. unstructured), and the risk and protective factors inherent in each. There is a limited amount of research pertaining to using leisure time as a strategy to delay the onset of adolescent substance use in each community. However, there are promising studies that show that increased access to and participation in leisure activities can result in reductions and delay in the onset of adolescent substance use (Sigfusdottir, Soriano, Mann, & Kristjansson, 2020).

Additionally, because roughly 40-50% of an adolescents' waking hours are spent outside of school in a discretionary way, research continues to explore the relationship between structured vs. unstructured leisure time and the role each may play in development (Afterschool Alliance, 2020b; Bartko & Eccles, 2003; Sharp et al., 2015). Subsequently, twenty-six percent of adolescent crime occurs during the afterschool hours (2-6 PM). This crime includes assault, theft, and drug-related offenses (Council for a Strong America, 2019). Because their brains are still developing, adolescents may be particularly vulnerable to both substance use and high-risk behavior during unsupervised leisure time. (Degenhardt et al., 2016). Early onset substance use could result in long-term use as well as adverse short-term health outcomes including chronic disease, addiction, and involvement in risky behavior (CDC, 2020).

Alternatively, research on leisure time suggests “that participation in extracurricular activities is positively related to academic performance, psychological well-being, and self-esteem, but negatively related to substance abuse” (Thorlindsson & Bernburg, 2006, p. 322). While the number of adolescents partaking in afterschool programs is increasing, approximately 20% of American K-12 students do not have adult supervision after the end of the school day (Afterschool Alliance, 2014). This means that many adolescents are left unsupervised until their parents return from work. Unsupervised adolescents are at an increased risk for engaging in risky behaviors when compared to their peers who participate in structured, supervised activities during discretionary hours.

Literature regarding the role of leisure in adolescence has shown that structured leisure is beneficial for adolescent development (Caldwell, 2011). It helps to build protective skills and relationships youth may not develop elsewhere (Darling, 2005). Prevention efforts focused on development of youth through structured leisure have shown to reduce substance use in adolescents (Sigfusdottir et al., 2020). This suggests that structured leisure activities may serve as a buffer (Badura et al., 2018; Kristjansson et al., 2020a). This study will assess the impact of structured leisure time on substance use in six communities in a Northeastern state. It will also evaluate the feasibility of utilizing structured leisure time as a substance use reduction strategy in the United States.

### **Rationale**

It is important to realize that efforts to reduce adolescent substance use continue. There have been failures but there also have been both small and great successes. The difference seems to lie in the approach of prevention efforts. There is a growing body of literature that describes and evaluates these various approaches. This literature covers

interventions with short-term or minimal impact as well as unique prevention approaches that have displayed long-term, sustainable reduction in substance use in adolescents. The Icelandic prevention model -- an intervention focused on altering the social environment surrounding the school, peer, family, and leisure dimensions of adolescent life -- has not only proven successful in reducing adolescent use in Iceland but has also shown great promise in a diverse group of other cultures (Sigfusdottir et al., 2020). One unique aspect of this approach is its emphasis on structured leisure. This emphasis reveals that this aspect of adolescent life is key to reducing adolescent substance use. Because adolescent substance use has been associated with increased crime rates, strained interpersonal relationships, decreased academic performance, and negative short and long-term health effects, we must acknowledge the costs this incurs to our society and to global public health (Darling, 2005; Degenhardt et al., 2016; Hall et al., 2016; Kristjansson et al., 2020a; Thorlindsson & Bernburg, 2006).

Successful changes to social environment as well as increased access to structured leisure time have been associated with reduced adolescent substance use, improved academic performance, a strengthened sense of community, and increased short-term social, emotional, and physical health benefits (Darling, 2005; Kristjansson et al., 2020a; Thorlindsson & Bernburg, 2006). Studies suggest that, in addition to positive social, physical, and academic outcomes, afterschool programs offering structured leisure time provide an opportunity for positive financial benefits (Afterschool Alliance, 2005; Afterschool Alliance, 2020a). Literature recommends additional focus in this area to not only increase understanding of the broad relationship between leisure time and adolescent



substance use in the United States but also to determine whether it can be used as an effective prevention approach.

In a time that is formative to adolescent development, environmental factors can shape adoption of both positive health outcomes (e.g., increased academic performance, psychological wellbeing and self-esteem) and negative health behaviors (e.g., involvement in antisocial, drug, alcohol, and sexual behavior) in adolescents (Darling, 2005; Kristjansson et al., 2020a; Thorlindsson & Bernburg, 2006). Thus, focusing on structured leisure time activities will help us understand both their impact and their potential to reduce adolescent substance use, the adverse outcomes associated, and costs to society.

### **Research Question**

The purpose of this study is to explore the associations between structured after-school leisure time and adolescent substance use. It will assess the following two-part research question:

**Research question:** What are the unique patterns of association across family, school, peer, and unstructured/structured leisure time factors on adolescent substance use of (A) alcohol and (B) cannabis?

### **Study Limitations and Rationale**

#### Delimitations

1. This study was conducted at six deliberately selected pilot communities in a Northeastern state.
2. Participants included students aged 12-18 who voluntarily completed the data collection survey.
3. Data were collected during the 2019-2020 academic year.

4. Study variables were measured using a protocol consisting of validated scales.
5. Data were self-reported by the students.

### Limitations

1. This is based on secondary data analysis. This means that the data collected were based on questions that had already been asked. In other words, we did not have input into the questions asked.
2. The six communities selected for the pilot program may not represent all communities in the United States or in the world.
3. The students who completed data collection surveys may not represent all students in the United States or in the world.
4. The data collected during the study's time period may somehow differ from data that would be collected during other years.
5. Instruments used in the study may not fully describe associated constructs or ideas.
6. Participants may not have been candid.
7. This is a cross-sectional descriptive study.
8. We cannot report on the quality of structured leisure.
9. Access to structured leisure varies across each community.

### Assumptions

1. The six communities selected were considered sufficiently representative of communities within this Northeastern state and the United States.

2. Students who voluntarily participated were considered sufficiently representative of similarly aged students in schools across this Northeastern state and the United States.
3. Data collected during the 2019-2020 academic year were considered sufficient for the purpose of the study.
4. Instruments selected for the study protocol sufficiently described their associated constructs for the purpose of this study.
5. Students responded to the survey with sufficient levels of honesty and perception for the purpose of this study.
6. Using a cross-sectional descriptive study design provides sufficient legitimate data analysis options for the purpose of the study.

### **Summary**

Public health interventions can show not only that we can link action with health outcomes but also that we can make change through preventative work. This connection has been made elsewhere and has impacted countless lives. The wide range of preventative work includes the fluoridation of water, the development of safe infrastructure, and the inclusion of physical education in schools. Investing in the health of citizens has shown to be a worthwhile cause. Research in adolescent development suggests that the contexts of family, school, peer group, and leisure are largely influential when considering adolescent substance use. Efforts are implemented in all of these contexts to provide positive environments for adolescents. Despite these efforts, adolescent substance use continues to be a global health issue (Degenhardt et al., 2016). This suggests that perhaps we are not investing enough or are prioritizing investments inefficiently. Studies have

shown that adolescent substance use is preventable and that leisure is a key context that cannot be ignored (Sigfusdottir et al., 2020).

Groups like the Afterschool Alliance have reported that participation in structured afterschool programs results in positive outcomes for adolescents (Afterschool Alliance, 2020a). Additional research supports that these types of programs are important, but that there are not currently enough opportunities for adolescents to participate in structured leisure time (Afterschool Alliance, 2020c). This suggests that there is a need for increased investment. Despite this information, funding for programs has been challenged by previous administrations (Peterson, 2020). Loss of funding would have directly affected over a million and a half adolescents who are currently enrolled in federally funded afterschool programs (Afterschool Alliance, 2020a; Peterson, 2020). However, in light of the COVID-19 pandemic, discussions at the state and federal level have shifted and are recognizing the importance of these programs in recovery and response (Peterson, 2021). Expansion of federal funding to support these crucial programs is being incorporated into federal aid proposals in order to increase equitable access and support adolescent and economic recovery (Peterson, 2021). This is an opportune time to continue to highlight and explore the benefits of structured leisure, and the importance of expanding opportunity. It is clear that structured leisure is a powerful tool, and it is important that we better understand the breadth of individual and community impact as well as the barriers that may be inhibiting access. This work will suggest that investing in youth development through structured leisure time will increase not only the educational benefits often associated with afterschool programming, but may also serve as a strategy to delay

the onset of the substance use that is affecting the health of adolescents in America (Afterschool Alliance, 2020a).

### **Definition of Terms (Common Terms)**

**Adolescence:** “the period of human development that starts with puberty (10–12 years of age) and ends with physiological maturity (approximately 19 years of age), although the exact age span varies across individuals. During this period, major changes occur at varying rates in physical characteristics, sexual characteristics, and sexual interest, resulting in significant effects on body image, self-concept, and self-esteem” (American Psychology Association, 2020).

**Adolescent Substance Use:** Adolescent substance use represents any underage use of alcohol, illegal drug, tobacco product, vape, or misuse of prescription medications.

**Context:** A set of conditions or situations that surround an event, activity, or behavior; a set of conditions or situations that influence the way one lives; the setting in which an event, activity, or behavior takes place (Caldwell, 2011).

**Leisure Time:** “Using discretionary time for participation in *leisure* activities; those defined as freely chosen, intrinsically-motivated activities done for enjoyment and meeting personal goals” (Sharp et al., 2015, p.62).

**Afterschool:** Hours from release of school until supervised by a parent at home.

**Family Time:** Quality time spent with family members, especially with a parent or guardian.

**Protective Factors:** “a clearly defined behavior or constitutional (e.g., genetic), psychological, environmental, or other characteristic that is associated with a decreased probability that a particular disease or disorder will develop in an individual, that reduces

the severity of an existing pathological condition, or that mitigates the effects of stress generally” (American Psychology Association, 2020).

**Risk Factors:** “a clearly defined behavior or constitutional (e.g., genetic), psychological, environmental, or other characteristic that is associated with an increased possibility or likelihood that a disease or disorder will subsequently develop in an individual.” (American Psychology Association, 2020)

**Peer:** “an individual who shares a feature or function (e.g., age, sex, occupation, social group membership) with one or more other individuals. In developmental psychology, a peer is typically an age mate with whom a child or adolescent interacts” (American Psychology Association, 2020).

**Structured Play referred to as Structured Activities:** “organized play that is governed by rules and controlled or directed by an adult. A teacher-initiated classroom play activity is an example”(American Psychology Association, 2020).

**Unstructured Activities:** Non-organized activities including individual, pair, or group play, hanging out. A general lack of adequate adult supervision when outside of school.

**Social Norms:** “any of the socially determined consensual standards that indicate (a) what behaviors are considered typical in a given context (descriptive norms) and (b) what behaviors are considered proper in the context (injunctive norms). Whether implicit or explicit, these norms not only prescribe the socially appropriate way to respond in the situation (the “normal” course of action) but also proscribe actions that should be avoided if at all possible” (American Psychology Association, 2020).

**Social Deviance Theories:** social deviance theories suggest that one can behave in a socially unacceptable “deviant” way only when provoked or when in an environment that is conducive to this behavior (Kristjansson et al., 2020a).

**Social Emotional Learning:** “the process through which children and adults understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions” (Collaborative for Academic Social and Emotional Learning (CASEL), 2020).

**Recreation:** “rejuvenating and pleasurable pastimes or sports” (American Psychology Association, 2020).

**Social Environment:** social norms, environment and dynamics that influence adolescent choices, and behavior.

**Social Capital:** “the social, cultural, and material resources young people acquire to help them in the various contexts of their lives and in the transition to adulthood” (Caldwell & Witt, 2011, p. 21).

**Social Control:** “the power of the institutions, organizations, and laws of society to influence or regulate the behavior of individuals and groups. For example, a person may internalize the values and beliefs of his or her religion and act accordingly; Similarly, a person may avoid stealing for fear of being caught by the police and punished (e.g., with fines or incarceration). The human tendency to conform increases the power of social institutions to shape behavior” (American Psychology Association, 2020).

## CHAPTER II: LITERATURE REVIEW

### **Introduction**

This chapter will explore and define adolescent substance use and its impact on global health and society. It will further explore the four environmental contexts: (1) the family, (2) schools, (3) peers, and (4) leisure time domains that have been identified to be areas of intervention that influence adolescent behavior. It will also take a deeper analysis of the literature on leisure including both its relationship to substance use and adolescent development, and its use as a preventative measure or intervention.

### **Adolescent Substance Use is a Global Health Burden**

Adolescent substance use remains a global health issue and is predicted to remain a burden to society (Hall et al., 2016). Adolescent substance use represents any underage use of alcohol, cannabis, illegal drug, tobacco product, vape, or misuse of prescription medications. In the United States, local, state, and national campaigns use private and public resources to educate adolescents and their parents about the adverse health outcomes associated with underage substance use. Their efforts work to address issues like underage alcohol use. Underage alcohol use alone causes approximately 4,300 adolescent deaths each year and costs Americans approximately \$24 billion annually (Centers for Disease Control, 2020). While these alcohol-specific statistics provide a glimpse into the direct costs associated with one substance, these numbers merely introduce the global health issue that is adolescent substance use. The insurmountable financial costs, health



costs, and qualitative costs associated with countless other substances are difficult to quantify from a local or global perspective.

The ripple of repercussions stemming from adolescent substance use are wider than one initially might think. Adverse health effects are generally well known and include an increased risk of “disruption of normal growth and sexual development, memory problems, unwanted, unplanned, and unprotected sexual activity, physical and sexual assault, changes in brain development, death from alcohol poisoning, and physical problems, such as hangovers or illnesses” (Centers for Disease Control, 2020). Engaging with substances increases the chance of participating in high-risk behaviors that result in accident-related injury (e.g., car accidents, “burns, falls, and drowning”) (Centers for Disease Control and Prevention, 2020), as well as school, social, and legal problems (Centers for Disease Control and Prevention, 2020). Early onset adolescent substance use can lead to long-term adverse health effects including a higher likelihood of addiction and the development of non-communicable diseases like “heart disease, high blood pressure, and sleep disorders” (Centers for Disease Control and Prevention, 2020). Adolescent substance use is such a global health burden that just one of many substances, alcohol, “is the largest cause of disease burden in young adults and older age groups” (Degenhardt et al., 2016). Health care costs directly associated with substance use in the U.S. soar over \$200 billion annually and the overall costs associated with use are estimated to be over \$740 billion annually (National Institute on Drug Abuse, 2020). While the financial costs associated are an immense burden on our society, these numbers do not consider the much more detrimental human cost born out in effects on an individual, family, and communities’ life and well-being.

Academic success and graduation rates may also be reflective of adolescent substance use. Academic failure can inhibit an adolescent's successful transition into adulthood, the workforce, and higher education (Hall et al., 2016). In adolescence, early substance use is associated with decreased academic success, reduced attendance at school, and increased delinquency (Lee & Vandell, 2015). Accordingly, some of the literature regarding adolescent substance use suggests that direct health issues may not be the largest burden associated with use. It suggests that the behaviors associated with use that are the most troublesome to society include "problem behavior, interpersonal violence, weapon carrying and fighting, [and] sexual risk-taking such as early debut and a large number of partners" (Nilsson, Starrin, Simonsson, & Leppert, 2007, p. 159). The reach of problematic outcomes associated with adolescent substance use is wide and can include financial instability, relationship difficulties, employment issues, legal issues, and accident-related issues later in life (Degenhardt et al., 2016). Crime rates associated with juvenile delinquency are at their highest during adolescent leisure time, often outside of school hours when adolescents are unsupervised (Council for a Strong America, 2019). Effects associated with crime rates are financially, psychologically, and socially costly as well as expensive in terms of time, education, and work, for adolescents and their families.

The impact of decreased graduation rates and increased crime rates can include increased unemployment, lower income, health care costs incurred more often, poorer local health statistics, and suffering local economies. The costs of these gaps spread into larger society and can affect the national and global economy. In 2005, Afterschool Alliance estimated that "each year's class of dropouts will cost the country more than \$200 billion during their lifetimes in lost earnings and unrealized tax revenue", that "teen

motherhood costs society an estimated eight billion dollars annually, and [that] American business currently spends more than \$60 billion each year on training -- much of that on remedial reading, writing, and mathematics” (Afterschool Alliance, 2005, p. 1). While it is not possible to say that adolescent substance use is directly causal for these costs, the associated adverse outcomes suggest an association.

Health costs in the United States are some of the highest in the world (Organisation for Economic Cooperation and Development, 2019) and cost the federal government over “\$3.6 trillion” (“\$11,172 per person) in 2018 (Centers for Medicare and Medicaid Services, 2020). The indirect and direct associations between adolescent substance use and adverse health and non-health related outcomes are apparent enough that federally funded institutions (e.g., SAMHSA and NIH) invest large sums to research and understand the issue. Private and public organizations operate programs to provide safe spaces for adolescents to learn and recreate in an effort to reduce substance use risk and improve the health and quality of life of adolescents and the American people. As adolescent substance use remains a global health issue, lessons learned from previous efforts can guide us to a more complete understanding of the root causes of use. They can also help us use people and financial resources more efficiently and in a preventative manner.

It is also important to understand the dynamic and emerging factors that contribute to adolescent substance use. The legalization of medicinal, and/or recreational use of cannabis in some states brings a new consideration to understanding adolescent use. As state-based legalization is increasingly becoming the norm, there are new and unique opportunities to explore associations between legalization for adult use and illegal adolescent use. It is important to monitor if and how changing policy affects adolescent use

when it comes to cannabis, to other substances, and to the associated adverse health outcomes.

## **Theory**

Several key theories help us establish a better understanding of the environmental contexts of adolescent development and how leisure may serve as a unique preventative effort. These include social ecological theory, the bioecological model, social cognitive theory, and theories of social deviance. Below, you will find a summary of each and a discussion of how each contributes to a shared understanding of the contexts and environments that are associated with adolescent development. These theories can help us understand the relationship between environmental contexts, adolescent substance use outcomes, and leisure time. They can also help to explain why some intervention efforts are fruitful while others may present challenges in preventing adolescent substance use.

### Social Ecological Theory

Bronfenbrenner's original theory posits that there are interacting levels of environmental systems that influence adolescent development. These environmental contexts are nesting in nature and include the microsystem, the mesosystem, the exosystem, and the macrosystem. The child is in the center of these nesting systems and is influenced by each. The microsystem is the nearest to the adolescent and encompasses their most direct environments including home, parents, family members, peer groups, school, and any extracurricular structured leisure activities. The mesosystem entails the relationships between microsystems. The way these systems interact influences an adolescent's development. Examples of the mesosystem include the relationships between a parent and the individuals in their children's microsystems: their children's friends' parents, their

children's teachers at school, or their children's coaches. While these mesosystem relationships may be indirect, they can have both positive and negative influence on an adolescent and their relationship with that microsystem. The exosystem is one in which an adolescent is not directly involved. This may be a parent's place of work, for example, since an adolescent is indirectly affected by their parents' experiences at their workplace. The macrosystem represents society as a whole. It suggests that an adolescent, their family, and their status of life is affected by the environment created in society. This may pertain to culture, access, and availability of community resources as well as the family's socioeconomic status. This theory suggests that these nesting systems all interact with each other, exerting continuous influence that contributes positively or negatively to adolescent development (Ashiabi & O'Neal, 2015).

The scientific literature surrounding adolescent substance use and development suggests that adolescents are a product of their environment, and that environmental systems can be largely influential in developmental outcomes including or related to adolescent substance use (Ettedal & Mahoney, 2017; Kristjansson et al., 2020a). This theory provides reason for measuring the relationships between the family, the school, and structured and unstructured leisure time activities as predictors of substance use. Social ecological theory proposes that the aspects of an adolescent's microsystems as well as their relationships can facilitate both protective and risk factors as related to development and adoption of their behavior. Levels of connectedness to school, parents, peers, and extracurricular activities can serve as protective factors in development, including the ability to remove oneself from risky situations. This theory will help to guide understanding

about the importance of these relationships as either protective or risk factors when predicting adolescent substance use.

This theory also emphasizes the importance of the interrelationships between system levels. The interrelations between the adolescent, the microsystem (i.e., their after-school staff, coaches, teachers, etc.), and the mesosystem are particularly relevant to how an adolescent spends their leisure time, their support outside of school and during leisure time, and the network of individuals with whom they spend their leisure time. As the adolescent is the center of the system, the surrounding environmental contexts influence the adolescent. The mesosystem suggests that the relationships between the microsystems directly impact an adolescent's development.

### Bioecological Model

Bronfenbrenner expanded upon his original ecological systems theory to further involve the individual and the role their interaction with the contexts play in development. This is known as the bioecological model. In the simplest terms for the purpose of this work, Bronfenbrenner suggests that the proximal processes of the contexts play a bigger role in development than the context itself. This proposes that the duration, frequency, or amount of engagement in a context makes a larger impact than the context itself. He suggests that the individual must be involved and interacting with the environment for it to exert influence. Examples would include the intensity, support, or supervision provided in a parent and adolescent relationship or, alternatively, a relationship with a positive role model like a teacher or coach (Ashiabi & O'Neal, 2015). This dynamic relationship is referred to as proximal duration or process.

The bioecological model guides us in forming and understanding our questions regarding associations related to the research question. We seek to understand whether the proximal duration of the exposure and relationships developed within each of the different environmental contexts associate with adolescent substance use. This theory suggests that the environmental context of structured leisure will expose adolescents to support from staff, peers, and parents as adolescents pursue extracurricular activities to improve themselves, to develop their skills, to pursue their interests, and to have fun. This theory simultaneously suggests that prolonged exposure to environmental contexts that are not conducive to positive behavior such as continuous boredom, lack of attachment to positive role models, and lack of supervision by adults, puts an adolescent in an environment that puts them more at risk of negative behavior. This theory guides us in understanding the association between exposure to certain environmental contexts and how they are linked to substance use.

### Social Cognitive Theory

Albert Bandura's social cognitive theory (SCT) focuses on reciprocal determinism: the idea that human behavior is based on a "dynamic, ongoing process in which personal factors, environmental factors, and human behavior exert influence upon each other" (Rimer & Glanz, 2005, p. 19). This theory centers on the idea that there are multiple factors that influence one's ability to change one's behavior, including a) personal cognitive factors, b) social environmental and social factors, and c) behavioral factors. An individual needs to have the self-efficacy (i.e., the ability to believe in oneself to achieve something or change a behavior) to make positive changes. They must also have a goal that resonates with them and that they believe is achievable. There also must be an

assumed beneficial health outcome (Rimer & Glanz, 2005). This theory is an updated version of Bandura's original social learning theory which focused on the idea that an individual learns not only from their own experiences but by observing the behaviors of others. The latter kind of learning is known as observational learning.

Behavioral capability and reinforcements are additional important concepts of SCT. Behavioral capability is the idea that an individual has to have the "knowledge or skill to perform a given behavior" (Rimer & Glanz, 2005, p. 20). Reinforcements are outside social, cultural, or environmental forces that either encourage or dissuade a certain behavior (Rimer & Glanz, 2005). Each of these concepts helps to reinforce the idea of reciprocal determinism -- that an individual's personal cognitive abilities (i.e., their ability to process information to make their own personal decisions), their social and environmental influences, and their behavioral capabilities all constantly exert influence on each other. In turn, no one sole environmental context is responsible for an individual behavior. Rather, all influence each other, and each is a contributing part.

This theory can help us to understand how and why an adolescent may engage with substances. Bandura's social cognitive theory suggests that one must feel capable of adopting a behavior for action to take place. In the context of substance use, an adolescent must feel capable of resisting the temptation to engage in high-risk behavior (use of substances) when presented the opportunity. The scientific literature surrounding adolescent leisure suggests that engagement in structured leisure can provide protective factors that are associated with lower substance use (Caldwell, 2011). The scientific literature also suggests that, when compared to structured leisure, adolescents who participate in unstructured leisure are more likely to engage in risky behaviors including substance use



(Sharp et al., 2015). This theory offers us a unique way to think about the importance of behaviors learned and observed in each context.

Additionally, this theory helps guide the suggestion that an adolescent must learn about the behavior to engage with it in the first place. They must also feel capable of performing it and foresee positive outcomes associated with it. This theory suggests that adolescents often learn through observation, i.e., that they could learn the behavior by seeing others engage with substances in the environmental contexts of their home, their peer group, or their culture. If an adolescent is part of a culture that views adolescent substance use as normative behavior, or as a rite of passage, an adolescent may feel that the behavior is acceptable and expect no negative outcomes associated. This perception may be enhanced by the feeling that they know how to use substances since they have been exposed to marketing that projects positive outcomes, or since they have observed parents or peers engaging.

### Theories of Social Deviance

A combined and general understanding of theories of social deviance suggest that one can behave in a socially unacceptable “deviant” way only when provoked or when in an environment that is conducive to a certain type of behavior (Kristjansson et al., 2020a). This idea proposes that, while an individual is a player in an environment, they are only likely to engage in a behavior if they are in an environment that accepts or encourages a certain generally socially unacceptable behavior. In relation to adolescent behavior, theories of social deviance suggest that an adolescent will only behave in a certain, deviant way if their present environment promotes it. Thus, it is important to understand the contexts adolescents are exposed to and how these can either protect or

contribute risk factors. For example, an adolescent's high school peer group commonly drinks alcohol on the weekends at parties. The adolescent attends these parties and is repeatedly exposed to peers' drinking. Because this behavior is normal and the environment is conducive to it, the adolescent may engage in the activity. On the contrary, if an environment does not provide easy access to substances, is not tolerant of adolescent substance use, and normal adolescent behavior does not involve engaging with substances, it is less likely that the adolescent will use substances.

The combined theories of social deviance help us to understand how an environment can be conducive to adolescent substance use. This theory has guided successful efforts to reduce adolescent substance use. The Icelandic prevention model (IPM) takes an ecological approach based on social deviance theories, suggesting that one can behave in a socially unacceptable "deviant" way only when provoked or when in an environment that is conducive to this behavior (Kristjansson et al., 2020a). Guided by the social deviance theory and the health impact pyramid, the IPM focuses on "[c]hanging the context to make individuals' default choices healthy" (Kristjansson et al., 2020a, p. 67). In order to create more positive behaviors naturally, the IPM seeks to change the social and cultural environment instead of intervening at an individual, behavioral level.

This theory is used as a basis for understanding the importance of an adolescent's relationship with the family, peer, school, and leisure environments and how these either provide protective or risk factors related to adolescent substance use. This theory suggests that a positive environment can yield positive outcomes while an environment conducive to deviant behavior produces increased risk for negative outcomes. This theory offers a unique way to consider the value of structured afterschool programming and

positive environments as a substance use prevention strategy. Based on this theory, a primary intervention in the form of a positive environment is associated with more favorable outcomes for the adolescent and society.

### Theory Summary

Together, these theories have offered background in sociology, criminology, and health-behavior-focused change. They have helped to rationalize by using the previously-identified family, school, peer, and leisure time environments as the developmental contexts most likely to influence adolescent development and substance use. Thus, this study will focus on understanding the risk and protective factors that these four key developmental contexts provide in the face of adolescent substance use. Evaluating these interrelated contexts will reveal their potential associations and impact. It will also help us understand the value that should be invested in these areas. These theories will allow us to conceptualize the forces that influence an adolescent at varying levels and will uncover the role societies and communities play in preventing or promoting substance use behaviors.

### **Developmental Contexts**

There is a consensus in research on adolescent development that substance use can be largely influenced by developmental contexts, including (1) the family, (2) schools, (3) peers, and (4) leisure time domains. Studies on each of these individual domains have focused on measuring associations between relationship and outcome in order to better understand adolescent behavior (Caldwell & Darling, 1999; Su & Supple, 2014; Su & Supple, 2016; T. Thorlindsson & Vilhjalmsson, 1991). Understanding why each of these environmental contexts is important as well as the impact each can have on

substance use will help us determine the weight that should be placed on each one. To this end, this section will explore risk and protective factors associated with each of these individual domains.

### Family Domain

The parent-child relationship is often studied in attempts to understand its association with the development of cognitive, social, behavioral and emotional skills, as well as how it influences adolescents' success in life (Putnam, 2015). Research on the parent-adolescent relationship and substance use has largely been studied in varying formats and areas of interest (Kapetanovic, Skoog, Bohlin, & Gerdner, 2019; Kristjansson et al., 2016; McCann et al., 2016; Su & Supple, 2014). Common study topics include but are not limited to parental control, parental support, and the association between time spent with parents and adolescent substance use.

In general, literature on adolescent substance use indicates that time spent with parents during adolescence can have a significant influence on use. It suggests that the more time adolescents spend with parents, and the stronger the bond between adolescent and parent, the less likely adolescents are to use substances (Thorlindsson, Bjarnason, & Sigfusdottir, 2007). From a developmental perspective, spending time with parents is often associated with positive benefits both for the quality of the relationship and for the development of the adolescent (Kapetanovic et al., 2019; Putnam, 2015). An increased amount of time engaged with parents naturally prevents an adolescent from being subject to risky situations including exposure to substances (Sigfusdottir et al., 2008). Additionally, the degree of closeness and openness of a parent-child relationship, as well as an adolescent's perception of parental approval or disapproval, can influence substance use

(Kristjansson, Sigfusdottir, James, Allegrante, & Helgason, 2010; Su & Supple, 2014). Conversely, the increase of secrecy in the relationship is correlated positively with adolescent use (McCann et al., 2016).

The literature regarding adolescent substance use and parental relationships suggests that parental control can be associated with certain risk and protective factors. Parental control is the extent to which an adolescent feels their choices are regulated or monitored by their parental figure(s). The level of monitoring or control an adolescent perceives can impact their sense of control over their own life. When kept to appropriate levels, parental control can protect an adolescent in that the adolescent can they feel they have adequate control of their life while maintaining the sense of safety and support they need to be successful. Dependent on the perception of control exerted by their parents, adolescents may feel inclined to abide by the rules enforced by their parents and society and build stronger ties to this context. If an adolescent feels that their parents exert either too much or too little control, or if there is no parental authority present in the dynamic at all, the adolescent may stray from both the relationship and societal norms. This increases the likelihood that the adolescent will both engage with a deviant peer group and adopt problem behaviors (Goldstein, Davis-Kean, & Eccles, 2005). In the case of substance use, literature often suggests that more parental control is associated with less adolescent substance use (McCann et al., 2016).

Fostering strong parent-adolescent relationships often reflects positive health outcomes and is a powerful means for preventing substance use. While parental trust and involvement is important and can prevent adolescent substance use, it is important to acknowledge that there are other factors that influence these outcomes. For example,

studies in multiple communities, have suggested that adolescents who lack of a sense of connection with their community (i.e., their parents, their friends' parents, and their school) are at increased risk of substance use (Bjarnason, Thorlindsson, Sigfusdottir, & Welch, 2005; Thorlindsson et al., 2007). The more connected the community is, the less likely adolescents will engage with substances or risky behaviors. Intergenerational closure further influences the likelihood of adolescent use and is something that is often facilitated in the natural hub of community-- the school. Intergenerational closure and enhanced connections within a community generate social capital for its members and provide a supportive environment rich with protective factors against adolescent substance use (Bjarnason et al., 2005; Thorlindsson et al., 2007). This communal environment makes school an important context for adolescents, parents, and the greater community.

### School Domain

While literature suggests that the parent-adolescent relationship can be important in helping determine whether an adolescent will use substances, there are multiple influential factors outside of the home that also play a role in predicting use. Most American adolescents are reported to attend school a minimum of four to five hours a day beginning in Kindergarten, and five to seven hours per day for approximately 180 days a year between first and twelfth grade (National Center for Education Statistics, 2008). Additionally, many adolescents spend more time in the school setting including time playing sports, attending events, and taking enrichment or extracurricular courses/classes before or after standard school hours and during the summer break (Afterschool Alliance, 2020b). Due to the amount of time teenagers spend there, the school is identified as a key developmental microsystem context throughout adolescence. Accordingly, the literature

suggests that adolescents' drug use can be related to the context of school. It also suggests that adolescents are more likely to use substances if drug use is an accepted and practiced normative behavior at their school (Kumar, O'Malley, Johnston, Schulenberg, & Bachman, 2002).

At a highly impressionable phase of life, adolescents spend much of their time in a school setting, each of which has its own unique culture and environment. While each adolescent is an individual, there are generally accepted or unacceptable norms and behaviors in school communities and amongst peers. Adolescents also often identify with their school in some capacity. Literature regarding adolescent substance use and the school context suggests that an increased level of connection to school is associated with a decreased likelihood of engagement with substances (Su & Supple, 2016). Additionally, studies on school culture and normative behaviors suggest that there is a corresponding association between general school acceptance or disapproval of substance use and rates of substance use among the student body (Kristjansson, Sigfusdottir, & Allegrante, 2013; Su & Supple, 2016). This suggests that creating a school environment that is intolerant of substance use can lead to stronger protective factors in the student body. It can also serve as an opportunity for contextual intervention. An environment that does not support or encourage use will lead to more adolescents feeling capable of saying no to risky situations or behaviors. Literature on school culture and substance use suggests that including the school in prevention efforts is important and that it can be used as a technique to influence adolescents on a broader scale (Kumar et al., 2002; Su & Supple, 2016).

Multiple studies have also suggested that adolescents "drink less if they attend schools where many parents know other parents" suggesting that the depth of

relationships matter in a community (Bjarnason et al., 2005, p. 386; Su & Supple, 2016). Intergenerational closure and school connectedness emphasize the important role that the school environment can play in providing multiple layers of protective factors against substance use.

As a place where adolescents spend a large majority of their adolescent years, there are many key relationships whose foundations lie in the community hub that school is. Adolescents often feel connected to, and associate their identity with, their school. Having a strong school community that is intolerant of substance use provides protective factors that can benefit an adolescent. In the school setting, adolescents learn from teachers and parents who can serve as an important role models and influencers), peers, and community members (via exposure to these adults during extracurricular programs, sports teams, libraries, etc.). Naturally, adolescents build strong relationships with their peers in their classrooms and on the playground. These relationships can be influential both inside and outside of the school environment. Peer approval and time spent with peers can also provide both protective and risk factors depending on the relationship.

### Peer Domain

The people adolescents spend time with outside of school matters. Peer group is an influential aspect of adolescent development. The culture and shared activities of specific peer groups can influence behavioral choices. This culture and these choices can exert influence on adolescent behavior making friends an influential force in adolescents' lives. Adolescents may choose their peers for a range of reasons. Adolescents often build relationships with those who share common interests, participate in the same extracurricular activities, are in the same classes, or live in the same neighborhood. Peer choice is



also influenced by parents through different adolescent perceptions and reactions (Goldstein et al., 2005). Peer relationships in leisure time help adolescents to build positive life skills including social skills, trust, and companionship (Caldwell & Witt, 2011). However, peer choice can also present risk factors and contribute to antisocial or problem behavior and increased likelihood of substance use (Caldwell & Darling, 1999; Su & Supple, 2014).

Adolescence is a natural time for growing autonomy from one's parents. An increase in the amount of time spent with peers commonly occurs during this time (Frazier et al., 2015; Su & Supple, 2014). This innate change in time and independence makes the peer group a context that is considered one of the most influential regarding substance use (Su & Supple, 2014). Adolescents intentionally and unintentionally exert influence on each other. This influence can contribute to peer substance use. Much like the opinion of one's parents, the opinions of peers often matter greatly to adolescents and can influence behavioral choices. Due to the increase in the amount of time spent with peers and away from parents, studies suggest that one of the strongest predictors of substance use is peer acceptance of use, perceived peer use, and reported peer use (Kristjansson, Sigfusdottir, Allegrante, & Helgason, 2008; Su & Supple, 2014).

The influence of one's peer group can provide risk or protective factors depending upon the type of influence and the nature of the group dynamics (Caldwell & Darling, 1999). Peer group members exert influence on one another. This influence can either promote pro-social, positive relationships or encourage negative behaviors. All members of a peer group can both exert influence and be the recipient of influence. The nature of influence can be particularly intense in close-knit groups who may form their own cultural

norms, behaviors and beliefs about using substances (Su & Supple, 2014). Supporting literature suggests that, if some members of a peer group engage with substances, other members are more likely to use substances as well (Su & Supple, 2014).

The type of peers adolescents select can also be dependent on parental control and perceived personal autonomy (Goldstein et al., 2005). A perceived lack of autonomy, or feelings that one has overbearing parents, may result in an adolescent choosing a “deviant” peer group as a way to disconnect from or gain independence from their parents (Goldstein et al., 2005). Peer relationships that are maintained or established with disregard to parents’ disapproval are more likely to result in an adolescent engaging in negative behavior (Goldstein et al., 2005). If a relationship is anti-parent, risk of substance use and anti-social behavior will likely increase (Goldstein et al., 2005). Since each adolescent is part of the peer group dynamic, their individual actions can influence those of their peers. The individual choice to engage with substances early in adolescence increases the likelihood of “association with deviant peers... [It also] longitudinally predicts poor outcomes in young adulthood” (Frazier et al., 2015, p. 273). Thus, the group with which an adolescent spends their time is important, particularly when group interactions are unsupervised. These interactions can result in increased risk factors to oneself and to those with whom they associate.

The adolescent peer group can influence an individual’s choices. These choices, in turn, can influence those of their peers. Peer dynamics are an important aspect of development. While these relationships are crucial for building social skills, trust, and companionship, risk can also be involved. Individual behavioral outcomes can vary depending on the environments created in the peer group. An important consideration of the peer

dynamic is where and how adolescents spend their time, especially when unsupervised by parents. It is reported that adolescents spend almost half of their waking hours outside of school (Afterschool Alliance, 2020b; Bartko & Eccles, 2003; Sharp et al., 2015). Many adolescents spend their time in a structured, supervised leisure environment or under some form of adult supervision. However, many do not. The peer dynamic is important in leisure time since this is the time when adolescents are most likely to engage in crime-causing behaviors. Conversely, it is also the time they can spend learning a variety of valuable skills that can lead to positive development (Caldwell & Darling, 1999).

### Leisure Domain

All aspects of an adolescent's time as well as the environments they are exposed to play a role in their development (Ashiabi & O'Neal, 2015). The way an adolescent spends their free time, estimated to be approximately 40-50% of their waking hours (Afterschool Alliance, 2020b; Bartko & Eccles, 2003; Sharp et al., 2015), can be largely influential on their development and behavioral choices (Hansen, Larson, & Dworkin, 2003). Subsequently, the highest rates of adolescent crime in the United States occur during the afterschool hours (Council for a Strong America, 2019). This large portion of an adolescent's life can contribute either positively or negatively to their development depending on the nature of how the leisure time is spent. The scientific literature on leisure suggests that adolescent substance use can be associated with certain aspects of leisure, including some of the most often-studied aspects: the type of leisure, its duration or frequency, and with whom leisure time is spent (Bartko & Eccles, 2003; Caldwell & Witt, 2011; Darling, 2005; Eccles & Barber, 1999; Mahoney & Stattin, 2000). Because leisure time format varies dramatically, highlighting the general and universally unique

outcomes associated with leisure time is important to understanding the protective and risk factors recognized by the scientific literature.

The scientific literature surrounding leisure generally defines it as “using discretionary time for participation in *leisure* activities, those defined as freely chosen, intrinsically-motivated activities done for enjoyment and meeting personal goals” (Sharp et al., 2015, p.62). This excerpt highlights the perceived nature of leisure. An activity is leisure-based if it is self-motivated and based on one’s own interest in being involved. While no leisure may be entirely free from outside influence, it can provide adolescents with their first taste of true autonomy and ability to pursue their own lives (Caldwell, 2011). Leisure is unique in the sense that it may be an adolescent’s first opportunity to spend their time how they please, to experience independence, and to explore their identity. Importantly, leisure also allows adolescents to find an opportunity to achieve, or be good at, something outside of an academic setting (Caldwell & Witt, 2011). Leisure has “been shown to contribute to adolescent identity exploration, initiative, and skill development more so than experiences in other settings of adolescents’ daily lives” (Sharp et al., 2015, p. 62). Depending on the type, leisure may also be protective against substance use (Caldwell, 2011).

Studies on leisure often focus on the outcomes associated with engagement in two broadly defined categories of leisure -- structured and unstructured. Leisure is considered *structured* if it is supervised by an adult, has a general format or guideline that follows a curriculum, and has a desired outcome. Examples may include being on a sports team, attending afterschool programs focused on STEM, participating in arts, or attending an activity-based camp. *Unstructured leisure* is most often referred to as activities which are

either unsupervised or minimally supervised by an adult. Examples of unstructured leisure time can range from hanging out alone listening to music to spending time socializing with peers. The scientific literature surrounding leisure and adolescent development suggests that both of these types of leisure can be beneficial to an adolescent (Caldwell, 2011). Oftentimes, research regarding structure type suggests that structured leisure is associated with protective factors that can safeguard against substance use (Caldwell, 2011).

Structured leisure offers opportunities for goal setting, relationship building, and exposure to positive role models (Bartko & Eccles, 2003; Caldwell, 2011). In the structured leisure environment, role models can exert powerful and unique influence on adolescents. The scientific literature regarding adolescent development and structured after-school activities suggests that adult figures in these settings are unique from teachers and parents in the supporting role that they play in adolescent development and promoting positive behavior (Anderson, Sabatelli, & Kosutic, 2007; Gottfredson, Cross, & Soulé, 2007). These types of supportive role models offer mentorship and set positive examples. This may be especially important for adolescents in high-risk home or school environments and may be one of the few non-biological adult relationships they have outside of the home (Anderson et al., 2007; Darling, 2005). Mentorship has been acknowledged as an “effective approach to building protective factors and influencing adolescents” and is associated with lower rates of substance use (Office of Justice Programs, 2011). It is often available in structured leisure activities in the shape of a one-on-one mentor, coach, or extracurricular instructor. There is a consensus that access to and engagement with

structured leisure is associated with positive youth development. Youth who do not participate are at increased risk of participating in risky activities (Caldwell, 2011).

While unstructured leisure time can also be beneficial to development, the lack of supervision, guidance, and unfettered freedom can also lead to opportunities to engage in risky behaviors (Sharp et al., 2015). Engaging with substances and other risky behaviors can often be viewed as leisure pursuits, and are more likely to occur in unsupervised environments (Darling, 2005). Studies exploring the way that leisure format affects delinquency suggest that “very little or no involvement” in structured leisure can be associated with “problematic outcomes for youth” (Sharp et al., 2015, p. 64). Unstructured environments may not provide the benefits of support, occasions for pro-social interaction, or opportunities to learn from role models or peers. Without these influences, adolescents may seek out more risky behaviors (Frazier et al., 2015). Common engagement with risky behaviors like substance use increases the likelihood of adverse effects including health issues, and “consequences related to education, employment, relationships, and earnings in young adulthood” (Frazier et al., 2015, p. 723). Adolescents who do not participate or who participate very little in structured activities are more likely to report higher engagement with some substances (Thorlindsson et al., 2007).

Leisure can play a large role in personal development that can be beneficial or detrimental to an individual during adolescence (Caldwell, 2011). Research on adolescent development suggests that, adolescents’ still-developing brains may lead them to make harmful, emotionally-charged decisions (Caldwell & Witt, 2011). Susceptibility to high-risk activities increases during adolescence due to both an undeveloped ability to separate reason from emotion when making decisions as well as an increased need for excitement.

The combined impact of these forces can leave adolescents vulnerable to risk taking (Caldwell & Witt, 2011; Degenhardt et al., 2016). Thus, adolescents are more likely to engage in high-risk activities due to their brain's immaturity coupled with the intensity of emotion during this stage in development. Despite this reality, adolescence is a time when strong skills and passions are often developed resulting in the adoption of life-long hobbies that may benefit their health, careers, and relationships (Caldwell, 2011; Caldwell & Witt, 2011). Structured leisure presents the opportunity to funnel risk-taking impulses into positive pursuits (Caldwell & Witt, 2011). This type of leisure creates an opportunity for adolescents to develop "soft skills" and experiment with leadership and relationships. It gives them a way to channel emotion, excitement, and passion into a protective-factor-building experience (Putnam, 2015).

Emphasizing the potential protective benefits of structured leisure is not to say that there are no positive benefits associated with leisure in general regardless of structure or organization type. Leisure does not have to be structured to provide benefits to an adolescent. A variety of leisure types at an early stage in life increases the likelihood of life-long benefits and participation in intrinsically motivated, fulfilling leisurely activities (Caldwell, 2011; Sharp et al., 2015). Perceived benefits of all types of "personally meaningful leisure" have been associated with "identity development, initiative, informal learning, planning and problem-solving skills, persistence, and the ability to overcome challenges" (Caldwell, 2011, p. 174).

Participation in leisure as an adolescent is associated with positive development modeled in short, and long-term social, emotional, and health related outcomes (Caldwell & Witt, 2011). Adolescent participation in structured leisure is recognized for the safe

risk-taking opportunities it provides. These opportunities allow adolescents to explore independence and build their own passions and skills in some of their first autonomous leisurely experiences. When compared to unstructured leisure, structured leisure is associated with more pro-social behaviors, academic success, and a lower likelihood of substance use (Caldwell, 2011). The protective factors associated with structured leisure suggest that it can serve as a buffer against high-risk situations, including adolescent substance use. This suggests that, among other developmental contexts, it serves as a useful and important resource for improving adolescent health outcomes associated with reducing and preventing substance use.

#### Summary of Developmental Contexts

Each of these four individually defined domains is important and contributes unique risk and protective factors that can influence adolescent substance use. Preventative efforts can take place in each of these environments to improve outcomes and discourage adolescent substance use. Ongoing investigation will focus on growing this understanding of contextual influence to address adolescent substance use as a global health issue. It is important to acknowledge that many cultures attempt to delay the onset of substance use in adolescents (Sigfusdottir et al., 2020). Alternatively, some current and past cultural norms view and promote adolescent use as a rite of passage and as a transitional experience between adolescence and adulthood (James & Wirth, 2010). While some efforts have resulted in some short-term reduction in substance use, most efforts have lacked long-term impact. (Knopf, 2017; Skiba, Monroe, & Wodarski, 2004). However, some approaches have drastically reduced substance use among adolescents (Sigfusdottir et al., 2020; Skiba et al., 2004). A review of literature surrounding adolescent



development suggests that focusing on leisure as a prevention strategy may serve as a unique and powerful way to decrease adolescent substance use in a more efficient and widespread manner.

### **Leisure as a Substance Use Prevention Strategy**

Early onset use of substances is a health issue that has short and long-term effects and needs attention at local and national levels (Degenhardt et al., 2016; Hall et al., 2016). Literature suggests that, if provided positive role models, access, and opportunity to participate in structured leisure time afterschool, adolescents are less likely to engage in risky behaviors (Sigfusdottir et al., 2020). Though there is a rich literature on leisure and the role it can play in adolescent development, leisure is not often used as a mechanism to prevent adolescent substance use. Yet, in multicultural implementations, leisure has been a crucial tool in preventing adolescent substance abuse (Kristjánsson et al., 2020a; Sigfusdottir, Thorlindsson, Kristjánsson, Roe, & Allegrante, 2009). It is clear that there is an association between leisure and adolescent substance use and that there are unique risk and protective factors associated with it. The literature on adolescent development and leisure points to some key constructs that help us to understand a) why leisure is such a crucial aspect of development, and b) how it is relevant to substance use.

It is important to recognize that all leisure can be beneficial. However, structured leisure is commonly associated with more positive outcomes (Caldwell, 2011; Mahoney & Stattin, 2000). The safe environment of structured leisure allows for an exciting exploration of personal identity through access to different interests, opportunities to hone mental and physical skills, and chances to engage in unique and influential relationships with role models and peers outside of the classroom or home life. Positive and structured

opportunities to pursue intrinsically-motivating activities has shown to increase positive outcomes and instill protective factors (Caldwell & Witt, 2011). The quality and delivery of the structured leisure an adolescent participates in is a characteristic that cannot be overlooked (Mahoney & Stattin, 2000; Vandell, 2013).

The quality of structured leisure programs is recognized by researchers across the world. The United States-based organization, Afterschool Alliance, recognizes it as a crucial piece in achieving positive outcomes for adolescents (Afterschool Alliance, 2005). A literature review of seventy-three afterschool programs found that programs needed to deliver “skill development activities that were sequential, active, focused and explicit” to be effective in increasing “positive social behaviors” and decreasing “problem behaviors and drug use” (Durlak, Weissberg, 2007, p. 14). Additionally, research on the efficacy of high-quality afterschool programs acknowledges that the “breadth, quality, intensity, and duration...of programs” matters for determining social, behavioral, and academic outcomes including decreased rates of adolescent substance use (Vandell, 2013, p. 12). There is a growing literature that explores the value and effectiveness of varying measures of program quality (e.g., staff qualification, curriculum, population reached, etc.) in promoting positive development (Gottfredson et al., 2007). Defining features include “regular participation schedules, rule-guided engagement, direction by one or more adult activity leaders, an emphasis on skill development that is continually increasing in complexity and challenge, activity performance that requires sustained active attention, and clear feedback performance” (Mahoney & Stattin, 2000, pp. 114-115). Successful reductions in adolescent substance use have been associated with increased access to and participation in certain structured leisure activities (Gottfredson et al., 2007). Programs

that have achieved positive outcomes often employ high quality staff, maintain small participant group sizes, and use evidence-based curriculum and approaches (Gottfredson et al., 2007).

Evidence-based interventions yield the best results for reduction in prevention of substance use, and are implemented at multiple levels of intervention depending on need (Skiba et al., 2004). Traditional public health interventions are often implemented when a health behavior problem has been identified in attempts to reverse or stop it from progressing. Due to its unique environment and protective factors, structured leisure may serve as a primary prevention strategy that can delay or prevent adolescent use in the first place.

Leisure can serve as a primary intervention for adolescents in the form of extracurricular, structured leisure activities such as sports, STEM, arts, mentoring, etc. Supervised leisure settings that a) provide access to positive role models and that b) promote goal setting, personal growth, and skill development, may help adolescents to find passion and identity in a time of growing social and behavioral autonomy (Caldwell & Witt, 2011; Mahoney & Stattin, 2000). Successful leisure-based prevention strategies have been used in communities with alarming rates of adolescent substance use (Sigfusdottir et al., 2008). In these settings, interventions have focused on increasing structured leisure program availability as well as access and availability to local adolescent substance use data. Interventions have also fostered community engagement and coalition building and, in some cases, subsidized activities meant to ensure equal access (Kristjansson et al., 2020b). Techniques such as the Icelandic model have exhibited multicultural reduction in adolescent substance use by changing the social environment (Kristjansson et al., 2020a).

These changes focus more on social deviance theories and the health impact pyramid and less on providing education on substance use. A strategy that focuses on widespread, community-based youth development through positive environment building has yielded results. This suggests that these types of model techniques may be more successful than programs based on alcohol education (Kristjansson et al., 2020a; Skiba et al., 2004).

When leisure activities focus on structured, positive youth development, serve adolescents with qualified staff, and are supported by parents, and pro-social peer interaction, these environments can provide protective factors starting at an early age.

Afterschool Alliance is an organization focused on conducting and publishing research, policy and advocacy, communications, and field building (Afterschool Alliance, n.d.). Their advocacy efforts help to secure funding for afterschool networks and programs across the United States. Their work has resulted in policy that provides federally allocated funds to programs serving over a million adolescents who may otherwise not be have access to structured leisure opportunities (Afterschool Alliance, 2020b). Afterschool Alliance reports that afterschool programs are associated with improved academic outcomes, increased school attendance, positive development of social skills, higher graduation rates, and more (Afterschool Alliance, 2020b). The benefits of structured leisure across the literature are generally associated with similar positive outcomes and with lower rates of substance use and involvement in problem behavior (Caldwell & Witt, 2011; Hansen et al., 2003). It is important to note that, in some cases, structured leisure is associated with risk factors. For example, there is some positive association between participation in sports and alcohol consumption in American high schools (Eccles & Barber, 1999).

Leisure is also often used in a preventative manner for high-risk youth. High-risk youth are often enrolled in programs that are specifically designed to mitigate risk factors and provide positive role models. When measuring voluntary adolescent participation in a youth recreation center, an association was found between type of leisure and problem behavior (Mahoney & Stattin, 2000). Unstructured activity participation within the recreation center correlated with higher levels of problem behavior, association with deviant peers, and poor parent-child relationships. Conversely, structured activity participation correlated with healthy behavior (Mahoney & Stattin, 2000). This suggests that these guidelines for structure leisure, (e.g., goal setting, positive role models, regular guided participation, etc.) could be used as a problem behavior intervention. Mentorship through programs like Big Brothers Big Sisters (BBBS) also show promise in reducing problem behavior through leisure. Studies of this approach have suggested that, compared to non-mentored youth, mentored youth were “46% less likely to have initiated drug use and 27% less likely to have initiated alcohol use” (Office of Justice Programs, 2011). While literature supports mentorship as a strong protective relationship that can help adolescents grow and that may prevent substance use, mentorship has a narrower reach than group or community-based programs.

When adolescents experience substance use issues within the legal system, the school environment, or in their home life, tertiary interventions may be sought as corrective or therapeutic treatment. Certain levels of incidence may result in legal repercussions, citations, and/or mandatory juvenile detention. Other non-legal-based interventions may include admission to medical or behavioral treatment. Based on the literature

reporting positive youth development and favorable associated health outcomes, structured leisure may serve as a useful form of intervention in a tertiary setting.

There are other adolescent substance use prevention-based strategies that are delivered in varying formats. Educational programs targeted at the individual level, such as, D.A.R.E., have long been used in the education system in attempts to prevent substance use (Kumar et al., 2002; Skiba et al., 2004). However, the original D.A.R.E. program was not able to report reductions in substance use associated with their programming. Presumably, this is because D.A.R.E. used scare tactics combined with drug and alcohol education, which has proven to be less effective than model-based strategies (Knopf, 2017; Skiba et al., 2004). Some substance education is also built into school curriculum as a means of prevention. Though some short-term positive outcomes are associated with educational programs, it seems that the most effective preventative approaches do not focus solely on individual-level education or scare tactics (Skiba et al., 2004). Prevention strategies that focus on community-wide, positive youth development initiatives and that include structured activities are more likely to negatively correlate with substance use (Skiba et al., 2004). This idea is supported by theories of social deviance and the health impact pyramid. If an environment promotes positive behavior, then positive behavior is a likely outcome. In combination, these ideas propose that increasing access to structured leisure in the community may be more effective than intervening at an individual level (Frieden, 2010).

While educational programs, juvenile punishment, and intervention programs are ingrained in our society, structured leisure time afterschool may be a feasible, more efficient means of preventing behavior in the first place. Understanding the relationship

between structured leisure and adolescent development in individual communities serves as an opportunity to improve the health of adolescents and decrease associated costs. Data from Afterschool Alliance suggests that there is a lack of access to programs across the United States (Afterschool Alliance, 2020c). Because lack of participation in structured leisure is associated with an increased risk of substance use, it's important to understand how to increase widespread access. Literature regarding structured leisure time and afterschool programs suggests that community-wide engagement coupled with increased access results in positive protective factors and positive outcomes.

### **Summary**

The reach of adolescent substance use is wide. Associated short and long-term health outcomes, financial costs, and countless direct and indirect outcomes affect societies in negatively. Because of its short and long-term impact, substance use remains a global health burden (Degenhardt et al., 2016). Efforts will continue to focus on improving the health of adolescents through prevention and intervention work. These will be supported by both public and private investment (Degenhardt et al., 2016). Continually changing trends and societal dynamics makes adolescent substance use an ongoing challenge. However, the abundance of literature surrounding adolescent development, substance use, and developmental contexts helps shed a light on opportunities to be further explored. The literature on structured leisure and its association with positive youth development highlight the subtle but powerful tool that it can be in reducing problem behavior, especially for those most at risk. By reviewing the literature in these areas, we hypothesize that structured leisure may serve as a means to delay or prevent the onset of

adolescent substance use. In combination with other crucial environmental contexts, (i.e., family, peer, school), investments in structured leisure show promise.

This analysis will explore the relationship between adolescent alcohol and cannabis substance use and structured leisure. This study presents an opportunity to better understand the predictors of adolescent substance use.

Structured leisure is a powerful tool in aiding positive youth development. Our review of the literature reveals that using structured leisure in our communities may benefit adolescents beyond the commonly-reported positive educational and behavioral outcomes. It may also be a useful means of reducing adolescent substance use as well as an efficient and fiscally responsible investment for communities. Understanding the breadth of positive benefits will help to identify future opportunities to reduce the occurrence and burden of adolescent substance use, thus improving the quality of life for all community members.



## CHAPTER III: METHODS

### **Brief Introduction**

This chapter provides an overview of the methodology used in this study. This study uses previously collected adolescent health and behavior surveillance data to answer our research question. We investigate the four domains that predict adolescent substance use: family, school, peer, and leisure. The first section will cover our study's development as well as steps we took to ensure valid data collection. These steps allowed for an appropriate analysis which is presented in the second half.

### **Participants**

This study used cross-sectional data from Planet Youth: Youth and Welfare's, "A Survey of Life and Living Conditions of Youth Survey" created by the Icelandic Center for Social Research and Analysis (ICRSA). The study occurred in six communities within three counties of a Northeastern state. These communities represent a range of environment types including urban and moderately rural to very rural. Data was collected once in the fall of 2019. The surveys were distributed to 7<sup>th</sup>-12<sup>th</sup> graders in 13 total middle and high schools. Approximately 3,500 responses were completed. This 82% response rate allows the knowledge gained to be generalizable to the communities' adolescent population.

Data was collected from every student who attended school on the day the questionnaire was administered. Students completed the questionnaire online under teacher supervision. Students received instruction to complete the entire questionnaire and were

advised to ask their teacher if they had questions. The completed questionnaires were sent directly to ICSRA. Data analysis was then completed by ICSRA. Questionnaires were completed with passive parental consent upon approval from school administrations.

## **Research Design**

### Research Question

The survey measures have been both validated internationally and used in published, peer-reviewed work (Kristjansson, James, Allegrante, Sigfusdottir, & Helgason, 2010). The questionnaire is designed to collect adolescent health and behavior data related to the school, family, peer, and community environments, leisure time, and alcohol, tobacco, and drug use. Measures of each of these variables were utilized in this study's analysis.

The measures utilized in this study from the questionnaire are as follows.

**Section 1: Current School Selection** -- Students are asked to select the school they currently attend out of the 13 being surveyed.

**Section 2: Demographics** -- Questions ask for information regarding gender, age, birth year, ethnicity, use of English language, neighborhood relocation occurrence, household occupancy, financial perceptions, and parental education.

**Section 3: Family Context** -- Questions ask about adolescent family life. These questions ask for perceptions of parental/caregiver monitoring, support, alcohol, tobacco, and other drug use (ATOD), time spent with parents, and financial support of extracurricular activities.

**Section 4: School Context** -- Questions ask for perceptions of school experience including relationships with adults, friends, and peers. Questions also ask for perceived

value of time, content, usefulness, and enjoyment of their school experiences. Students are asked to select their previous school year final grades for math and English.

**Section 5: Leisure Context** -- These questions ask about adolescent experiences outside of school. This section includes questions related to supervision during off-school hours, weekly participation in structured activities, and daily participation in unsupervised activities.

**Section 6: Broader Community Context** -- These questions ask about adolescents' experiences within their community, the support they receive from friends, family, neighbors and other community members, perceptions of safety in their community, and their sense of connectedness with their community.

**Section 7: Peer Context** -- These questions ask about perceptions of peer and personal antisocial behavior and substance use.

**Section 8: Alcohol Tobacco and Other Drug Use** -- These questions ask about lifetime and recent adolescent experiences with alcohol, tobacco, marijuana, and other illicit drugs.

**Section 9: Outcomes** -- These questions ask about adolescent experiences or feelings. Questions focus on occurrence of anti-social behaviors, mental and physical health, and social–emotional health.

#### Data Collection Procedures

The method for administering the survey and collecting data was established by ICSRA. The methodology consists of a series of steps that ensure the process is conducted ethically, legally, and with support from schools and their surrounding communities. The data collected from adolescents is cross-sectional in order to ensure anonymity

of responses. This allows participants to feel confident in disclosing personal health and behavioral information. Schools are the chosen setting of administration based on their access to a diverse and representative sample of adolescents, high rates of participation in school settings, low costs, and because schools often provide health and behavior education and intervention. Our efforts may also benefit the schools as they may use the data we collect to improve or evaluate efforts (Kristjansson, Sigfusson, Sigfusdottir, & Allegrante, 2013). Questionnaires are completed online in student classrooms.

ICSRA has developed key steps to ensure successful data collection. The protocol is as follows:

“Steps in Planning and Collecting Data Among Children and Adolescents in Schools:

**Step 1:** Obtain institutional approval for use of human subjects.

**Step 2:** Determine eligible schools and potential sample sizes.

**Step 3:** Conduct community pre-study notification.

**Step 4:** Solicit community study participation.

**Step 5:** Secure school principal support.

**Step 6:** Identify and contact school supervisor contact agent.

**Step 7:** Prepare survey materials for each eligible school class.

**Step 8:** Mail survey materials to each school.

**Step 9:** Distribute consent forms to parents.

**Step 10:** Supervisor contact agent reminder

**Step 11:** Distribute letters of appreciation for participation” (Kristjansson et al., 2013).

ICSRA notes that while these steps have proven useful in collecting data for over 15 years in Iceland, each school and community is unique and will require unique considerations (Kristjansson et al., 2013).

### **Measures**

The study will use the following measures.

#### Dependent Variables

The following dependent variables are used to assess participant engagement with substances.

##### Alcohol Use

The dependent variable, *alcohol intoxication*, was assessed with the following question: How often have you become drunk? (In your lifetime), 1 = “Never”, 2 = “1-2 times”, 3 = “3-5 times”, 4 = “6-9 times”, 5 = “10-19 times”, 6 = “20-39 times” and 7 = “40 times or more”.

##### Cannabis Use

The dependent variable, *cannabis use*, was assessed with the following question: How often if ever have you used any of the following drugs? Cannabis (hashish or marijuana) 1 = “Never”, 2 = “1-2 times”, 3 = “3-5 times”, 4 = “6-9 times”, 5 = “10-19 times”, 6 = “20-39 times”, 7 = “40 times or more”.

#### Independent Variables

The following independent variables were selected based on the domains identified in the literature review.

### Family Domain

The independent variable assessing the *family domain* was measured with the cumulative sum score for the parental support scale. This scale included six questions that measured parent/caregiver support as well as knowledge of activities outside of the home. Sample items included, “My parents/caregivers know where I am in the evenings” and “My parents/caregivers know my friends.” Responses were on a four- point Likert scale ranging from “Applies very well to me”, to “Applies very poorly to me” (for further description see Appendix A, Table A.2).

### Peer Domain

The independent variable assessing the *peer domain* was measured with the cumulative sum score of the perception of peer behavior scale. This scale includes seven items created to indicate students’ perceptions of their peers’ behaviors and activities. Sample items included “How many of your friends do you believe...smoke cigarettes?”, and “...drink alcoholic beverages?” Responses were on a five-point Likert scale ranging from “None” to “All” (for further information see reference in Appendix A, Table A.4).

### School Domain

The independent variable *school domain* was assessed with a cumulative sum score based on the School as a Protective Factor scale (Kristjansson, Daily, Smith, Mann, personal communication, September 14, 2020). This series of questions measures adolescents’ feelings of connection to their schools. These feelings are associated with protective factors against substance use. The brief version of the school as a protective factor scale uses 15 items (three subscales) to indicate school factors. They are available for reference in Appendix A, Table A.3.

### Leisure Domain

To assess the independent variable *leisure domain*, we looked at two independent variables: structured and unstructured leisure time. To measure structured leisure time, we used reported frequency of weekly participation in supervised out-of-school activities. This question included six prompts including “Drama”, “Sports” etc. The eight possible response options ranged from “Not available in my community” to “6 times per week”. Scores from these items were summed up to create a composite score for “structured leisure”. To measure unstructured activity, we summed up the cumulative scores of the two items measuring the frequency of weekly participation in unsupervised time outside of the home. These items included, “was outside after 10 o’clock in the evening”, and “went outside and returned after midnight”. The eight possible responses ranged from “Never” to “7 times” (Further information is available for reference in Appendix A, Table A.1).

### Control Variables

The following variables are known to be associated with substance use in adolescents, so we controlled for them in our model.

Gender was assessed binarily with 0 = “Male” and 1 = “Female”.

Age was coded categorically by year of birth.

Socioeconomic status was assessed with mother’s education level. Responses to “What is the highest level of schooling your mother has completed?” coded categorially were 0 = “I don’t know/Doesn’t apply”, 1 = “Elementary or middle school or less”, 2 = “Started high school but has not finished”, 4 = “Graduated from high school”, 5 = “Started junior college or trade school but has not finished”, 6 = “Graduated from junior college or trade school”, 7 = “Started university or 4-year college but has not finished”, 8

= “Graduated from a university or 4-year college”, 9 = “Graduated from a Master’s, Doctorate, or Professional Degree”.

### **Data Analysis Procedures**

SPSS will be used to a) analyze the data collected from the adolescent health and behavior surveillance questionnaire, to b) produce descriptive statistics and to c) produce a hierarchical multiple regression. This analysis method was chosen because it would allow us to observe the predictive effects of the independent variables (predictor variable) on the dependent variables (outcome variables) for the research question. To examine this research question, a hierarchical multiple regression model was conducted to assess whether family, peer group, leisure, or school connectedness could predict alcohol or cannabis lifetime use. The hierarchical multiple regression provided a variance model of analysis between independent factors and the sum score of alcohol or cannabis as the dependent variable. The regression model was calculated using the standard multiple linear regression equation:  $y = b_1*x_1 + b_2*x_2 + b_3*x_3 \dots + c$ , where  $y$  = alcohol or cannabis use,  $b$  = the regression coefficients for linear effect,  $c$  = the random error for  $y$  in observation, and  $x$  = each independent dimension (family, peer, leisure, school). Independent variables were entered simultaneously into the model; an F-test in one-way ANOVA was used to assess the overall significance of the regression model. The strength of the relationship between the multiple regression model and the dependent variable was assessed with a goodness of fit measure indicated by  $R^2$  (the coefficient of multiple determination).”



### **Summary of Methods**

The described methods were used to investigate this research question. Clearly, there will be some limitations (as discussed in our literature review). However, we still believe that this study will meaningfully contribute to the literature surrounding adolescent substance use and leisure time.

## CHAPTER IV: RESULTS

The purpose of this study was to assess whether the four identified domains are associated with adolescent alcohol use and cannabis use. We analyzed each outcome variable using separate hierarchical multiple regression models. For each model, we controlled for gender, age, and maternal education (SES) on the first step. On the second step, we added the independent variables family domain, school domain, peer domain, structured leisure domain, and unstructured leisure domain.

### **Associations of Key Study Variables with Alcohol**

The results of the regression indicated that the independent variables account for 30% of the variance in alcohol use ( $R^2=.3$ ,  $F(8, 2485) = 135.56$ ,  $p < .001$ ). In this model, the only significant control variable was maternal education ( $B = .03$ ,  $p < .001$ ). For key variables of interest -- family ( $B = .01$ ), peer ( $B = .11$ ) structured leisure ( $B = -.01$ ), and unstructured leisure domains ( $B = .1$ ) -- all significantly contributed to the variance in lifetime alcohol use. The school domain variable was not significant ( $B = -.004$ ,  $p = .08$ ). Table 4.1 summarizes the descriptive statistics. The control variable, maternal education, was positively associated with alcohol use. As mother's education level increased, so too did alcohol use. Reports of lifetime alcohol use increased by .01 for every one unit decrease in parental support (family domain). Alcohol use increased by .11 for every one unit increase in perceived peer use (peer domain). Alcohol use decreased by .01 for every one unit increase in participation in structured leisure activity (structured leisure domain). Alcohol use increased by .1 for every one unit increase in participation in unstructured,

unsupervised nighttime leisure (unstructured domain). Based on the standardized betas within this model, the peer domain ( $\beta=.450$ ) variable contributes most to change in alcohol use. This is followed by unstructured domain ( $\beta=.19$ ), structured leisure domain ( $\beta=-.07$ ), and the family domain ( $\beta=.05$ ). Table 4.2 summarizes analysis results for the multiple regression model for adolescent alcohol use.

**Table 4.1 Descriptive Statistics for Adolescent Alcohol Use**

	N	Mean	SD
Family	2494	15.25	5.01
School	2494	56.77	13.02
Peer	2494	13.63	6.01
Structured	2494	22.18	8.56
Unstructured	2494	3.65	2.77

**Table 4.2 Multiple Hierarchical Regression Model for Adolescent Alcohol Use**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.032	.187		-.169	.866
Family	.013	.005	.045	2.476	.013
School	-.004	.002	-.003	-1.769	.077
Peer	.105	.004	.450	24.069	<.001
Structured	-.012	.003	-.074	-3.686	<.001
Unstructured	.098	.011	.192	9.173	<.001

Dependent variable = Adolescent substance use rate  
 $R^2 = .302$

### Associations of Key Study Variables with Cannabis

The results of the regression indicated that the independent variables explained 26% of the variance in adolescent cannabis use ( $R^2=.26$ ,  $F(8, 2482) = 107.51$ ,  $p < .001$ ). The only significant control variable in the model was maternal education level ( $B = .03$ ,  $p = .004$ ). The key study variables -- family domain ( $B = .02$ ), school domain ( $B = -.01$ ), peer domain ( $B = .13$ ), structured leisure domain ( $B = -.02$ ), and unstructured leisure domain ( $B = .09$ ) -- were all significantly associated with lifetime cannabis use. The control variable, maternal education, was positively associated with alcohol use. As mother's education level increased, so too did lifetime cannabis use. Reports of lifetime cannabis use increased by .02 per every one unit decrease in parental support (family domain). Cannabis use decreased .01 for every one unit increase in levels of school connectedness (school domain). Cannabis use increased by .13 for every one unit increase in perceived peer use (peer domain). Cannabis use decreased by .02 for every one unit increase in participation in structured leisure activity. Cannabis use increased by .09 for every one unit increase in participation in unstructured, unsupervised nighttime leisure (unstructured leisure domain). Based on the standardized betas within this model, the peer domain ( $\beta = .42$ ) variable contributes most to the change in cannabis use. This is followed by the unstructured leisure domain ( $\beta = .09$ ), the structured leisure domain ( $\beta = .08$ ), the school domain ( $\beta = -.07$ ) and the family domain ( $\beta = .06$ ). Table 4.4 summarizes analysis results for the multiple regression model for adolescent cannabis use.

**Table 4.3 Descriptive Statistics for Adolescent Cannabis Use**

	N	Mean	SD
Family	2491	15.25	4.97
School	2491	56.83	11.92
Peer	2491	13.63	5.99
Structured	2491	22.14	8.47
Unstructured	2491	3.65	2.77

**Table 4.4 Multiple Hierarchical Regression Model for Adolescent Cannabis Use**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	<i>B</i>	Std. Error	Beta		
(Constant)	.288	.256		1.126	.260
Family	.022	.007	.060	3.208	.001
School	-.010	.003	-.065	-.3410	<.001
Peer	.130	.006	.420	21.781	<.001
Structured	-.018	.005	-.084	-4.032	<.001
Unstructured	.085	.014	.127	5.873	<.001

Dependent variable = Adolescent cannabis use rate  
R<sup>2</sup>= .255

**Table 4.5 Pearson Correlations Among Key Variables**

	Family	School	Peer	Structured	Unstructured
<b>Alcohol Use</b>					
Family	-				
School	-.28**	-			
Peer	.25**	-.32**	-		
Structured	.07**	.03	.23**	-	
Unstructured	.25**	-.23**	.36**	.53**	
<b>Cannabis Use</b>					
Family	-				
School	-.28**	-			
Peer	.25**	-.32**	-		
Structured	.07**	.03	.23**	-	
Unstructured	.25**	-.23**	.36**	.53**	-

\* Correlation is significant at the 0.05 level (2-tailed)

\*\* Correlation is significant at the 0.01 level (2-tailed)

## CHAPTER V: DISCUSSION

The purpose of this study was to explore the association between structured after-school leisure time and adolescent substance use. This chapter includes a discussion of the study's findings and their relation to the literature review which covers the developmental contexts that largely influence adolescent substance use (alcohol and cannabis). Limitations, suggestions for future research, and a summary are also included in this chapter.

The two-part research question, "What are the unique patterns of association across family, school, peer, and unstructured/structured leisure time factors on adolescent substance use of (A) alcohol and (B) cannabis?" was analyzed with a multiple hierarchical regression. This analysis helped to compare the relative associations between each contextual domain identified as influential in the literature as influential when providing adolescents risk and/or protective factors.

### **Summary of Key Results**

As supported by the literature review, all the selected variables in our analysis of the family domain, school domain, peer domain, structured leisure domain, and unstructured leisure domain were significantly associated with one or both of the dependent variables (alcohol or cannabis use). The control variable used to measure socioeconomic status (mother's education level) was significantly related to both alcohol and cannabis use, also.

This study had three key findings related both to the selected variables and alcohol and cannabis use. Perception of peer use was the strongest risk factor for adolescent substance use in our study model. As perception of peer use increased, rates of use increased for both substances. The literature indicates that peer substance use and perceived peer use is one of the strongest predictors of adolescent substance use. For example, a study focusing on the associations between cigarette smoking and social factors found that peer use and perceptions of peer use had the strongest positive correlation with adolescent use (Kristjansson et al., 2008). It is generally recognized that associating with peers who use substances increases the risk factors for individual adolescent use (Su et al, 2014). We believe this study reinforces these ideas.

Unstructured leisure, measured with participation in unsupervised nighttime activities, was significantly associated with alcohol and cannabis use and was the second strongest variable associated with adolescent substance use. As participation in the unstructured leisure domain increased, so did reports of substance use. Studies suggest that, due to multiple factors, adolescents who do not participate in structured activities --or who spend more time in unstructured, unsupervised activities -- are at an increased risk for engaging with substances (Sharp et al., 2015; Thorlindsson et al., 2007). Our study agrees with this. While not all unsupervised activity presents high levels of risk (Caldwell, 2011; Sharp et al., 2015), our study suggests that risk factors for adolescents engaging in unsupervised activity is higher than the factors of adolescents who do not spend as much time unsupervised.

Participation in structured leisure activities (leisure domain) demonstrated protection comparable to that found in the family domain and higher protection than that found



in school domain. Additionally, it is the independent variable that contributes most to variation in use rates of both substances. As participation in structured activity increased, the rates of substance use decreased for both alcohol and cannabis. As noted in the literature review, structured leisure is often associated with positive youth development and those who participate in structured leisure are at less risk of participating in risky behavior than those who do not participate (Caldwell, 2011). Our study supports the notion that participation in structured leisure does offer benefits against adolescent substance use. It also supports studies that suggest that multifaceted prevention strategies that incorporate structured leisure can decrease adolescent use rates (Kristjánsson et al., 2020a; Sigfúsdóttir, Thorlindsson, Kristjánsson, Roe, & Allegrante, 2009).

Additionally, it is important to note that both the family and school domains were significantly associated with adolescent substance use as well. Multiple studies we referred to suggested that parental control, parental support, and lack of secrecy are often associated with reduced adolescent alcohol and drug use (Kristjánsson et al., 2013; McCann et al., 2016; Bjarnason et al., 2005). As reports of parental support or parental control increased, the family domain offered protection against both alcohol and cannabis use in adolescents. Similarly, as connection to school increased, rates of cannabis use decreased. This is consistent with studies that suggest that an increased connection to school is associated with decreased risk for substance use (Su & Supple, 2016). However, in the same study, they found that school culture that tolerated substance use within the school was a stronger indicator than influence of parents or peer group (Su & Supple, 2016). While our data did not allow us to specifically measure the normative culture of substance use in the schools we surveyed, our findings suggest that the peer domain was a

much stronger indicator than the school. It is important to note that while our data suggested that the school domain was significantly associated with cannabis use, it was not significant regarding alcohol use.

Theory, the literature, and this study all suggest that each of the environmental contexts studied (family, school, peer, and leisure domains) provide both risk and protective factors that influence adolescent substance use. These nesting environmental contexts, which are highlighted in Bronfenbrenner's social ecological and bioecological theories, both interact with and build upon one another (Ashiabi and O'Neal, 2015; Rimer & Glanz, 2005). It is important for our society to find ways to ensure that these contexts' interactions cultivate strong environments where adolescents can develop skillsets, pursue their passions, and feel free to make positive choices with caregiver/role model support. Our data suggests that both leisure type and choice of peer group matters.

### **Implications for Public Health Practice**

Taken individually our study suggests small but significant relationships between each of the domains. But collectively when we focus on these domains, they account for 26% and 30% of the variance in alcohol and cannabis use. Based on this study, and all the other research reviewed, we believe there is a lot of promise in utilizing structured leisure as a preventative strategy (Sigfusdottir et al., 2020). We know that structured leisure provides unique opportunities for positive youth development not often found in the other domains. Additionally, adolescents participating in structured leisure naturally have less exposure to and opportunity to use substances. Our study reinforces this idea and suggests that students who participate more frequently in structured leisure are less likely to use substances.

Because peer perception of use is the strongest predictor in this study, we believe that structured leisure time activities can provide opportunities to decrease both peer perception of use as well as actual peer use. If adolescents are most strongly influenced by peers and structured leisure provides protective factors, then risk can be decreased by providing more opportunities for adolescents to spend time with peers in environments that provide safe, structured leisure activities (Kristjansson et al., 2020a). Increased exposure to likeminded peers who regularly participate in structured leisure activities helps the peer domain offer more protection against substance use. In the context of this study, increasing structured leisure activity and decreasing access to environments that are conducive to socially deviant behavior could reduce overall adolescent use risk within a community (Kristjansson et al., 2020a).

From a public health perspective, there is abundant opportunity to utilize the knowledge that participation in structured leisure activities can protect against the global issue of adolescent substance use. Based on our data, the reviewed literature, and theory, adolescents who participate in increased rates of structured leisure have a lower likelihood of using substances (Sigfusdottir et al., 2020). We believe that structured leisure, in part because of the involvement of likeminded peers, is an opportunity to take productive, preventative effort to build stronger adolescents. Prevention efforts have allowed us to see that, when designing interventions, increasing access to structured leisure successfully reduces rates of adolescent substance use (Sigfusdottir et al., 2020).

We believe that providers of afterschool programs, organizations who support programs, public health professionals, and public and private investors should work together to provide opportunities for youth to attend quality structured leisure activities.

Many structured adolescent recreational activities already exist and are a normative aspect of American society, making it a natural intervention point. However, as highlighted in the literature review, millions of adolescents do not have access to affordable structured leisure activities within their communities (Afterschool Alliance, 2014; Afterschool Alliance 2020c). Therefore, enhancing access to positive, fun, safe, and structured recreation environments for adolescents is an important tool that can both instill protective factors and be utilized to fight the public health battle that is adolescent substance use.

Public health professionals should partner with organizations to capitalize on existing opportunities and to advocate for increased investment in quality and expanded access to programs. Collaboration between public health professionals and structured leisure organizations could propel development of higher impact, broader-reaching programming that directly impacts adolescents' short and long-term health. This could reduce rates of adolescent substance use and, subsequently, reduce the overall health and financial burden associated. It is important to note that the other highlighted developmental domains similarly influence adolescent substance use and are of great importance. Multiple developmental contexts should be recognized as influential when considering interventions and when designing environments to be protective against adolescent substance use.

### **Recommendations for Future Research**

Future research should consist of longitudinal studies on communities (such as the six communities highlighted in this study) to further understand the impact of improving access to structured leisure opportunities within a community on rates of adolescent substance use. It would be useful to incorporate measures of program quality offered in

each community to identify their impact on use rates in each given community. Additionally, conducting longitudinal studies in states likely to legalize cannabis would help assess the impact of legalization on adolescent cannabis use. Additionally, longitudinal studies in states where recreational cannabis is illegal would allow for comparison of trends in adolescent use as influenced by state policy.

### **Conclusion**

There are clear benefits to adolescent engagement in structured leisure time. Research on adolescent development and leisure time has continued to support advocacy for continued investment in this aspect of adolescent life. Research has often focused on the important influence structured leisure time can impart on academic outcomes. However, it is clear that these positive outcomes can extend much further. Our study suggests that structured leisure is approximately just as influential as other domains in adolescent life when predicting substance use. Countless programs, campaigns, and initiatives have worked to decrease adolescent substance use. Even so, the rates of use and occurrences of adverse health outcomes remain a global public health issue. Our data support the notion that structured leisure serves as a protective factor against substance use. As such, structured leisure could be strategically used as a substance use prevention strategy in the United States as other countries have successfully demonstrated (Sigfusdottir et al., 2020). If investing in other means of protecting our adolescents from adverse health outcomes related to substance use has resulted in minimal change, perhaps we must invest elsewhere. Providing increased access to prevention methods that are evidence-based and beneficial to multiple aspects of adolescent development may help us decrease substance use rates and help adolescents thrive.

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## APPENDIX A

**Independent Variable Scales**

**Table A1 Leisure Domain Factors**

Participation in Structured Leisure: How many times a week do you participate in any of the following out-of-school activities are supervised by adults?	
<ul style="list-style-type: none"> <li>• “Sports or sports teams (swim team, soccer, football, dance)</li> <li>• Religious organizations</li> <li>• Art, drama, or musical instrument (band) classes</li> <li>• Volunteering in the community</li> <li>• Go to a community center like “Boys and Girls Club” or another such After-School program,</li> <li>• Other</li> </ul>	<p>The following answers were available for each activity:</p> <p>1 = “Not available in my community”,</p> <p>2 = “Less than once per week”,</p> <p>3 = “Once per week”</p> <p>4 = “Twice per week”,</p> <p>5 = “Three times per week”,</p> <p>6 = “Four times per week”</p> <p>7 = “Five times per week”</p> <p>8 = “Six times per week”.</p>
Participation in Unstructured Leisure: During the last 7 days, how often did you do the following?	
<ul style="list-style-type: none"> <li>• Was outside after 10 o’clock in the evening.</li> <li>• Went outside and returned after midnight.</li> </ul>	<p>1 = “Never”</p> <p>2 = “Once”</p> <p>3 = “Twice”</p> <p>4 = “Three times”</p> <p>5 = “Four times”</p> <p>6 = “Five times”</p> <p>7 = “Six times”</p> <p>8 = “Seven times”</p>



**Table A.2 Family Domain Factors**

How well do the following apply to you?	
<ul style="list-style-type: none"> <li>• My parents/caregivers set definite rules about what I can do at home.</li> <li>• My parents/caregivers set definite rules about what I can do outside the home.</li> <li>• My parents/caregivers set definite rules about when I should be home in the evening.</li> <li>• My parents/caregivers know whom I am with in the evenings.</li> <li>• My parents/caregivers know where I am in the evenings.</li> <li>• My parents/caregivers know my friends.</li> <li>• My parents/caregivers know the parents of my friends.</li> <li>• My parents/caregivers find it important that I do well in school.</li> <li>• My parents/caregivers follow what I do in recreational activities. (Ex: drama performances, sports teams, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Applies very well to me</li> <li>• Applies pretty well to me</li> <li>• Applies pretty poorly to me</li> <li>• Applies very poorly to me</li> </ul>

**Table A.3 School Domain Factors**

<p>The following questions ask you to think about adults at your school. Please select the response that best captures your experience.</p>	
<ul style="list-style-type: none"> <li>• The adults at my school care about me.</li> <li>• The adults at my school are fair and kind to me.</li> <li>• It is safe to be around the adults at my school.</li> <li>• The adults at my school notice when I'm having a hard time and offer to help me.</li> <li>• The adults at my school believe I can make the world a better place.</li> </ul>	<ul style="list-style-type: none"> <li>• Strongly disagree</li> <li>• Somewhat disagree</li> <li>• Neither agree nor disagree</li> <li>• Somewhat agree</li> <li>• Strongly agree</li> </ul>
<p>The following questions ask you to think about your friends at your school. Please select the response that best captures your experience.</p>	
<ul style="list-style-type: none"> <li>• I have friends at school that care about me.</li> <li>• My friends think we should try our best at school.</li> </ul>	<ul style="list-style-type: none"> <li>• Strongly disagree</li> <li>• Somewhat disagree</li> <li>• Neither agree nor disagree</li> <li>• Somewhat agree</li> <li>• Strongly agree</li> </ul>
<p>The following questions ask you to think about other kids at your school. Please select the response that best captures your experience.</p>	

<ul style="list-style-type: none"> <li>• The students at my school are nice to each other.</li> <li>• At my school, it is not a big deal to make mistakes while trying your best.</li> </ul>	<ul style="list-style-type: none"> <li>• Strongly disagree</li> <li>• Somewhat disagree</li> <li>• Neither agree nor disagree</li> <li>• Somewhat agree</li> <li>• Strongly agree</li> </ul>
<p>The following questions ask you to think about your experiences at your school. Please select the response that best captures your experience.</p>	
<ul style="list-style-type: none"> <li>• My school is helping me achieve goals that matter to me.</li> <li>• I try my best in school.</li> <li>• At least one thing I do at my school makes me want to be the best I can be.</li> <li>• I have a good time participating in activities at my school.</li> <li>• My school helps me discover things I'm good at doing.</li> <li>• Doing my best in school now will help me have a good life when I'm older.</li> </ul>	<ul style="list-style-type: none"> <li>• Strongly disagree</li> <li>• Somewhat disagree</li> <li>• Neither agree nor disagree</li> <li>• Somewhat agree</li> <li>• Strongly agree</li> </ul>

**Table A.4 Peer Domain Factors**

How many of your friends do you think...	
<ul style="list-style-type: none"><li>• Smoke cigarettes?</li><li>• Drink alcohol beverages (liquor, beer, wine)?</li><li>• Get drunk at least once a week?</li><li>• Smoke marijuana?</li><li>• Get bad grades in school?</li><li>• Skip classes or school?</li><li>• Get in trouble at school?</li></ul>	<ul style="list-style-type: none"><li>• None</li><li>• A few</li><li>• Some</li><li>• Most</li><li>• All</li></ul>

## APPENDIX B

**Research Question Variable Table**

**Table B.1 Variable Table**

Research Question	Control Variable	Independent Variable	Dependent Variable
What are the unique patterns of association across family, school, peer, and unstructured/structured leisure time factors on adolescent substance use of (A) alcohol and (B) cannabis?	Caregiver education level (SES), Gender, Year Born (Age)	School Domain: School connectedness Family Domain: Parental support Peer Domain: Peer substance use Leisure Domain: Frequency of participation in structured leisure, Frequency of participation in unstructured leisure.	Alcohol lifetime intoxication, Cannabis lifetime use