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Exploring the Relationship Between Organized Sports Participation and Alcohol Experimentation in Children Aged 9 and 10

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This is to certify that the doctoral dissertation by

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2024

Abstract

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M.Ed., Wayne State University, 2017

BA, University of Toledo, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Clinical Psychology

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Abstract

Children experimenting with alcohol is a phenomenon that has been occurring for decades, with the assumption that most children begin to experiment during adolescence. Research has addressed children over the age of 12 in numerous studies; however, little research has been directed at children between the ages of 9 and 10. In this study, the relationship between alcohol experimentation and sports participation was explored in children between the ages of 9 and 10 years old through a social learning theory lens. The study sample consisted of children aged 9-10 from across the country participating in the ABCD study. Many factors can influence alcohol experimentation, including peer groups, adverse childhood experiences, and sports participation. Social learning theory suggests that children learn from observing their environment and mimicking the behavior they find. Demographics, family structure, and other variables were explored to identify possible relationships and implications that can further research on this vulnerable population. The Chi-squared (χ^2) statistic was 51.299, and the p-value was less than .001. The logistic regression model was statistically significant, $\chi^2(4) = 27.402$, $p < .0005$. The model explained 40.0% (Nagelkerke R^2) of the variance in experimentation with alcohol and correctly classified 71.0% of cases. This analysis could open a new avenue for positive social change through continued research that may identify possible strategies that can assist schools and parents with the prevention or continued use of alcohol into adulthood and have positive outcomes leading to social change in communities.

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Dedication

This dissertation is dedicated to my partner in life and love, Roger Billings, who has been a source of strength, support, and inspiration, along with the occasional bouts of motivation and determination to keep me on task. I am beyond thankful and blessed for a partner who has been supportive throughout this journey and a constant source of motivation. I also dedicate this to my mother, Tammy Johnson, for allowing me to be who I wanted to be throughout my life and one of my biggest cheerleaders.

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I would like to take this moment to acknowledge my chair, Dr. Delinda Mercer, and my second committee member, Dr. Arcella Trimble. Thank you for having patience and assisting me through this journey. Thank you for helping me continue through this doctoral journey with motivation and guidance. Thank you for seeing my vision through my eyes and helping me shape my dissertation to encompass my vision. I would like to thank you both, Dr. Mercer and Dr. Trimble, for being a calming force and dealing with my many emails and texts to assure me that we were on track. Thank you for being the force of motivation. I will continue to recite the words you told me at residency one: "You will question this and ask yourself why, you will cry, and ask yourself why as you write your dissertation." It was true, but your words affirmed that it is normal, and I could complete my dissertation with perseverance and tears.

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Chapter 1: Introduction

Introduction

This study aimed to examine the connection between participation in organized sports and early alcohol experimentation among children aged 9-10 who are enrolled in the Adolescent Brain Cognitive Development (ABCD) study. In ascertaining factors influencing alcohol experimentation with children, this study sought to determine whether sports participation is an avenue to explore as a way to reduce the experimentation rate, thus creating positive, healthy outcomes. It is essential to investigate preventative interventions, as doing so can lead to implementing new or better techniques to stunt this increase (King et al., 2017).

This first chapter begins with the purpose of the study, exploring previous information and the need for this study's background, the study's significance, the theoretical framework driving the study, and the nature of the study. I present the definitions of variables utilized in this study, the study's assumptions, and the study's scope, including the delimitations and limitations of this study.

Background

Investigators have previously focused on children at peri-adolescence or adolescence when earching for risk or protective factors surrounding childhood alcohol use that include sex, race, and other demographic variables (Jackson et al., 2015; King et al., 2017; Sullivan et al., 2022; Wade et al., 2021). At the same time, there have been significant indications that alcohol use begins before age 11 (Sullivan et al., 2022). After reviewing prior research, the assumptions were that children aged 9-10 often do not

experiment with alcohol or other drugs because of their level of concrete development (Kwan et al., 2014; Skylstad et al., 2022), but data also indicate that children ages 9-10 have begun experimenting with alcohol sipping (Jackson et al., 2018; Sullivan et al., 2022). This concrete level of development may cause children to see alcohol as "bad' so they would be less likely to use it (Dunn et al., 1996; Skylstad et al., 2022). However, researchers have found evidence that children as young as three have experimented with alcohol (Jackson et al., 2015). Alcohol is a typical starter substance of choice for youth due to its accessibility within a home (Chan et al., 2018; Cheever & Eisenberg, 2022); due to the assumption that young children do not drink alcohol, researchers have spent little time collecting and analyzing data from this age group (Jackson et al., 2015; Skylstad et al., 2022; Wade et al., 2021). Given that Wade et al. found that alcohol experimentation indicates a higher chance of alcohol abuse later in life, it is important to study when that experimentation occurs and ways to prevent it.

The use of alcohol by children has increased in recent years (SAMSHA, 2021). This increase has raised flags in the health community as alcohol use is associated with reduced health outcomes (Wade et al., 2021). When children begin to use alcohol at an early age, it can lead to a decline in school outcomes, an increase in risky behavior, and an increase in later substance abuse (Skylstad et al., 2022; Wade et al., 2021). Alcohol experimentation has numerous factors leading to it, including peer pressure, emotional stress, family structure, and exposure to alcohol in the home (Hoffman et al., 2022). There has been discussion by researchers as to the impact of sex, race, family structure, and socioeconomic status (SES) on alcohol use by children, especially within children

high school (Felnőttek et al., 2017; Kwan et al., 2014). Researchers have examined adolescent experimentation and regular use of alcohol in adolescents 12 and older (Smit et al., 2018). Investigators have spent little time exploring alcohol use in children under twelve (Skylstad et al., 2022; Wade et al., 2021). They have also found alcohol to be a common starting point substance for youth as it is often accessible within a home or culturally accepted, creating an ease of access for children to use when struggling with adverse experiences in their lives (Chan et al., 2018; Cheever & Eisenberg, 2022).

Activities are an essential aspect of developmental and emotional growth in childhood. Organized sports are an everyday extracurricular activity that many children participate in, with positive outcomes, including social, physical, and developmental benefits. Sports can promote increased physical well-being, self-esteem, collaboration with peers, problem-solving, and other significant developmental milestones in children. The impact of activities like organized sports participation has yet to be thoroughly investigated.

Data suggest that children as young as 3 (Jackson et al., 2015) have begun to drink, which calls for further investigation. However, children are considered a vulnerable and protected group due to their developmental level, with their youth limiting their emotional and intellectual functioning and ability to consent to complex constructs they are part of in research (Shivayogi, 2013). Previous studies utilized children or adolescents between the ages of 12 to 18 to examine the correlation between organized sports participation and alcohol use using complex surveys (Adachi-Mejia et al., 2014; Barker et al., 2022; Boyes et al., 2017; King et al., 2017; Mays et al., 2010; Skylstad et

al., 2022). Researchers also did not investigate age groups under 12 due to the complexity of the surveys and the hypothesis that that age group has a lower percentage of use than others (Jackson et al., 2015). This indicates a significant gap in research focusing on children between the ages of 9-10 that scientists should explore to create further understanding of early alcohol use and work towards ascertaining whether sports participation increases or decreases alcohol use in children.

In children under 12, few studies have identified if sports participation is a risk or protective factor against alcohol use (Skylstad et al., 2022; Sullivan et al., 2022; Wade et al., 2021). Several studies have investigated the relationship between organized sports participation and alcohol use, focusing on children 12 and over, specifically within high school sports, rather than young children under 12 (Walczak et al., 2023). Walczak et al. (2023) performed a meta-analysis study that primarily focused on ages 9-18, with a significantly higher number of studies looking at high school-aged children. Results have been inconclusive, as some studies have shown a correlation between a lower risk of adolescent drinking (Adachi-Mejia et al., 2014; King et al., 2017) or slight risk of experimentation (Barker et al., 2022; Borraccino et al., 2020; Boyes et al., 2017) associated with sports participation, and others have found there is no correlation between sports and alcohol experimentation (Jackson et al., 2015; Mays et al., 2010; Skylstad et al., 2022).

This study investigated this gap using data provided by children on their experiences with sports participation and alcohol experimentation from the ABCD study. While the ABCD study is longitudinal in design, specific age groups are identified that

address children between the ages of 9 and 10 and so on as each year passes. This will allow data to be pinpointed to specific age groups that have yet to be fully explored. Recent research has suggested the need for further investigation into sports participation and alcohol use (Skystald et al., 2022), as few studies have addressed these topics and the impact the results can have on future research.

Problem Statement

This study investigated this gap using data provided by children on their experiences with sports participation and alcohol experimentation from the ABCD study. While the ABCD study is longitudinal in design, specific age groups are identified that address children between the ages of 9 and 10 and so on as each year passes. In order to ascertain further significance, it is important to identify possible indicators of sports participation and alcohol use; the use of these covariates can do this. This will allow for data to be pinpointed to specific age groups and covariates of sex, race, SES, and family structure that have yet to be fully identified as areas of interest for interventions. Recent research has suggested further investigation into sports participation and alcohol use (Skystald et al., 2022), as few studies have addressed these topics and the impact the results can have on future research.

Purpose of the Study

The purpose of this archival quantitative study was to examine if there is a relationship between organized team sports participation and alcohol experimentation in children aged 9-10 enrolled in the ABCD study.

Research Question and Hypothesis

RQ1: What is the relationship between organized sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study?

$H_0$1: There is no relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study.

$H_1$1: There is a relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study.

RQ2: What is the relationship between sex, race/ethnicity, SES, and familial structure in children aged 9-10 who participate in sports and use alcohol?

$H_0$2: There is no significant relationship between sex, race/ethnicity, SES, parent education, and familial structure in children aged 9-10 who participate in sports and use.

$H_1$2: There is a significant relationship between sex, race/ethnicity, SES, parent education, and familial structure in children aged 9-10 who participate in sports and use.

Theoretical Framework

The theoretical framework for this study is social learning theory (SLT) (Bandura, 1969). SLT examines the behaviors of children and how outside factors could influence a child's behavior (Bandura, 1969). This theory, proposed by Albert Bandura, suggests that individuals learn behaviors through observing, mimicking, and modeling others around them (1969). SLT found that children often find cues within their environment from peers, parents, teachers, and coaches on how to behave and what behaviors are

appropriate (Smit et al., 2018). Utilizing the SLT will allow this study to investigate and create an understanding of surrounding factors and influences that can impact children's experimentation with alcohol from the perspective of organized sports participation. These can include social development, problem-solving, promotion of healthy habits, and determent of harmful habits like drinking alcohol by observing positive peers and adults, as well as developmental skills within the organized sports environment (Moral-García et al., 2020).

The SLT theoretical framework directed this study by helping to understand the motivation for increased or decreased substance use through social constructs and consequences of behaviors in children ages 9-10. Understanding how social engagement through sports, or the lack thereof, can impact a child's behaviors and attitudes toward alcohol can assist in creating interventions to address adverse outcomes later in life. This understanding can uncover prevention systems and lead to the creation of interventions that encourage better decision-making skills for this age group.

Nature of the Study

A cross-sectional design was used for this study. The ABCD study collected quantitative data that was examined to determine the relationship between sports participation and alcohol experimentation in children ages 9-10. While the ABCD study is longitudinal, it is still ongoing and incomplete, making its temporal data incomplete. While this limits the study's ability to determine a causal relationship, it does allow investigation of the association of the two variables: organized sports participation as the independent variable and alcohol experimentation as the dependent variable.

The first question to be analyzed consisted of a chi-square test of just those two variables. The second research question consisted of a logistic regression to include covariates of sex, race, family structure, and SES. This gave a baseline association without consideration of any other factors. While the ABCD study is longitudinal, it is still ongoing and incomplete, making its temporal data incomplete. While this limits the study's ability to determine a causal relationship, it does allow one to look strictly at the association of the two variables, organized sports participation as the independent variable and alcohol experimentation as the dependent variable.

Definitions

ABCD Study: Refers to the Adolescent Brain Cognitive Developmental study, a 10-year longitudinal collaborative research consortium that tracks over 11,000 children in the United States. This study explored adolescents' brain development, academic performance, social and environmental factors, and overall health outcomes, including physical and mental health (Hoffman et al., 2022).

Alcohol experimentation: Refers to any amount of alcohol use, including that by curiosity or peer pressure, but not explicitly focusing on the cause of the experimentation (Hoffman et al., 2022).

Parental education: Refers to a parent's highest level of completed education, which can influence better educational access by a child (Hoffman et al., 2022).

Organized sports participation: Refers to an activity focused on a sport arranged and managed by adults. These sports activities include the child's school, community outreach, or intermural programs (Hoffman et al., 2022).

Socioeconomic Status (SES): Refers to measuring a participant's social and economic situation. This can include income, education, occupation, and environmental factors such as place of residence (Hoffman et al., 2022).

Assumptions

In this study, looking into potential relationships between alcohol experimentation and organized sports participation amongst children 9-10 who participate in the ABCD study, several assumptions were made. They are the reliability of self-reported data in which participants answer all questions in the study truthfully. This includes information about their involvement in organized sports, their alcohol experimentation, and their demographic factors. The sample is comprised of 11,876 children aged 9-10 participating from across the country. It is assumed that the sample will be diverse and consistent with the overall population of the age group. Generalizability is also assumed in that scientists can apply the study results to 9-10-year-olds, given that the sample is representative of that population. These assumptions were foundational to the study. While necessary, some limitations could impact the validity and generalizability of the results.

Scope and Delimitations

The study's scope defines the aspects that are within the study to give clearly defined areas. This non-experimental study investigated the relationship between organized sports participation and alcohol experimentation, with demographic considerations among children aged 9-10 in the ABCD study. The focus was on children aged 9-10 enrolled in the ABCD study, limiting the research to this age group and the available and accurate data within the ABCD study. This study included data on whether

children participate in organized sports or not. This is also true for data on alcohol experimentation. Besides sports participation and alcohol experimentation, the study incorporated data on covariates such as sex, family structure, SES, and race to explore potential covariates in the analyzed primary relationship.

The study's delimitations include the following. For one, cross-sectional data does not lend itself to determining cause-and-effect relationships or the direction to which alcohol experimentation and organized sports participation are related. Causal inference techniques are outside the scope of this paper but may further the understanding of this relationship. As the data are self-reported and collected from participants at a different time than the action, recall bias is one concern to consider. Some participants may not be willing to answer a question in a way they feel does not align with their age group's or peers' answers, which is known as social desirability bias, and the study must recognize it as a possibility. Also, while the ABCD study tries to cover as broad a sample as possible with many recruitment sites, it does not guarantee that the study results will apply to every 9–10-year-old. The lack of generalizability can reduce the findings' ability to indicate the most likely outcome for all of the population. Lastly, the data were gathered from the ABCD study, and no other data were used in the data analysis. The ABCD study maintains the data for use by the NIH; however, there may be missing data or other data quality issues that may impact the results of this study. The ability to have access to the complete data set allowed for a higher likelihood of generalizability.

This summary of delimitations may miss other factors related to the primary relationship of interest. Exploration and synthesis of the variables require an

understanding of specific areas that can impact the data analysis through assumptions and expectations of the study. Acknowledging the study's scope and delimitations is essential to clearly understand the research's boundaries, limitations, and potential implications.

Limitations

The study, which explored the relationship between organized sports participation and alcohol experimentation among children aged 9-11 enrolled in the ABCD study, had several limitations that should be acknowledged. Potential limitations included cross-sectional design, which looks at collected data at a single point in time and cannot determine if organized sports participation leads to alcohol experimentation as we need to know which occurred first. The ABCD study is a 10-year longitudinal study; this study only explored the baseline year versus the entire length of the study. Different experimental designs or analyses of longitudinal data from the study could lead to evidence, or lack thereof, of a causal relationship.

Social desirability bias can occur when participants answer by giving what they consider the socially acceptable answer instead of answering truthfully, which can influence the data. This bias could have impacted the accuracy and reliability of the data and, by extension, the study's results. Another limitation that needed to be addressed is the limited scope of demographic factors that were utilized for this study. The study considers certain demographic factors, such as SES, race/ethnicity, and parental education, and others that may influence the relationship between organized sports participation and alcohol experimentation. Thousands of demographic considerations

within the ABCD data set were not utilized within this study, but it is important to consider other demographic connections.

Another limitation was self-selection bias, which is the unmeasured differences between those who choose to participate or not, whether in the study itself or one of the variables, such as choosing to participate in organized team sports. The reliance on the data provided by the ABCD study can impact the outcome of this study as it may only capture a partially accurate data set of all 9-10-year-old children. As it is the only source of data in the study, this could limit the external validity of the results. Keeping these limitations in mind when looking at the study results is important, as they may have affected the result in a way that was unaccounted for in the analysis.

Significance

The overall goal of the study was to provide insight into factors that may contribute to early alcohol experimentation. This understanding could impact more than just the children themselves and lead to interventions involving the community to benefit everyone in the short term and in the future. Researchers have found early alcohol experimentation among children between the ages of 9-10 (Jackson et al., 2015). Children who use alcohol are likely to have decreased academic performance and delayed motor skill-development (Martz et al., 2022). Schools can utilize findings to create programs for sports that allow children to be in positive social situations that could potentially decrease alcohol experimentation (King et al., 2017). Sports interventions do not need to only be school-related, as local community recreation groups could also contribute by creating more opportunities for children to participate in organized sports.

Parents could also use the information to look for organized activities for their children. This community support in sports participation allows children to witness and mimic appropriate healthy behaviors in a more comprehensive learning environment. Healthier strategies informed by the exploration of participation in sports can significantly impact the development and well-being of children, including motor skills, peer interaction, and cognitive development, through new programs designed to give children more opportunities to be exposed to positive influences (Martz et al., 2021).

Alcohol is currently the third leading cause of death in Americans (AMPH, 2019). Continuous or excessive drinking can increase the likelihood of cancer, liver disease, cardiovascular events, injury, post-operation complications, and gastrointestinal diseases (Sterling et al., 2020). The implementation of these beneficial programs may lead to a decrease in the likelihood of alcohol experimentation in children 9-11 years old (Borraccino et al., 2020). Scientists have found that the introduction and continued use of alcohol during adolescence increases the likelihood of continued drinking into adulthood (Jackson et al., 2015: Martz et al., 2021). The ability to decrease alcohol use and, therefore, negative health outcomes through interventions creates a need for public entities to push for further research into the factors that contribute to the use of alcohol in children (AMPH, 2019).

The result of this study provides only a starting point. Further studies could cover some of the limitations that were previously discussed. The ABCD study researchers are still collecting data as of November 2023. When fully completed, others will be able to use these data for a longitudinal analysis, which would provide more information into the

causal relationship between organized sports participation and early alcohol experimentation (ABCD, 2023). In addition, this study, as well as further studies stemming from it, can provide information into understanding social and psychological factors in children that lead to their alcohol use or continued use. Research can have a significant impact on the outcomes of the next generation of children and their ability to abstain from early alcohol experimentation.

Summary

This study explored the correlation between organized sports participation and alcohol experimentation within the sample of children in the ABCD study cohort. The research questions explored the potential relationship between children's participation in organized sports and their experimentation, or lack thereof, with alcohol while understanding and addressing demographic considerations. Using a cross-sectional design in a quantitative approach, the study explored these variables of archival data collected by the ABCD study. The theoretical framework guiding this study was social learning theory, which looks at understanding children's behavior, including observation of their environment, imitation of those around them, and positive or negative reinforcements. The problem statement addressed the lack of current research into the correlation between alcohol experimentation and organized team sports participation and demographic factors that have the potential to impact the relationship. The purpose of the study was to gain insights into the prevalence, patterns, and factors influencing alcohol experimentation among children aged 9-10 who participate in organized sports. This study's goal was to explore the relationship between sports participation and alcohol

experimentation that can assist in creating interventions and other preventative measures that can encourage positive health behaviors in children. Numerous assumptions are made in the study, addressing self-reporting data, well-rounded sampling, and others. The study's limitations addressed the cross-sectional design, potential confounding variables, limited generalizability, and the use of self-reported data. Through a thorough investigation of previous research and data collected, this study was designed to enhance understanding of the influence of alcohol experimentation within the context of social activities and provide valuable insights for developing strategies and interventions to promote healthier behaviors in this age group.

Chapter 2: Literature Review

Introduction

The growth of alcohol experimentation in children and continued use has become an ongoing health concern amongst preadolescent children. The use of alcohol during ages of cognitive and social development can have a significant impact on their brains and physical wellness. Exploration of variables influencing childhood experimentation is critical to creating preventative measures and positive interventions. This literature review explores the current research regarding organized sports participation and preadolescent alcohol experimentation in children aged 9-10.

Extracurricular activities often contribute to positive health outcomes. Organized sports participation is considered one of the most popular extracurricular activities amongst children aged 9-10. Significant benefits have been found from children's participation in sports, including positive physical, social, and psychological outcomes that can create resilience and other valuable traits to be used throughout their development. Organized sports are often run in structured environments supervised by an adult, typically a coach. This person can then provide an example for the child to follow, promoting positive decisions and steering the child away from potential risks.

There has been significant evidence that sports participation has a positive impact (Borraccino et al., 2020); however, there has been a lack of research linking extracurricular activities and alcohol use. Previous research suggested that there is a positive outcome from children participating in sports and resilience against substance use (King et al., 2017). The environment created within organized sports often supports

structure and building of routines, focusing on health and well-being, including diet and exercise, team building skills, and social networking, which has the potential to increase resiliency, which may then decrease the likelihood of early alcohol experimentation. In contrast, there have been studies that have found little correlation or adverse outcomes between participating in organized sports and alcohol experimentation among children (Kwan et al., 2014). Others have found that numerous factors can influence alcohol experimentation in children. These include peer influence, parental attitudes toward substance use, core beliefs, religious constructs, and psychological factors, including reward pathways, emotional regulation, and impulsivity (Murray et al., 2021; Nees et al., 2012).

Due to the inconsistencies and lack of relatable information on 9–10-year-olds found within the current literature on influencing factors for alcohol experimentation and organized sports participation, this study will further research and gain an understanding of the influence of organized sports participation on alcohol experimentation in children ages 9-10. Given what we know about the benefits of sports participation, the hope is that it can work as a preventative factor to reduce childhood experimentation with alcohol. Using the ABCD data, this relationship can be analyzed while accounting for covariates using demographic and socioeconomic data. This area is unexplored in current research, with this investigation looking to fill the gap and potentially lead to new preventative measures being deployed in child psychology.

Literature Search Strategy

The strategy was based on exploring alcohol use by preadolescents or children between 9-10. Previous research has focused on the adolescent population, making finding current research on this age group difficult. Using databases such as Walden Library, EBSCOhost, and the ABCD website, literature was found on children between 9 and 10. I broadened my search to include children over the age of 12 to assist in finding where research deficits were. Research articles were also gathered by contacting individuals with articles I could not access. The keywords used were *adolescence, pre-adolescence, sports participation, sports activity, team sports, organized team sports, athletics, substance abuse, preadolescent, alcohol use, experimenting with alcohol, sipping alcohol, childhood, children aged under twelve, ABCD study, young adult, vulnerable, coping skills, coping mechanisms, treatment,* and *social learning theory*.

Theoretical Foundation

Social Learning Theory

Children encounter numerous varied situations throughout their development. Researchers have long been looking into the environmental and social factors children are exposed to when they are introduced to daycares, schools, and other activities (Gottfredson et al., 2019). Bandura sought to understand the learning phenomena experienced by children being exposed to the behavior firsthand or witnessing the behavior and the reaction to the behavior, whether the action led to a reward or a consequence (Bandura, 1969). Social interactions with peers, elders, or parental figures can ingrain in children the risks and rewards of engaging in previously unseen behaviors.

Albert Bandura's social learning theory focuses on the environmental factors that help shape behavior, including social observation and influences. Bandura's theory emphasizes the impact of modeling, where he believes the most learning takes place. Individuals take in environmental and behavioral cues from others within their environment whom they consider role models, people of importance, or those they consider themselves close with. The individual then takes the information and behaviors they have observed, begins to imitate or mimic the behavior, and continues or discontinues based on reactions to behaviors. With today's improvements in technology, the array of behaviors that children can view has widened as they have easier access to movies, television, and social media like YouTube.

When children are introduced to a new social group of peers or like-minded individuals, they are likely to be influenced by them (Aker et al., 1979). Attempting to fit in with their peers by observing and mimicking their behavior has been seen throughout research for centuries. Observational learning in social learning theory focuses on four specific areas: attention, retention, reproduction, and motivation (Bandura, 1969). Attention is a crucial portion of observational learning in that the individual needs to be present in the time and space in which the behavior occurs as individuals are witnessing and giving attention to the behavior, the ability to retain the information and be able to recall the information at a later time (Bandura, 1969). Retention involves specific brain functionality and encoding the behavior to long-term memory, which will be called forth later (Bandura, 1969). Once the information can be recalled and given space, the individual needs to mimic the behavior through their past observations (Bandura, 1969).

Appropriate cognitive functioning, motor skills, and the ability to reproduce the behavior are required. One of the most critical processes is motivation, which focuses on the influence of the behavior, where the behavior came from, and how others later perceive it (Bandura, 1969; Moral-Garcia, 2020). The behavior is likely to continue if there is a positive outcome from the behavior and how well they believe they perform the initially observed behavior (Bandura, 1969; Halldorsson et al., 2013).

SLT allows for understanding the social constructs that can impact children's likelihood of observing and mimicking behaviors when examining the relationships between organized sports participation and alcohol experimentation in children aged 9-10. Alcohol use and experimentation will likely be observed by witnessing the behavior within the child's environment, including parents, siblings, and peers (King et al., 2017; Skylstad et al., 2022). If the child has access to social media or access to the internet and streaming services that portray positive outcomes of alcohol use while participating in sports, it can influence their beliefs surrounding alcohol use and experimentation, i.e., celebratory drinking at a bar when a game is won, receiving a bottle of wine, or other like circumstances (Mehus et al., 2018).

Many researchers have theorized that the use of alcohol will increase when children play organized team sports as the susceptibility through social contacts increases (Borraccino et al., 2020; King et al., 2017). However, data indicate that later in adolescence, children may start drinking more as they progress through young adulthood with less parental guidance and positive influences (Adachi-Mejia et al., 2014; Andreescu, 2019). As children witness their parents or guardians indulging in the use of

alcohol and their reactions to the effects of intoxication, they may learn that drinking is appropriate because of the behavior displayed by those in authority around them with little repercussions (Andreescu, 2019; Jackson et al., 2015). This could then be reinforced through similar situations. Bandura (1977) addresses this as one of his pillars in social learning theory and how it can assist in reinforcing the behavior and willingness to experiment with alcohol at an inappropriate age. The experimentation of alcohol within peer groups has been found to have social consequences such as school grades and decreased participation (Bozzini et al., 2021; Burns et al., 2020). Sports programs are more likely to utilize drug tests as part of physicals during the children's try-out process, leaving the possibility of use during the season open (King et al., 2017).

Through the SLT lens, organized sports create an environment that allows observation, learning, and processing. Children can be encompassed within the environment by engaging with those around them, including close observations of their peers and coaches. As the child can observe the behaviors of those around them, they can also see positive or negative outcomes produced by the behaviors that can impact their perception of the behavior, which can adjust their core belief system accordingly to include or dissuade alcohol experimentation.

The study produced insights into how observational learning, social influences, and cognitive processes within the organized sports context may contribute to alcohol experimentation or prevention among children by utilizing SLT principles. This knowledge can inform the development of targeted interventions and strategies that promote positive social norms, role modeling, and education around responsible alcohol

behaviors within the sports setting, ultimately reducing the likelihood of early alcohol initiation.

Literature Review of Key Factors

Children/ Preadolescent Population

Children and adolescents have been the focus for researchers to address the onset of various mental health quandaries. Specifically, research has been focused on how the child's environment can impact their brain development (Martz et al., 2022). The American Association of Pediatrics has indicated that there is a significant deficiency of research on children, their development, and behaviors and how that implicates treatment courses and knowledge of providers (Field, 2004). Research directed specifically toward children is limited and requires regulated perimeters to ensure that they are protected from further harm from participating in the study (Squeglia, 2020). Brain development and outside forces that can impact a person's functioning in society and furthering research during all stages of development is vital to create a complete understanding that allows for prevention and protection (Squeglia, 2020). The introduction of alcohol at the preliminary stages of development has been found to disrupt or change the trajectory of brain development, which can create significant adverse outcomes later in life, including long-term consequences on memory, learning abilities, and decision-making skills (Barch et al., 2018). Skylstad et al. (2022) found that early alcohol consumption can also significantly impact other organs and systems within the body, possibly contributing to kidney or liver disease, hormone imbalance, and cardiovascular issues. These adverse outcomes can create significant barriers to the child's development and ability to function

within their community and generate a need for further research into the full-scale impact of alcohol use on children.

Another barrier that restricts gathering information on this population and has allowed for a gap in the literature regarding children under the age of twelve is their vulnerable status within research, making them a protected class that requires specific guidelines and understanding in order to cause no significant harm or skew results (Shivayogi, 2013). Children under twelve are considered vulnerable due to their limited ability to make informed decisions, dependency on caregivers, and heightened susceptibility to potential harm. As a vulnerable population, they require additional safeguards and protection in research settings. Ethical considerations become critical when studying this age group to ensure their rights, welfare, and well-being are preserved. Researchers must obtain informed consent from parents or legal guardians and, when possible, the child's assent. Moreover, researchers must use age-appropriate language and procedures to ensure comprehension and minimize potential distress when conducting research with children. The study design should prioritize minimizing harm and maximizing the benefits of the research, which may include informing interventions, educational programs, and policies to prevent underage alcohol use and its associated negative consequences.

The focus of recent research on alcohol experimentation has been on preadolescents, with the expectation that children under twelve are less likely to experiment with alcohol than their adolescent counterparts. Skylstad et al. (2022) explored both how accessible alcohol is to children and the level of consumption of

alcohol in children, as well as the lack of protective or preventive systems for children in comparison to their adult counterparts. They recognized that children as young as four could recognize alcohol and the constructs surrounding their consumption (Skylstad et al., 2022). The researchers utilized large-scale surveys compiled from countries worldwide, including the USA. They found difficulty in generalizing the information because of the definitions of "sipping," "tasting," and "drinking" within the surveys they utilized. (Skylstad et al., 2022). However, the data indicated that 48% of 10-year-old children in the United States have tasted or sipped alcohol and that at eight years old 35% had tasted or sipped (Skylstad et al., 2022). The researchers also found that social learning influenced children's original drinking experiences. A multi-disciplined approach with parent involvement can improve the overall effectiveness of interventions to reduce a child's alcohol consumption. The study acknowledged that further research needs to address "younger children" under twelve to identify determents for alcohol experimentation and use (Skylstad et al., 2022).

Researchers have been under the assumption that preadolescents are less likely to use alcohol because of their stage of development, focusing on concrete ideas such as alcohol "is bad for you" and other core beliefs instilled by their environments, including parents or guardians (Smit et al., 2018). Smit et al. (2018) addressed current studies and beliefs surrounding childhood alcohol use or expectancies and the impact they can have on children's health, including substance use disorders. They found that, while children as young as six often thought of alcohol use in a negative light, positive alcohol expectancies can originate from environmental, familial, and peer factors (Smit et al.,

2018). The authors found that those who have positive alcohol expectancies are more likely to use alcohol at an early age. They suggested that social learning and other factors can impact their use (Smit et al., 2018). The authors said no current research exists to find the median age of alcohol initiation/experimentation or service. The researchers also found the onset of alcohol expectancies in children as early as age 3 which could be either positive or negative (Smit et al., 2018). This study is essential in that it acknowledges that children at an early age are aware of alcohol use and its rewards and consequences. Donovan (2013) also had found that while few studies explored children under twelve alcohol experiences, a significant number of this population have tried alcohol. This was further explored by Jackson et al. (2015), who found that children were experimenting with alcohol as early as three years old. Jackson et al. (2015) addressed how tasting or sipping alcohol can impact behavior throughout the individual's lifetime. They explored work previously done by Donovan and Molina by including other variables, including other drug consumption and the amount of alcohol consumption that occurred throughout the study's timeline (Jackson et al., 2015). The study focused on sixth, seventh, and eighth grade students' alcohol experiences before participating. The researchers found that by sixth grade, 29.4% of children had sipped alcohol, with the median age of first consumption at 7.61 years (Jackson et al., 2015). The study also indicated that they often had received alcohol from a parental figure within their household. They found that those who had taken a sip by sixth grade had a 26% chance of continuing to consume full drinks by the beginning of ninth grade. The study focused on the children's parents and whether they had alcohol within the home and their

permissiveness towards its use, with researchers concurring that a higher of either led to a higher likelihood of the child consuming alcohol (Jackson et al., 2015). The researchers encouraged further investigation into the constructs of alcohol experimentation and parental or peer role within.

Research has found that children under the age of twelve are often exposed to alcohol within the home and or through social gatherings through family, religious, or learned behaviors (Jackson et al., 2015; Moral-García et al., 2020; Skylstad et al.,2022). This exposure or knowledge could assist in the early experimentation and use of alcohol as a religious construct, providing small amounts of alcohol to children when participating in religious activities, which also needs to be accounted for (Jackson et al., 2015). Researchers have found a correlation between parental drinking or lack thereof and children's experimentation with alcohol as well as outside influences (Connor et al., 2011; Lees S et al., 2021; Mehus et al., 2018; Sullivan et al., 2022; Tael et al., 2018). Skylstad et al. (2022) explored early alcohol use with children from varying countries and the later-in-life complications that follow, including health and brain development issues that can occur from early childhood alcohol use. Researchers have acknowledged that there has been significant research regarding adolescent alcohol use. However, there has been a lack of research on children, or what they deemed "really young children," under twelve (Jackson et al., 2015; Skylstad et al., 2022; Sullivan et al., 2022). They found that children are highly suggestable to advertising and images of products they would want to use. These factors, mental health struggles and stressors, familial influence, and other environmental elements, could contribute to a child's alcohol use.

Researching alcohol use in children under twelve is essential to understand the impact of early alcohol exposure on their physical, cognitive, and emotional well-being (Martz et al., 2022; Barch et al., 2018). Exploring and understanding the impact of the environment and social implications on children can allow resiliency factors to be addressed or risk factors to be found. Through the outcomes of further research and studies, a greater understanding and implementation of treatment and interventions to decrease or stop alcohol use can assist in positive outcomes for children throughout their lives.

Alcohol Experimentation

Alcohol has been viewed as a gateway drug, something that is easily accessible but that can lead to further alcohol or drug abuse, which can then lead to developmental inconsistencies as children grow into adulthood (Skylstad et al., 2022). There is a growing concern about the rise of alcohol and drug use among children under the age of twelve years and its impact on their development (Martz et al., 2022; Salmanzadeh et al., 2021). There has been little research specifically addressing children under the age of twelve due to IRB (Internal Review Board) standards and ethical considerations as well as willing to participate in a research study that has significant social impact as well as consequences (Donovan, 2014). Researchers have also identified that there is a lack of studies on risk factors of early onset alcohol use in children (Donovan et al., 2024). Sullivan et al. (2022) explored the participants' substance use levels throughout the first four years of the ABCD study. The ABCD study aims to collect data for researchers to investigate the leading causes of substance use and its effects as children continue to

develop. They found that at least 22.51% of the Y0 children 9-10 years old, or at baseline, sipped alcohol (Sullivan et al., 2022). That percentage increased across the following years of the study, which supports the need to address the early onset of alcohol initiation or experimentation of youth (Martz et al., 2022; Sullivan et al., 2022). Sullivan et al. (2022) found that there were more males who experimented with alcohol than females, however, further exploration into a child's SES, family structure, or race was not addressed in conjecture with sex. In addressing the variables, it is important also to explore covariates related to sports participation and alcohol use, such as sex, race, family structure, and SES. Clements-Noelle et al. (2018) acknowledged that researchers have often focused on risk factors or specific protective factors, but there is a need for studies to address participant background, race, and sex factors. Other studies have looked specifically at sex differences; however, addressing family structure and cultural background can assist in identifying specific areas of need for education and interventions (Jackson et al., 2015; King et al., 2017:Wade et al., 2021)

Experimentation or trying alcohol at an early age has been found to start as early as three; however, researchers have suggested that further research into these age groups needs to occur because there has been little addressing such young age groups but there can be a detrimental impact on the development of children if use continues (Jackson et al., 2018; Skylstad et al., 2022). Children who are coming into adolescence and the beginning stages of puberty are at a greater risk of becoming engaged in risky behaviors and becoming sensitive to substance use disorders (Jordan et al., 2017). Jackson et al. (2015) wanted to investigate the earliest children are exposed to and partake in alcohol

consumption in any form. They found that children as young as three years old had experimented with alcohol in some form, with the percentages increasing as children got older, where the largest number of children using alcohol was seen at ten years of age, with 26% percent of the age group drinking (Jackson et al., 2015). This has been found to include parental consent or insistence to try alcohol. The growth and early onset of alcohol use found by Jackson et al. (2015) and research continued by Skylstad et al. (2022) indicate a need for researchers to inquire into how to address the phenomenon of younger children experimenting with alcohol.

Smit et al. (2018) found that children as young as six often thought of alcohol use in a negative light. This belief instilled in youth is thought to dissuade children from attempting to experiment with or use alcohol. While this study provided significant insight into how the belief can assist as a deterrent for alcohol use, they acknowledged that as children continue to be in differing environments and have different experiences, they are less likely to maintain those beliefs (Smit et al., 2018). The researchers acknowledged that as children grow, they can become curious about the happenings around them, including drinking alcohol or drug use (Smit et al., 2018). Hatoum et al. (2021) explored the connection between alcohol naïve youths and their risk factors for substance use, particularly alcohol, as they continue through childhood into adulthood. The authors found a correlation between parents' alcohol use and their children's use through self-reports of witnessed behaviors from both the youth and the parent (Hatoum et al., 2021). This links to Jackson et al.'s (2015) exploration into contributing factors to early experimentation, including environmental, familial, or peer factors that can lead to

increased positive alcohol expectancies. Researchers have found that while specific information regarding younger children's proclivity to use alcohol has not been significantly documented, there is a case to continue exploration due to the variety of influences and environments that surround the population (Jackson et al.,2015; King et al., 2017; Skylstad et al., 2022; Volkow et al., 2018). Research has also found that children may not recall or disclose their use appropriately when questioned later in life (Donovan, 2014). He found that when students were asked in high school when their first drink was, it could change over a four-year period (Donovan, 2014). He then suggested that asking during younger, more formative years leads to finding more prevalence and direct answers about their initial alcohol consumption (Donovan, 2014).

Wade et al. (2021) explored how curiosity can impact childhood use of alcohol in children aged 9-10 and how it can significantly impact later in life. This continues the work of Jackson et al. (2015) and is a contributing factor to Skylstad et al.'s call to investigate early age groups due to the continued growth in alcohol experimentation in children (2022). Wade et al. (2021) acknowledged that curiosity about alcohol would increase alcohol use later in life. The authors utilized the ABCD cohort to investigate children's level of interest and found that a sizable portion of the participants had already experimented with alcohol (Wade et al., 2021). Researchers have discussed the need to find the age when curiosity about alcohol use occurs, as they discovered that children aged 9-11 had already tried alcohol (Wade et al., 2021; Jackson et al., 2015; Skylstad et al., 2022; Sullivan et al., 2022). Grevenstein et al. (2020) further explored this by examining children's curiosity and social interactions with alcohol at school and home,

focusing on contributing factors for later binge drinking or excessive alcohol consumption.

Alcohol use early in development can lead to numerous negative outcomes that can continue to impact the child's life. Brain development changes including white matter decreases and gray matter increases when children become involved with early alcohol consumption whereas the opposite is what occurs in those who do not participate in drinking during adolescence (Park et al., 2018). Park et al. (2018) also found that there were significant changes in the lateral ventricles, corpus callosum, and cingulate gyrus as well as an increase/ decrease in microstructural DTI measurements of the fornix of children who drank compared to those who did not. The ABCD study voiced their concerns about the early introduction of drinking in children under the age of twelve, including structural and functional abnormalities in the brain, in addition to concerns of reduced memory, visuospatial skills, attention, and executive functioning when creating their study (Lisdahl et al., 2018). These areas are important in problem-solving, moderating behavior, selective attention, conflict monitoring, and decision-making, which are vital abilities of human productivity within the community and their lives (Park et al., 2018). Researchers have also found links between alcohol use during adolescence and subcortical and hypothalamus functioning with significant impacts to risk and reward-taking (Kim et al., 2021). Changes to the brain during adolescent development can cause irreparable damage to cognitive functioning, altering the child's overall development (Kim et al., 2021).

Behavioral and emotional functioning and regulation are often impaired with early experimentation with alcohol in children (Aguinaldo et al., 2021). Lack of proper social functioning or social impairment can lead to poor mental health and physical health outcomes such as mood disorders, depression, drug dependence, and neurodegenerative diseases that can continue into adulthood if not properly addressed (Mahon et al, 2022; Sal). Furthermore, researchers have begun to look at the presence of other disorders prior to or after alcohol initiation, including affective disorders such as depression or anxiety, and how they impact early alcohol use in children (Klein et al., 2022). The study found that children with anxiety or depression had an increased likelihood of using alcohol or tobacco between the ages of 9 and twelve years old (Klein et al., 2022).

Researchers have found that early experimentation and continuation of drinking can lead to violence both in perpetrating and being a victim, higher risk for communicable diseases, further substance experimentation, and other adverse health outcomes (Pinto et al., 2020). Cognitive impairment due to continued alcohol consumption can lead to impulsivity, other risk-taking behaviors, and a decrease in emotional regulation, which can have significant and potentially fatal consequences (Jadhav et al., 2019). Behavioral and emotional impairment has also seen the increase of suicidality of children who are drinking at an early age (Aguinaldo et al., 2021).

Researchers in the United Kingdom have previously found a decrease in weekly alcohol consumption by adolescents between the ages of 11-15 in higher-income countries (Kraus et al., 2020). The improvement of health standards, including better

diets and elevated levels of activities through sports or through the view of social constructs of social media, may have begun to assist in the low levels of consumption found in the research produced by Kraus et al. (2021). The U.K. also has a significantly lower legal age of consumption compared to the U.S., which could contribute to the decline. Studies outside of the U.S. have been conducted but few significant findings were found on the onset of alcohol use nor continued use of alcohol in children under the age of twelve (Skylad et al., 2022). Other studies have found that 67% of children under the age of 17 have begun drinking and of that 67%, 17% participate in binge drinking by the age of 17 (Clements-Noelle et al., 2019). There was an indication of an increase in alcohol expectancies due to street connectedness in rural African areas and the higher level of substance use within the community however, there has not been further investigation within the U.S. (Inchey et al., 2018). Several countries within Europe have also seen a decline in the initiation of sipping alcohol, but no specific cause has been found outside of current health trends (Inchey et al., 2018). Further investigation into the trend is occurring, but the population is of a protected class, so research is slow (Squeglia, 2020).

The lack of in-depth research furthers the need to explore alcohol initiation and use in children ages 9-11. While there have been studies that have grazed the population and its alcohol use, continued research that focuses on exploring factors that increase or decrease the likelihood of use needs to occur to assist in the development of prevention strategies and treatment. The importance of decerning factors and implications of alcohol

use grows if children continue to drink alcohol during early childhood, leading to significant developmental implications and effects.

Organized Team Sports Participation

Researchers have explored the idea that when children or adolescents begin to participate in sports, there is a greater opportunity for those children to be introduced to and begin to use alcohol (King et al., 2017; Lee et al., 2021; Veliz et al., 2015; Vest et al., 2013). Team sports allow children to work together and spend time with others in their age group outside of the structure of school and family (King et al., 2017). Interactions during social experiences can significantly influence children's behavior through experiencing and witnessing others' actions around them (Kovács et al., 2017). Research and understanding of the implications of sports participation and alcohol use have been complex and difficult to traverse due to the age groups as well as a litany of variables that can impact a child's propensity to experiment with alcohol (Denault et al., 2018). By understanding children's sports participation and alcohol use, researchers can address the protective and risky factors that are associated with consumption and negative health outcomes later in life.

Sports participation also increases emotional and physical well-being, cognitive functioning and well-being, goal setting, respect for others, boundaries, and personal growth (Bjørnarå et al., 2021). The dynamic in their future health outcomes appears to shift, including better dietary habits, physical health, psychological health, goal setting, and problems solving skills (Peck et al., 2008). It is recommended that children seek an hour of physical activity multiple times a week to stimulate muscle growth and bone

strength (Rullestad et al, 2021). Physical activity has also been linked with improved academic performance through increased social interactions and cognitive functioning, including grades and behavior (Burns et al., 2020).

Walczak et al. (2023) explored current studies regarding alcohol consumption and sports participation in youth. They created a literature review from nineteen studies have been conducted within the United States on alcohol consumption by adolescents between the ages of 10-19 years old (Walczak et al.,2023). However, after a thorough investigation of references, very few of these studies focused on children under twelve. They found thirty-two studies worldwide that addressed alcohol and sports participation, but few of these studies addressed early alcohol consumption through "sipping" or experimentation. The authors found that while there were positive correlations between sports participation and alcohol use in a portion of these studies, they also found contradicting studies where alcohol consumption was negatively correlated with sports participation (Walczak et al., 2023). During this exploration, they found a significant gap. They consider that further research can address this through more substantial longitudinal studies to attempt to identify when alcohol consumption starts and its relation to sports participation, as well as the continued use of alcohol throughout adolescence into adulthood (Walczak et al., 2023).

During their review, Bjørnarå et al. (2021) also found little information or correlation between physical activities or organized sports participation and increased or decreased alcohol use in the adolescents participating. The authors acknowledged a positive benefit to sports participation with children and adolescents, but further

investigation into the impact on childhood alcohol use needs to occur (Bjørnarå et al., 2021). They found many positive implications for children being active in sports through their metanalysis (2021). Earlier studies concentrating in children in high school showed no specific correlation between sports participation and alcohol use but suggested exploring other social variables involved with sports participation and possible linking of alcohol consumption (Lees, 2008).

Researchers found that despite their hypothesis that children within this age group involved in sports activities would be more likely to experiment with alcohol, they were less likely to have used it in the past year when participating in a sport (King et al., 2017). This study focused on children's peer interactions and how likely they were to be swayed by others due to exposure to alcohol by their sports-playing peers (King et al., 2017). Researchers had utilized data collected through the Pride survey, which looked at 37,616 seventh to twelfth-grade students within a metropolitan area to explore the impact of sports participation on adolescent alcohol use (King et al., 2017). The researchers found, despite their hypothesis that children use alcohol throughout all sports activity within this age group, they were less likely to have used it in the past year or recently when participating in a sport (King et al., 2017). The result of the study regarding children's use may be due to the study's limitations in that they only looked at older adolescents over the age of twelve, according to their report. The authors acknowledged that continued exploration into younger age ranges is vital to identify the shift in alcohol use and sports participation (King et al., 2017)

The integration of social interaction and social norms can begin during participation in sports, which could lead to dissuading children from using alcohol or other drugs (Cristello et al., 2020). Social interactions are a vital part of learning that can mold how the child interacts with the world around them. Studies have also explored some of the complex relationships between peers, sports, injuries, and alcohol to attempt to identify relationships between them in an effort to understand the divergence from a positive protective factor to risky behavior (Cristello et al.,2020). Researchers have found that in older age groups above 14 years old, social interactions with peers indicated a higher degree of alcohol use (Pinto et al., 2020; Murray et al., 2021), though due to the lack of studies focusing on younger children, there has been little or no evidence that sports participation increases the use of alcohol (Lee et al., 2021; Veliz et al., 2015; Vest et al., 2013). Children above the age of twelve but not sixteen were found in King et al.'s study to have low alcohol use despite significant social interaction and connectedness (2017). Other studies concluded that there was a significant finding regarding the low use or decreased use of alcohol by younger adolescents and an increase in physical health and protective risk factors associated with sports participation (Zenic et al., 2020).

Sports participation and the resources needed to participate will be addressed. Vandermeerschen et al. (2015) explored parental education, SES, and family structure and their impact on a child's ability to participate in sports. They found that children who come from a home at risk of poverty or do not have disposable income are less likely to be able to participate in sports (Vandermeerschen et al., 2015). Studies also found links between dietary considerations associated with SES, as children who have fresh fruit and

vegetables available increase positive outcomes in children (Burns et al., 2020). This can create a gap in the ability to participate in sports and gain protective factors or risk factors of being around others who use them (King et al., 2017).

Interestingly, they found that parents who participated in sports were more likely to have their children participate in sports too (2015). Rullestad et al. (2021) also found that parents who are active within the household can positively impact their child's attitude towards sports participation, increasing their likelihood of continuing sports throughout their childhood into adulthood. It is important to recognize factors that can also limit a child's ability to participate in sports. Acknowledging protective factors and risks allows for a complete view of the varying outcomes of sports participation, including inclusion and exclusion of others and health outcomes that impact a child's well-being as they continue to develop and grow into adulthood.

Summary

This study will explore the correlation between organized sports participation and alcohol experimentation within the sample of children in the ABCD study cohort. Demographic considerations that will also be explored include family structure, sex, race/ethnicity, parental education, and SES and their implications for the relationships between organized sports participation and alcohol experimentation. Using a cross-sectional design in a quantitative approach, the study will explore these variables in archival data collected by the ABCD study. The research questions focused on examining the prevalence and patterns of organized sports participation and alcohol

experimentation, exploring the association between these variables, and investigating the moderating effects of demographic factors.

The literature review suggests there are protective factors involved with organized sports participation and alcohol experimentation in children. As children have aged into adolescence and young adulthood, there has been a significant increase in alcohol experimentation found. Current research on team sports participation and alcohol use with children 9-10 years old aligned with Bandura's Social Learning Theory, the study, utilizing the notion that behaviors are learned through witnessing behaviors or events, mimicking them, and the subsequent reward or consequences. Children have many opportunities to witness behaviors at home, and as they begin to participate in other environments, they are exposed to differing social norms or beliefs held by their peers. This can influence their likelihood of engaging in alcohol experimentation.

Specific research with the proposed age group regarding alcohol use is limited due to the population's vulnerability and topics, which are surrounded by ethical guidelines for researchers to follow. Research addressing adolescent use of alcohol and sports participation has indicated that the exploration of children under the age of twelve needs to occur to gain more insight. The availability of information regarding the onset of alcohol use can assist parents, schools, and therapists in creating programs that can reduce the onset and continued use to decrease adulthood alcohol use disorders that can impact their development and progress throughout life.

The lack of research focusing on children under the age of 12 suggests that alcohol experimentation by this age group is not as well understood as that of older

children and adolescents, so further investigation needs to occur. Increasing available information regarding the onset of alcohol use can assist parents, schools, and therapists in creating programs that can reduce the rate at which children under twelve begin to consume alcohol, leading to a decrease in alcohol-related health issues, both short and long-term onset that could impact their development and progress throughout life.

Chapter 3 of this study presents the research methods and data analysis plan for the quantitative archival data study. It will include the research design, population, sampling process, and archival data processes. Ethical considerations and limitations will also be addressed.

Chapter 3: Research Method

Introduction

The research method utilized in this study was quantitative in approach with a cross-sectional design meant to examine if there is a relationship between organized team participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study. The ABCD utilized surveys and questionnaires to collect data within the sample. This study utilized secondary data provided by the National Institute of Health (NIH) to explore the relationships between multiple variables related to alcohol experimentation, team sports participation, family system, and demographics using logistic regression.

The following chapter discusses the research design and rationale for the study, starting from the data collection process through recognizing the internal and external validity of the results. This includes the recruitment procedures, sample selection, informed consent, and ethical oversight of the data collection. The data analysis process was then discussed in a data analysis plan that details the software and statistical techniques used to explore the research questions. The results of those procedures are then further scrutinized by looking at their internal and external validity. Using a quantitative research method focusing on chi-squared and logistical regression, this study will gather empirical evidence for the prevalence of alcohol experimentation among children aged 9-10 who participate in organized sports. This model provides a structured approach to analyzing variables, leading to meaningful conclusions and practical recommendations for practice and policy.

Research Design and Rationale

This research study was a quantitative and cross-sectional, using archival data provided by the ABCD and NIH. While the ABCD study is longitudinal, the data used here were collected at a specific point in time, which is considered year 0 of the ABCD study. This allowed for focus to be restricted to those in the 9-10 age group. I analyzed the independent variable of participation in organized team sports and the dependent variable of alcohol sipping using chi-squared and logistic regression analysis, including odds ratio, positive predictive value, and negative predictive value, to find a correlation between the two variables. Covariates included SES, sex, family structure, race, and age. After checking whether pairs are independent, these covariates were added to the regression model to get a closer approximation of the relationship between alcohol experimentation and sports participation.

A correlational study provides information on if there is a positive, negative, or no correlation between independent and dependent variables. As there is limited information on this age group, the correlation between organized team sports participation and experimentation with alcohol could provide insight as to whether organized team sport participation is associated with experimentation with alcohol and, therefore, whether organized team sports participation could be used as to deter alcohol experimentation in children.

The ABCD data collected came from a vulnerable population with the guidance of an Internal Review Board (IRB) that strictly holds the confidentiality of its participants and the surveys they complete (ABCD, 2023). One of the benefits of utilizing archival

data is that it allows researchers to look at data collected on these vulnerable populations, like children, to explore human development early in life (Steward, 2012). Vulnerable populations are challenging to study, which slows understanding of human behaviors and possibly stalls the development of interventions to address their problems. Secondary or archival data analysis creates a generous amount of raw data defined with the highest degree of certainty to build stable and reliable variables.

Methodology

Population

The population utilized for this study consisted of children between 9 and 10 years old from various backgrounds. This study focused on children due to the lack of data on childhood use of alcohol or other drugs and the impact of activities to decrease this use. Exploration completed by Jackson et al. (2015) indicated that experimenting with alcohol could be seen as early as 3 years of age, with increases in participation between the ages of 7 and 10.

Sampling

The 11,876 ABCD participants and their parents/guardians from areas surrounding the 21 United States research sites were recruited to participate in surveys and lab-related activities (Saragosa-Harris et al., 2022). The ABCD study reached out to elementary schools, including public and private (Garavan et al., 2018). They sought to include single-child households, as well as twins or siblings. The ABCD study recruited children aged 9-10 from across multiple states to research sites that were closely located in densely populated areas for ease of access to fMRIs but included individuals from rural

areas to ensure sufficient power when addressing the number of research points and gathering information to ensure that the variation between subjects would not cause the study to suffer (Garavan et al., 2018). Recruiting from diverse locations was intended to help the generalizability of the results of studies using this data.

Archival Data

The ABCD study is a 10-year longitudinal study that follows children starting at age 9 for 10 years (Saragosa-Harris et al., 2022). The study began in 2016 and is currently in its 6th year of gathering information from its sample. The sample began with 11,876 children from across the United States, utilizing 21 university campuses that house fMRI programs (Saragosa-Harris et al., 2022). The study explores most facets of the child's life, including drug and alcohol use, social media, biometrics including fMRI data, and urine and hair samples. The data were provided through the National Institute of Health's archive, as the NIH funds the study and thus is charged with maintaining its data. The study's procedures, surveys, sample taking, fMRI, and other samplings were approved by an Institutional Review Board (IRB) and continue to be reviewed yearly at the University of California, San Diego (Saragosa-Harris et al., 2022; Garavan et al., 2018).

Procedures for Data Collection

The NIH provided the data after permissions are granted, and the IRB validates a study's meaningfulness. The data collected through all 21 ABCD sites are gathered and cleaned so the public can utilize them to investigate the study population. The ABCD

study collects thousands of data points over ten years of a child's life to assist in identifying and addressing substance use and its impact on the developing brain.

During each appointment, researchers walk the parent and child through possible outcomes, including the option to skip questions or not partake in specific surveys to obtain informed consent (Garavan et al., 2018; Saragosa-Harris et al., 2022). The children began participating in the research at 9 or 10 years old. They will continue participating for 10 years unless they choose to be removed from the study via their release protocol and exit interviews. Each year, the participants answer survey questions and may also participate in an fMRI and bio-specimens depending on their year within the study; during even years, they participate in the fMRI, while in the odd years, they will only complete surveys and give bio samples (Saragosa et al., 2022). This study addressed only the first year of the study, the baseline, to explore the alcohol experimentation of children based on participation in sports in only 9- to 10-year-olds.

Instrumentation and Operationalization Constructs

ABCD Parent Sports and Activities Involvement Questionnaire (SAIQ)

The ABCD study created many of its measures for its study (ABCD, 2023). The SAIQ was provided to parents of children within the study every year. It sought to include most sports and activities the ABCD study found appropriate and warranted for their study. These measures were created based on the Vermont Health and Behavioral Questionnaire (VBHQ) and the Dutch Health Behavioral Questionnaire (DBHQ). However, a wider breadth of sports and activities were added (Barch et al., 2018). Parents were asked if their child participates in sports, which was recorded as a binary yes/no

response. Then, follow-up questions were asked for each sport and if it is a team sport. All these responses were also recorded as dichotomous (Yes/No). The parents were asked to provide Likert-scaled answers about the amount of participation and how many hours they spent on the sport or activity.

iSay Sip Inventory

iSay Sip Inventory is an 8-item measure of experimentation with alcohol that explores the first alcohol-sipping experience of children (Lisdalh et al., 2018). There are follow-up survey questions about their first use, including the age of first use, the type of product, and from whom they received the substance. The participant is first asked if they have sipped alcohol and recorded as a dichotomous (Yes/No; Jackson et al., 2015). The other follow-up questions regarding type and whose alcohol it was are Likert scaled items (Jackson, 2015). The iSip Sipping Inventory survey created by Jackson for use in their study to investigate first alcohol use among middle school students was adapted for younger students in the ABCD study (Lisdalh et al., 2018).

Covariates include demographic information gathered by research assistants at the beginning of each appointment. These include age, sex, race, SES, parental education, household size, and other information related to the purpose of the ABCD study provided by the parent through their set of surveys.

Data Analysis Plan

The data was collected as part of the ABCD study, a nationwide cohort that recruited 9-10-year-olds of diverse backgrounds to participate in a multi-year study. The data used were the baseline year only; thus, no longitudinal analysis will be conducted.

As they are archival data, they were pre-processed and cleaned before access. The data were given in a (.xls, .txt, etc.) file and read into SPSS 28 for analysis.

This data were used to answer two research questions:

RQ1: What is the relationship between organized sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study?

$H_0$1: There is no relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study.

$H_1$1: There is a relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study.

RQ2: What is the relationship between sports participation, sex, race/ethnicity, SES, and familial structure in children aged 9-10 who experimented with alcohol?

$H_0$2: There is no significant relationship between sports participation, sex, race/ethnicity, SES, parent education, and familial structure in children aged 9-10 who experimented with alcohol.

$H_1$2: There is a significant relationship between sports participation, sex, race/ethnicity, SES, parent education, and familial structure in children aged 9-10 who experimented with alcohol.

To determine if there was a relationship between organized sports participation and alcohol experimentation, logistic regression was used in SPSS. This allowed for covariates such as sex, race, and familial status to be addressed and to find whether there was an association. To examine whether sex directly impacted the relationship between organized sports participation and experimenting with alcohol, a regression analysis was

run with the interaction term sex * sports participation. Similarly, a regression analysis was run with the interaction term familial status * sports participation to determine if there is a significant difference between children from a single-parent home and those from a multi-parent home.

In each regression, the result was determined by whether the p-value of the predictor of interest (organized sports participation, sex * sports participation, and familial status * sports participation, respectively) is lower than 0.05, the chosen alpha level. If so, then it will show an association. The odds ratio could then be reported by raising the natural number e to the coefficient of the predictor and giving the confidence interval. These results were more interpretable than just saying there is an association, as it was possible to say how much higher or lower the odds are of experimenting with alcohol depending on whether the child participates in organized sports, is a male or female participating in organized sports or not or are from a single parent home or not participating in organized sports or not.

Threats to Validity

External Threats

Generalizability

While the ABCD study tries to cover as comprehensive of a sample as possible with many recruitment sites, it does not guarantee that the study results will apply to every 9–10-year-old. The ABCD data set is comprised of data collected from 11,876 participants across 21 study sites. Considerations were given to create a diverse pool of participants within predetermined distance from the research sites, which also have

access to imaging technology in order to complete the fMRI scans to assist in the collection of all variables linked to their study. Due to travel restrictions or lack of access there could be a gap of participants that have been left out, although the study does provide travel for most families to assure access to the research site and full testing services. This created a narrow sampling of the population to locales within the research sites compared to a randomized sampling throughout the United States.

Representativeness of the Sample

The sample of the study, children aged 9-10 from across the country participating in the ABCD study is representative of the population of children aged 9-10 (Gonzales et al., 2021). The ABCD Study sample size was found to be 20% of the group of children ages 9-10 years old within the U.S. at the time of recruitment (Garavan et al., 2018). This population percentage assists in the data analysis's validity due to the diverse sample regarding both experiences and places individuals live. As these ABCD surveys and imaging practices had been utilized by other studies and approved by the IRB, there is minimal threat to validity as this study looks at previously collected data versus experimental data collection.

Availability and Scope of ABCD Study Data

The study data was obtained from the ABCD study using no other outside database. This data has been maintained by the ABCD study for use by them; however, missing data or other data quality issues may impact the result (Gonzales et al, 2021). The NIH provides access to the data through protocols and data collected at separate sites, which are gathered and combined into one dataset.

Internal Threats

Variables of Interest

Besides sports participation and alcohol experimentation, the study will incorporate data on demographic covariates such as sex, family structure, SES, and race/ethnicity, to explore potential covariates in the primary relationship. The variables considered for this study will create structure and identify specific areas of interest for further study.

Causality

Cross-sectional data does not lend itself to determining cause-and-effect relationships or the direction to which alcohol experimentation and organized sports participation are related. Causal inference techniques are outside the scope of this paper but may further the understanding of this relationship. Nowhere within the data were the participants asked if they experimented with alcohol before or after organized team sports participation to address if the participation in the sport reduced or stopped the alcohol experimentation or use. No experimentation or treatments were provided to the participants, reducing threats to internal validity.

Self-Reported Data

As the data is self-reported and collected from participants at a different time than the action was taking place, recall bias is one concern to take into account. Social desirability bias also must be considered, as participants may not be willing to answer a question accurately.

Social Desirability Bias

Data may be influenced by children answering by giving what they consider the socially acceptable answer instead of answering truthfully. This influence can be from the individual's cultural background, school, and other social-environmental factors (Nazari et al., 2023). This could have an impact on the accuracy and reliability of the data and, by extension, the results of the study.

Participant Compliance

Participants were assumed to have fully engaged with the process, fulfilling the requirements of the study in earnest, providing dependable data, and allowing researchers to create a robust data set.

Statistical Conclusion Validity

For statistical validity with a logistic regression to be attained, it is imperative to have an accurate and large data sample and then choose the correct statistical approach to analyze that data (Osbourne, 2008). The ABCD data provides fourteen thousand five hundred data points that have been collected and cleaned (ABCD, 2023). The data being provided based on answers from the participants will be coded variables that will be utilized in the data analysis. The use of logistic regression was found to be the most appropriate data analysis plan for the data points due to the variables in the hypothesis being dichotomous.

Ethical Procedures

Access to the ABCD study required a Data Use Certificate (DUC) to be completed by the individual wishing to access the data and their supervisor or institution.

The DUC outlines the rules that one must follow when using ABCD data. Individuals are also required to complete the Collaborative Institutional Training Initiative (CITI) in order to apply at Walden University for access to the ABCD data. Once the initial DUC is completed, the Walden University Research Department will assist in completing Forms A, B, and C to gain access to the data set. The NIH will provide the data through permissions granted through Walden to ensure that the information will be protected.

Data protection is comprehensive because there is no identifying information other than a PQUID, a randomized alphanumeric string, to identify the individuals. The ABCD study utilizes the IRB's outlined specifications that require informed consent, and an outline of what procedures will occur during the appointment and testing. Data collected is housed within a server only accessible via VPN and multifactor verification. It can only be accessed by those with permission to ensure the data's validity and the participants' anonymity. The identifying information is only given to research assistants and their directors as they are the ones who are completing the testing with the sample. This creates a significant separation between the data gathering aspect and the researcher's use of the data collected; at no time do the researchers have access to the identifying information of the participants. To assist in maintaining the validity of the information provided by the NIH, the data will be accessed through security protocols. Once the data analysis is completed, the data will be deleted and no longer be accessible by anyone.

For this study, the relationship between organized sports participation and alcohol experimentation with the age group of children between the ages of 9-10 years old was

explored. The purpose of this study was to explore the likelihood of alcohol experimentation in children who participate in organized sports and other influences. This study contributes to understanding potential protective and risk factors that can influence early alcohol use in children. To address the research questions, a quantitative research design through the archival data collected by the ABCD study. The ABCD data was collected from a large and diverse sample of children from 9-10 years old across the United States. The theoretical framework that grounded this study is that of Albert Bandura and Social Learning theory that implies children often mimic behaviors they witness of those around them. Through this theory, understanding can be gained about possible protective factors such as problem-solving, motor skill development, self-esteem, and other social factors.

Summary

To examine possible patterns and prevalence of organized sports participation and alcohol experimentation within the ABCD study, descriptive statistics were used to characterize the participants and create the data analysis plan. Chi-square tests or correlation analyses were implemented to explore the relationship between the variables. Logistic regression analysis was also be utilized to address the covariates and further association between organized sports participation and alcohol experimentation.

This study assumed that the archival data from the ABCD Study is accurate and reliable, as well as the validity of the measures utilized for collecting the data on children's alcohol experimentation and organized sports participation. Biases, the reliance on cross-sectional data, and causal inference cannot be further explored to define

the limitations of this study. The scope of the study was delimited by utilizing children from the sample of the ABCD study who are between the ages of 9 and 10 years of age, creating a specific population that cannot be generalized toward all children. Limitation includes other factors that can be present in the child's life, such as social influence from their peer group, family involvement, and family environment.

This study explored the relationship between organized sports participation and alcohol experimentation in children aged 9-10 who were involved in the ABCD study. Using archival data and appropriate data analysis contributed to a greater understanding and knowledge of possible protective or risk factors linked with organized sports participation and early alcohol use in children. The data collected in this study could inform and create a basis for advancing prevention programs and interventions that can foster healthy, positive behaviors in children between the ages of 9-10.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to examine the relationships between alcohol experimentation and sports participation in children aged 9-10 years old. I used archival data from the baseline year of the ABCD longitudinal study in which the participants were 9 and 10 years old. The research questions that were explored were as follows:

RQ1: What is the relationship between organized sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study?

$H_0$1: There is no relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study.

$H_1$1: There is a relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study.

RQ2: What is the relationship between sports participation and alcohol experimentation when controlling for the covariates of sex, race, SES, and family structure?

$H_0$2: There is no significant relationship between sports participation, sex, race/ethnicity, SES, parent education, and familial structure in children aged 9-10 who experimented with alcohol.

$H_1$2: There is a significant relationship between sports participation, sex, race/ethnicity, SES, parent education, and familial structure in children aged 9-10 who experimented with alcohol.

In this chapter, I explain the data collection process, the steps taken to analyze the data, and the results of the analyses.

Data Collection

Once I received approval from IRB and the NIH to receive the data, I downloaded the data onto a laptop, which was removed from any outside interference, including the Internet. The data for this analysis were collected during the baseline year of the ABCD study that started in 2016. The archival data were cleaned through the ABCD study. The study's sample size was 11,878 children between the ages of 9 and 10 years old. Upon receipt of the data from the NIH, it was found that some individuals in the sample did not complete or partake in a set of surveys utilized in this study. Those individuals who participated in the study were given a unique identity number and letters or PQUID. PQUIDs found to have data missing from the surveys utilized for this study were removed from the sample and analysis. After removing missing or refused variables, the sample was reduced to 10,387 children between the ages of 9 and 10. No other changes were made to the sample used in this study from the information the NIH released.

Due to the sparsity of the data and to attempt to make categories approximately the same size, I combined the "Asian" category in the race variable into "Other" when creating dummy variables. Similarly, within income, I combined incomes of less than $15,999 into one variable instead of the three that the ABCD provided to be closer to the size of the other categories. Two other income brackets were combined into a single

bracket, $16,000-$34,999, for the same reason, leaving a total of seven income brackets for the variable total combined family income.

The study sample, children aged 9-10 from across the country participating in the ABCD study, is representative of the population of children aged 9-10 (Gonzales et al., 2021). The ABCD study sample size was found to be 20% of the group of children ages 9-10 years old within the United States at the time of recruitment (Garavan et al., 2018). The demographic makeup of the ABCD study is congruent with the overall population of children ages 9- 10 years in the United States, which is consistent with the analysis's validity due to the diverse sample regarding both experiences and places individuals live. As these ABCD surveys and imaging practices had been utilized by other studies and approved by the IRB, there was minimal threat to validity as this study looked at previously collected data instead of data collected experimentally.

Covariates such as sex, race, SES, and family structure were utilized to control for their influence on sports participation and alcohol experimentation. When looking at these covariates, similar numbers of male and female participants fully participated in the surveys utilized for this study. Comparing the sample's race data to the United States, they are similar in distribution, which contributes to the validity and reliability of the sample (United States Census Bureau, 2023. Family structure data, on the other hand, were different from the national statistics in that 70% of households have a two-parental structure while 27% of children live in one-parent households within the United States, and within this study, two-parent households are 82% of the population, and single-parent households make up the other 18% (Federal Interagency Forum on Child and Family

Statistics, 2023). Income spread aligns with United States statistics collected by the Census Bureau (FIFCFS, 2023). Chi-squared analyses were conducted to test whether covariates, including sex, race, SES, and family structure, should be added to a regression analysis. They were all found to be significant and were then included in the logistic regression.

Results

The independent and dependent variables of sports participation and alcohol sipping, respectively, are both dichotomous, as well are two of the covariates, sex and familial structure. Two other covariates, SES and race, are categorical with seven categories for SES and four for race. Chi-squared assumptions include the fact that the sample is random and provides one data point for each person, and the variables are independent. Logistic regression assumes that the dependent variable is dichotomous and that the observations are independent. This study does not include any continuous variables.

Research Question 1

What is the relationship between organized sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study?

$H_0$1: There is no relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study.

$H_1$1: There is a relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study.

When exploring the variables for this study, a chi-squared analysis was first conducted to justify further investigation. The Chi-squared (χ^2) statistic was 51.299, and the p-value was less than .001. There is evidence to reject the null hypothesis that whether someone sipped alcohol or not is independent of playing sports. However, there is no directionality in a chi-squared analysis.

Table 1

Chi-Squared Test

Sport participation	Sipped alcohol No (*n*)	Yes (*n*)	Total (*n*)
No	3,161	785	3.946
Yes	4,763	1,678	6,441
Total	7,924	2,463	10,387

Further analysis was conducted using the two-way table of alcohol sipping and sports participation constructed from the dataset to calculate the odds and risk ratios. The odds of alcohol experimentation in those who played sports are 1.42 times higher than the odds of those who did not play sports participating in alcohol experimentation (Table 1). The risk ratio is 1.31, indicating that alcohol experimentation is 1.31 times as likely in those who play sports than those who do not.

Research Question 2

What is the relationship between sports participation and alcohol experimentation when controlling for the covariates of sex, race, SES, and family structure?

$H_0$2: There is no relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study when controlling for sex, race, SES, and family structure.

$H_1$2: There is a relationship between sports participation and alcohol experimentation in children ages 9-10 enrolled in the ABCD study when controlling for sex, race, SES, and family structure.

A logistic regression was performed to ascertain the effects of sex, race, SES, family structure, and sports participation on the likelihood that participants have experimented with alcohol. The logistic regression model was statistically significant, $\chi^2(4) = 27.402$, $p < .0005$ (Table 2). The model explained 40.0% (Nagelkerke R^2) of the variance in experimentation with alcohol and correctly classified 71.0% of cases. The references utilized for the variables followed median income ($50,000-$74,999k), White for race, and yes answers for both partner and sports (Table 2). The following values only hold true when other variables in the regression outcome are consistent. Females were 16% less likely to experiment with alcohol than males. The odds of a non-sport-playing participant are 11% lower than those who play sports in experimenting with alcohol. The family structure variable that looked at the number of parent figures found that the odds of a child from a single-parent household is 35% higher than a child from a two-parent in experimenting with alcohol. When using White as the reference for the race covariates, it was found that every other race had odds lower than the reference group: African American at 47% lower, Hispanic and "Other" at 13% lower than White (Table 2).

Table 2

Logistic Regression Results

Independent Variables	Coefficient	% Change in Odds	Significance
Sports (Ref = Yes)			
No	-.120	-11%	0.023
Sex (Ref = Male)			
Female	-.169	-16%	<.001
Partner (Ref = Yes)			
No	.298	35%	<.001
RACE (Ref = White)			
African American	-.638	-47%	<.001
Hispanic	-.140	-13%	.039
Other	-.134	-13%	.065
Income (Ref=%50,000-74,999)			
$0- $14,999	-.120	-11%	<.001
$15,000-$34,999	-.169	-16%	.023
$35,000- $49,999	-.227	-20%	.039
$75,000- $99,999	.048	3%	.591
$100,000-$199,999	.27	32%	<.001
$200,000+	.584	79%	<.001

Higher incomes were associated with an increased likelihood of experimenting with alcohol, while lower incomes were associated with a reduction in the likelihood of exhibiting alcohol experimentation (Table 2). In families that had an income of $200,000 or more, it was indicated that the odds were 79% higher to experiment with alcohol than median-income households (a combined income of $50,000-$74,999 as the reference). Following that, the odds of a child from a household that makes $100,000- $199,999 is 32% higher than the odds of a child from a household with a combined income at the reference value when it comes to experimenting with alcohol. Those who came from households that have an income of $75,000-$99,000 were found to be at 3% odds higher

of experimenting with alcohol. Those who came from households that have an income less than $50,000 were found to have lower odds of using alcohol, including 34% lower for incomes up to $14,999 and then 22% lower for those households that make up to $15,000-$34,999. Families that have an income of $35,000-$49,999 were indicated to have 20% lower odds of experimenting with alcohol.

Summary

Through the data analysis performed via a chi-squared test, a significant relationship was found between sports participation and alcohol experimentation. The odds ratio indicated that those playing sports had a higher likelihood of alcohol experimentation than those who did not participate in sports. While 25% of children from this sample have experimented with alcohol, it was found that there is a higher likelihood of alcohol consumption within sports participation. This suggests that children may learn through observation and mimicking of others around them, increasing experimentation practices, which is one of the main tenets of social learning theory.

Further tests completed via logistic regression indicated there was a significant relationship between alcohol experimentation and sports, as well as between covariates added that could also impact alcohol use. Demographic factors were considered through the logistic regression to identify risk factors that were found to be related to alcohol experimentation and sports participation. Data found within this study allow for relationships to be identified that can impact their use of alcohol. White Children from higher incomes and two-parent households were more likely to have experimented with alcohol compared to other races, one-parent households, and lower incomes. The number

of risk and protective factors a child is exposed to as young as 9 years old continues to grow as they progress through life milestones.

Chapter 5 includes the principle of social learning theory and the data found in this study, including how the topic was researched to increase awareness and education on alcohol experimentation outcomes and how the results tie into Bandura's theory. The interpretations of the findings will be discussed, as well as the study's limitations, with recommendations for future studies to overcome these limitations.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of the study was to gain insight into the prevalence of, patterns in, and factors influencing alcohol experimentation among children aged 9-10 who participate in organized sports. A cross-sectional design was used. The ABCD study collected quantitative data that was examined to determine the relationship between sports participation and alcohol experimentation in children ages 9-10. Using this data, as they were archival, limited the study's ability to determine a causal relationship. However, it was suitable to run a chi-square analysis to look at the association strictly between the two variables of interest: organized sports participation as the independent variable and alcohol experimentation as the dependent variable.

Through the analysis, it was found that there was a significant relationship between alcohol experimentation and sports participation, such that there was greater alcohol experimentation in those who participated in sports. When looking at covariates, it was determined that there was a significant relationship between sports participation and alcohol experimentation when controlling for the influences of race, family structure, SES, and sex in children aged 9-10 years old. The relationship between alcohol experimentation and sports participation also holds significance when controlling for the covariates.

Interpretation of Findings

After running a chi-square test, a relationship was found to be significant between alcohol experimentation and sports participation. However, a chi-squared test cannot

identify causality, as no directionality can be inferred. As this was a cross-sectional study using archival data, data were unavailable to identify which event occurred first. A logistic regression analysis with covariates indicated that there was significance found in sex, race, family structure, and SES with alcohol experimentation and sports participation. Even when controlling for all the covariates, the results were still significant in the relationships between sports participation and alcohol experimentation. While all covariates were significant, subsets of the variable were insignificant, such as "Other" within race and $75,000-$99,999 within SES.

One interesting factor was that the number of minorities (Hispanic, Black, and Asian) included within the sample and outcomes was small in comparison to White individuals. The study found that White individuals were twice as likely to experiment with alcohol compared to other races. However, compared to national averages and census information, the data analysis data aligns with the overall population disbursement and alcohol use (United States Census Bureau, 2023). Individuals who come from higher-income households were found to be more likely to have experimented with alcohol than those who came from lower-income households, especially those who participated in sports. Two-parent households were found to have a significantly higher number of children who had experimented with alcohol compared to their single-parent counterparts (Table 2).

Limitations of the Study

There are limitations when adding more categorical variables to a logistic regression; the model becomes less precise and hard to interpret (Xing & Xing, 2010).

The population proportions are similar when comparing the data in this study with United States census data and data from other research studies, making this study more valid and reliable. There are limitations to the study regarding the use of logistic regression. The dataset that was obtained from the ABCD study contained thousands of columns, each of which could have been used as a variable added to the regression model, assuming they were not collinear with another variable. However, adding too many variables to a regression model can lead to uninterpretable results. As such, variables previously mentioned in other studies or accepted widely by professionals in the field were selected to be added to the model as covariates. Because advanced variable selection techniques were unused in the analysis, it is possible that important or more explanatory variables were excluded from the model, thus limiting its accuracy.

Social bias and self-selection, as discussed in Chapter 1, are also limitations that need to be taken into consideration. When the sample for the analysis was created, those who did not complete the surveys were removed to reduce errors within SPSS. Social bias can be difficult to identify as the children within this study answer the questions with the assistance of a research aid who can clarify their questions regarding the surveys.

Recommendations

The results obtained through this analysis indicate that there could be other risk factors that were not explored within this study that can impact alcohol consumption and sports participation, such as peer relationships, religion, and exposure to adverse childhood events. Exploring other activities outside of organized sports participation, including individual sports, arts, music, and theater, to explore the significance of alcohol

experimentation within these activities can provide a further look into the relationship between alcohol and this age group. Within this age group, 23.7% of children have experimented with alcohol. When looking through the social learning lens, there is a need to address peer influence on alcohol experimentation. This can be done by utilizing the more recent data collected by the researchers working on the ABCD Social Development (ABCD, 2024). This could include data on the number of friends and close friends and their relationship with alcohol as well, or whether a child was bullied or not, with data for both of which included in the ABCD dataset.

Through the decades that followed the raising of the legal age of alcohol consumption, children have experimented with alcohol at a rate of 50% (Roodbeen et al., 2021). Jackson et al. (2015) found that children as young as 3 years of age had experimented with alcohol (7% of the sample), and the median age within their study of the onset of experimentation was 7.61 years old. Murray et al. (2021) found that by their senior year of high school, minors reported higher use of alcohol in those who participated in sports. The same study identified a need to explore further the difference between sports participation in junior and senior high school students and extracurricular activities (Murray et al., 2021). Hoffman (2006) found that those who participated in activities outside of sports were less likely to experiment with alcohol. It is important to continue the investigation into other activities outside of sports that children can participate in that could be associated with a decrease in the likelihood of alcohol or drug consumption.

Socio-economic status varied in results within many studies. Hoffman (2006) found that females with lower SES were more likely to use alcohol, whereas males were more likely to use it if they came from a higher SES. Andrabi et al. (2017) identified that children in lower SES are less likely to have access to substance-free activities and live in communities where there is high accessibility to substances, including alcohol and drugs. This study identified that children from higher SES were more likely to experiment with alcohol, which differs from Andrabi et al.'s (2017) findings and the data found about females in Hoffman's (2006) study but aligned with the male distribution found in Hoffman's study.

In this study, family structure was found to be significant in the case of a two-parent household, where having a two-parent household increased the likelihood of experimentation with alcohol. One possible explanation is that an increase in SES allows for alcohol to be more affordable within a two-parent household versus a single-parent home with a lower income (Khlat et al., 2020). Family structure and socioeconomic status also assist in making sports participation more accessible. Those who are at or below the poverty level may not have the resources to participate in sports, even if they are through school or club-like programs that do not cost money, as accessibility to gear and travel may impede the ability to participate (Vandermeerschen et al., 2015). Pasqualini et al. (2018) explored the onset of early alcohol consumption in children at the age of 14. They found that shifting from a two-parent household to a single-parent household increased early alcohol consumption by 80%. Addressing the many aspects of family structure, including shifting between the number of in-home parents and parental

education as well as socioeconomic status, indicates that there is a significant need to continue to explore the impact family structure has on a child's sports participation and alcohol use.

Prior studies have explored how perceived disapproval from peers can change a child's behavior toward alcohol, indicating that further exploration into peer relationships and their impact on sports participation and alcohol use needs to be considered. King et al. (2017) found that 42% of adolescent children grades 7-12 reported they used alcohol within the last year. The authors also found that there were sex differences between use, with females being less likely to use alcohol if there was a perceived peer disapproval. This lines up with King et al.'s (2017) study, which identified that one of the variables that could impact the use of alcohol in adolescence is perceived disapproval of alcohol use by peers. They found that although there were no changes when males were around their peers, females were found to be less likely to drink around their peers for fear of disapproval (King et al., 2017). This study was unable to do so due to the lack of questions in the ABCD study surveys involving peer relationships, specifically regarding alcohol consumption.

Following SLT, the guidance provided by family members and close relatives can often have a profound effect on the behavior of children (Habib et al., 2010). Close family structure has been found to indicate lower levels of adolescent alcohol use through various research studies (Habib et al., 2010; Holbert et al., 2020; Johnson et al., 2020). Children's ability to learn from their family and peers can create healthy protective factors through witnessing positive occurrences and social interactions versus negative

interactions such as disapproval, loss of respect from teachers and school, or severe consequences when caught using alcohol or drugs.

Studies that have been performed outside of the United States that have lower legal age requirements for consumption and purchase of alcohol have found little significance in longer-term or continued substance use after onset drinking use nor continued use of alcohol in children under the age of twelve (Skylad et al., 2022). European countries have continued to see a decline in the initiation of sipping alcohol due to their society becoming more health conscious (Inchey et al., 2018).

A significantly higher number of individuals in the study came from families with higher income levels, indicated by SES. To continue studying this further, focusing on the difference between higher and lower-income families and their vices would be essential in future research to further understand this age group. The relationship between family structure was also interesting in that our study found that participants from two-parent households were more likely to experiment with alcohol than those from a single-parent household. Addressing parental occupation and time spent at home could further identify the risks of alcohol experimentation in younger children.

Investigation also needs to occur to look at continued drinking into adulthood in those that start as children as well as the experimentation with other drugs, such as cannabis and narcotics, that can cause developmental and functional implications. Cohn et al. (2023) explored the recent trend of cannabis use among adolescents due to the laws around its use changing. They found that children trying alcohol first was more likely than using cannabis before or at the same time as alcohol (Cohn et al., 2023).

Further exploration using longitudinal data should be conducted to see if continued use occurs when participating in sports and activities or even multiple sports over seasons or years to identify relationships between them and alcohol experimentation. This could also help delineate between cases where the child started experimenting with alcohol before playing sports, and the opposite case where participation in sports came first. The information gathered through a longitudinal study can be used to follow a child throughout their life to identify risk, protective factors, and coping mechanisms.

Implications

Through this analysis, it was found that 16% of the sample of 10,387 children aged 9-10 years old experimented with alcohol and participated in sports. Several significant covariates increased the likelihood of alcohol experimentation, such as coming from a higher-income household, having two parental figures, and being male and White. As alcohol is the third leading cause of death in Americans, identifying and addressing possible causes for early experimentation can assist in decreased mortality from alcohol-related causes (AMPH, 2019).

Through the identification of risk and protective factors of activities that children participate in, schools and community organizations can implement education and programs that can assist children moving toward positive activities rather than experimenting with alcohol and/or other illicit substances. Alcohol consumption has been found to decrease academic performance and slow development in children; conversely, sports participation is beneficial to increase bone and muscle growth along with social skills and peer relationships. Continued use of alcohol can lead to further physical and

mental health problems and implications that can impact their community and family negatively (Skyslad et al., 2021). Physical health issues can occur, such as liver deterioration, cancer, cardiovascular issues as well as susceptibility to falling and injuring themselves (Gomez et al., 2023). Mental health disorders and issues can occur at a higher rate as individuals are less likely to take optimal care of themselves in they have begun binge drinking (Gomez et al., 2023). This can include an increase in depressive symptoms, lack of hygiene, increase in suicidal thoughts, and paranoia (Gomez et al., 2023). Worse, if there is no change to the behavior, the individual can die through a decline in their health or disease that occurs from continued use (AMPH, 2019).

Walczak et al. (2023) explored the connection between alcohol consumption of children aged 10-19 and their participation in sports. Their meta-analysis found that of the 19 studies based in the United States, 12 found a negative impact on children, where a child participating in sports was more likely to use alcohol than their non-sports playing counterpoints (Walczak et al., 2023). Our study lends credence to the findings of this study that indicate that there is a higher likelihood of children who play sports experimenting with alcohol. The implications of this study suggest that parents and community members support education and identification of risk factors that can decrease the experimentation of alcohol use. Through education, parents will be prepared to look for and be able to identify risk factors and symptoms of alcohol experimentation. Researchers have created programs that address concerns and ways to address children who have begun to experiment with alcohol to assist in decreasing consumption of

alcohol and address causes that could have caused that experimentation (Glenn et al., 2023).

Conclusion

While there was no directionality determined in this analysis, there is a relationship found between alcohol use and sports participation. With this knowledge, it can be assumed that further exploration of covariates' impact on sports participation and alcohol experimentation needs to occur to find further risk or protective factors. The ABCD study provides thousands of data sets; within this study, there was a focus on specific variables that are thought to increase or decrease the likelihood of alcohol expiration (ABCD, 2023). This study utilized a narrowed scope to begin the identification of risk or protective factors that are related to alcohol experimentation, and further studies can widen the scope to address variables such as adverse childhood events, peer interactions, parental behaviors, physical and emotional environment, type of school they attend, time spent without adults, religion, and siblings (May et al., 2022). This study utilized archival data to address the research questions. Still, there are specific variables that need to be addressed to further research on alcohol experimentation of children, which could be done through a study that focuses on timing and identifying the types of substances children use along with risk and protective factors.

The dataset indicates that children as young as 9 years of age have experimented with alcohol, which can cause significant harm to not only the child but also their family. The act of alcohol sipping or experimentation, as identified within this study, has been addressed in numerous studies with adolescent children above the age of 12 to attempt to

identify the onset of alcohol use (Jackson et al., 2015). This study looked specifically at children younger than previous studies to attempt to find and investigate the beginning of alcohol experimentation and factors that help or hinder the use of alcohol in children. It was found that 25% of the sample had experimented with alcohol at the age of 9 or 10; specific onset was not identified to see if the use had started before those ages. Further investigation into younger populations could create a more refined estimate of when alcohol use begins.

As children continue to be exposed to more people in their lives through school, sports, arts, dance, and possible changes in the family, there is a need to explore the behavior that children witness and take into practice because they have seen it by someone in their environment (Bandura, 1977). It is important that parents, teachers, and community members become aware of their actions and their children's actions and the impact they can have on those around them within the community. Observation and mimicking are some of the most common ways of learning, and they begin early in a child's life; exposure to negative behaviors can impact their well-being without recognition from others around them.

Alcohol and other substance use can cause a variety of issues with their health, education, family, and community interactions. As children continue to use alcohol, they can begin to have deficits in brain development and physical health (May et al., 2022). Continued use into adulthood can lead to loss of family, jobs, health, and financial stability (Skylstad et al., 2021). If use is not deterred, eventual death can occur, which can impact the individual's family and community negatively. Educational programs for

children and parental engagement can assist in making the community a protective factor for children to grow to their fullest potential.

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Appendix: Tables

Table A3

Family Structure

Alcohol	Sports No	Sports Yes	Total
Two Parents			
Yes	601	1458	2059
No	2436	3971	6407
Total	3037	5429	8466
One Parent			
Yes	184	220	404
No	725	792	1517
Total	909	1012	1921

Table A4

Gender Crosstabs Layered

Alcohol	Sports No	Sports Yes	Total
Male			
Yes	308	1063	1371
No	1117	2895	4012
Female			
Yes	477	1678	1092
No	2044	1868	3912
Total	3946	6441	10387

Table A5

Race Crosstabs Layered

Alcohol		Sports No	Sports Yes	Total
White				
	Yes	434	1145	1579
	No	1327	2889	4216
African-American				
	Yes	87	92	179
	No	638	536	1174
Hispanic				
	Yes	103	204	307
	No	430	576	1006
Other				
	Yes	103	204	307
	No	430	576	1006
Total		3946	6441	10387

Table A6

Income Crosstabs Layered

Alcohol	Sports No	Sports Yes	Total
up to $15,999			
Yes	81	52	133
No	494	306	800
$15,000-$34,999			
Yes	102	83	185
No	500	392	892
$35,000-$49,999			
Yes	71	87	158
No	386	344	730
$50,000-$74,999			
Yes	71	187	315
No	477	658	1135
$75,000-$99,000			
Yes	111	240	351
No	431	754	1185
$100,000-$199,999			
Yes	214	681	895
No	694	1673	2367
$200,000+			
Yes	78	348	426
No	179	636	815
Total	3946	6441	10387

Table A7

"Yes" Alcohol Sip and Sports Participation percentage

Category		Percentage	Number
Sex			
	Male	63%	1063
	Female	37%	615
Two Parents			
	Yes	87%	1458
	No	13%	220
Race			
	White	62%	1045
	African American	5%	92
	Hispanic	14%	237
	Other	12%	204
Income			
	$5,000- $14,999	3%	52
	$15,000- $34,999	5%	83
	$35,000- $49,999	5%	87
	$50,000-74,999	11%	187
	$75,000- $99,999	14%	240
	$100,000-$199,999	41%	681
	$200,000+	21%	348