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Walden University

College of Health Sciences and Public Policy

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Angela Matthew

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Review Committee
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Dr. Roberta Emetu, Committee Member, Public Health Faculty
Dr. Loretta Shields, University Reviewer, Public Health Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2022

Abstract

Comparative Study of Risky Sexual Behaviors in African American Adolescents Who Use Drugs and Alcohol

By

Angela Matthew

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

February 2023

Abstract

Sexually transmitted infections (STIs) are a major public health problem in the United States. Adolescents are a high majority of these cases, with African American adolescents being affected disproportionally. Previous research has shown that risky sexual behaviors, such as non-condom use, multiple sexual partners, early initiation of sexual intercourse, and alcohol or marijuana use before sexual intercourse put adolescents at a higher risk of contracting an STI when they are sexually active. These behaviors can be observed through the theoretical framework of the problem behavior theory that describes the constructs of why individuals engage certain behaviors. How alcohol and drug use affect risky sexual behaviors of adolescents is evaluated in this study. The Youth Risk Behavior Surveillance System data collected between 2015 and 2017 in Florida were analyzed and compared to see if there was an increase or decrease in these behaviors when under the influence of alcohol and drug use. Logistic regression was used to analyze the data. Results shows that risky sexual behaviors and alcohol and marijuana use were correlated in both 2015 and 2017, and these relationships persisted in 2017. These results can give insight into the degree of impact that programs in Florida have on adolescents and whether they should be continued or improved upon so that more adolescents are reached. These results could also be used in school counties to try to help address the needs of their student population by not only showing them how to access programs in Florida but to also educate adolescents about risky behaviors.

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November 2022

Dedication

I dedicate this PhD to my husband, Leston Matthew, and my daughters, Lexi, and Asha Matthew. All of you have sacrificed so much so that I could continue my educational journey, and I know I could have never made it to this point without all your encouragement and support. Leston you were my rock throughout this process when I felt like giving up you were right by my side pushing me forward. Lexi, your birth saved me and gave me the courage to start college and make a better life for you. I wanted you to have someone you could look up to and that you saw no matter how hard it gets to never give up on your dreams. I also would like to thank my mom, Angelika Lyons. Although you may not have fully understood what I was doing, you knew how important it was to me. You asked about the process and always had words of encouragement. You have always believed in me, and I can never thank you enough for that.

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Chapter 1: Introduction to the Study

Introduction

Sexually transmitted infections (STIs) have been a public health issue for many years across the globe. They have a major impact on the reproductive and sexual health of adolescents worldwide (World Health Organization [WHO], 2016). There are more than 30 different viruses, bacteria, and parasites that can be transmitted through sexual contact (WHO, 2016). Most STIs are transmitted by contact with infected fluids such as semen or vaginal fluids. They can also be transmitted by contact with infected skin or mucous membranes (Center for Young Women's Health [CYWH], 2019c). There are some STIs that can be spread through blood and even some from mother to child during pregnancy or birth (WHO, 2016). The greatest incidence of STIs is linked to eight pathogens: Syphilis, chlamydia, gonorrhea, trichomoniasis, herpes simplex virus (HSV), hepatitis B, HIV and human papillomavirus (HPV) (WHO, 2016). Syphilis, chlamydia, gonorrhea, and trichomoniasis are all curable diseases but herpes simplex virus, hepatitis B, HIV, and HPV are all incurable. There are exceptions to this, with some strains of gonorrhea having a resistance to antibiotics which can make treatment more difficult (Mayo Clinic, 2019). HBV and HPV are preventable with vaccines that are available through a medical office (CYWH, 2019a, 2019b). The Department of Public Health regulates the reporting of five STIs: gonorrhea, chlamydia, syphilis, neonatal herpes, and chancroid (Department of Public Health [DPH], 2019). These surveillance programs allow public health officials to evaluate where the problem areas are and then try to develop an initiative that will help decrease the number of outbreaks of these diseases.

Statistics of STIs

In the world, there are more than one million STIs that are transmitted each day (WHO, 2016). It is estimated each year that there are 357 million infections of syphilis, chlamydia, trichomoniasis, and gonorrhea in the world (WHO, 2016). In middle–and low–income countries, it can be challenging to control STIs and the risky sexual behaviors that contribute to their transmission (Gottlieb et al., 2014). A large majority of these STIs are asymptomatic or have very mild symptoms that can be mistaken for other illnesses. HSV is one STI that an individual can go without symptoms sometimes their whole life and they might not even be aware that they are infected (American Sexual Health Association [ASHA], 2019). In the world, there are more than 500 million individuals that are infected with Herpes simplex virus in their genital areas (Gottlieb et al., 2016; WHO, 2016). The WHO (2015) estimated that 417 million individuals between the ages 15–49 years old were infected with HSV. Many of these STIs also increase the risk of acquiring HIV (WHO, 2016).

STIs are also a major problem in the United States and the Centers for Disease Control and Prevention (CDC) estimate that there are almost 20 million newly transmitted infections that are occurring each year (CDC, 2016). Another concern is that the number of infections annually cost the United States an estimated 16 billion dollars (CDC, 2016). ASHA (2018) states that 24,000 women each year become infertile because they are not aware of having an STI because they do not get tested which is an important aspect of getting this epidemic under control. HPV will affect 80% of the population that are sexually active at some point in their life (ASHA, 2018). Since the

vaccine was introduced, there has been a decrease in females of 64% that are between the age of 14 to 19 years old (ASHA, 2018; Braverman, 2019). HSV infection is also very common in the United States with one in six individuals having genital herpes (ASHA, 2018). In 2015, the three STIs that are most commonly reported which are syphilis, gonorrhea, and chlamydia. Chlamydia cases that were reported was the highest number ever reported at 1.5 million cases (ASHA, 2018). The CDC also reported that 1.1 million individuals have HIV in the United States but 1 in 7 are not even aware that they are infected with the virus (ASHA, 2018). In recent years the incidence of HIV infection has been decreasing but not in certain populations that are considered vulnerable such as ethnic minorities, adolescents, and individuals in the Southern part of the United States (Weinstein, Otto & Cohen, 2017).

In the United States, adolescents make up a large majority of the individuals that are infected with STIs. Adolescents between ages 15 and 24 account for almost half of the 20 million new cases that are reported each year (Office of Adolescent Health, 2016). Many STIs have no obvious signs so it is imperative that sexually active individuals get tested. Two in five adolescents that are sexually active in the United States have an STI that can cause them to be infertile or death (Office of Adolescent Health, 2016). In 2016, there was a total of 1,008,403 cases reported of chlamydia in adolescents between the ages 15–24 years old which represented about 63% of all reported cases of chlamydia (CDC, 2017). There was also an increase in chlamydia cases of 4% in adolescents between the ages of 15 and19 years old (CDC, 2017). In the case of the STI gonorrhea, adolescents and young adults had an increase of reported infections of 11.3% which was

540.8 cases per 100,000 in females and 455.3 cases per 100,000 in males (CDC, 2017). The CDC reported in 2009 that 6.7% of the 1,148,200 individuals that were living with HIV were adolescents (Ellis, 2016). It was also reported that out of that 6.7%, 60% of them were African American adolescents (Ellis, 2016).

The Southern region of the United States had the highest reported cases of STI's (CDC, 2017). Syphilis is another reportable infection which had an increase of cases in 2016 of 13% in adolescents between 15 and 19 years old (CDC, 2017). HIV is also prevalent in the adolescent and young adult population with 22% of the new HIV diagnoses falling in this age range (CDC, 2017). In Florida, adolescents, and young adults between the ages 15 and 29 accounted for three out of four reported cases of STIs (Florida Health, 2019). Over half of the reported STIs reported in Florida were from individuals that were under 25 years old (Florida Health, 2019). In 2015, adolescents between 15–24 years old accounted for 13% of Florida's population but they also accounted for 64% of the reported cases of chlamydia infections (Florida Health, 2019).

Other groups of individuals are disproportionally affected by STIs including adolescents who are men who have sex with other men (MSM) (CDC, 2018; McCree et al., 2017). In 2014, there were a total of 722, 244 individuals that transmitted HIV, and of those 70% were attributed male–to–male sexual contact (CDC, 2018). There was a total of 230, 260 females that contracted HIV and of those 74% were contributed to heterosexual sexual contact (CDC, 2018). African Americans were the largest ethnic group that was affected by HIV including male–to–male sexual contact (CDC, 2018; McCree et al, 2016). In 2018, there was a total of 37,832 new HIV diagnoses in the

United States, 42% of these new cases were African Americans and 31% of those were contracted through male–to–male sexual contact (CDC, 2018).

Risky Sexual Behaviors

Adolescents and young adults when compared to older adults are at a higher risk of acquiring STIs because of cultural, behavioral, and biological reasons (CDC, 2017). Some common risk factors of risky sexual behaviors and alcohol and drug use are poverty, peer pressure, lack of school connectedness, lack of parental involvement, and family history (CDC, 2018). Risky sexual behaviors are one of the main risk factors for the transmission of STIs. Risky sexual behaviors include multiple partners, condom use, and early age of first sexual intercourse. In 2015, United States high school students were surveyed through the YRBS and 41% of them had reported that they have had sexual intercourse (CDC, 2017). The adolescents that had reported having sexual intercourse 30% of them had had this sexual encounter in the last three months (CDC, 2017). Of these adolescents 43% did not use a condom during their last intercourse, 14% did not use any method that would prevent pregnancy including condoms, and 21% had either used drugs or alcohol during their last sexual encounter (CDC, 2017). The YRBS was also administered in 2017 and of the high school students surveyed 40% had sexual intercourse and 10% had four or more partners (CDC, 2019). The students that were sexually active within the last 3 months of taking the survey, 46% of them did not use condoms (CDC, 2019). Nineteen percent of these students had used drugs or alcohol while being sexually active (CDC, 2019). Since 2003, there has been a decrease in condom use among adolescents from 63% to 57% in 2015 (Child Trends, 2019). Males

were more likely to use condoms than females. African American males were 27 times more likely to use condoms than African American females (Child Trends, 2019.). In 2015, 11.5% of high school students reported having four or more partners since they have been sexually active (Resource Center for Adolescent Pregnancy Prevention [ReCAPP], 2018). Males are more likely than females to have had multiple partners (ReCAPP, 2018). In this same survey, males were more likely to report having sex before the age of 13 than females and 3.9% of all adolescents in this survey had reported having sexual intercourse before they were 13 years old (ReCAPP, 2018).

The FDA approved oral preexposure prophylaxis (PrEP) that can be given to uninfected individuals to prevent them from contracting HIV in 2012 (Weinstein et al., 2017). There were concerns about this drug because it was felt by AIDS Healthcare Foundation that it would be difficult to implement this drug because of barriers that are found in the healthcare system (Weinstein et al., 2017). Healthcare barriers included poor adherence and that it would increase the transmission of STI because there would be an increase in risky sexual behaviors (Walker, 2019; Weinstein et al., 2017). African Americans account for about 45% of the new HIV infections in the United States and only about 10% of this ethnic group has a prescription for PrEP (Weinstein et al., 2017). A study was done in Australia that showed there was an increase in the incidence of STIs in individuals after starting PrEP (Walker, 2019). Other studies have reported contradictory data about risky sexual behaviors and the use of PreP (Walker, 2019).

Drug and Alcohol Use

Alcohol use is also a major public health issue among adolescents along with risky sexual behaviors. Adolescents abuse alcohol more than any other substance (National Institute on Alcohol Abuse and Alcoholism, 2017). Adolescents reported that by age 15, 33% had already had at least one alcoholic drink (National Institute on Alcohol Abuse and Alcoholism, 2017). When the adolescents reached the age of 18, 60% had reported having at least one alcoholic drink (National Institute on Alcohol Abuse and Alcoholism, 2017). Binge drinking is defined as an individual having five or more drinks for males or four or more drinks for females on the same occasion. Binge drinking among adolescents and young adults account for more than 90% of the alcohol they consume (National Institute on Alcohol Abuse and Alcoholism, 2017). In the past month, 5.1 million adolescents reported binge drinking in the last month and 1.3 million adolescents reported binge drinking in the last month on five or more days (National Institute on Alcohol Abuse and Alcoholism, 2017). The use of alcohol can hinder an individual's judgment and perception of risk which can make them more likely to partake in risky sexual behaviors (Office of Adolescent Health, 2019).

Drug use can have the same negative effects that alcohol use can have on individuals (Office of Adolescent Health, 2019ac). Depending on the drug this can alter the adolescent's judgment and decision–making skills which makes them more likely to behave in a manner that puts them at a higher risk of negative outcomes (Office of Adolescent Health, 2019ac). There are several different categories of drug use from using marijuana, prescription drugs, or street drugs such as meth, cocaine, or heroin (Cerda et

al.,2018). Adolescents reported that by 12th grade over half have used an illicit drug at least once (Office of Adolescent Health, 2019a). The most commonly used drug of adolescents is marijuana, which can also change the individual's ability to make sound decisions and lead to adolescents participating in riskier sexual behaviors. Marijuana is more accepted in the adolescent community because it is believed that it is not harmful to individuals. Marijuana use has short and long–term effects such as memory loss, increased heart rate, and anxiety attacks (Child Trends, 2016). These negative effects of marijuana use can cause adolescents to participate in negative behaviors such as more drug use, alcohol use, and risky sexual behaviors. Under federal law, marijuana is illegal in the United States, but some states have passed laws legalizing either medicinal or recreational use (Office of Adolescent Health, 2019c). Twenty–nine states have legalized marijuana use for medicinal purposes and eight states have legalized it for recreational use (Carliner et al, 2017). A study was done on medical marijuana legalization, and it was reported that adolescent use of marijuana did not increase once it was legalized (Carliner et al, 2017; Hasin et al., 2015).

Problem Statement

Risky adolescent sexual behaviors include engaging in sexual activity with multiple partners, lack of condom use, and early initiation of sexual intercourse (CDC, 2016). In the United States, risky sexual behaviors are a major public health issue that has a plethora of data that has been collected for many years (CDC, 2016; Child Trends Data Bank, 2014; Medscape, 2014). A survey conducted in 2015 reported that 41% of the adolescents have had sexual intercourse in the past three months (CDC, 2016), with 43%

of sexually active teens not using condoms and 14% not using any type of contraception. Males reported having slightly more sex than females at 35% and 33% respectively (Child Trends Data Bank, 2014). In the United States, African American students are more likely than Caucasian students to state that they are sexually active (Child Trends Data Bank, 2014).

The YRBS is a survey administered by the CDC every 2 years to assess different risky behaviors of adolescents in the United States. This survey has adolescents from public and private high schools report risky behaviors including alcohol use, drug use, risky sexual behaviors, obesity, physical activity, tobacco use, and injuries. The YRBS in 2015 stated that 33% of the high school students drank some type of alcohol in the last 30 days and of these high school students 18% binge drink (CDC, 2016). CDC (2016) also reported that 30 days before the survey was administered that 32.8% had drunk alcohol and 21.7% had used marijuana. Alcohol consumption can lead to individuals having impaired judgment which can increase the likelihood of an individual exhibiting risky sexual behaviors (Office of Adolescent Health, 2019). The National Survey on Drug Use and Health in 2015 also reported that 20% of adolescents between the ages 12 and 20 years old were drinking and 13% of them were binge drinking (CDC, 2016).

Studies have reported that adolescents that use drugs and alcohol are more likely to exhibit risky sexual behaviors which put them at a higher risk for STIs and unintended pregnancies (Hops et al, 2011). In Florida, 33.1% of female adolescents and 32.7% of male adolescents reported drinking alcohol within the last 30 days (CDC, 2015). Marijuana use was also assessed and 35.6% of females and 37.4% of males have reported

using it in the past (CDC, 2015). Risky sexual behaviors were also included in the questionnaire and adolescents reported being sexually active at 25.5% and 29.3%, females and males respectively (CDC, 2015). In Florida, female adolescents reported having sexual intercourse without a condom more than males, but more males reported drinking alcohol or using drugs before there last intercourse (CDC, 2015). There has been no comparison of the 2015 and 2017 data collected from the YRBS to evaluate if this public health issue has decreased or increased in adolescents especially in African American adolescents which have shown is disproportionally more effected then other ethnic groups. There is a disproportionally high STI rate in African American adolescents, especially in the Southern United States. A comparative study of the YRBS from 2015 and 2017 can determine if alcohol and drug use have increased or decreased since the previous YRBS and if there is still an association with risky sexual behaviors with individuals under the influence.

Purpose of the Study

The purpose of this study was to explore the correlations between risky sexual behaviors and alcohol and drug use in African American adolescent populations of Florida. Risky sexual behaviors include multiple partners, condom use, and early age of initiation of sexual intercourse. I evaluated the data from the YRBS that was administered in 2015 and 2017. The independent variables of this study were gender, age, the region of residence (metropolitan and rural), ethnicity, and risky sexual behaviors. The dependent variables were alcohol and marijuana use. Alcohol consumption included any type of beverage that contains alcohol, and drug use included marijuana and synthetic drugs. I

also evaluated the relationship between ethnicity, region, and gender risky sexual behaviors and alcohol and drug use of adolescents.

Research Questions and Hypotheses

Research Question 1 (RQ1): Is there a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse)?

Null Hypothesis ($H_0$1a): There is no association between age of first alcohol drink and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).,

Alternative Hypothesis (H_a1a): There is an association between age of first alcohol drink and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).

Null Hypothesis ($H_0$1b): There is no association between the frequency of alcohol consumption and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).

Alternative Hypothesis (H_a1b): There is an association between the frequency of alcohol consumption and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).

Null Hypothesis ($H_0$1c): There is no association between the frequency of binge drinking and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).

Alternative Hypothesis (H_a1c): There is an association between the frequency of binge drinking and adolescent exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Research Question 2 (RQ2): Does the relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents?

Null Hypothesis ($H_0$2a): There is no association between age of first alcohol drink and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Alternative Hypothesis (H_a2a): There is an association between age of first alcohol drink and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Null Hypothesis ($H_0$2b): There is no association between frequency of alcohol consumption and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Alternative Hypothesis (H_a2b): There is an association between frequency of alcohol consumption and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Null Hypothesis ($H_0$2c): There is no association between frequency of binge drinking and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Alternative Hypothesis (H_a2c): There is an association between frequency of binge drinking and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Research Question 3 (RQ3): Is there a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse)?

Null Hypothesis ($H_0$3a): There is no association between frequency of marijuana use and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Alternative Hypothesis (H_a3a): There is an association between frequency of marijuana use and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Null Hypothesis ($H_0$3b): There is no association between age of first marijuana use and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Alternative Hypothesis (H_a3b): There is an association between age of first marijuana use and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Null Hypothesis ($H_0$3c): There is no association between frequency of marijuana use in the last 30 days and adolescents exhibiting risky sexual behaviors (sexually active,

sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Alternative Hypothesis (H_a3c): There is an association between frequency of marijuana use in the last 30 days and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Research Question 4 (RQ4): Does the relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse) differ by socio–demographic characteristics of the adolescents?

Null Hypothesis ($H_0$4a): There is no association between frequency of marijuana use and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Alternative Hypothesis (H_a4a): There is an association between frequency of marijuana use and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Null Hypothesis ($H_0$4b): There is no association between age of first marijuana use and adolescents' risky sexual behaviors (sexually active, sexual partners in their

lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Alternative Hypothesis (H_a4b): There is an association between age of first marijuana use and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Null Hypothesis ($H_0$4c): There is no association between frequency of marijuana use in the last 30 days and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Alternative Hypothesis (H_a4c): There is an association between frequency of marijuana use in the last 30 days and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

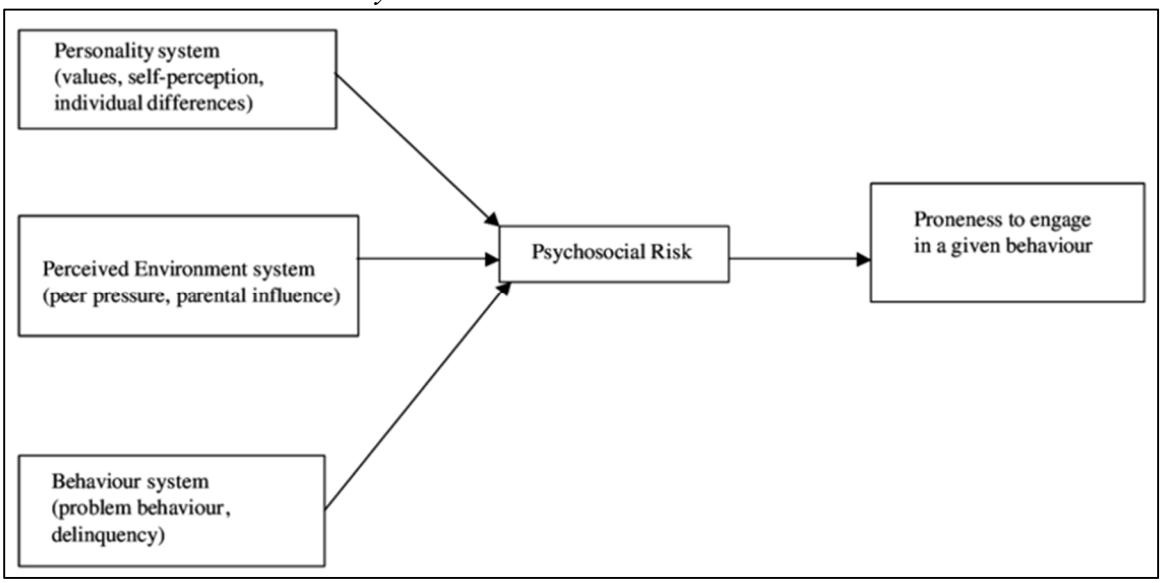
Theoretical Framework

Problem behavior theory was originally developed to study the abuse of alcohol and other problem behaviors in a tri–ethnic small community (Jessor, 1987). Since the original use of this theory, it has been used to assess drug use, tobacco use, and other risky behaviors in adolescents. There are three constructs of this theory: perceived–environment, behavior, and personality (Bryan et al., 2012). The approval of peers and the disapproval of the parental figures and other environmental factors play a role in the perceived–environment construct (Bryan et al., 2012; Neppl et al., 2016). The personality system includes external behaviors and impulsivity that are exhibited by adolescents. The last construct of behavior states that adolescents that engage in problem behaviors will usually engage in other problem behaviors (Bryan et al., 2012). This last construct could explain the associations between alcohol consumption and drug use with risky sexual behaviors that have been explained in previous studies. These constructs could also clarify why adolescents make the decision of drinking in excess or using drugs and using these before having sexual intercourse. These behaviors can alter their decision making and could play a role in the risky sexual behaviors that are exhibited by these adolescents. Adolescents tend to seek the approval of their peers and can make poor decisions to try to fit–into the crowd they perceive as popular (Neppl et al., 2016). If the adolescent's peers are participating in certain behaviors, they will be more likely to follow along regardless of if they know the behavior is dangerous because they seek acceptance (Neppl et al., 2016). Adolescents that display a personality with impulsivity can lead them to make decisions without thinking of all the consequences that are associated with the behavior

(Bryan et al., 2012). The last construct of behavior explains that adolescents that engage in problem behaviors will most likely engage in other problem behaviors which could explain past associations with alcohol and drug use with risky sexual behaviors (Bryan et al., 2012).

Figure 1

The Problem Behavior Theory



Note. Adapted from "The Theory of Planned Behavior," by Ajzen, 1991, *The Canadian Journal of Human Sexuality,* Figure 2, p 41.

Nature of the Study

I used a quantitative design to investigate the results of the YRBS, which is administered to high school students at random throughout the United States every 2 years. The students that participate in this survey must be attending public or private high school. The YRBS is a survey that is administered by the CDC, and it addresses public

health issues such as behaviors that contribute to unintentional injuries and violence, sexual behaviors, alcohol and drug use, tobacco use, unhealthy dietary behaviors, and inadequate physical activity (CDC, 2016). I focused on the sections of the YRBS that include sexual behaviors and alcohol and drug use. In this correlational study, I evaluated the possible relationships between alcohol and drug use and risky sexual behaviors of African American adolescents in Florida that reside in either metropolitan or rural areas within the state. I compared the data from the YRBS of 2015 and 2017 to see if there has been an increase or decrease in the relationship between the use of drugs and alcohol and risky sexual behaviors.

There have been several studies that have shown the correlation between alcohol and drug use and risky sexual behaviors in adolescents especially African American adolescents (Bryan et al, 2012; Dir, Coskunpinar, 2014; Ellis, 2016; Kerr et al, 2015). These adolescents are affected by these behaviors disproportionally compared to other racial groups in this age range. This study will evaluate African American adolescents that live in urban and rural areas and gender to see if there has been an increase or decrease in that relationship among this population between 2015 and 2017. The independent variables will be risky sexual behaviors and sociodemographic characteristics. The risky sexual behaviors include condom use, multiple partners, and early initiation of sexual intercourse. The dependent variables are alcohol use and marijuana use.

The YRBS administers the questionnaires to both public and private schools throughout all 50 states and the District of Columbia (CDC, 2016). The CDC used a

three–stage cluster sample design that produced a nationally representative sample of students that are in public or private high school and are in 9th through 12th grade (CDC, 2016). The first sampling cluster was for the counties that would receive the questionnaire. The second sampling cluster randomly chooses high schools in the public and private sector and the third sampling cluster randomly chose classes and grades that would participate in the survey.

Operational Definitions

Adolescents: An individual that is between the ages of 13 and 19 years old.

Alcohol use: Consumption of alcohol or any beverage that has alcohol content.

Binge drinking: When an individual consumes 5 or more beverages in a single period.

Drug use: Use of either marijuana or synthetic drugs.

Risky Sexual Behaviors: Includes behaviors such as multiple partners, condom use and early initiation of sexual intercourse

Assumptions, Delimitations, Scope, and Limitations

Assumptions

It is assumed that the study instrument was reliable and valid based on the CDC's use of this questionnaire in the past. It is also assumed that the questions were validated and were effective to collect the appropriate data on risky sexual behaviors, alcohol use, and drug use. This study also assumed that the participants answered each question honestly and to the best of their ability at that time. Finally, it was assumed that the

sample size was sufficient to represent the adolescent population in Florida and that all participants voluntarily participated in the questionnaire.

Delimitations

This study was delimited to adolescents that could read and speak English and that were attending either a public or private high school in the state of Florida. Adolescents had to be currently enrolled in a school and were in 9th through 12th grade. Adolescents that were not present the day the survey was administered and ones that were not currently enrolled in a public or private high school were excluded from the study.

Scope

In my study, the data was compared from the YRBS that was administered in 2015 and 2017 to adolescents that were enrolled in public and private high schools. This study investigated if the relationship between drug and alcohol use was still associated with risky sexual behaviors in adolescents. My research focused my study on adolescents that were African American and compared urban and rural areas of residence.

Limitations

In this study, it was limited to adolescents that were surveyed by the CDC and that were enrolled in public or private high school. This survey has students' self–report which could lead to an increase in social desirability bias and recall bias. The associations that are described in this study are only from a single point in time.

Significance of Study

Risky sexual behaviors exhibited by teenagers have been a public health issue for many years and there have been numerous studies that have addressed different aspects

of these behaviors (Lepusie, Radovie–Radoveie, 2013; Office of Adolescent Health, 2019; Ritchwood et al, 2017). The YRBS is a questionnaire that is given by the CDC every two years to high school students (CDC, 2016). The last two years that this survey was administered was in 2015 and 2017 (CDC, 2016). This study will compare data from these two years to see if there has been any change in alcohol and drug use with risky sexual behaviors. The information that is analyzed will allow researchers the opportunity to evaluate if there has been a change and if so, is it a positive or negative change. If changes are found, then the data can be used as a platform to develop new strategies that can address this public health issue. This study can be significant because it can be further evidence that interventions need to be developed to address excessive drinking in adolescents. The CDC reported that adolescents that usually drink are obtaining alcohol from others such as parents or guardians (Esser et al., 2017). Further initiatives can help decrease the ways that adolescents are getting their alcohol or drugs. Education programs can be implemented in school systems that educate adolescents on the effectiveness of decision making when under the influence on drugs and alcohol and how these factors are predictive of risky sexual behaviors.

Summary

Risky sexual behaviors of adolescents have been on the radar of public health officials for many years. The rate of STIs has decreased over the last few years but there is still a high incidence of STIs in adolescents. Adolescents still hold the highest rate of new cases of HIV than any other age group especially African American and gay and bisexual men. There are about 20 million new cases of STIs reported each year and

almost half of them were between 15–24 years old (Office of Adolescent Health, 2019). In Florida, adolescents and young adults accounted for three out of four reported cases of STIs (Florida Health, 2019). The YRBS that was administered in 2015 reported that 41% of high school students reported having sexual intercourse and 21% of them had used drugs or alcohol during there last sexual intercourse (CDC, 2017). Drugs and alcohol can hinder an individual's judgment and decision–making skills which can lead them to make decisions that they might not normally make or cause them to have a false sense of security concerning negative consequences of sexual intercourse (Office of Adolescents Health, 2019).

Alcohol and drug use are another public health issue in adolescents that has been associated with risky sexual behaviors. Adolescents reported that by 12th grade over half had used an illicit drug at least once (Office of Adolescent Health, 2016). Alcohol consumption is also reported in adolescents by 15 years old 33% had already consumed at least one alcoholic beverage and by 18 years old 60% had consumed an alcoholic drink (National Institute on Alcohol Abuse and Alcoholism, 2017). In Chapter 2 risky sexual behaviors and drug and alcohol use are further explained along with their associations in previous studies.

The problem behavior theory is used in this study to describe why adolescents choose to use drugs, alcohol and partake in risky sexual behaviors. The problem behavior theory was first developed to study alcohol abuse and other problem behaviors (Jessor, 1987). The three constructs of this theory are behavior, personality, and perceived

environment. Further discussion of this theory and how it is applied in this study is found in Chapter 2.

Chapter 2: Literature Review

The Consequences of Risky Sexual Behaviors

Risky sexual behaviors are behaviors that put individuals at a higher risk for negative health outcomes (Dalmida et al., 2018; Hulland et al., 2015; Pittiglio, 2017; Respress et al., 2018; Voisin et al., 2014). Several risky sexual behaviors that are common in the general population are multiple sexual partners, condom use, and early initiation of sexual intercourse (CDC, 2016; Dalmida et al., 2018; Dir et al., 2014; Voisin et al., 2014). Many factors play a role in whether an individual will exhibit these behaviors such as age, gender, ethnicity, alcohol and, drug use, and whether they live in an urban or rural area. In this study, I focused on African American adolescents living in Florida that have a history of drug and alcohol use and who are already sexually active.

Age is a major contributor to negative sexual health outcomes because the younger the individual is, the less likely they are to have the attitude and knowledge to know what risky sexual behaviors are and will tend to copy the social norms from their environment (Cox et al., 2014; Dalmida et al., 2018; Hulland et al., 2015). Dalmida (2018) reported that during adolescence, significant changes are occurring in social environments and neural, which can affect their behaviors. Adolescents tend to start to explore their sexuality during this time, and the negative or positive reactions they receive from parents or peers will influence their attitude towards sexual intercourse (Cox et al., 2014; Hulland et al., 2015). Another influencing factor is their school connectedness. Respress et al. (2018) reported that adolescents who have higher grades were more likely to practice safe sex or stay abstinent and not use drugs.

In the United States population, adolescents only account for 12% of the population (ACT for Youth, 2019). Adolescents and young adults account for 25% of individuals that are sexually active in the United States, but this age group makes up over half of the newly reported sexually transmitted infections (Dalmida et al., 2018; Dir et al., 2014; Ya–Huei et al., 2017). Gender is another component of risky sexual behavior, and females develop and hit puberty about 1 year before males hit puberty (Cox et al., 2014). On the contrary, even if females hit puberty before males, they are still less knowledgeable about STIs (Voisin et al., 2012). A previous study shows a linkage with high levels of sexual sensation–seeking and risky sexual behaviors among female adolescents (Jackson et al., 2015; Ritchwood et al., 2014). Another study states that males usually play a more dominant role in relationships so they can influence decisions such as condom use and other means of protection (Ritchwood et al., 2014). Pubertal development is linked with cognitive development, so that lack of cognitive development would explain the lack of understanding or knowledge of the negative outcomes of being sexually active (Chung et al., 2017; Cox et al., 2014; Dalmida et al., 2018). When adolescents are receiving information about sexual activities from many different sources, they are more likely going to listen to the information that they receive from their peers (Shepard et al., 2017).

Race is another feature that is associated with risky sexual behaviors (Dalmida et al., 2018; Hulland et al., 2015; Mustanski et al., 2013; Pittiglio, 2017; Ya–Huei et al., 2017). African American adolescents have a disproportionally higher rate of engaging in risky sexual behaviors (Pittiglio, 2017; Repress et al., 2018; Ritchwood et al., 2016; Sales

et al., 2012). African American adolescents also have higher rates of HIV, more sexual partners over their lifetime, higher sexual frequency, earlier age of initiation of sexual intercourse and lower usage of condoms (Dalmida et al., 2018; Dir et al., 2014; Repress et al., 2018; Voisin et al., 2014). One study reported that African American adolescents account for 63% of new infections among the age group 13 to 19 years old (Ya–Huei et al., 2017). Previous studies have reported that African American females have a higher rate of STIs, and risky sexual behaviors compared to their Hispanic and Caucasian counterparts (Hulland et al., 2015; Pittiglio, 2017; Ritchwood et al., 2014; Voisin et al. 2014). Other studies have shown that being involved in school and having good relationships with parents have had a positive effect on lowering the occurrences of risky sexual behaviors (Hill & Mrug, 2015; Maslowsky et al., 2015; Park et al., 2018; Su & Supple, 2016; Vidourek et al., 2017; Zaharakis et al., 2018). There have also been studies that have reported that socioeconomic status, region of where they live, low acceptance of homosexuality, single–family households, no father involvement, and drug and alcohol use all negatively affect the rate of risky sexual behaviors in African American adolescents (Hulland et al., 2015; Mustanski et al., 2013; Ya–Huei et al., 2017).

Marijuana and alcohol are more widely used by adolescents, and about 50% of them reported having used both substances in their lifetime (Dir et al., 2018; Gillman et al., 2018). Alcohol and drug use increase risky sexual behaviors among adolescents because it impairs their judgment and decision–making skills (Asby et al., 2012; Bryan et al., 2012; Chung et al., 2017). Alcohol and marijuana affect the brain, and individuals do not process or react as fast as if they were sober (Simons et al., 2010). The use of both

substances has all been studied in previous research and associations between these factors, and risky sexual behaviors have been statistically proven (Asby et al., 2012; Bryan et al., 2012; Dir et al., 2018; Jackson et al., 2015; Luk et al., 2016; Simons et al. 2010). African American adolescent females reported more marijuana use than alcohol use compared to Caucasian adolescent females (Chung et al., 2017). Mustanski et al. (2013) reported that African American adolescents use marijuana and drink alcohol less frequently than Caucasian female adolescents. Another study reported that adolescents using marijuana were significantly less likely to engage in risky sexual behaviors compared to adolescents that used alcohol only or used both (Gillman et al., 2018). Chung et al. (2017) reported that some studies had found a small effect size on substance use and risky sexual behaviors.

The research problem that I addressed in this study was whether there was a difference in risky sexual behaviors of adolescents that use drugs or consume alcohol from the 2015 YRBS and the 2017 YRBS, specifically focusing on African American adolescents residing in Florida. Risky sexual behaviors affect not only the adolescent but additionally the government. The estimated medical costs of STIs is about 6.5 billion dollars among adolescents (Luk et al., 2016). Risky sexual behaviors are a public health problem within every ethnic group, but African American adolescents show a disproportionally higher rate of engaging in multiple sexual partners, lack of condom use and earlier age of initiation of sexual intercourse (Kerr et al., 2015; Kogan et al., 2013, 2015; McCree et al., 2016; Ritchwood, 2014; Sales et al., 2012). Other risky behaviors are common in this age group as well, including alcohol and drug use (Chung et al.,

2017; McDade et al., 2015). Adolescents that are involved in one type of risky behavior are going to be more likely involved in other risky behaviors, which is stated by the problem behavior theory (Jessor, 1987). There is also a distinct developmental period between adolescence and emerging adults that expects them to explore their identities and not consider the long–term consequences of their actions (Chung et al., 2017; Cox et al., 2014; Dalmida et al., 2018; Lam & Lefkowitz, 2013). Many of these risky behaviors are involved with each other because an individual that is intoxicated is more likely to make a damaging decision and not use condoms or having multiple partners (Aspy et al., 2012; Gillman et al., 2018; Simons et al., 2010). The same is true for an adolescent on drugs: their judgments are altered, and they are more likely to make a decision that will have a long–term consequence (Jackson et al., 2015; Simons et al., 2010).

The purpose of this study was to investigate the correlations between risky sexual behaviors and consumption of alcohol, including binge drinking and drug use in African American adolescent populations in Florida. I assessed these factors in African American adolescents in urban and rural regions in the state of Florida. Risky sexual behaviors include condom use, multiple sexual partners, and early age of initiation of intercourse. In regard to the consumption of alcohol, I evaluated all alcohol use, including binge drinking, which is when a person consumes five more alcoholic drinks in one event (Esser, 2017; Jan et al., 2017). I focused on drug use specifically marijuana use that is surveyed in the YRBS. The importance of this study was to assess if there was still a significant on–going issue of alcohol consumption, drug use, and risky sexual behaviors in African American adolescents in Florida.

Literature Search Strategy

To search for literature, I used the Walden Library database, including search engines such as EBSCO, PubMed, and Medline. I used Google Scholar when trying to find initial resources which then could lead to further search in the Walden Library Database. In this literature review, I searched for the key variables in the databases listed above which were *risky sexual behaviors, attitudes of sex, knowledge of sex, sexual education programs, adolescents, drug use, alcohol consumption, teenagers, African American adolescents, multiple sexual partners, condom use, early age of initiation of sexual intercourse*, problem behavior theory, and YRBS. Several of these terms did not come up with any relevant results that pertained to this study but when put together with other variable terms there were more meaningful results.

When I used the key term *condom use* a plethora of research was found, so it had to be further narrowed down to adolescents and then further into African American adolescents so that the results would be more meaningful. Multiple sexual partners and early initiation of sexual intercourse searches were not as fruitful, and the search took longer to find articles that were relevant to the study. There were minimal studies found on urban and rural areas and risky sexual behaviors so there was not much information that could be added to this study.

Areas Searched for the Study

Risky Sexual Behaviors

Adolescents are in a stage of their development when they are becoming more aware of their identities and sexual existence (Cox et al., 2014; Dalmida et al., 2018).

This period is what marks the transition into sexual intercourse. During early adolescence, they are forming their attitudes and opinions about sexual intercourse, and it is influenced by their experiences, friends, family, media, and education (Cox et al., 2014; Dalmida et al., 2018; Ritchwood et al., 2017). In this period, they are going through cognitive development and imbalanced physical development so most of their behaviors are sudden and impulsive (Hulland et al., 2015; Xu et al., 2017). Studies have reported the age of this initiation is starting younger over time and there is a distinct difference in different ethnic groups (Sales et al., 2012). African American adolescents have reported in previous studies that initiation of sex is happening before the age of 16, which is the national average (Chung et al., 2017; Ritchwood et al., 2017; Sales et al., 2012). Early initiation age, multiple sexual partners, and condom use are a major concern for adolescents in the United States (Dalmida et al., 2018; Kincaid et al., 2012; Pittiglio, 2017). Adolescents that are involved in sexually risky behaviors are also more likely to be consuming alcohol and using marijuana which coincides with the problem behavior theory.

The CDC reported in 2014 that among high school students in the United States, nearly half reported sexual intercourse and less than two-thirds reported using a condom during their last intercourse (CDC, 2014). In 2017, the CDC reported 40% of high school students were sexually active and 10% of them had four or more partners (CDC, 2017). In the last 3 months, 30% had sexual intercourse and 46% of them did not use a condom and 19% had used alcohol or drugs before intercourse (CDC, 2019). Early initiation of sex was before age 13 which was reported by 5.6% of high school students (Shepherd et

al., 2017). Another study found that African American male adolescents were more likely to engage in sexual intercourse before the age of 13 years old (Lindberg et al., 2019). Age also plays a role in adolescents exhibiting risky sexual behaviors, older adolescents tended to report more negative behaviors, but younger adolescents had less knowledge (Dalmida et al, 2018; Shepherd et al., 2017). Lindberg (2019) points out that initiating sex at such a young age means that they were not exposed to sex education or have the proper knowledge to protect themselves.

Risky sexual behaviors lead to an increased likelihood of contracting STIs (Ritchwood et al., 2016). One study found that younger adolescents were more at risk because of their lack of knowledge about STI's, condom use, and attitudes towards protecting themselves (Lepusic & Radovic–Radvcic, 2013; Lindberg et al., 2019). Protective factors of these young adolescents were involvement in school and parental relationships (Respress et al., 2018). Lepusic (2013) reported that 73% of adolescents that felt school was important to them were less likely to contract an STI which means they were not involved in risky sexual behaviors. Adolescents that had good parental relationships were 70% less likely to report STI's which means this is another protective factor (Lepusic & Radovic–Radovcic, 2013). Other studies have reported factors that increased the chance of African American adolescents becoming sexually active such as low socioeconomic status, low acceptance of homosexuality, and single–parent households (Li et al., 2017).

Alcohol Use and Risky Sexual Behaviors

Alcohol consumption in adolescents is a serious health concern in the United States (CDC, 2018; Morean et al., 2018; Luk et al., 2016; National Institute on Alcohol Abuse and Alcoholism, 2017; Shorey et al., 2015). This risky behavior has significant impacts on not only an adolescent's health but also educational, economic, social, and family problems (Aspy et al., 2012; Morean et al, 2018). Excessive drinking and drug use cost the United States about 700 billion each year due to health care expenses, criminal justice costs, and productivity (Luk et al., 2016). Binge drinking is common among adolescents and leads to an increased likelihood of risky sexual behaviors (CDC, 2013; Jan et al., 2017). Morean (2018) reported that the earlier adolescents start to drink the more alcohol–related problems they will have when they are older. Another study stated that early binge drinking leads to individuals having more sexual partners when they were adults (Bonar et al., 2017; Green et al., 2017; Jang et al., 2017).

Binge drinking is when an individual consumes five or more drinks in a single period (Curtis et al., 2018; Jan et al., 2017; National Institute on Alcohol Abuse and Alcoholism, 2017). Curtis (2018) reported that in 2016, 9% of adolescents had consumed alcohol in the past month and 4.9% of them had engaged in binge drinking. According to the YRBS in 2017, 30% of high school students reported drinking alcohol and 14% reported binge drinking. The National Institute of Alcohol Abuse and Alcoholism (2017) reported that by age 15, 33% of teens have already consumed at least one drink. Another study reported that in African American high school adolescent females only 31.3% reported consuming alcohol which is lower than their Caucasian and Hispanic

counterparts at 35.7% and 39.7%, respectively (Jackson et al., 2015). Esser (2017) reported that current and binge drinking was higher among non–Hispanic Caucaisan adolescents and Hispanic adolescents compared to African American adolescents. Another study reported that 27% of African American female adolescents reported having three or more drinks in one night (Jackson et al., 2015). Yet another study stated that African American adolescents have unique drinking patterns compared to Caucasian adolescents by having a delayed onset of heavy drinking (Jan et al., 2017). Lee (2014) stated that African American adolescents had higher rates of substance use than any other ethnic group. On the contrary, Mustanski (2013) reported that African American adolescents were significantly less likely to consume alcohol compared to other ethnic groups. Another study also stated that the association between substance use, and risky sexual behaviors is weaker in African American adolescents compared to their Caucasian counterparts (Chung et al., 2017).

Alcohol consumption has been associated with risky sexual behaviors (Aspy et al., 2012; Chung et al., 2017; Dir et al., 2017; Ewing et al., 2016; Gillman et al., 2018; Green et al., 2017; Jackson et al., 2015; Lee et al., 2014; Mustanski et al., 2013; Shorey et al, 2015). Jackson (2015) described in his study that African American female adolescents had associations with drinking alcohol and having multiple sexual partners, being intoxicated during sexual intercourse, and inconsistent condom use. Ritchwood (2015) reported that 22.1% of adolescents engage in substance use during their first sexual encounter. Another study stated 20% of females that consumed alcohol were still virgins compared to non–drinking adolescents reporting almost 100% of them being

virgins (Lee et al., 2014). Adolescents that are consuming alcohol were more likely to have their first sexual encounter at a younger age, have more sexual partners, and were less likely to use a condom (Ritchwood, 2015). Jan (2017) reported that older adolescents will engage in heavy drinking compared to young adolescents. Sensation seeking adolescents are also more likely to engage in risky sexual behaviors under the influence of alcohol (Dir et al., 2014). In 2009, heavy and binge drinking was reported in 24% of high school students (Aspy et al., 2011).

Alcohol consumption not only is bad for the individual's health but can affect their judgment and decision–making skills (Green et al., 2017; Lee et al., 2014; Luk, 2016; National Institute on Alcohol Abuse and Alcoholism, 2017). This complication of decision making may increase the likelihood of them having risky sexual encounters such as condom inconsistency, multiple sexual partners, and early age sexual debut (Green et al., 2017; Simons et al., 2010; Shorey et al., 2015). Research in neurocognition reported that these effects can be profound in adolescents (Ritchwood, 2015; Wilson et al., 2015). The limbic system is responsible for emotional control and is developed earlier than the frontal cortex which deals with decision making (Ritchwood, 2015). This difference in the development of different areas of the brain can cause adolescents to make decisions based on emotions rather than reasoning. In 2008, 22.5% of adolescents that were sexually active reported using alcohol or drugs before their last sexual encounter (Aspy et al., 2011). Another study reported that 50% of adolescents reported substance use and 63% of them described drinking alcohol (Dir et al., 2018). Ewing (2016) had a study that stated 47% of adolescents reported being sexually active and 22% of them reported

having alcohol before sexual intercourse. Another study reported that 47% of adolescents were having sex and 11.4% reported being drunk or high the last time they had sex (Ritchwood et al., 2016). Ritchwood (2015) stated that females had a stronger association with substance use and risky sexual behaviors. Women have a lower tolerance for alcohol due to their body weights and lower gastric metabolism which means that they would have a greater impairment when drinking (National Institute on Alcohol Abuse and Alcoholism, 2017). However, Chung (2017) reported that Caucasian females consumed alcohol more than African American adolescents. In teenagers that were involved in school, staying out of trouble, and not skipping all were less likely to consume alcohol (Aspy et al., 2011).

Marijuana Use and Risky Sexual Behaviors

Marijuana is the most used drug among adolescents in the U.S. (Banks et al., 2017; Barton et al., 2018; Buckner et al., 2016; Dir et al., 2018; HHS, 2019; Hill & Mrug, 2015; Kliewer & Parham, 2019; Mcdade et al., 2015; Shih et al., 2017; Simons et al., 2010; Swartzendruber et al., 2016; Taggart et al., 2018; Vidourek et al., 2017; Zaharakis et al., 2018). HHS (2019) reported that in 2016, 14% of 10th graders and 23% of 12th graders had reported using marijuana within the last 30 days. NIDA (2019) stated that in 2018, 16.7% of 10th graders and 22.20% of 12th graders had used marijuana in the last 30 days. These studies show a slight increase in marijuana use in 10th graders and a slight drop in 12th graders. Marijuana use is becoming more of a concern because unlike the trend in alcohol use which has been decreasing in the last decade, marijuana use has been

increasing in adolescents in the past ten years (American Academy of Child & Adolescent Psychiatry, 2019; Banks et al., 2017; HHS, 2019).

Research has been mixed on the prevalence of marijuana use among different ethnic adolescent groups (Buckner et al., 2016). Some studies have reported that African American adolescents were found to use marijuana significantly less than their Caucasian counterparts (Assari et al., 2018; Banks et al., 2017; Foster et al., 2017; Evans–Polce et al., 2015; Foster et al., 2017; Keyes et al., 2015; Maslowsky et al., 2015; Mustanski et al., 2013). However, other studies have reported higher use of marijuana in African American adolescents (Chung et al., 2017; Green et al., 2017; Kliewer & Parham, 2019; Lee et al., 2014; McDade et al, 2015; Reboussin et al., 2015; Vidourek et al, 2017; Villagrana & Lee, 2018; Zaharakis et al., 2018). Historically Caucasians had a higher rate of marijuana use than African Americans but in the mid–2000s this trend changed, and usage increased in African Americans (McDade et al., 2015; Reboussin et al., 2015; Swartendruber et al., 2016; Vidourek et al., 2017). Jackson (2015) reported that 27% of African American adolescents reported using marijuana which is higher than the 18% reported in Caucasian adolescents. Other studies have reported that African American adolescents used alcohol and marijuana significantly less than their Caucasian counterparts (Swartzendruber et al., 2016). Family structure played a role in whether an adolescent was a marijuana user. Adolescents that come from an intact family structure were less likely to use marijuana compared to individuals that come from a single–family household (Goldstick et al., 2018; Jelsma & Varner, 2020; Mcdade et al., 2015; Maslowsky et al., 2015; Park et al., 2018; Su & Supple, 2016; Vidourek et al., 2017;

Villagrana & Lee, 2018). Peer influence was also a risk factor for marijuana use among African American adolescents (Goldstick et al., 2018; Hill & Mrug, 2015; Park et al., 2018; Su & Supple, 2016; Vidourek et al., 2018; Zaharakis et al., 2018).

Studies have reported that marijuana use is associated with adolescents not using condoms, multiple sexual partners, and early sexual debut (Agrawal et al., 2016; Buckner et al., 2018; Dir et al., 2018; El–Menshawi et al., 2019; Gillman et al., 2018; Jackson et al., 2015; Ritchwood et. al., 2016; Ross et al., 2015; Vidourek et al., 2017). Previous studies reported that marijuana use was associated with less risky sexual behavior when compared to alcohol consumption (Chung et al., 2017; Dir et al., 2018; Gillman et al., 2018; Mustanski et al., 2013). Marijuana use and alcohol consumption are commonly used by adolescents immediately preceding sexual intercourse (Agrawal et al., 2016; Swartzendruber et al., 2019). Ritchwood (2016) reported that 47% of adolescents had reported being sexually active and 36% of them had sexual intercourse in the last 90 days and 11.4% reported being drunk or high during sexual intercourse. Individuals that use both alcohol and marijuana experience a higher rate of alcohol using problems (Simons et al., 2010). In both the use of alcohol and marijuana the greater the substance use the more likely adolescents were not using condoms and having multiple sexual partners (Dir et al., 2018; Green et al., 2017; Gillman et al., 2018; Simons et al., 2010; Swartzendruber et al., 2019; Zebrak & Green, 2017)

Marijuana use can also affect a person's ability to make sound decisions and avoid negative health outcomes (El–Menshawi et al., 2018; Green et al., 2017; HHS, 2019; Lee et al., 2014; Luk et al., 2016; Ross et al., 2015; Simons et al., 2010). Alcohol

use can also cause similar effects which impair the individual's cognitive process that allow them to make sound decisions (Bonar et al., 2017; El–Menshawi et al., 2018; Ross et al., 2015; Shorey et al., 2015; Simons et al., 2010). Research has shown that adolescents have worse effects from marijuana use compared to adults (HHS, 2019). The effects of smoking marijuana range from excitement, a sense of well–being, stimuli enhancement, and disinhibition (Agrawal et al., 2016; Ritchwood et al., 2016).

Rural vs Urban vs Risky Sexual Behaviors

Social determinants of health play a major role in an adolescent's health disparities (Bonar et al., 2017; Thompson et al, 2017). One of these determinants is the adolescent's environment such as them living in a rural or urban region. Urban regions are classified as regions that have 50,000 people or more and have a densely developed territory that encompasses commercial, residential, and non–residential areas (United States Census Bureau, 2019). Rural regions are all the territory, population, and housing that are not in urban areas (United States Census Bureau, 2019). African American's disproportionately live in urban areas with these areas having higher rates of crime, violence, and poverty (Kliewer & Parham, 2019; Reboussin et al., 2015; Summers et al., 2017; Taggart et al., 2018; Voisin et al., 2017; Zebrak & Green, 2017). African American adolescents in the southeastern part of the U.S. are particularly vulnerable to STI's because of the lower access to healthcare, high rates of poverty, dense sexual networks and the stigma associated with STI's (Ritchwood et al., 2016; Kerr et al., 2015). Florida adolescents were reported to have worse sexual health indicators compared to the

national data but in this study, it was stated that there was no difference in adolescent's risky sexual behavior in urban vs rural regions (Thompson et al., 2017).

Multiple Sexual Partners

One of the risky behaviors that has a strong association with negative outcomes for adolescence is multiple sexual partners (Zhao et al, 2017). This is when an individual has multiple sexual partners within a given time frame. Dir (2014) reported that 14% of sexually active adolescents have reported having four or more sexual partners since they became sexually active. Another study reported that 16% of female adolescents have had multiple partners (Zhao et al., 2017). Previous studies have reported that adolescents have an increased association with multiple partners especially when substance use is involved such as alcohol consumption and marijuana use (Vasilenko & Lanza, 2014). Multiple partners can be divided into two categories which are concurrent and sequential. Concurrent is when the individual has more than one partner during the same period (Vasilenko & Lanza, 2014). Sequential is when nonoverlapping partners are occurring over close time frames (Vasilenko & Lanza, 2014). Vasilenko (2014) states that it is more acceptable in our society for males to have multiple partners compared to females which could predict that they are more likely to be involved in other problematic behaviors. These problematic behaviors cause STI rates to increase throughout adolescence and then will peak in early adulthood.

The increase in STI rates has had an overwhelming impact on the African American community, especially impoverished adolescents (Kerr et al., 2015). African American male and female adolescents are more likely to report having four or more

sexual partners in their lifetime (Ritchwood et al., 2017). African American boys report riskier sexual behavior than their female counterparts and boys and girls from other ethnicities (Kogan et al., 2013; Ritchwood et al., 2014, 2017). Males reported having intercourse more frequently and a greater number of partners in their lifetime compared to females (Ritchwood et al., 2014). Self–worth, parental influences, peers, neighborhood factors, and consistent discipline play a role in multiple partners for African American adolescents. (Kogan et al., 2013; Ritchwood et al., 2014). In one study, older adolescent males who had an increase in the number of partners exhibited low levels of self–esteem, fewer curfews, less perceived parental knowledge, absence of harsh punishment, and greater maternal warmth (Kogan et al., 2013; Ritchwood et al., 2014). Adolescents' peers at school who exhibited high risk–taking behavior also influenced their problematic behaviors (Aspy et al., 2011). Ritchwood (2014) reports that for African American females older age, decreased levels of self–esteem, less parental knowledge, and fewer curfews will increase the number of sexual partners. African American adolescent females had fewer partners when there were more curfews enforced which meant that their parents had more parental knowledge about their daughter which was a protective factor against the number of sexual partners (Ritchwood et al., 2014). Females with lower self–esteem may use sexual intercourse to help decrease negative feelings and to gain social acceptance (Ritchwood et al., 2014). Fewer curfews mean more unsupervised time which can lead to more negative behaviors such as more sexual partners, alcohol consumption, and drug use.

Demographic areas also play a role in the spread of STIs in the African American adolescent community. Rural areas can be more problematic because they are isolated areas and STI pathogens can spread easily throughout the community due to the limited dating pool (Kogan et al., 2013). Adolescent males with a socioeconomic disadvantage such as inadequate family resources, single–parent family structure, and overall low–resources will be more likely to have a reproductive strategy based on the number of partners rather than have an investment in one single partner (Kogan et al., 2013). If African American male adolescents come from well–resourced areas and have a more predictable structure at home, they are more likely to invest in a committed relationship than multiple partners (Kogan et al., 2013). Race discrimination is something that adolescents can experience in both metropolitan and rural areas and has been shown to affect especially adolescent men and their problematic behaviors. This can be very demeaning and stressful to adolescents and can cause them to feel psychological distress especially towards their masculinity (Kogan et al., 2015). Kogan (2015) states that in previous research there has been a link established between threats on masculinity and African American adolescent males' engagement in behaviors such as multiple partners, alcohol use, and drug use.

Substance use has already been associated with multiple sexual partners by increasing the number of partners or the odds of them exhibiting that behavior (Vasilenko & Lanza, 2014). Heavy drinking (HED) is when an individual has four drinks or five drinks for females and males, respectively. HED was found to be a significant predictor for males before the age of 31 and for all ages of females from 14 to 32 (Vasilenko &

Lanza, 2014). One study reported that adolescents that engaged in HED were 5.5 and 7.0 times more likely to have multiple sexual partners for males and females, respectively (Vasilenko & Lanza, 2014). Marijuana use also had a strong association with multiple sexual partners, but this association was found to decrease over time as an adolescent reaches young adulthood (Vasilenko & Lanza, 2014).

Condom Use

Condom use just like multiple sexual partners is risky behavior that adolescent engage in that puts them at a higher risk of transmitting an STI and unintended pregnancy (Zhao et al., 2017). Condoms are one of the best methods available to prevent STIs and unintended pregnancies (Xu et al., 2017). Even though condom use is not a complete guarantee of protection for adolescents it does give more protection than if the adolescent used nothing at all. Adolescents that are sexually active less than 50% reported using condoms when they are having sexual intercourse (Dir et al., 2014; Zhao et al., 2017). When these same adolescents were asked about their most recent encounter half of females and one-third of the males stated that they did not use any form of protection (Dir et al., 2014).

Adolescents are also strongly influenced by their environment and the people that are in their inner circle (Aspy, 2011). Previous studies have reported three factors that predict condom use behavior are cost associated with condom use during sexual intercourse, perceived benefit of using a condom, and self-efficacy in using condoms (Xu et al., 2017). Condom self-efficacy is when an individual believes that they can perform the act of using a condom (Ritchwood et al., 2017). This is going to be different by

gender because for a male they just to need to know how to use the condom and be willing to use it but for females, they must be able to negotiate with their partner to use a condom in hopes that it does not put their relationship at risk (Shepard et al., 2017: Zhao et al., 2017). Sheperd (2017) stated that adolescents believe that if they use condoms in their relationship that it is a sign of trust issues and commitment in the relationship. Condom use is associated with trusting their significant other and having a belief that they are monogamous (Sheperd et al., 2017; Zhao et al., 2017). Because of this difference, adolescent females may report lower rates of condom use than their male counterparts (Ritchwood et al., 2017; Zhao et al., 2017). Behaviors are an important part of whether a condom is used because human behavior is complex and not just a linear process. Xu (2017) stated that all adolescents that have knowledge about HIV use condoms during sex and adolescents who always use condoms do not always know about HIV.

Early Age of Initiation of Sexual Intercourse

The younger the individual is the more likely they have a lack of knowledge of the consequences of not protecting themselves. These adolescents have a sense of invincibility and believe that negative consequences cannot happen to them (Sales et al., 2012). As stated previously, younger adolescents were more likely to contract an STI because of their lack of knowledge about protecting themselves and attitudes towards sexual behaviors (Savioja et al., 2017). Younger adolescents also reported less partner communication, lower condom use self-efficacy, and lower ability to refuse sexual intercourse (Sales et al., 2012). Older adolescents were more likely to report the greater

frequency of sex in the past 6 months, history of STI, and more unprotected sex during the same time as younger adolescents (Sales et al., 2012). Adolescents that were older were not considered as impulsive as younger adolescents, but they still reported risky sexual behaviors (Sales et al., 2012). When compared with Caucasian and Hispanic youth, African American adolescents reported having their first sexual encounter before the age of 13 which is below the national average of 16 years old (Ritchwood et al., 2017). Sheperd (2017) reported that 5.6% of high school students had their sexual debut before 13 years old.

Conceptual Framework

The problem behavior theory was initially developed to study the abuse of alcohol and other problematic behaviors in adolescents from a small rural tri-ethnic community (Jessor et al., 1968). Problem behavior is described as the behavior that departs from the norms of society. The perspective of this theory is psychosocial and there are three systems which are personality, perceived environment, and behavior (Jessor, 1987). Personality and perceived environment are direct sources that can lead adolescents into illegitimate behaviors (Jessor et al., 1967). Adolescents will seek the approval of their peers and will not care as much if their parental figures disapprove of a behavior because their inner circle can be more important at that age (Bryan et al., 2012). This perceived environment will lead adolescents to make decisions that will not necessarily keep them safe. The next construct is personality which discusses the adolescent's behaviors that they externalize and their impulsivity in situations. Adolescents feel a false sense of security and have a mentality that nothing negative could happen to them. They can see

and hear about stories of an individual's contracting an STI or having alcohol poisoning or drug overdose and they still feel that this cannot happen to them.

The last construct of behavior states that adolescents that engage in problem behaviors will usually engage in other problem behaviors (Bryan et al., 2012). This construct can explain many of the behaviors of adolescents and why we see an increase in risky sexual behaviors when adolescents use drugs or alcohol. There are more risks than just the health risks associated with drug and alcohol use but there are also the risks that come from their judgment being altered and they are more likely to participate in other dangerous behaviors. If each one of these constructs are assessed in research, then programs can be developed that target those specific behaviors to reduce the number of risky behaviors that adolescents are participating in.

Summary

The literature has shown throughout the years that there is an association with alcohol and drug use and risky sexual behaviors. Adolescents and young adults are more likely to participate in these types of behaviors because of their lack of knowledge and sense of invincibility. All adolescents have a high rate of risky sexual behaviors and drug and alcohol use, but African American adolescents have a disproportionally higher rate than other adolescents from different racial groups. Many factors play a role in the decisions of adolescents including socio-economic status, peers they are associated with, parental relationship, and involvement at school. Adolescents were found to participate less in risky behaviors when their parents were more involved and knowledgeable about their whereabouts and when there were curfews in place. Adolescents that had a higher

GPA, involved in more extra-curricular activities, and didn't skip school also had lower rates of risky behaviors. In all three risky sexual behaviors reviewed in the literature, African American adolescents had higher rates. Multiple sexual partners were higher especially in males that lived impoverished and had limited family resources. They based their sexual activity on quantity and not quality. Research has shown that if the males did not feel that they could attain their goals and invest in their future they were more likely to have a reproductive strategy of more is better. African American females had reported higher rates of condom inconsistency because they are the ones that will have to negotiate with their partner on using a condom. Males just need to know how to use the condom appropriately, but females can only try to convince their partner to use condoms. Condom use is also associated with trust and commitment in a relationship, so adolescents are more apt to not use condoms because they fear that means they don't trust their partner, or they don't believe that their partner is faithful. Early age of initiation of sexual intercourse is the other risky sexual behavior discussed in this study. The national average of sexual debut is 16 years old but in African American adolescents many reported their sexual debut before the age of 13 years old. The younger the adolescent is when their first sexual intercourse takes place the less knowledgeable about the negative consequences of sexual intercourse and long-term effects.

Alcohol consumption and drug use are other risky behaviors that are found in high rates in adolescents especially in older adolescents that are in higher grades. When an adolescent is on alcohol or drugs it affects their mental state and their ability to make sound decisions. Their judgment is affected along with their perception of what is right

and wrong and what the consequences are to those behaviors. Adolescents that were using alcohol and/or drugs were more likely to be also participating in risky sexual behaviors such as multiple partners, early sexual debut, and condom inconsistency. These risky behaviors have been shown to be associated with each other in a multitude of studies. In this study, I will be taking the data from the YRBS of 2015 and 2017 and comparing these risky sexual behaviors to see if there has been a decline or increase of these associations. This is a comparative study that can give researchers more information to help develop programs that are more effective in the targeted population.

Chapter 3: Research Method

Purpose of Study

The purpose of this study was to establish if there is still a relationship between risky behaviors such as drug and alcohol consumption with risky sexual behaviors in African American adolescents in different regions in Florida. A relationship between these different risky behaviors has already been established in previous studies but in this investigation, I compared the 2015 YRBS and 2017 YRBS to see if this correlation still existed in Florida or have measures taken throughout past years been effective in reducing this relationship. Florida has several initiatives that have focused on either drug & alcohol use or risky sexual behaviors such as Changing Alcohol Norms (CAN): Florida Initiative to Lower Youth Drinking, Becoming a Responsible Teen (B.A.R.T), Focus on Youth + ImPACT, and Video opportunities for Innovative Condom Education and Safer Sex (VOICES/VOCES) (Florida Health, N.D.b). The analysis of this study will give relevant data to determine if these programs have been successful in reducing risky sexual behaviors in African American adolescents. The appropriate statistical analyses was completed to identify if alcohol and marijuana consumption were still pertinent determinants to risky sexual behaviors such as multiple sexual partners, condom use, and early initiation of sexual intercourse. This was a comparative study in which I used secondary data that was collected by the YRBS (Appendix A) which was administered by the CDC.

In Chapter 3, I will address the research design and the methodology that was implemented in this investigation. I describe the instrumentation used, research design,

research methodology that I used in this study. I will also discuss the population, sample size, measurements used, and how the instrumentation was successfully administered. This chapter will also include a description of all the dependent and independent variables that will be used in the statistical analysis.

Research Design and Approach

The investigation was designed to determine if there is still a correlation between drug and alcohol use with risky sexual behaviors. Due to the purpose of this study, the appropriate design was the quantitative method. The quantitative method is designed to examine the relationship between variables (Creswell, 2009). These relationships between the variables have already been established in previous YRBS's that were administered. The comparative design of this study evaluated if these relationships still existed between the 2015 YRBS and the most recent YRBS administered in 2017. This gave the most current data that had been collected on risky behaviors in adolescents in Florida.

The reasoning for using a quantitative method is because I evaluated variables and used statistics to determine if there continues to be a relationship between the independent and dependent variables in the 2015 and 2017 YRBS. The dependent variables in this study were alcohol consumption and drug use. The independent variables were risky sexual behaviors such as multiple sexual partners, condom use, and early initiation of sexual intercourse.

Population and Sample Size

I used the archival data from the YRBS that was administered by the CDC in 2015 and 2017. The YRBS was developed in 1990 so that behaviors in adolescents could be monitored in the U.S. (CDC, 2018). The sampling frame from the 2015 YRBS consisted of all regular private and public schools in all 50 states including the District of Columbia (CDC, 2015). The frame for sampling was based on data from the Market Data Retrieval database (MDR) which has information from both private and public schools (CDC, 2015). The sampling frame also includes data from the Common Core of Data that is from the National Center for Education Statistics (CDC, 2015). The national representative sample of adolescents in a private and public school in Grades 9 through 12 was produced by a three-stage cluster sample design (CDC, 2015). The frame for the first stage consisted of 1,259 primary sampling units (PSUs) which include counties, adjacent counties, subareas of counties that are larger (CDC, 2015). These PSUs were then categorized into 16 strata by their status as a metropolitan area and the percentage of Hispanics and African Americans in the sampling unit (CDC, 2015). CDC (2015) stated that 54 PSUs were able to be sampled with their probability of being proportional to their overall school enrollment size. The second stage of sampling included 180 schools that were part of the 54 PSUs from the first stage (CDC, 2015). The last stage of sampling design included a random sampling of one or two classes from either a required subject or a required class period (CDC, 2015). In Florida, there were 6,359 students that completed the 2015 YRBS in 77 public and charter schools (Florida Health, 2018). The

student response rate was 75%, the school response rate was 95% and the overall response rate was 72% (Florida Health, 2018).

The 2017 YRBS included all public schools, charter, Catholic and private schools that had Grade 9 through 12 in all 50 states including District of Columbia (CDC, 2018). Schools that were excluded were special education, alternative, schools that are operated by the Department of Defense, vocational schools, and the Bureau of Indian Education schools (CDC, 2018). CDC (2018) states that schools with enrollment less than 40 in nineth through 12th grade were also excluded from the sampling frame. The sampling data was retrieved from the same sources as the 2015 YRBS which were the Market Data Retrieval (MDR) and the National Center for Education Statistics (NCES0 (CDC, 2018). To produce a nationally representative sample of adolescents in Grades 9 through 12 the 2017 YRBS used a three-stage cluster sample design (CDC, 2018). The first stage consisted of 1257 PSUs which was categorized into 16 strata according to their metropolitan status and the percentage of African Americans and Hispanics (CDC, 2018). In the second stage of sampling, secondary sampling units (SSUs) were described as a physical school that has Grade 9 through 12 or creating a school by combining nearby schools that provided all the grades needed to be part of the sampling. Out of the 54 PSU from the first stage 162 SSUs were sampled which corresponded to 192 physical schools (CDC, 2018). The third stage of sampling included sampling from one or two classes by either a required subject or class period (CDC, 2018).

Sample Size Analysis

When conducting research on adolescents and the exhibited behaviors it is impossible to collect data from every adolescent. To eliminate this problem, researchers take a sample of the studied population to get a general representation of the behaviors of that population. It is important not to underestimate the number of cases needed because your study could be underpowered, and it is possible to miss important effects that might have supported the hypothesis (Rudestam & Newton, 2015). If the researcher overestimates the number of participants, then it was a waste of time, energy, and money for unneeded data (Rudestam & Newton, 2015). Rudestam (2015) stated the best method to determine the needed number of participants is a power analysis.

In my study, I used Cochran's formula to calculate the sample size. Using this formula allows the researcher to calculate the sample size needed given the desired confidence level, level of precision, and the estimated proportion of the variables that are used in this study (Statistics How To, 2019).

$$n_0 = \frac{Z^2 pq}{e^2}$$

The Z is found from using the Z tables and in this case, it is 1.96. P is the proportion of the estimated population which exhibits the variable in question. I would estimate that 50% of the adolescent population exhibits these behaviors. Q is 1-p. Using Cochran's formula my sample size should be 385. The YRBS from 2015 had 6,359 adolescents participate and the 2017 YRBS had 6,152 adolescents participate in the survey (Florida Health, 2018). The larger the sample size the greater power to detect any

differences in the sample. I used the total participants in the 2015 and 2017 YRBS so my sample size is over the calculated sample size.

Instrumentation and Materials

The purpose of the YRBS was to determine the incidence of different health behaviors, evaluate whether these behaviors increased, decreased, or stayed the same over time, assess the co-occurrence of different health behaviors, and be able to compare local, state, and national data (CDC, 2018). CDC (2018) stated these health behaviors that are evaluated are behaviors that can contribute to unintentional violence or injuries, risky sexual behaviors, alcohol and drug use, tobacco use, dietary behaviors, and physical activity. This survey was developed in 1990 to start surveillance to monitor these behaviors in adolescents (CDC, 2018). Every 2 years during the spring semester the CDC administers this survey to adolescents that are enrolled in high schools that are chosen through their sampling design (CDC, 2018).

The reliability of the YRBS has been shown through test/retest studies that have been completed over the years. Brener (1995) did a test/retest reliability study of the YRBS and administered the survey to 1,679 students in Grade 7 through 12 two different times 14 days apart. The researchers computed the Kappa statistic for each of the self-report items and then compared the prevalence estimates both the times the survey was administered. There was no statistical difference between the two estimates that were calculated from the two times the survey was given (Brener et al.,1995). This study also gave evidence that seventh graders' responses were not as reliably as students from higher grades, so they recommended that the survey be administered to students in higher grades

(Brener et al., 1995). Another test/test reliability study was done on the 1999 YRBS by the same researchers. In this study, 4,619 female and male students from different ethnic groups were given the YRBS on two different occasions 2 weeks apart (Brener et al., 2002). There were several questions that were not consistent between the two administered surveys and eventually those questions were altogether eliminated from all future surveys of the YRBS (Brener et al., 2002). Students appeared to be reporting information that was reliable on their surveys.

To date, there have been no validity studies on the YRBS questionnaire. A systematic review that examined different factors that related to how adolescents self-report was conducted (Brener et al., 2003). In this study, articles were examined to see what factors affected the self-reporting of adolescents of several different behaviors that are reported on the YRBS. Self-reporting was affected by two factors which were situational and cognitive, but it was reported that these factors did not threaten the validity of the self-reporting with any of these behaviors (Brener et al., 2003).

Dependent Variables and Independent Variables

The dependent variable of this study were alcohol consumption and marijuana use in adolescent African Americans in Florida. Alcohol consumption is the amount of alcohol that is consumed at one event or over a certain period. This alcohol consumption could include binge drinking which is when an individual has five or more drinks within the same period or less number of drinks. Marijuana use is when an individual consumes any amount over a period of time.

The independent variables of this study were risky sexual behaviors and the amounts of alcohol consumed or marijuana used. The risky sexual behaviors include multiple sexual partners, condom use, and early initiation of sexual intercourse. The amount of alcohol consumed over the last 30 days and the amount of marijuana used in the last 30 days. The last independent variable is if alcohol or marijuana was used during sexual intercourse. The table below lists all the variables and the questions that were used in the YRBS survey between 2015 and 2017.

Type of Variable	Question	Abbreviation	How Measured
Dependent Variable			
Alcohol Use	Do you consume alcohol?	ALCUSE	Categorized as: Yes: 1 No: 2
Marijuana Use	Do you use marijuana?	MARIUSE	Categorized as: Yes: 1 No: 2
Independent Variables			
Socio-demographic factors			
Age	How old are you?	AGE	Continuous Later to be categorized as: 12 or younger: 1 13–14 yrs old: 2 15–16 yrs old: 3 17–18 yrs old: 4
Gender	What is your sex?	SEX	Male: 1 Female: 2
Grade	In what grade are you?	GRADE	Categorized as: Ungraded or other grade: 0 9th grade. 1 10th grade. 2

			11th grade. 3 12th grade. 4
Race	Are you Hispanic or Latino? What is your race?	RACE	Categorized as: Hispanic: 1 American Indian/Alaska Native: 2 Asian: 3 Black/African American: 4 Native Hawaiian/Other Pacific Islander: 5 White: 6
Location	Rural/Urban	REGION	Categorized as: Rural: 1 Urban: 2
	Alcohol Use		
Frequency of Alcohol Use (FAU)	a) During your life, on how many days have you had at least one drink of alcohol?	FAU1	Continuous Later to be categorized as: 0 days: 1 1 or 2 days: 2 3 to 9 days: 3 10 to 19 days: 4 20 to 39 days: 5 40 to 99 days 6 100 or more: 7
	b) How old were you when you had your first drink of alcohol other than a few sips?	FAU2	Continuous Later to be categorized as: Never: 0 8 yrs old or younger: 1 9 or 10 yrs old: 2 11 or 12 yrs old: 3 13 or 14 yrs old: 4 15 or 16 yrs old: 5 17 yrs old or older: 6

	c) During the past 30 days, on how many days did you have at least one drink of alcohol?	FAU3	Continuous Later to be categorized as: 0 days: 0 1 or 2 days: 1 3 to 5 days: 2 6 to 9 days: 3 10 to 19 days: 4 20 to 29 days: 5 All 30 days: 6
	d) During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?	FAU4	Continuous Later to be categorized as: 0 days: 0 1 day: 1 2 days: 2 3 to 5 days: 3 6 to 9 days: 4 10 to 19 days: 5 20 or more: 6
	e) During the past 30 days, how did you usually get the alcohol you drank?	FAU5	Categorized as: No alcohol: 0 Store: 1 Bar/Club: 2 Public event: 3 Individual: 4 Received: 5 Stole: 6 Other: 7
	f) During the past 30 days, on how many days did you have 4 or more drinks of alcohol in a row (if you are female) or 5 or more drinks of alcohol in a row (if you are male)?	FAU6	Continuous Later to be categorized as: 0 days: 0 1 day: 1 2 days: 2 3 to 5 days: 3 6 to 9 days: 4 10 to 19 days: 5 20 or more: 6
	g) During the past 30 days, on how many days did you have 5 or more	FAU7	Continuous

	drinks of alcohol in a row, that is, within a couple of hours?		Later to be categorized as: 0 days: 0 1 day: 1 2 days: 2 3 to 5 days: 3 6 to 9 days: 4 10 to 19 days: 5 20 or more: 6
	h) During the past 30 days, what is the largest number of alcoholic drinks you had in a row?	FAU8	Continuous Later to be categorized as: 0 days: 0 1 or 2 drinks: 1 3 drinks: 2 4 drinks: 3 5 drinks: 4 6 or 7 drinks: 5 8 or 9 drinks: 6 10 or more: 7
	Marijuana Use		
Frequency of Marijuana Use (FMU)	a) During your life, how many times have you used marijuana?	FMU1	Continuous Later to be categorized as: 0 times: 0 1 or 2 times: 1 3 or 9 times: 2 10 to 19 times: 3 20 to 39 times: 4 40 to 99 times: 5 100 or more times: 6
	b) How old were you when you tried marijuana for the first time?	FMU2	Continuous Later to be categorized as: Never: 0 8 yrs old or younger: 1 9 or 10 yrs old: 2 11 or 12 yrs old: 3 13 or 14 yrs old: 4 15 or 16 yrs old: 5 17 yrs old or older: 6

	c) During the past 30 days, how many times did you use marijuana?	FMU3	Continuous Later to be categorized as: 0 times: 0 1 or 2 times: 1 3 to 9 times: 2 10 to 19 times: 3 20 to 39 times: 4 40 or more times: 5
	Risky Sexual Behavior's		
Risky Sexual Behaviors (RSB)	a) Have you ever had sexual intercourse?	RSB1	Categorized as: Yes: 1 No: 2
	b) How old were you when you had sexual intercourse for the first time?	RSB2	Continuous Later to be categorized as: Never: 0 11 yrs old or younger: 1 12 yrs old: 2 13 yrs old: 3 14 yrs old: 4 15 yrs old: 5 16 yrs old: 6 17 yrs old or older: 7
	c) During your life, with how many people have you had sexual intercourse?	RSB3	Categorized as: Never: 0 1 person: 1 2 people: 2 3 people: 3 4 people: 4 5 people: 5 6 or more people: 6
	d) During the past 3 months, with how many people did you have sexual intercourse?	RSB4	Categorized as: Never: 0 Yes, not in past 3 months: 1 1 person: 2 2 people: 3 3 people: 4 4 people: 5 5 people: 6 6 or more people: 7
	e) Did you drink alcohol or use drugs	RSB5	Categorized as:

before you had sexual intercourse the last time?		Never had sexual intercourse: 0 Yes: 1 No: 2
f) The last time you had sexual intercourse, did you or your partner use a condom?	RSB6	Categorized as: Never had sexual intercourse: 0 Yes: 1 No: 2
g) The last time you had sexual intercourse, what one method did you or your use to prevent pregnancy?	RSB7	Categorized as: Never had sexual intercourse: 0 No method used: 1 Birth control pills: 2 Condoms: 3 IUD or implant: 4 Shot, patch or ring: 5 Withdrawal or other method: 6 Not sure: 7

Data Analyses and Statistical Significance

The Research Questions

Research Question 1 (RQ1): Is there a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse)?

Null Hypothesis ($H_0$1a): There is no association between age of first alcohol drink and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).,

Alternative Hypothesis (H_a1a): There is an association between age of first alcohol drink and adolescents exhibiting risky sexual behaviors (sexually active, sexual

partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).

Null Hypothesis ($H_0$1b): There is no association between the frequency of alcohol consumption and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).

Alternative Hypothesis (H_a1b): There is an association between the frequency of alcohol consumption and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).

Null Hypothesis ($H_0$1c): There is no association between the frequency of binge drinking and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before last sexual intercourse).

Alternative Hypothesis (H_a1c): There is an association between the frequency of binge drinking and adolescent exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Research Question 2 (RQ2): Does the relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents?

Null Hypothesis ($H_0$2a): There is no association between age of first alcohol drink and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Alternative Hypothesis (H_a2a): There is an association between age of first alcohol drink and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Null Hypothesis ($H_0$2b): There is no association between frequency of alcohol consumption and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Alternative Hypothesis (H_a2b): There is an association between frequency of alcohol consumption and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Null Hypothesis ($H_0$2c): There is no association between frequency of binge drinking and adolescents' risky sexual behaviors (sexually active, sexual partners in their

lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Alternative Hypothesis (H_a2c): There is an association between frequency of binge drinking and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

Research Question 3 (RQ3): Is there a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse)?

Null Hypothesis ($H_0$3a): There is no association between frequency of marijuana use and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Alternative Hypothesis (H_a3a): There is an association between frequency of marijuana use and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Null Hypothesis ($H_0$3b): There is no association between age of first marijuana use and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in

their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Alternative Hypothesis (H_a3b): There is an association between age of first marijuana use and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Null Hypothesis ($H_0$3c): There is no association between frequency of marijuana use in the last 30 days and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Alternative Hypothesis (H_a3c): There is an association between frequency of marijuana use in the last 30 days and adolescents exhibiting risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse).

Research Question 4 (RQ4): Does the relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse) differ by socio–demographic characteristics of the adolescents?

Null Hypothesis ($H_0$4a): There is no association between frequency of marijuana use and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use

before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Alternative Hypothesis (H_a4a): There is an association between frequency of marijuana use and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Null Hypothesis ($H_0$4b): There is no association between age of first marijuana use and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Alternative Hypothesis (H_a4b): There is an association between age of first marijuana use and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Null Hypothesis ($H_0$4c): There is no association between frequency of marijuana use in the last 30 days and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Alternative Hypothesis (H_a4c): There is an association between frequency of marijuana use in the last 30 days and adolescents' risky sexual behaviors (sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use and alcohol or drug use before sexual intercourse) after adjusting for socio–demographic characteristics of the adolescents.

Research Questions 1

For the first research question, which is to measure the strength of association between the dependent variable of alcohol use (ALCUSE) and the risky sexual behaviors of condom use (CONUSE), multiple sexual partners (MULTPAR) and early initiation of sexual intercourse (AGESEX). Descriptive statistics I ran on all variables to determine the mean and standard deviation (Forthofer et al., 2007; Salkind, 2017). Frequency distributions and cross-tabulations were used to compare the relationship between alcohol use and the risky sexual behaviors of condom use, multiple sexual partners. I first compared the risk of alcohol use with condom use. I then compared the risk of alcohol use with multiple sexual partners using logistic regression models. Then I compared the risk of alcohol use with early initiation of sexual intercourse. The outcome, which is also the dependent variable, is alcohol use and the independent variables are condom use, multiple sexual partners, and early initiation of sexual intercourse. This type of analysis will estimate the odds outcome of alcohol use given the independent variable of the three risky sexual behaviors. The Odds ratio (OR) is a measure of the association between an outcome and a predictor variable (Szumilas, 2010). The regression coefficient that is calculated is the estimated increase of the outcome per unit increase for that exposure

(Szumilas, 2010). The interpretation of OR is that if it equals 1 then the variable has no effect on the odds of outcome. If the OR is greater than one then the variable is associated with higher odds of the outcome and if the OR is below one then the variable is associated with lower odds of the outcome (Szumilas, 2010). A 95% confidence interval and an alpha value of .05 will be used for this study. If the p-value is below .05 then the independent variable was statistically significant.

Research Question 2

The second research question measured the association between alcohol use and sociodemographic characteristics such as gender (SEX), age (AGE), grade level (GRADE) and race (RACE). Descriptive statistics was run to find the mean and standard deviation of each sociodemographic variable. The frequency distributions was run for gender, age, race. This allowed us to compare the relationship between alcohol use and the sociodemographic variables of gender, age, grade level and race. I first compared the risk of alcohol use with the age of adolescents only looking at age groups that are currently in high school. I then compared the risk of alcohol use with gender. Next, I compared the risk of alcohol use with grade levels in high school which would be 9^{th} through 12^{th} grade. Then I compared the risk of alcohol use with race looking at the different racial groups such as Caucasian, Hispanic, African American, American Indian/Alaska Native, Asian, and Native Hawaiian/Other Pacific Islander. Lastly, I compared the risk of alcohol use with the location in Florida specifically evaluating urban and rural areas. As in the first research question, there is a binary dependent variable of alcohol use and the independent variables of gender, age, grade level and race. A multiple

logistic regression statistical test was done, and the OR was calculated to measure how each sociodemographic variable affects the outcome of alcohol use. A confidence interval of 95% and an alpha value of .05 will be used. If the OR equals one for each variable when compared with alcohol use, then the variable will have no effect on alcohol use. If the OR is greater than one, then that variable will have a higher outcome on alcohol use. If the OR is less than one, then that variable will have a lower outcome on alcohol use. The multiple logistic regression will be used to compare these sociodemographic variables to alcohol use.

Research Question 3

The third research question measured the association between marijuana use (MARIUSE) and risky sexual behaviors such as condom use, multiple sexual partners, and early initiation of sexual intercourse. As in the previous research questions, a multiple logistic regression was used since there is a binary dependent variable of marijuana use and multiple independent variables of risky sexual behaviors such as condom use, multiple sexual partners, and early initiation of sexual intercourse. Descriptive statistics was done to calculate the median and standard deviation of both dependent and independent variables. A frequency distribution and cross-tabulations was run for the three risky sexual behaviors of condom use, multiple sexual partners, and early initiation of sexual intercourse. This allowed us to compare the relationship between marijuana use and risky sexual behaviors. I first compared the risk of marijuana use the use of condoms in adolescents. Then I compared the risk of marijuana use with multiple sexual partners. Finally, I compared the risk of marijuana use to early initiation

of sexual intercourse. Similarly, to the last two research questions, a multiple logistic regression was the statistical analyses used because of the binary dependent variable and multiple independent variables. The OR will be calculated which will measure the effect of each independent variable on the outcome. An OR greater than one will imply a positive association between marijuana use and risky sexual behaviors and an OR below one will imply a negative relationship between marijuana use and risky sexual behaviors. A confidence interval of 95% and an alpha value of .05 will be assumed for this objective. The logistic regression will be used to compare 3 risky sexual behaviors and the use of marijuana in adolescent populations in Florida.

Research Question 4

The fourth research question measured the association between marijuana use and sociodemographic characteristics such as gender, age, grade level and race. The dependent variable is binary and determining the use of marijuana and there are multiple independent variables such as gender, age, grade level, and race. Descriptive statistics was calculated for each independent variable to determine the mean and standard deviation. Frequency distributions was run for the sociodemographic variables which allowed us to compare the relationship between marijuana use and gender, age, grade level and race. I first compared the risk of marijuana use with the adolescent's gender. Then I compared the risk of marijuana use and the age of the adolescents. Next, I compared the risk of marijuana use and the grade level in high school. After compared the risk of marijuana use and different racial groups of Caucasians, Hispanic, African American, Asian, American Indian/Alaska Native, and Native Hawaiian/Other Pacific

Islander. A multiple logistic regression statistical analyses was run for this last research question because of the binary outcome of the dependent variable and the multiple independent variables. The OR was calculated to determine the association between each of the independent variables with marijuana use. If the OR is greater than one, then there is a positive association between marijuana use and one of the sociodemographic variables. If the OR is less than one than there is a negative association between marijuana use and the sociodemographic variables. A 95% confidence interval and .05 alpha value was assumed for this objective. The multiple logistic regression was used to compare marijuana use in adolescents based on their sociodemographic variables.

Ethical Considerations

Data collection was conducted after the Walden IRB Approval. The YRBS survey is on a public domain, so I did not need to request data from YRBS for either 2015 or 2017. The CDC has established procedures for participant confidentiality which complies with federal law. They have been collecting data on adolescents since this survey was first developed and there have been no recorded events of information being breached. All information that is acquired for this study will be kept on a secure computer and all measures to safeguard information have been taken.

Summary

In Chapter 3, the focus was on describing the research design and methodology of this study and on how data was collected. This is a quantitative study that used secondary data from the CDC's YRBS that is administered every two years to students that are in public or private high school. The students are in Grade 9 through 12 and must be

currently enrolled to participate in this survey. This chapter also summarizes the sampling design, study population of adolescents, instrumentation, and sample size. The research questions each are asking for the association between independent variables such as different risky sexual behaviors and sociodemographic characteristics and the outcome of either alcohol use or marijuana use. The data analysis plan was described for each objective and because of the binary outcome and multiple independent variables for each question a multiple logistic regression was used for the statistical analyses. Each objective was run separately to be able to measure the association between each of the variables with the outcome of the dependent variable. Descriptive statistics and frequency distribution was also run through SPSS for each of the variables to give a summary of the quantitative data that is coming from a large sample. The population for this study is a vulnerable population but since it is secondary data that is already been collected and made public through the CDC there are no ethical concerns. The CDC has established procedures to protect the identity of the adolescents that participate in this questionnaire.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to determine if the relationship still existed between risky sexual behaviors and alcohol and marijuana use. The risky sexual behaviors in this study include multiple sexual partners, condom use and early initiation of sexual intercourse. The other independent variables that were evaluated were sociodemographic factors such as age, gender, grade, and race. The dependent variables were alcohol and marijuana use. Previous studies have shown the relationship between these variables, so in this study these variables was evaluated from the YRBS from 2015 and 2017 to see if these correlations between the variables still exist.

Research Questions and Hypotheses

RQ1: Is there a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse)?

$H_0$1: There is no association between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse).

H_a1: There is an association between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse.

RQ2: Does the relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents?

$H_0$2: There is no association between alcohol use and adolescents' risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

H_a2: There is an association between alcohol use and adolescents' risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) after adjusting for the sociodemographic characteristics of the adolescents.

RQ3: Is there a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse)?

$H_0$3: There is no association between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse).

H_a3: There is an association between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, early initiation of sexual intercourse).

RQ4: Does the relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by socio-demographic characteristics of the adolescents?

$H_0$4: There is no association between marijuana use and adolescents' risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) after adjusting for socio-demographic characteristics of the adolescents.

H_a4: There is an association between marijuana use and adolescents' risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) after adjusting for socio-demographic characteristics of the adolescents.

Data Collection

Archival data was used from the YRBS of 2015 and 2017 that is administered by the CDC every two years. The YRBS was designed to determine the prevalence of different health behaviors which in this study would be risky sexual behaviors and alcohol consumption and marijuana use. This survey is also used to examine the co-occurrence of different health behaviors among adolescents in the U.S. The YRBS is administered to public and private high school students that are between Grade 9 through 12 (CDC, 2020). In this study the surveys was focused on that were administered in Florida in the years of 2015 and 2017.

A three-stage cluster sample design was used for the 2015 YRBS to produce a nationally representative sample of students in private and public high school (CDC, 2016). This YRBS contained 89 questions about unintentional injuries and violence, sexual behaviors, alcohol and other drug use, tobacco use, unhealthy dietary behaviors, and inadequate physical activity (CDC, 2020). In this study sexual behaviors and alcohol and drug use were focused on. For the 2015, YRBS there were 6,359 responses from 77

different public and charter schools that was used for data analysis (Florida Health Department, 2018).

A three-stage cluster design was also used for the 2017 YRBS to produce a nationally representative sample of students in private and public high schools (CDC, 2018). This questionnaire contained 89 questions about unintentional injuries and violence, sexual behaviors, alcohol and other drug use, tobacco use, unhealthy dietary behaviors, and inadequate physical activity (CDC, 2020). For the 2017, YRBS there were 6171 responses from public, private, charter, and Catholic schools.

Results

Demographics

In the 2015 YRBS, Caucasian adolescents made up most of the respondents at 37.6% and Latinx ethnicity was 27.6 % which was the next largest group of respondents. African Americans comprised 18.8% of the respondents. American Indian/Alaska Native comprised the smallest group of respondents at 0.6% and Asians were 2.9%. The different ethnicities and distributions are shown in Table A1 (Appendix A). In the 2015 YRBS, 64.9% were Hispanic and 33% reported not being Hispanic. The Hispanic distribution ranges are shown in Table A9 (Appendix A). The largest number of respondents that completed the questionnaire, in the 2015 YRBS, were 15 or 16 years old, 26.3% and 26.2% respectively. The next largest group of respondents were 17 years old which made up 22.2% of the participants. The 12–and 13–year–old group had the lowest number of respondents at 0.3% and 0.2% respectively. The age ranges and distributions are shown in Table A3 (Appendix A). In the 2015 YRBS, males and females

were very close in percentage of respondents. Females made up 50.3% of the respondents and males made up 48.5% of the respondents. The gender distributions are shown in Table A5 (Appendix A). The YRBS was administered to high school students Grade 9 through 12. In 2015, 28.1% of the respondents were in grade 10 and 27.4% were in grade nine. Students that were in grade 11 made up 23.2% of the respondents and grade 12 were 20.1% of the respondents. The grade levels and distributions ranges are shown in Table A7 (Appendix A).

In the 2017 YRBS, 34.3% of the respondents were Caucasian adolescents and Latinx was 28.8%. African Americans accounted for 19.9% of the respondents. The same as in 2015 YRBS American Indian/Alaska Native were the smallest group of respondents at 0.6% and Asians at 3.1%. The different ethnicities and distributions are shown in Table A2 (Appendix A). In the 2017 YRBS, 63.5% reported being Hispanic and 34.9% were not Hispanic. The Hispanic distribution ranges are shown in Table A10 (Appendix A). In the 2017 YRBS, 15 years old made up 25.9% of the respondents and 26.6% of the participants were 16 years old. The next largest group of participants were 17 years old which comprised 22.6% of the total respondents. As in 2015 YRBS the 12- and 13-year-olds had the lowest group of respondents at 0.4% and 0.2%. The age ranges and distributions are shown in Table A4 (Appendix A). In the 2017 YRBS, males and females were also very close in percentage of respondents. Male respondents were 47.6% and female respondents were 50.9%. The gender distributions are shown in Table A6 (Appendix A). In the 2017 YRBS, the number of respondents in grade nine and 10 were very close at 27.7% and 27.9%, respectively. The respondents in the grade 11 were

23.2% and in grade 12 20.1%. The grade levels and distribution ranges are shown in Table A8 (Appendix A).

Age of First Alcoholic Drink

In 2015, the question in the YRBS was "How old were you when you had your first drink of alcohol other than a few sips?" Most of the respondents reported that they have never had a drink of alcohol other than a few sips at 45%. For the adolescents that reported drinking more than a few sips, there ages ranged from 15 to 16 years old at 16.8% and 13 to 14 years old at 16.6%. The ranges and distributions of the different age groups is shown in Table A11 (Appendix A).

In 2017, the question in the YRBS was "How old were you when you had your first drink of alcohol other than a few sips?" The largest group of respondents were 43.4% which had never had a drink of alcohol other than a few sips. The age group with the largest percentage of age of first alcoholic drink was 15 to 16 years old at 15.5% and after was 13 to 14 years old at 14.8%. The ranges and distributions of the different age groups is shown in Table A12 (Appendix A).

Frequency of Alcohol Consumption

The YRBS administered in 2015 asked about frequency of alcohol consumption. It stated, "During the past 30 days, on how many days did you have at least one drink of alcohol?" In the adolescents that took the survey 64.8% reported that they did not consume any alcohol in the last 30 days. Adolescents that reported drinking 1 to 2 days of the last 30 days was reported at 16.5%. The ranges and distributions of days is shown in Table A13 (Appendix A).

In 2017, the question in the YRBS was “During the past 30 days, on how many days did you have at least one drink of alcohol?” It was reported that 69% of adolescents did not have any drinks in the last 30 days. The greatest number of days that adolescent reported drinking alcohol was 1 to 2 days at 14.6% by adolescents. The ranges and distributions of days is shown Table A14 (Appendix A).

Frequency of Alcohol Consumption during Lifetime

In 2017, the YRBS question was “During your life, on how many days have you had at least one drink of alcohol?” In the adolescents that took the survey 39.6% reported drinking 0 days in their lifetime. Sixteen percent of adolescents reporting drinking 1 to 2 days in their lifetime. This question was added on the 2017 YRBS so in 2015 this question was not part of the questionnaire. The ranges and distributions are shown in Table A15 (Appendix A).

Frequency of Binge Drinking

In 2015 YRBS the question was “During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?” Eight two-point eight percent of adolescents reported 0 days of binge drinking in the last 30 days. Adolescents that reported binge drinking one day in the last 30 days was at 6%. The range and distributions are shown in Table A16 (Appendix A).

In 2017, the YRBS question was “During the past 30 days, on how many days did you have four or more drinks of alcohol in a row (if you are female) or five or more drinks of alcohol in a row (if you are male)?” The adolescents that reported binge drinking 0 days in the last 30 days was at 84.5% and adolescents reporting binge drinking

1 day of the last 30 days was at 5%. The range and distributions are shown in Table A17 (Appendix A).

Frequency of Marijuana Use During Lifetime

In the 2015 YRBS it asks, "During your life, how many times have you used marijuana?" Sixty-two-point six percent of adolescents reported not smoking marijuana during their lifetime. The next largest percentage of days using marijuana was 100 or more times which was 9.3% of the adolescent population. The distributions and ranges are shown in Table A18 (Appendix A).

In the 2017 YRBS it asks, "During your life, how many times have you used marijuana?" Of the adolescents that completed the survey 63.3% reported never using marijuana in their lifetime. Using marijuana 1 or 2 times during a lifetime was the next largest percentage of adolescents at 7.5%. The distributions and ranges are shown in Table A19 (Appendix A).

Age of First Marijuana Use

In the YRBS of 2015 the question was "How old were you when you tried marijuana for the first time?" Most of the adolescents reported never having used marijuana at 62.5% but 12.5% stated that they started to use marijuana at 13 to 14 years old. The ranges and distributions are shown in Table A20 (Appendix A).

In the YRBS of 2017 the question was "How old were you when you tried marijuana for the first time?" Sixty four percent of the adolescents reported never using marijuana before while 12.6% reported that they used marijuana for the first time

between 13 and 14 years old. The ranges and distributions are shown in Table A21 (Appendix A).

Frequency of Marijuana use 30 days

In the 2015 YRBS the question was "During the past 30 days, how many times did you use marijuana?" Most of the adolescents did not use marijuana in the last 30 days at 77.5%. The next largest group of adolescents had only used marijuana 1 or 2 times in the last 30 days at 7%. The ranges and distributions are shown in Table A22 (Appendix A).

The YRBS of 2017 the question was "During the past 30 days, how many times did you use marijuana?" Seventy eight percent of the adolescents reported not using marijuana in the last 30 days and 7% of the adolescents reported using marijuana 1 to 2 times in the last 30 days. The ranges and distributions are shown in Table A23 (Appendix A).

Sexual Intercourse (Lifetime)

The YRBS in 2015 had the question "Have you ever had sexual intercourse?" A larger number of adolescents reported not ever having sexual intercourse at 53.9%. Thirty-four-point three percent of adolescents reported having sexual intercourse in their lifetime. The range and distributions are shown in Table A24 (Appendix A).

The 2017 YRBS had the question "Have you ever had sexual intercourse?" Fifty-eight-point two percent of adolescents reported not having sexual intercourse in their lifetime. Only 33.2% of adolescents reported having sexual intercourse in their lifetime. The range and distributions are shown in Table A25 (Appendix A).

Age of First Sexual Intercourse

The question in the 2015 YRBS was "How old were you when you had sexual intercourse for the first time?" Most of the adolescents reported not having sexual intercourse ever at 53.7%. Eight-point seven percent of adolescents reported having sexual intercourse for the first time when they were 15 years old. The range and distributions are shown in Table A26 (Appendix A).

In the 2017 YRBS the question was "How old were you when you had sexual intercourse for the first time?" Fifty eight percent of adolescents reported never having sexual intercourse in their lifetime. The most common age of first sexual intercourse reported was 15 years old at 9.4%. The range and distributions are shown in Table A27 (Appendix A).

Sexual Intercourse Partners (Lifetime)

In the 2015 YRBS the question was "During your life, with how many people have you had sexual intercourse?" Fifty-three-point eight percent of adolescents reported not having sexual intercourse in their lifetime and 13.1% reported only having one sexual partner in their lifetime. The ranges and distributions are shown in Table A28 (Appendix A).

The 2017 YRBS question was "During your life, with how many people have you had sexual intercourse?" Fifty-eight-point two percent of adolescents reported never having sexual intercourse. Fourteen-point four percent of adolescents reported only having one sexual partner in their lifetime. The ranges and distributions are shown in Table A29 (Appendix A).

Sexual Intercourse Partners (3 months)

In the 2015 YRBS the question posed was "During the past 3 months, with how many people did you have sexual intercourse?" Most of the adolescents reported not ever having sexual intercourse in their lifetime at 53.9% and 10.9% reported having sexual intercourse but not in the last 3 months. Seventeen percent of the adolescents reported only having 1 partner in the last 30 days. The ranges and distributions are shown in Table A30 (Appendix A).

The 2017 YRBS question was "During the past 3 months, with how many people did you have sexual intercourse?" Fifty-eight-point one percent of adolescents that completed the survey reported not ever having sexual intercourse and 10.1% reported having sexual intercourse but not in the last 3 months. In the adolescents that reported having sexual intercourse in the last 3 months, 17.2% reported only having one sexual partner. The ranges and distributions are shown in Table A31 (Appendix A).

Alcohol or Drugs Before Sexual Intercourse

In the 2015 YRBS the question posed was "Did you drink alcohol or use drugs before you had sexual intercourse the last time?" Fifty-three-point seven percent of the adolescents reported never having sexual intercourse. Of the adolescents that did report having sexual intercourse, 27.3% did not use alcohol or drugs before. The range and distributions are shown in Table A32 (Appendix A).

In the 2017 YRBS the question was "Did you drink alcohol or use drugs before you had sexual intercourse the last time?" Most of the adolescents reported never having sexual intercourse at 57.9%. In the adolescents that reported having sexual intercourse,

27.3% reported using alcohol or drugs before. The ranges and distributions are shown in Table A33 (Appendix A).

Last Sexual Intercourse Condom Use

In the 2015 YRBS, the question asked was "The last time you had sexual intercourse, did you or your partner use a condom?" Most adolescents reported not having sexual intercourse at 53.7%. Of the adolescents that reported having sexual intercourse 21.6% stated they used a condom. The ranges and distributions are shown in Table A34 (Appendix A).

The 2017 YRBS question was "The last time you had sexual intercourse, did you or your partner us a condom?" Fifty-eight percent of adolescents reported not having sexual intercourse. Of the adolescents that reported having sexual intercourse 19.7% did not use a condom. The ranges and distributions are shown in Table A35 (Appendix A).

Research Question 1a

RQ1: Is there a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse)?

The dependent variable is age of first alcohol drink and the independent variables will be if they are sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use during last intercourse and alcohol or drug use before last sexual intercourse.

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use,

multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable of being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The ordered log-odds (Estimate) = - .779, *SE* = .241, *Wald* = 10.446, p < .001. The estimated odds ratio favored an inverse relationship of nearly **[n]** fold [*Exp (Estimate)* = 3.580, 95% CI (3.236, 3.962)] for every one unit increase of age of first alcoholic drink (Tables 1 & 2).

The predictor variable, age of initial sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.315], *SE* = [.028], *Wald* = [127.310], *p* < .001. The estimated odds ratio favored an positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.370], 95% CI (1.301, 1.443)] compared to the reference variable: age of first alcohol drink (Table 1 & 2).

The predictor variable, sexual intercourse partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.104], *SE* = [.029], *Wald* = [12.951], *p* < .001. The estimated odds ratio favored an inverse relationship of nearly [n] fold [*Exp (Estimate)* = [.104], 95% CI (1.052, 1.170)] compared to the reference variable: age of first alcohol drink (Table 1 & 2).

The predictor variable, sexual intercourse partners last 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds

(Estimate)] = [-.078], *SE* = [.039], *Wald* = [4.129], $p < .001$. The estimated odds ratio favored an inverse relationship of nearly [n] fold [*Exp (Estimate)* = [.925], 95% CI (.863, .990)] compared to the reference variable: age of first alcohol drink (Table 1 & 2).

The predictor variable, condom use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.179], *SE* = [.084], *Wald* = [4.496], $p < .001$. The estimated odds ratio favored an inverse relationship of nearly [n] fold [*Exp (Estimate)* = [.836], 95% CI (.716, .977)] compared to the reference variable: age of first alcohol drink (Table 1 & 2).

The predictor variable, alcohol, or drug before sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.296], *SE* = [.105], *Wald* = [7.938], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.344], 95% CI (1.115, 1.621)] compared to the reference variable: age of first alcohol drink (Table 1 & 2).

Table 1

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[FIDR=1]	1.154	.139	69.269	1	.000	.882	1.426
	[FIDR=2]	1.396	.139	100.861	1	.000	1.124	1.668
	[FIDR=3]	1.541	.139	122.448	1	.000	1.268	1.814
	[FIDR=4]	1.854	.140	175.386	1	.000	1.580	2.129
	[FIDR=5]	2.770	.143	373.228	1	.000	2.489	3.051
	[FIDR=6]	4.763	.160	890.865	1	.000	4.450	5.075
Location	Recode_Sex	-.779	.241	10.446	1	.001	-1.251	-.307
	AGESEX	.315	.028	127.310	1	.000	.260	.370
	MULSEX	.104	.029	12.951	1	.000	.047	.161
	MULSEX3	-.078	.039	4.129	1	.042	-.154	-.003
	SEXCON	.179	.084	4.496	1	.034	.014	.345
	Recode_BEFSEX	.296	.105	7.938	1	.005	.090	.502

Table 2

Parameter Estimates

			95% Wald Confidence Interval			Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
Parameter		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Age of first alcohol drink=1]	.796	.1345	.532	1.060	35.017	1	.000	2.217	1.703	2.885
	[Age of first alcohol drink=2]	1.038	.1348	.774	1.302	59.250	1	.000	2.823	2.168	3.678
	[Age of first alcohol drink=3]	1.183	.1351	.918	1.448	76.709	1	.000	3.264	2.505	4.254
	[Age of first alcohol drink=4]	1.496	.1357	1.230	1.762	121.555	1	.000	4.465	3.422	5.825
	[Age of first alcohol drink=5]	2.412	.1383	2.141	2.683	304.173	1	.000	11.158	8.509	14.632
	[Age of first alcohol drink=6]	4.405	.1531	4.104	4.705	827.134	1	.000	81.825	60.607	110.470
Recode_Sex		-.242	.2320	-.696	.213	1.086	1	.297	.785	.498	1.237
Age of first sexual intercourse		.315	.0265	.263	.367	141.390	1	.000	1.370	1.301	1.443
Sexual intercourse partners (lifetime)		.104	.0272	.051	.157	14.680	1	.000	1.110	1.052	1.170

Sexual intercourse partners (3 mos.)	-.078	.0351	-.147	-.010	5.003	1	.025	.925	.863	.990
Alcohol or drugs before sexual intercourse	.296	.0954	.109	.483	9.631	1	.002	1.344	1.115	1.621
Last sexual intercourse condom use	-.179	.0794	-.335	-.023	5.082	1	.024	.836	.716	.977

Dependent Variable: Age of first alcohol drink
Model: (Threshold), Recode_Sex, Age of first sexual intercourse, Sexual intercourse partners (lifetime), Sexual intercourse partners (3 mos.), Alcohol or drugs before sexual intercourse, Last sexual intercourse condom use
a. Fixed at the displayed value

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.051], *SE* = [.331], *Wald* = [.024], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.950], 95% CI (.526, 1.716)] for every one unit increase of age of first alcohol drink (Table 3 & 4).

The predictor variable, age of initial sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.288], *SE* = [.030], *Wald* = [89.142], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.334], 95% CI (1.260, 1.412)] compared to the reference variable: age of first alcohol drink (Table 3 & 4).

The predictor variable, sexual intercourse partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered

log-odds (Estimate)] = [.124], *SE* = [.032], *Wald* = [15.209], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.132], 95% CI (1.067, 1.200)] compared to the reference variable: age of first alcohol drink (Table 3 & 4).

The predictor variable, sexual intercourse partners last 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [- .086], *SE* = [.043], *Wald* = [4.040], $p < .001$. The estimated odds ratio favored an inverse relationship of nearly [n] fold [*Exp (Estimate)* = [.917], 95% CI (.850, .990)] compared to the reference variable: age of first alcohol drink (Table 3 & 4).

The predictor variable, condom use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.234], *SE* = [.089], *Wald* = [6.919], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.264], 95% CI (1.070, 1.493)] compared to the reference variable: age of first alcohol drink (Table 3 & 4).

The predictor variable, alcohol, or drug before sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [- .162], *SE* = [.118], *Wald* = [1.872], $p < .001$. The estimated odds ratio favored an inverse relationship of nearly [n] fold [*Exp (Estimate)* = [.851], 95% CI (.691, 1.047)] compared to the reference variable: age of first alcohol drink (Table 3 & 4).

Table 3

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[FIDR=1]	.794	.171	21.667	1	.000	.459	1.128
	[FIDR=2]	1.037	.171	36.890	1	.000	.702	1.372
	[FIDR=3]	1.199	.171	49.170	1	.000	.864	1.534
	[FIDR=4]	1.516	.171	78.105	1	.000	1.179	1.852
	[FIDR=5]	2.444	.174	197.310	1	.000	2.103	2.785
	[FIDR=6]	4.619	.191	586.619	1	.000	4.245	4.993
Location	AGESEX	.288	.030	89.142	1	.000	.228	.348
	MULSEX	.124	.032	15.209	1	.000	.062	.186
	MULSEX3	-.086	.043	4.040	1	.044	-.171	-.002
	Recode_BEFSEX	-.162	.118	1.872	1	.171	-.393	.070
	Recode_SEXCON	.234	.089	6.919	1	.009	.060	.409
	Recode_SEX	-.051	.331	.024	1	.876	-.699	.597

Table 4

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Age of first alcohol drink=1]	.794	.1568	.486	1.101	25.621	1	.000	2.211	1.626	3.007
	[Age of first alcohol drink=2]	1.037	.1570	.729	1.345	43.652	1	.000	2.821	2.074	3.837
	[Age of first alcohol drink=3]	1.199	.1571	.891	1.507	58.193	1	.000	3.316	2.437	4.512
	[Age of first alcohol drink=4]	1.516	.1577	1.206	1.825	92.366	1	.000	4.552	3.342	6.200
	[Age of first alcohol drink=5]	2.444	.1606	2.129	2.759	231.499	1	.000	11.521	8.409	15.785
	[Age of first alcohol drink=6]	4.619	.1794	4.267	4.970	663.059	1	.000	101.382	71.331	144.093
Age of first sexual intercourse		.288	.0290	.231	.345	98.708	1	.000	1.334	1.260	1.412

Sexual intercourse partners (lifetime)	.124	.0300	.065	.183	16.958	1	.000	1.132	1.067	1.200
Sexual intercourse partners (3 mos.)	-.086	.0391	-.163	-.010	4.875	1	.027	.917	.850	.990
Sexual intercourse (ever)	-.051	.3018	-.643	.540	.029	1	.865	.950	.526	1.716
Last sexual intercourse condom use	.234	.0849	.068	.400	7.615	1	.006	1.264	1.070	1.493
Alcohol or drugs before sexual intercourse	-.162	.1061	-.369	.046	2.319	1	.128	.851	.691	1.047

Research Question 1b

RQ1: Is there a relationship between alcohol use (frequency of alcohol consumption) and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse)?

The dependent variable will be frequency of alcohol consumption and the independent variables will be if they are sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use during last intercourse and alcohol or drug use before last sexual intercourse.

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-1.284], *SE* = [.257], *Wald* = [25.049], $p < .001$. The estimated odds ratio favored an inverse relationship of nearly [n] fold [*Exp*

(Estimate) = [.624], 95% CI (.370, 1.054)] for every one unit increase of frequency of alcohol consumption (Table 5 & 6).

The predictor variable, age of initial sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.015], *SE* = [.029], *Wald* = [.262], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.985], 95% CI (.930, 1.044)] compared to the reference variable: frequency of alcohol consumption (Table 5 & 6).

The predictor variable, sexual intercourse partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.118], *SE* = [.030], *Wald* = [15.159], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.125], 95% CI (1.059, 1.195)] compared to the reference variable: frequency of alcohol consumption (Table 5 & 6).

The predictor variable, sexual intercourse partners during the past 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.254], *SE* = [.041], *Wald* = [38.811], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.289], 95% CI (1.182, 1.406)] compared to the reference variable: frequency of alcohol consumption (Table 5 & 6).

The predictor variable, condom use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds

(Estimate)] = [.271], *SE* = [.089], *Wald* = [9.248], $p < .001$. The estimated odds ratio favored an inverse relationship of nearly [n] fold [*Exp (Estimate)* = [.763], 95% CI (.640, .909)] compared to the reference variable: frequency of alcohol consumption (Table 5 & 6).

The predictor variable, alcohol, or drug before sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [1.465], *SE* = [.110], *Wald* = [178.954], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [4.330], 95% CI (3.495, 5.363)] compared to the reference variable: frequency of alcohol consumption (Table 5 & 6).

Table 5

Parameter Estimates

							95% Confidence Interval	
		Estimates	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[DADR=1]	3.484	.149	547.100	1	.000	3.192	3.776
	[DADR=2]	4.699	.158	885.416	1	.000	4.390	5.009
	[DADR=3]	5.571	.168	1100.184	1	.000	5.242	5.900
	[DADR=4]	6.375	.180	1253.281	1	.000	6.022	6.728
	[DADR=5]	7.347	.201	1331.228	1	.000	6.952	7.742
	[DADR=6]	7.983	.223	1279.029	1	.000	7.545	8.420
Location	Recode_Sex	-1.284	.257	25.049	1	.000	-1.787	-.781
	AGESEX	-.015	.029	.262	1	.609	-.072	.042
	MULSEX	.118	.030	15.159	1	.000	.058	.177
	MULSEX3	.254	.041	38.811	1	.000	.174	.334
	SEXCON	.271	.089	9.248	1	.002	.096	.445
	Recode_BEFSEX	1.465	.110	178.954	1	.000	1.251	1.680

Table 6

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of alcohol consumption= 1]	2.942	.1551	2.638	3.246	359.925	1	.000	18.955	13.987	25.688
	[Frequency of alcohol consumption= 2]	4.158	.1628	3.838	4.477	651.878	1	.000	63.912	46.449	87.941
	[Frequency of alcohol consumption= 3]	5.029	.1714	4.693	5.365	861.100	1	.000	152.841	109.232	213.860
	[Frequency of alcohol consumption= 4]	5.834	.1820	5.477	6.190	1027.358	1	.000	341.579	239.096	487.990
	[Frequency of alcohol consumption= 5]	6.805	.2031	6.407	7.203	1122.769	1	.000	902.678	606.255	1344.035
	Frequency of alcohol consumption= 6]	7.441	.2259	6.998	7.884	1084.816	1	.000	1704.725	1094.832	2654.368
Recode_Sex		-.471	.2672	-.995	.053	3.108	1	.078	.624	.370	1.054
Age of first sexual intercourse		-.015	.0296	-.073	.043	.253	1	.615	.985	.930	1.044
Sexual intercourse partners (lifetime)		.118	.0309	.057	.178	14.436	1	.000	1.125	1.059	1.195
Sexual intercourse partners (3 mos.)		.254	.0442	.167	.341	33.023	1	.000	1.289	1.182	1.406
Alcohol or drugs before sexual intercourse		1.465	.1092	1.251	1.680	180.068	1	.000	4.330	3.495	5.363
Last sexual intercourse condom use		-.271	.0895	-.446	-.095	9.161	1	.002	.763	.640	.909

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the

2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [3.733], *SE* = [.348], *Wald* = [115.120], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [41.819], 95% CI (20.948, 83.483)] for every one unit increase of frequency of alcohol consumption (Table 7 & 8).

The predictor variable, age of initial sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.018], *SE* = [.032], *Wald* = [.318], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.982], 95% CI (.922, 1.047)] compared to the reference variable: frequency of alcohol consumption (Table 7 & 8)

The predictor variable, sexual intercourse partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.096], *SE* = [.034], *Wald* = [8.160], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.101], 95% CI (1.030, 1.176)] compared to the reference variable: frequency of alcohol consumption (Table 7 & 8)

The predictor variable, sexual intercourse partners during the past 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.265], *SE* = [.044], *Wald* = [36.238], $p < .001$. The estimated odds

ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.304], 95% CI (1.187, 1.432)] compared to the reference variable: frequency of alcohol consumption (Table 7 & 8)

The predictor variable, condom use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.225], *SE* = [.094], *Wald* = [5.743], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.253], 95% CI (1.041, 1.507)] compared to the reference variable: frequency of alcohol consumption (Table 7 & 8)

The predictor variable, alcohol, or drug before sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-1.675], *SE* = [.123], *Wald* = [185.883], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.187], 95% CI (.147, .239)] compared to the reference variable: frequency of alcohol consumption (Table 7 & 8)

Table 7

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[DADR=1]	.593	.180	10.873	1	.001	.241	.946
	[DADR=2]	1.911	.181	111.408	1	.000	1.556	2.266
	[DADR=3]	2.846	.184	238.169	1	.000	2.485	3.208
	[DADR=4]	3.716	.194	367.426	1	.000	3.336	4.096
	[DADR=5]	4.546	.213	455.279	1	.000	4.128	4.963
	[DADR=6]	4.921	.227	470.870	1	.000	4.476	5.365
Location	AGESEX	-.018	.032	.318	1	.573	-.080	.044
	MULSEX	.096	.034	8.160	1	.004	.030	.162

	MULSEX3	.265	.044	36.238	1	.000	.179	.351
	Recode_BEFSEX	-1.675	.123	185.883	1	.000	-1.916	-1.434
	Recode_SEXCON	.225	.094	5.743	1	.017	.041	.409
	Recode_SEX	3.733	.348	115.120	1	.000	3.051	4.415

Table 8

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of alcohol consumption=1]	.593	.1814	.238	.949	10.690	1	.001	1.809	1.268	2.582
	[Frequency of alcohol consumption=2]	1.911	.1826	1.553	2.269	109.502	1	.000	6.759	4.725	9.667
	[Frequency of alcohol consumption=3]	2.846	.1861	2.481	3.211	233.984	1	.000	17.222	11.959	24.801
	[Frequency of alcohol consumption=4]	3.716	.1957	3.333	4.100	360.613	1	.000	41.116	28.017	60.339
	[Frequency of alcohol consumption=5]	4.546	.2164	4.122	4.970	441.335	1	.000	94.219	61.654	143.986
	[Frequency of alcohol consumption=6]	4.921	.2311	4.468	5.374	453.523	1	.000	137.095	87.165	215.625
Age of first sexual intercourse		-.018	.0325	-.082	.046	.301	1	.584	.982	.922	1.047
Sexual intercourse partners (lifetime)		.096	.0337	.030	.162	8.129	1	.004	1.101	1.030	1.176
Sexual intercourse partners (3 mos.)		.265	.0478	.171	.359	30.705	1	.000	1.304	1.187	1.432
Sexual Intercourse (ever)		3.733	.3527	3.042	4.425	112.038	1	.000	41.819	20.948	83.483
Last sexual intercourse condom use		.225	.0945	.040	.410	5.679	1	.017	1.253	1.041	1.507
Alcohol or drugs before sexual intercourse		-1.675	.1243	-1.919	-1.431	181.512	1	.000	.187	.147	.239

Research Question 1c

RQ1: Is there a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse)?

The dependent variable will be frequency of binge drinking and the independent variables will be if they are sexually active, sexual partners in their lifetime, sexual partners in the last three months, condom use during last intercourse and alcohol or drug use before last sexual intercourse.

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [- 1.186], *SE* = [.310], *Wald* = [14.595], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.706], 95% CI (.381, 1.310)] for every one unit increase of frequency of binge drinking (Table 9 & 10).

The predictor variable, age of initial sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.030], *SE* = [.035], *Wald* = [.750], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.971], 95% CI (.907, 1.039)] compared to the reference variable: frequency of binge drinking (Table 9 & 10).

The predictor variable, sexual intercourse partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.132], *SE* = [.035], *Wald* = [14.102], $p < .001$. The estimated odds

ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.142], 95% CI (1.064, 1.225)] compared to the reference variable: frequency of binge drinking (Table 9 & 10).

The predictor variable, sexual intercourse partners during the past 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.213], *SE* = [.043], *Wald* = [24.189], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.238], 95% CI (1.130, 1.356)] compared to the reference variable: frequency of binge drinking (Table 9 & 10).

The predictor variable, condom use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.279], *SE* = [.105], *Wald* = [7.039], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.756], 95% CI (.615, .930)] compared to the reference variable: frequency of binge drinking (Table 9 & 10).

The predictor variable, alcohol, or drug before sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [1.543], *SE* = [.116], *Wald* = [177.316], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [4.679], 95% CI (3.720, 5.885)] compared to the reference variable: frequency of binge drinking (Table 9 & 10).

Table 9

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[MODR=1]	4.829	.176	755.112	1	.000	4.485	5.174
	[MODR=2]	5.537	.184	910.338	1	.000	5.177	5.897
	[MODR=3]	6.223	.193	1041.887	1	.000	5.845	6.601
	[MODR=4]	7.150	.209	1166.926	1	.000	6.740	7.561
	[MODR=5]	7.835	.227	1188.685	1	.000	7.389	8.280
	[MODR=6]	8.472	.253	1122.191	1	.000	7.977	8.968
Location	Recode_Sex	-1.186	.310	14.595	1	.000	-1.794	-.577
	AGESEX	-.030	.035	.750	1	.386	-.098	.038
	MULSEX	.132	.035	14.102	1	.000	.063	.202
	MULSEX3	.213	.043	24.189	1	.000	.128	.298
	SEXCON	.279	.105	7.039	1	.008	.073	.486
	Recode_BEFSEX	1.543	.116	177.316	1	.000	1.316	1.770

Table 10

Parameter Estimates

			95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of binge drinking=1]	4.271	.1822	3.914	4.628	549.702	1	.000	71.567	50.081	102.273
	[Frequency of binge drinking=2]	4.978	.1888	4.608	5.348	695.540	1	.000	145.218	100.310	210.230
	[Frequency of binge drinking=3]	5.664	.1974	5.277	6.051	823.312	1	.000	288.382	195.855	424.621
	[Frequency of binge drinking=4]	6.592	.2130	6.174	7.009	957.978	1	.000	729.004	480.231	1106.651
	[Frequency of binge drinking=5]	7.276	.2310	6.823	7.729	992.283	1	.000	1445.065	918.923	2272.457
	[Frequency of binge drinking=6]	7.914	.2573	7.409	8.418	945.972	1	.000	2734.371	1651.369	4527.628
Recode_Sex		-.347	.3152	-.965	.270	1.215	1	.270	.706	.381	1.310
Age of first sexual intercourse		-.030	.0348	-.098	.038	.742	1	.389	.971	.907	1.039
Sexual Intercourse partners (lifetime)		.132	.0358	.062	.203	13.717	1	.000	1.142	1.064	1.225
Sexual intercourse partners (3 mos.)		.213	.0466	.122	.305	20.933	1	.000	1.238	1.130	1.356
Alcohol or drugs before sexual intercourse		1.543	.1171	1.314	1.772	173.751	1	.000	4.679	3.720	5.885
Last sexual intercourse condom use		-.279	.1058	-.487	-.072	6.975	1	.008	.756	.615	.930

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [4.080], *SE* = [.388], *Wald* = [110.667], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [59.117], 95% CI (27.686, 126.231)] for every one unit increase of frequency of binge drinking (Table 11 & 12).

The predictor variable, age of initial sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.061], *SE* = [.037], *Wald* = [2.668], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.941], 95% CI (.873, 1.014)] compared to the reference variable: frequency of binge drinking (Table 11 & 12).

The predictor variable, sexual intercourse partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.054], *SE* = [.039], *Wald* = [1.886], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.055], 95% CI (.978, 1.139)] compared to the reference variable: frequency of binge drinking (Table 11 & 12).

The predictor variable, sexual intercourse partners during the past 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.327], *SE* = [.048], *Wald* = [45.679], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.387], 95% CI (1.252, 1.537)] compared to the reference variable: frequency of binge drinking (Table 11 & 12).

The predictor variable, condom use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.214], *SE* = [.112], *Wald* = [3.655], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.238], 95% CI (.944, 1.544)] compared to the reference variable: frequency of binge drinking (Table 11 & 12).

The predictor variable, alcohol, or drug before sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-1.641], *SE* = [.128], *Wald* = [164.364], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.194], 95% CI (.151, .250)] compared to the reference variable: frequency of binge drinking (Table 11 & 12).

Table 11

Parameter Estimates

		Estimates	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[MODR=1]	1.910	.207	85.168	1	.000	1.504	2.316
	[MODR=2]	2.639	.209	159.616	1	.000	2.230	3.049
	[MODR=3]	3.317	.213	242.779	1	.000	2.900	3.735
	[MODR=4]	4.220	.225	352.737	1	.000	3.779	4.660
	[MODR=5]	4.931	.242	414.222	1	.000	4.456	5.406
	[MODR=6]	5.385	.260	430.387	1	.000	4.877	5.894
Location	AGESEX	-.061	.037	2.668	1	.102	-.134	.012
	MULSEX	.054	.039	1.886	1	.170	-.023	.131
	MULSEX3	.327	.048	45.679	1	.000	.232	.422
	Recode_BEFSEX	-1.641	.128	164.364	1	.000	-1.892	-1.390
	Recode_SEXCON	.214	.112	3.655	1	.056	-.005	.433
	Recode_SEX	4.080	.388	110.667	1	.000	3.319	4.840

Table 12

Parameter Estimates

		B	95% Wald Confidence Interval		Hypothesis Test			Exp(B)	95% Wald Confidence Interval for Exp(B)	
			Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.		Lower	Upper
Threshold	[Frequency of binge drinking=1]	1.910	.2060	1.506	2.314	86.012	1	.000	6.754	4.511	10.113
	[Frequency of binge drinking=2]	2.639	.2075	2.233	3.046	161.815	1	.000	14.003	9.324	21.029
	[Frequency of binge drinking=3]	3.317	.2113	2.903	3.732	246.485	1	.000	27.588	18.223	41.742
	[Frequency of binge drinking=4]	4.220	.2242	3.780	4.659	354.069	1	.000	68.000	43.816	105.532
	[Frequency of binge drinking=5]	4.931	.2440	4.453	5.410	408.368	1	.000	138.552	85.881	223.524
	[Frequency of binge drinking=6]	5.385	.2630	4.870	5.901	419.419	1	.000	218.209	130.328	365.350
Age of first sexual intercourse		-.061	.0380	-.135	.014	2.559	1	.110	.941	.873	1.014
Sexual Intercourse partners (lifetime)		.054	.0391	-.023	.130	1.904	1	.168	1.055	.978	1.139
Sexual intercourse partners (3 mos.)		.327	.0523	.225	.430	39.174	1	.000	1.387	1.252	1.537
Sexual intercourse (ever)		4.080	.3870	3.321	4.838	111.096	1	.000	59.117	27.686	126.231
Last sexual intercourse condom use		.214	.1124	-.006	.434	3.619	1	.057	1.238	.994	1.544
Alcohol or drugs before sexual intercourse		-1.641	.1290	-1.894	-1.388	161.787	1	.000	.194	.151	.250

Research Question 2a

RQ2: Does the relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents?
The dependent variable will be age of first alcohol drink and the independent variables will be ethnicity, age, gender, grade level and whether they are Hispanic.

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.157], *SE* = [.021], *Wald* = [55.783], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.171], 95% CI (1.123, 1.220)] for every one unit increase of age of first alcohol drink (Table 13 & 14).

The predictor variable, of age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.229], *SE* = [.036], *Wald* = [40.983], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.257], 95% CI (1.175, 1.345)] compared to the reference variable: age of first alcohol drink (Table 13 & 14).

The predictor variable, of gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.162], *SE* = [.048], *Wald* = [11.297], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.851], 95% CI (.774, .935)] compared to the reference variable: age of first alcohol drink (Table 13 & 14).

The predictor variable, of grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.226], *SE* = [.040], *Wald* = [32.426], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.254], 95% CI (1.162, 1.352)] compared to the reference variable: age of first alcohol drink (Table 13 & 14).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.216], *SE* = [.071], *Wald* = [9.239], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.241], 95% CI (1.079, 1.427)] compared to the reference variable: age of first alcohol drink (Table 13 & 14).

Table 13

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[FIDR=1]	2.416	.255	90.120	1	.000	1.917	2.915
	[FIDR=2]	2.645	.255	107.712	1	.000	2.146	3.145
	[FIDR=3]	2.781	.255	118.851	1	.000	2.281	3.281
	[FIDR=4]	3.076	.256	144.733	1	.000	2.575	3.577
	[FIDR=5]	3.957	.258	235.852	1	.000	3.452	4.461
	[FIDR=6]	5.868	.265	489.122	1	.000	5.348	6.387
Location	RACE	.157	.021	55.783	1	.000	.116	.199
	AGE	.229	.036	40.983	1	.000	.159	.299
	GEN	-.162	.048	11.297	1	.001	-.256	-.067
	GRA	.226	.040	32.426	1	.000	.148	.304
	HIS	.216	.071	9.239	1	.002	.077	.355

Table 14

Parameter Estimates

			95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Age of first alcohol drink=1]	2.416	.2521	1.922	2.910	91.816	1	.000	11.202	6.834	18.362
	[Age of first alcohol drink =2]	2.645	.2524	2.151	3.140	109.827	1	.000	14.087	8.590	23.104
	[Age of first alcohol drink=3]	2.781	.2526	2.286	3.276	121.234	1	.000	14.087	8.590	23.104
	[Age of first alcohol drink=4]	3.076	.2531	2.580	3.572	147.743	1	.000	21.671	13.197	35.586
	[Age of first alcohol drink =5]	3.957	.2550	3.457	4.456	240.820	1	.000	52.277	31.717	86.165
Ethnicity		.157	.0212	.116	.199	55.121	1	.000	1.171	1.123	1.220
Age		.229	.0345	.161	.296	43.985	1	.000	1.257	1.175	1.345
Gender		-.162	.0484	-.257	-.067	11.189	1	.001	.851	.774	.935
Grade Level		.226	.0386	.150	.302	34.3232	1	.000	1.254	1.162	1.352
Hispanic Ethnicity		.216	.0712	.076	.355	9.194	1	.002	1.241	1.079	1.427

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.114], *SE* = [.021], *Wald* = [28.463], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.121], 95% CI (1.075, 1.170)] for every one unit increase of age of first alcohol drink (Table 15 & 16).

The predictor variable, of age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.179], *SE* = [.038], *Wald* = [21.549], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.196], 95% CI (1.112, 1.285)] compared to the reference variable: age of first alcohol drink (Table 15 & 16).

The predictor variable, of gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.294], *SE* = [.051], *Wald* = [33.368], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.745], 95% CI (.674, .824)] compared to the reference variable: age of first alcohol drink (Table 15 & 16).

The predictor variable, of grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.261], *SE* = [.043], *Wald* = [36.672], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.298], 95% CI (1.196, 1.408)] compared to the reference variable: age of first alcohol drink (Table 15 & 16).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.181], *SE* = [.073], *Wald* = [6.136], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.199], 95% CI (1.038, 1.384)] compared to the reference variable: age of first alcohol drink (Table 15 & 16).

Table 15

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[FIDR=1]	1.822	.260	49.201	1	.000	1.313	2.331
	[FIDR=2]	2.061	.260	62.805	1	.000	1.551	2.570
	[FIDR=3]	2.221	.260	72.820	1	.000	1.711	2.731
	[FIDR=4]	2.515	.261	93.048	1	.000	2.004	3.026
	[FIDR=5]	3.373	.263	165.059	1	.000	2.858	3.887
	[FIDR=6]	5.516	.273	407.920	1	.000	4.981	6.052
Location	RACE	.114	.021	28.463	1	.000	.072	.156
	AGE	.179	.038	21.549	1	.000	.103	.254
	GEN	-.294	.051	33.368	1	.000	-.394	-.194
	GRA	.261	.043	36.672	1	.000	.176	.345
	HIS	.181	.073	6.136	1	.013	.038	.325

Table 16

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig	Exp(B)	Lower	Upper
Threshold	[Age of first alcohol drink=1]	1.822	.2590	1.314	2.329	49.453	1	.000	6.182	3.721	10.272
	[Age of first alcohol drink=2]	2.061	.2593	1.553	2.569	63.183	1	.000	7.852	4.724	13.051
	[Age of first alcohol drink=3]	2.221	.2594	1.713	2.729	73.295	1	.000	9.217	5.543	15.325
	[Age of first alcohol drink=4]	2.515	.2598	2.006	3.025	93.725	1	.000	12.371	7.434	20.586
	[Age of first alcohol drink=5]	3.373	.2616	2.860	3.885	166.178	1	.000	29.155	17.459	48.686
	[Age of first alcohol drink=6]	5.516	.2729	4.981	6.051	408.677	1	.000	248.707	145.687	424.576
Ethnicity		.114	.0216	.072	.157	28.116	1	.000	1.121	1.075	1.170
Age		.179	.0370	.106	.251	23.326	1	.000	1.196	1.112	1.285
Gender		-.294	.0511	-.394	-.194	33.084	1	.000	.745	.674	.824
Grade Level		.261	.0417	.179	.343	39.191	1	.000	1.298	1.196	1.408
Hispanic Ethnicity		.181	.0734	.038	.325	6.107	1	.013	1.199	1.038	1.384

Research Question 2b

RQ2: Does the relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents?
The dependent variable will be frequency of alcohol consumption and the independent variables will be ethnicity, age, gender, grade level and whether they are Hispanic.

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.159], *SE* = [.024], *Wald* = [43.559], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.173], 95% CI (1.118, 1.230)] for every one unit increase of frequency of alcohol consumption (Table 17 & 18).

The predictor variable, of age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.102], *SE* = [.041], *Wald* = [6.084], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.107], 95% CI (1.018, 1.205)] compared to the reference variable: frequency of alcohol consumption (Table 17 & 18).

The predictor variable, of gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.006], *SE* = [.055], *Wald* = [.011], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.006], 95% CI (.903, 1.120)] compared to the reference variable: frequency of alcohol consumption (Table 17 & 18).

The predictor variable, of grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.158], *SE* = [.046], *Wald* = [11.870], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.172], 95% CI (1.067, 1.286)] compared to the reference variable: frequency of alcohol consumption (Table 17 & 18).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.160], *SE* = [.080], *Wald* = [4.057], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.174], 95% CI (1.004, 1.372)] compared to the reference variable: frequency of alcohol consumption (Table 17 & 18).

Table 17

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[DADR=1]	2.742	.290	89.493	1	.000	2.174	3.310
	[DADR=2]	3.740	.292	164.211	1	.000	3.168	4.313
	[DADR=3]	4.448	.294	228.904	1	.000	3.871	5.024
	[DADR=4]	5.102	.297	294.883	1	.000	4.520	5.685
	[DADR=5]	5.894	.304	374.724	1	.000	5.297	6.490
	[DADR=6]	6.433	.314	420.716	1	.000	5.818	7.048
Location	RACE	.159	.024	43.559	1	.000	.112	.206
	AGE	.102	.041	6.084	1	.014	.021	.183
	GEN	.006	.055	.011	1	.918	-.102	.113
	GRA	.158	.046	11.870	1	.001	.068	.249
	HIS	.160	.080	4.057	1	.044	.004	.316

Table 18

Parameter Estimates

			95% Wald Confidence Interval		Hypothesis Test			95% Wald Confidence Interval for Exp(B)		
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of alcohol consumption=1]	2.742	.2926	2.168	3.316	87.800	1	.000	15.518	8.745	27.537
	[Frequency of alcohol consumption=2]	3.740	.2947	3.163	4.318	161.110	1	.000	42.116	23.638	75.039
	[Frequency of alcohol consumption=3]	4.448	.2969	3.866	5.029	224.414	1	.000	85.421	47.736	152.855
	[Frequency of alcohol consumption=4]	5.102	.3001	4.514	5.691	289.044	1	.000	164.407	91.298	296.060
	[Frequency of alcohol consumption=5]	5.894	.3074	5.291	6.496	367.531	1	.000	362.721	198.561	662.599
	[Frequency of alcohol consumption=6]	6.433	.3165	5.813	7.053	413.177	1	.000	622.049	334.531	1156.680
Ethnicity		.159	.0242	.112	.207	43.161	1	.000	1.173	1.118	1.230
Age		.102	.0431	.017	.186	5.598	1	.018	1.107	1.018	1.205
Gender		.006	.0550	-.102	.114	.011	1	.918	1.006	.903	1.120
Grade Level		.158	.0476	.065	.252	11.069	1	.001	1.172	1.067	1.286
Hispanic ethnicity		.160	.0798	.004	.317	4.023	1	.045	1.174	1.004	1.372

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.191], *SE* = [.025], *Wald* = [58.280], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.210], 95% CI (1.152, 1.272)] for every one unit increase of frequency of alcohol consumption (Table 19 & 20).

The predictor variable, of age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.080], *SE* = [.045], *Wald* = [3.167], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.923], 95% CI (.840, 1.014)] compared to the reference variable: frequency of alcohol consumption (Table 19 & 20)

The predictor variable, of gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.161], *SE* = [.061], *Wald* = [7.008], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.852], 95% CI (.756, .959)] compared to the reference variable: frequency of alcohol consumption (Table 19 & 20)

The predictor variable, of grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.397], *SE* = [.051], *Wald* = [61.293], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.488], 95% CI (1.340, 1.653)] compared to the reference variable: frequency of alcohol consumption (Table 19 & 20)

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.484], *SE* = [.085], *Wald* = [32.689], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.622], 95% CI (1.373, 1.917)] compared to the reference variable: frequency of alcohol consumption (Table 19 & 20).

Table 19

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[DADR=1]	3.148	.304	107.241	1	.000	2.552	3.744
	[DADR=2]	4.237	.307	190.721	1	.000	3.636	4.838
	[DADR=3]	5.013	.310	261.580	1	.000	4.406	5.621
	[DADR=4]	5.706	.315	328.011	1	.000	5.088	6.323
	[DADR=5]	6.374	.324	386.808	1	.000	5.739	7.009
	[DADR=6]	6.667	.330	407.645	1	.000	6.019	7.314
Location	RACE	.191	.025	58.280	1	.000	.142	.240
	AGE	-.080	.045	3.167	1	.075	-.168	.008
	GEN	-.161	.061	7.008	1	.008	-.280	-.042
	GRA	.397	.051	61.293	1	.000	.298	.497
	HIS	.484	.085	32.689	1	.000	.318	.650

Table 20

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of alcohol consumption=1]	3.148	.3087	2.543	3.753	103.993	1	.000	23.284	12.715	42.639
	[Frequency of alcohol consumption=2]	4.237	.3113	3.627	4.847	185.198	1	.000	69.188	37.586	127.362
	[Frequency of alcohol consumption=3]	5.013	.3146	4.397	5.630	253.895	1	.000	150.401	81.178	278.651
	[Frequency of alcohol consumption=4]	5.706	.3197	5.079	6.332	318.518	1	.000	300.544	160.614	562.382
	[Frequency of alcohol consumption=5]	6.374	.3286	5.730	7.018	376.287	1	.000	586.298	307.915	1116.365
	[Frequency of alcohol consumption=6]	6.667	.3346	6.011	7.322	397.037	1	.000	785.664	407.805	1513.636
Ethnicity		.191	.0252	.141	.240	57.311	1	.000	1.210	1.152	1.272
Age		-.080	.0478	-.174	.014	2.804	1	.094	.923	.840	1.014
Gender		-.161	.0609	-.280	-.041	6.971	1	.008	.852	.756	.959
Grade Level		.397	.0536	.292	.502	54.993	1	.000	1.488	1.340	1.653
Hispanic Ethnicity		.484	.0851	.317	.651	32.304	1	.000	1.622	1.373	1.917

Research Question 2c

RQ2: Does the relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents?

The dependent variable will be frequency of binge drinking and the independent variables will be ethnicity, age, gender, grade level and whether they are Hispanic.

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by

sociodemographic characteristics of the adolescents was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.199], *SE* = [.032], *Wald* = [39.390], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.220], 95% CI (1.146, 1.299)] for every one unit increase of frequency of binge drinking (Table 21 & 22).

The predictor variable, of age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.037], *SE* = [.054], *Wald* = [.478], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.038], 95% CI (.931, 1.158)] compared to the reference variable: frequency of binge drinking (Table 21 & 22).

The predictor variable, of gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.236], *SE* = [.073], *Wald* = [10.507], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.266], 95% CI (1.098, 1.461)] compared to the reference variable: frequency of binge drinking (Table 21 & 22).

The predictor variable, of grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.206], *SE* = [.060], *Wald* = [11.725], $p < .001$. The estimated odds ratio favored a positive

relationship of nearly [n] fold [*Exp (Estimate)* = [1.229], 95% CI (1.089, 1.387)] compared to the reference variable: frequency of binge drinking (Table 21 & 22).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.222], *SE* = [.102], *Wald* = [4.734], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.248], 95% CI (1.022, 1.524)] compared to the reference variable: frequency of binge drinking (Table 21 & 22).

Table 21

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[MODR=1]	4.217	.380	123.367	1	.000	3.473	4.961
	[MODR=2]	4.816	.381	159.502	1	.000	4.068	5.563
	[MODR=3]	5.370	.383	196.262	1	.000	4.619	6.121
	[MODR=4]	6.135	.388	250.017	1	.000	5.375	6.896
	[MODR=5]	6.685	.394	287.848	1	.000	5.913	7.457
	[MODR=6]	7.185	.403	317.910	1	.000	6.395	7.974
Location	RACE	.199	.032	39.390	1	.000	.137	.261
	AGE	.037	.054	.478	1	.489	-.069	.143
	GEN	.236	.073	10.507	1	.001	.093	.379
	GRA	.206	.060	11.725	1	.001	.088	.324
	HIS	.222	.102	4.734	1	.030	.022	.421

Table 22

Parameter Estimates

			95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig	Exp(B)	Lower	Upper
Threshold	[Frequency of binge drinking=1]	4.217	.3816	3.469	4.965	122.127	1	.000	67.845	32.114	145.333
	[Frequency of binge drinking=2]	4.816	.3832	4.065	5.567	157.948	1	.000	123.435	58.247	261.579
	[Frequency of binge drinking=3]	5.370	.3853	4.615	6.125	194.306	1	.000	214.901	100.997	457.262
	[Frequency of binge drinking=4]	6.135	.3899	5.371	6.899	247.532	1	.000	461.767	215.031	991.618
	[Frequency of binge drinking=5]	6.685	.3959	5.909	7.461	285.160	1	.000	800.276	368.361	1738.627
	[Frequency of binge drinking=6]	7.185	.4047	6.391	7.978	315.180	1	.000	1318.858	596.662	2915.194
Ethnicity		.199	.0318	.137	.261	39.162	1	.000	1.220	1.146	1.299
Age		.037	.0558	-.072	.147	.450	1	.502	1.038	.931	1.158
Gender		.236	.0729	.093	.379	10.498	1	.001	1.266	1.098	1.461
Grade Level		.206	.0617	.085	.327	11.146	1	.001	1.229	1.089	1.387
Hispanic Ethnicity		.222	.1020	.022	.421	4.720	1	.030	1.248	1.022	1.524

An ordinal logistic regression analysis to investigate if there is a relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, of ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.210], *SE* = [.032], *Wald* = [42.111], $p < .001$. The estimated odds ratio

favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.234], 95% CI (1.157, 1.316)] for every one unit increase of frequency of binge drinking (Table 23 & 24).

The predictor variable, of age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.150], *SE* = [.057], *Wald* = [6.915], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.861], 95% CI (.763, .971)] compared to the reference variable: frequency of binge drinking (Table 23 & 24).

The predictor variable, of gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.015], *SE* = [.080], *Wald* = [.036], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.985], 95% CI (.842, 1.152)] compared to the reference variable: frequency of binge drinking (Table 23 & 24).

The predictor variable, of grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.501], *SE* = [.065], *Wald* = [60.021], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.650], 95% CI (1.441, 1.891)] compared to the reference variable: frequency of binge drinking (Table 23 & 24).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.481], *SE* = [.108], *Wald* = [19.691], $p < .001$. The estimated odds ratio favored a positive

relationship of nearly [n] fold [*Exp (Estimate)* = [1.618], 95% CI (1.306, 2.004)] compared to the reference variable: frequency of binge drinking (Table 23 & 24).

Table 23

Parameter Estimates

							95% Confidence Interval	
		Estimates	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[MODR=1]	4.317	.395	119.283	1	.000	3.542	5.092
	[MODR=2]	4.910	.397	152.872	1	.000	4.131	5.688
	[MODR=3]	5.496	.400	189.150	1	.000	4.712	6.279
	[MODR=4]	6.255	.405	238.331	1	.000	5.461	7.050
	[MODR=5]	6.845	.413	274.463	1	.000	6.035	7.655
	[MODR=6]	7.199	.421	292.995	1	.000	6.375	8.024
Location	RACE	.210	.032	42.111	1	.000	.147	.274
	AGE	-.150	.057	6.915	1	.009	-.262	-.038
	GEN	-.015	.080	.036	1	.850	-.172	.142
	GRA	.501	.065	60.021	1	.000	.374	.628
	HIS	.481	.108	19.691	1	.000	.269	.694

Table 24

Parameter Estimates

			95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of binge drinking=1]	4.317	.4027	3.528	5.106	114.923	1	.000	74.958	34.044	165.040
	[Frequency of binge drinking=2]	4.910	.4043	4.117	5.702	147.463	1	.000	135.588	61.387	299.478
	[Frequency of binge drinking=3]	5.496	.4066	4.699	6.293	182.682	1	.000	243.635	109.809	540.558
	[Frequency of binge drinking=4}	6.255	.4121	5.448	7.063	230.470	1	.000	520.858	232.263	1168.045
	[Frequency of binge drinking=5]	6.845	.4199	6.022	7.668	265.810	1	.000	939.472	412.568	2139.304
	[Frequency of binge drinking=6]	7.199	.4271	6.362	8.037	284.169	1	.000	1338.714	579.635	3091.871
Ethnicity		.210	.0328	.146	.274	41.055	1	.000	1.234	1.157	1.316
Age		-.150	.0618	-.271	-.029	5.902	1	.015	.861	.763	.971
Gender		-.015	.0801	-.172	.142	.036	1	.850	.985	.842	1.152
Grade Level		.501	.0693	.365	.637	52.221	1	.000	1.650	1.441	1.891
Hispanic Ethnicity		.481	.1092	.267	.695	19.408	1	.000	1.618	1.306	2.004

Research Question 3a

RQ3: Is there a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse)?

The dependent variable will be frequency of marijuana use during their lifetime and the independent variables will be if they are sexually active, multiple sexual partners, condom use and if they used drugs or alcohol during last sexual intercourse.

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, age of first sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.035], *SE* = [.028], *Wald* = [1.521], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.035], 95% CI (.979, 1.095)] for every one unit increase of frequency of marijuana use during their lifetime (Table 25 & 26).

The predictor variable, multiple sexual partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.255], *SE* = [.030], *Wald* = [73.310], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.290], 95% CI

(1.216, 1.369)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 25 & 26).

The predictor variable, multiple sexual partners in the last 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.022], *SE* = [.041], *Wald* = [.300], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.023], 95% CI (.939, 1.113)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 25 & 26).

The predictor variable, being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.031], *SE* = [.260], *Wald* = [.014], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.031], 95% CI (.617, 1.724)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 25 & 26).

The predictor variable, condom use during sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.399], *SE* = [.086], *Wald* = [21.272], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.671], 95% CI (.567, .795)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 25 & 26).

The predictor variable, alcohol, or drug use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [1.742], *SE* = [.112], *Wald* = [243.514], $p < .001$. The estimated

odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [5.711], 95% CI (4.583, 7.117)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 25 & 26).

Table 25

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[MARI=1]	3.228	.155	434.173	1	.000	2.925	3.532
	[MARI=2]	3.714	.157	559.119	1	.000	3.406	4.022
	[MARI=3]	4.230	.160	696.314	1	.000	3.916	4.544
	[MARI=4]	4.609	.163	796.124	1	.000	4.289	4.930
	[MARI=5]	5.019	.167	899.701	1	.000	4.691	5.347
	[MARI=6]	5.540	.173	1023.26	1	.000	5.200	5.879
Location	AGESEX	.035	.028	1.521	1	.218	-.020	.090
	MULSEX	.255	.030	73.310	1	.000	.196	.313
	MULSEX3	.022	.041	.300	1	.584	-.058	.103
	Recode_Sex	.031	.260	.014	1	.906	-.479	.540
	Recode_SEXCON	-.399	.086	21.272	1	.000	-.568	-.229
	Recode_BEFSEX	1.742	.112	243.514	1	.000	1.524	1.961

Table 26

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of marijuana use lifetime=1]	3.228	.1550	2.924	3.532	433.616	1	.000	25.234	18.622	34.194
	[Frequency of marijuana use lifetime=2]	3.714	.1571	3.406	4.022	559.128	1	.000	41.011	30.145	55.794
	[Frequency of marijuana use lifetime=3]	4.230	.1601	3.916	4.544	698.371	1	.000	68.710	50.208	94.029
	[Frequency of marijuana use lifetime=4]	4.609	.1631	4.290	4.929	799.148	1	.000	100.426	72.955	138.242
	[Frequency of marijuana use lifetime=5]	5.019	.1670	4.691	5.346	902.636	1	.000	151.217	108.996	209.792
	[Frequency of marijuana use lifetime=6}	5.540	.1731	5.200	5.879	1023.678	1	.000	254.600	181.334	357.468

Age of first sexual intercourse	.035	.0287	-.022	.091	1.463	1	.226	1.035	.979	1.095
Sexual intercourse partners (lifetime)	.255	.0301	.196	.314	71.512	1	.000	1.290	1.216	1.369
Sexual intercourse partners (3 mos)	.022	.0434	-.063	.107	.266	1	.606	1.023	.939	1.113
Recode_Sex	.031	.2623	-.484	.545	.014	1	.907	1.031	.617	1.724
Last sexual intercourse condom use	-.399	.0862	-.568	-.230	21.382	1	.000	.671	.567	.795
Alcohol or drugs before sexual intercourse	1.742	.1122	1.522	1.962	240.982	1	.000	5.711	4.583	7.117

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, age of first sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.012], *SE* = [.030], *Wald* = [.169], $p <$ .001. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.988], 95% CI (.931, 1.049)] for every one unit increase of frequency of marijuana use during their lifetime (Table 27 & 28).

The predictor variable, multiple sexual partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.282], *SE* = [.032], *Wald* = [78.878], $p <$ .001. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.326], 95% CI (1.244, 1.413)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 27 & 28).

The predictor variable, multiple sexual partners in the last 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.072], *SE* = [.043], *Wald* = [2.764], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.930], 95% CI (.851, 1.017)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 27 & 28).

The predictor variable, being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [4.223], *SE* = [.334], *Wald* = [159.465], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.930], 95% CI (.851, 1.017)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 27 & 28).

The predictor variable, condom use during sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.489], *SE* = [.088], *Wald* = [30.811], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.631], 95% CI (1.372, 1.938)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 27 & 28).

The predictor variable, alcohol, or drug use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-1.723], *SE* = [.123], *Wald* = [197.905], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.178], 95%

CI (.140, .227)] compared to the reference variable: frequency of marijuana use over a lifetime (Table 27 & 28).

Table 27

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Threshold	[MARI=1]	.529	.172	9.456	1	.002	.192	.867
	[MARI=2]	1.046	.173	36.527	1	.000	.707	1.385
	[MARI=3]	1.663	.174	91.309	1	.000	1.322	2.004
	[MARI=4]	2.023	.174	134.538	1	.000	1.682	2.365
	[MARI=5]	2.495	.175	202.823	1	.000	2.151	2.838
	[MARI=6]	2.991	.177	287.196	1	.000	2.645	3.337
Location	AGESEX	-.012	.030	.169	1	.681	-.071	.046
	MULSEX	.282	.032	78.878	1	.000	.220	.345
	MULSEX3	-.072	.043	2.764	1	.096	-.157	.013
	Recode_SEX	4.223	.334	159.465	1	.000	3.567	4.878
	Recode_SEXCN	.489	.088	30.811	1	.000	.316	.662
	Recode_BEFSEX	-1.723	.123	197.905	1	.000	-1.964	-1.483

Table 28

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Conference Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of marijuana use lifetime=1]	.529	.1731	.190	.869	9.346	1	.002	1.698	1.209	2.383
	[Frequency of marijuana use lifetime=2]	1.046	.1740	.705	1.387	36.121	1	.000	2.846	2.023	4.002
	[Frequency of marijuana use lifetime=3]	1.663	.1748	1.320	2.005	90.420	1	.000	5.272	3.743	7.427
	[Frequency of marijuana use lifetime=4]	2.023	.1753	1.680	2.367	133.257	1	.000	7.565	5.365	10.666
	[Frequency of marijuana use lifetime=5]	2.495	.1761	2.149	2.840	200.690	1	.000	12.117	8.580	17.111
	[Frequency of marijuana use lifetime=6]	2.991	.1776	2.643	3.339	283.637	1	.000	19.908	14.056	28.197
Age of first sexual intercourse		-.012	.0305	-.072	.048	.160	1	.689	.988	.931	1.049
Sexual intercourse partners (lifetime)		.282	.0325	.219	.346	75.396	1	.000	1.326	1.244	1.413

Sexual intercourse partners (3 mos.)	-.072	.0454	-.161	.017	2.535	1	.111	.930	.851	1.017
Sexual intercourse (ever)	4.223	.3369	3.562	4.883	157.077	1	.000	68.219	35.246	132.037
Last sexual intercourse condom use	.489	.0881	.317	.662	30.843	1	.000	1.631	1.372	1.938
Alcohol or drugs before sexual intercourse	-1.723	.1229	-1.964	-1.482	196.588	1	.000	.178	.140	.227

Research Question 3b

RQ3: Is there a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse)?

The dependent variable will be age of first marijuana use and the independent variables will be if they are sexually active, multiple sexual partners, condom use and if they used drugs or alcohol during last sexual intercourse.

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, age of first sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.275], *SE* = [.029], *Wald* = [91.083], $p <$ .001. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.316], 95% CI (1.246, 1.391)] for every one unit increase of age of first marijuana use (Table 29 & 30).

The predictor variable, multiple sexual partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered

log-odds (Estimate)] = [.173], *SE* = [.030], *Wald* = [34.105], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.188], 95% CI (1.125, 1.255)] compared to the reference variable: age of first marijuana use (Table 29 & 30).

The predictor variable, multiple sexual partners in the last 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.078], *SE* = [.039], *Wald* = [3.989], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.925], 95% CI (.862, .992)] compared to the reference variable: age of first marijuana use (Table 29 & 30).

The predictor variable, being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.269], *SE* = [.261], *Wald* = [1.060], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.309], 95% CI (.804, 2.131)] compared to the reference variable: age of first marijuana use (Table 29 & 30).

The predictor variable, condom use during sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.305], *SE* = [.086], *Wald* = [12.604], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.737], 95% CI (.627, .866)] compared to the reference variable: age of first marijuana use (Table 29 & 30).

The predictor variable, alcohol, or drug use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.550], *SE* = [.106], *Wald* = [26.738], $p < .001$. The estimated odds

ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.733], 95% CI (1.433, 2.095)] compared to the reference variable: age of first marijuana use (Table 29 & 30).

Table 29

Parameter Estimates

							95% Confidence Interval	
		Estimates	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[AGEMARI=1]	2.126	.151	197.228	1	.000	1.829	2.422
	[AGEMARI=2]	2.200	.152	210.534	1	.000	1.903	2.497
	[AGEMARI=3]	2.293	.152	227.887	1	.000	1.995	2.591
	[AGEMARI=4]	2.578	.153	284.172	1	.000	2.279	2.878
	[AGEMARI=5]	3.528	.157	501.859	1	.000	3.220	3.837
	[AGEMARI=6]	5.603	.180	964.723	1	.000	5.250	5.957
Location	AGESEX	.275	.029	91.083	1	.000	.218	.331
	MULSEX	.173	.030	34.105	1	.000	.115	.230
	MULSEX3	-.078	.039	3.989	1	.046	-.155	-.001
	Recode_Sex	.269	.261	1.060	1	.303	-.243	.782
	Recode_SEXCON	-.305	.086	12.604	1	.000	-.474	-.137
	Recode_BEFSEX	.550	.106	26.738	1	.000	.341	.758

Table 30

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Age of first marijuana use=1]	2.126	.1419	1.848	2.404	224.319	1	.000	8.379	6.344	11.067
	[Age of first marijuana use=2]	2.200	.1422	1.921	2.478	239.229	1	.000	9.022	6.827	11.922
	[Age of first marijuana use=3]	2.293	.1426	2.014	2.573	258.782	1	.000	9.907	7.492	13.100
	[Age of first marijuana use=4]	2.578	.1436	2.297	2.860	322.554	1	.000	13.176	9.944	17.458
	[Age of first marijuana use=5]	3.528	.1476	3.239	3.818	571.014	1	.000	34.062	25.503	45.494
	[Age of first marijuana use=6]	5.603	.1711	5.268	5.939	1072.254	1	.000	271.275	193.980	379.368
Age of first sexual intercourse		.275	.0282	.220	.330	95.239	1	.000	1.316	1.246	1.391
Sexual intercourse partners (lifetime)		.173	.0280	.118	.227	37.835	1	.000	1.188	1.125	1.255
Sexual intercourse partners (3 mos.)		-.078	.0359	-.149	-.008	4.771	1	.029	.925	.862	.992
Recode_Sex		.269	.2487	-.218	.757	1.172	1	.279	1.309	.804	2.131
Last sexual intercourse condom use		-.305	.0824	-.467	-.144	13.720	1	.000	.737	.627	.866
Alcohol or drugs before sexual intercourse		.550	.0968	.360	.739	32.223	1	.000	1.733	1.433	2.095

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, age of first sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.209], *SE* = [.030], *Wald* = [47.923], $p <$ .001. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.233], 95% CI (1.164, 1.306)] for every one unit increase of age of first marijuana use (Table 31 & 32).

The predictor variable, multiple sexual partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.172], *SE* = [.031], *Wald* = [29.850], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.188], 95% CI (1.120, 1.259)] compared to the reference variable: age of first marijuana use (Table 31 & 32).

The predictor variable, multiple sexual partners in the last 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.101], *SE* = [.043], *Wald* = [5.583], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.904], 95% CI (.837, .976)] compared to the reference variable: age of first marijuana use (Table 31 & 32).

The predictor variable, being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [1.161], *SE* = [.329], *Wald* = [12.469], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [3.194], 95% CI (1.752, 5.825)] compared to the reference variable: age of first marijuana use (Table 31 & 32).

The predictor variable, condom use during sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.335], *SE* = [.088], *Wald* = [14.588], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.398], 95% CI (1.184, 1.651)] compared to the reference variable: age of first marijuana use (Table 31 & 32).

The predictor variable, alcohol, or drug use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.520], *SE* = [.117], *Wald* = [19.794], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.595], 95% CI (.482, .733)] compared to the reference variable: age of first marijuana use (Table 31 & 32).

Table 31

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[AGEMARI=1]	1.599	.170	88.694	1	.000	1.267	1.932
	[AGEMARI=2]	1.659	.170	95.241	1	.000	1.326	1.992
	[AGEMARI=3]	1.711	.170	101.240	1	.000	1.378	2.045
	[AGEMARI=4]	1.943	.171	129.672	1	.000	1.609	2.278
	[AGEMARI=5]	2.901	.174	278.973	1	.000	2.561	3.242
	[AGEMARI=6]	5.058	.195	671.611	1	.000	4.676	5.441
Location	AGESEX	.209	.030	47.923	1	.000	.150	.269
	MULSEX	.172	.031	29.850	1	.000	.110	.234
	MULSEX3	-.101	.043	5.583	1	.018	-.185	-.017
	Recode_Sex	1.161	.329	12.469	1	.000	.517	1.806
	Recode_SEXCON	.335	.088	14.588	1	.000	.163	.507
	Recode_BEFSEX	-.520	.117	19.794	1	.000	-.749	-.291

Table 32

Parameter Estimates

		B	Std. Error	95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
				Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Age of first marijuana use=1]	1.599	.1597	1.286	1.913	100.292	1	.000	4.950	3.620	6.770
	[Age of first marijuana use=2]	1.659	.1598	1.345	1.972	107.727	1	.000	5.253	3.840	7.185
	[Age of first marijuana use=3]	1.711	.1599	1.398	2.025	114.529	1	.000	5.536	4.047	7.574
	[Age of first marijuana use=4]	1.943	.1605	1.629	2.258	146.567	1	.000	6.981	5.097	9.562
	[Age of first marijuana use=5]	2.901	.1642	2.580	3.223	312.151	1	.000	18.199	13.191	25.110
	[Age of first marijuana use=6]	5.058	.1877	4.690	5.426	726.267	1	.000	157.305	108.888	227.252
Age of first sexual intercourse		.209	.0293	.152	.267	51.236	1	.000	1.233	1.164	1.306
Sexual intercourse partners (lifetime)		.172	.0298	.114	.230	33.317	1	.000	1.188	1.120	1.259
Sexual intercourse partners (3 mos)		-.101	.0391	-.178	-.024	6.654	1	.010	.904	.837	.976
Sexual Intercourse (ever)		1.161	.3066	.560	1.762	14.350	1	.000	3.194	1.752	5.825
Last sexual intercourse condom use		.335	.0848	.169	.501	15.636	1	.000	1.398	1.184	1.651
Alcohol or drugs before sexual intercourse		-.520	.1069	-.730	-.310	23.637	1	.000	.595	.482	.733

Research Question 3c

RQ3: Is there a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse)?

The dependent variable will be frequency of marijuana use in the last 30 and the independent variables will be if they are sexually active, multiple sexual partners, condom use and if they used drugs or alcohol during last sexual intercourse.

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, age of first sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.011], *SE* = [.031], *Wald* = [.123], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.011], 95% CI (.951, 1.075)] for every one unit increase of frequency of marijuana use in the last 30 days (Table 33 & 34).

The predictor variable, multiple sexual partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.210], *SE* = [.031], *Wald* = [44.382], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.233], 95% CI

(1.158, 1.313)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 33 & 34).

The predictor variable, multiple sexual partners in the last 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.142], *SE* = [.041], *Wald* = [12.064], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.152], 95% CI (1.059, 1.254)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 33 & 34).

The predictor variable, being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.406], *SE* = [.285], *Wald* = [2.027], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.667], 95% CI (.382, 1.164)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 33 & 34).

The predictor variable, condom use during sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.271], *SE* = [.094], *Wald* = [8.364], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.762], 95% CI (.634, .917)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 33 & 34).

The predictor variable, alcohol, or drug use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [1.822], *SE* = [.110], *Wald* = [274.119], $p < .001$. The estimated

odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [6.186], 95% CI (4.975, 7.691)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 33 & 34).

Table 33

Parameter Estimates

							95% Confidence Interval	
		Estimates	Std. Error	Wald	df	Sig	Lower Bound	Upper Bound
Threshold	[DAMARI=1]	4.449	.168	704.770	1	.000	4.121	4.778
	[DAMARI=2]	5.123	.174	868.629	1	.000	4.783	5.464
	[DAMARI=3]	5.804	.182	1017.562	1	.000	5.447	6.161
	[DAMARI=4]	6.319	.189	1118.371	1	.000	5.949	6.689
	[DAMARI=5]	6.784	.196	1199.168	1	.000	6.400	7.168
Location	AGESEX	.011	.031	.123	1	.726	-.049	.071
	MULSEX	.210	.031	44.382	1	.000	.148	.271
	MULSEX3	.142	.041	12.064	1	.001	.062	.222
	Recode_Sex	-.406	.285	2.027	1	.154	-.964	.153
	Recode_SEXCON	-.271	.094	8.364	1	.004	-.455	-.087
	Recode_BEFSEX	1.822	.110	274.119	1	.000	1.607	2.038

Table 34

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig	Exp(B)	Lower	Upper
Threshold	[Frequency of marijuana use 30 days =1]	4.449	.1672	4.122	4.777	708.319	1	.000	85.562	61.657	118.735
	[Frequency of marijuana use 30 days =2]	5.123	.1731	4.784	5.463	875.599	1	.000	167.916	119.594	235.761
	[Frequency of marijuana use 30 days =3]	5.804	.1812	5.449	6.159	1026.041	1	.000	331.635	232.502	473.036
	[Frequency of marijuana use 30 days =4]	6.319	.1884	5.950	6.688	1124.963	1	.000	555.064	383.686	802.992
	[Frequency of marijuana use 30 days =5]	6.784	.1958	6.401	7.168	1200.617	1	.000	884.016	602.275	1297.556
Age of first sexual intercourse		.011	.0312	-.050	.072	.118	1	.731	1.011	.951	1.075
Sexual intercourse partners (lifetime)		.210	.0321	.147	.272	42.657	1	.000	1.233	1.158	1.313
Sexual intercourse partners (3 mos)		.142	.0430	.057	.226	10.842	1	.001	1.152	1.059	1.254
Recode_Sex		-.406	.2845	-.963	.152	2.033	1	.154	.667	.382	1.164
Last sexual intercourse condom use		-.271	.0944	-.456	-.086	8.272	1	.004	.762	.634	.917
Alcohol or drugs before sexual intercourse		1.822	.1111	1.605	2.040	268.965	1	.000	6.186	4.975	7.691

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, age of first sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.059], *SE* = [.032], *Wald* = [3.281], $p <$ .001. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.943], 95% CI (.883, 1.007)] for every one unit increase of frequency of marijuana use in the last 30 days (Table 35 & 36).

The predictor variable, multiple sexual partners during their lifetime, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.191], *SE* = [.033], *Wald* = [32.715], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.211], 95% CI (1.132, 1.294)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 35 & 36).

The predictor variable, multiple sexual partners in the last 3 months, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.112], *SE* = [.044], *Wald* = [6.387], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.118], 95% CI (1.022, 1.224)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 35 & 36).

The predictor variable, being sexually active, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [4.612], *SE* = [.350], *Wald* = [173.913], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [100.733], 95% CI (50.165, 202.275)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 35 & 36).

The predictor variable, condom use during sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.232], *SE* = [.097], *Wald* = [5.754], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.261], 95% CI (1.042, 1.527)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 35 & 36).

The predictor variable, alcohol, or drug use during last sexual intercourse, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-1.802], *SE* = [.121], *Wald* = [223.265], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.165], 95% CI (.130, .210)] compared to the reference variable: frequency of marijuana use in last 30 days (Table 35 & 36).

Table 35

Parameters Estimates

		Estimates	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[DAMARI=1]	1.142	.184	38.587	1	.000	.781	1.502
	[DAMARI=2]	1.874	.185	103.158	1	.000	1.512	2.236
	[DAMARI=3]	2.594	.186	194.899	1	.000	2.230	2.958
	[DAMARI=4]	3.127	.188	275.793	1	.000	2.758	3.496
	[DAMARI=5]	3.631	.193	354.501	1	.000	3.253	4.009
Location	AGESEX	-.059	.032	3.281	1	.070	-.122	.005
	MULSEX	.191	.033	32.715	1	.000	.126	.257
	MULSEX3	.112	.044	6.387	1	.011	.025	.198
	Recode_SEX	4.612	.350	173.913	1	.000	3.927	5.298
	Recode_SEXCON	.232	.097	5.574	1	.016	.042	.422
	Recode_BEFSEX	-1.802	.121	223.265	1	.000	-2.038	-1.566

Table 36

Parameter Estimates

		B	Std. Error	95% Wald Confidence Interval		Hypothesis Test				95% Wald Conference Interval for Exp(B)	
				Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of marijuana use 30 days=1]	1.142	.1858	.777	1.506	37.747	1	.000	3.132	2.176	4.507
	[Frequency of marijuana use 30 days=2]	1.874	.1864	1.509	2.239	101.043	1	.000	6.514	4.520	9.387
	[Frequency of marijuana use 30 days=3]	2.594	.1877	2.226	2.962	190.892	1	.000	13.381	9.262	19.333
	[Frequency of marijuana use 30 days=4]	3.127	.1903	2.754	3.500	270.102	1	.000	22.814	15.712	33.126
	[Frequency of marijuana use 30 days=5]	3.631	.1950	3.249	4.014	346.636	1	.000	37.764	25.767	55.348
Age of first sexual intercourse		-.059	.0334	-.124	.007	3.093	1	.079	.943	.883	1.007
Sexual intercourse partners (lifetime)		.191	.0342	.124	.258	31.317	1	.000	1.211	1.132	1.294
Sexual intercourse partners (3 mos.)		.112	.0461	.021	.202	5.870	1	.015	1.118	1.022	1.224
Sexual intercourse (ever)		4.612	.3557	3.915	5.310	168.152	1	.000	100.733	50.165	202.275
Last sexual intercourse condom use		.232	.0976	.041	.423	5.670	1	.017	1.261	1.042	1.527
Alcohol or drugs before sexual intercourse		-1.802	.1221	-2.041	-1.563	217.899	1	.000	.165	.130	.210

Research Question 4a

RQ4: Does the relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents? The dependent variable will be frequency of marijuana use in their lifetime and the independent variables are ethnicity, age, gender, grade level and if they are Hispanic

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.072], *SE* = [.023], *Wald* = [9.599], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.074], 95% CI (1.027, 1.124)] for every one unit increase of frequency of marijuana use in their lifetime (Table 37 & 38).

The predictor variable, age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.254], *SE* = [.040], *Wald* = [40.300], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.290], 95% CI (1.189, 1.399)] compared to the reference variable: frequency of marijuana use in their lifetime (Table 37 & 38).

The predictor variable, gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.151], *SE* = [.053], *Wald* = [8.122], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.164], 95% CI (1.048, 1.291)] compared to the reference variable: frequency of marijuana use in their lifetime (Table 37 & 38).

The predictor variable, grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.068], *SE* = [.044], *Wald* = [2.375], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.070], 95% CI (.979, 1.170)] compared to the reference variable: frequency of marijuana use in their lifetime (Table 37 & 38).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.126], *SE* = [.078], *Wald* = [2.596], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.135], 95% CI (.973, 1.323)] compared to the reference variable: frequency of marijuana use in their lifetime (Table 37 & 38).

Table 37

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[MARI=1]	2.855	.283	101.488	1	.000	2.300	3.411
	[MARI=2]	3.225	,284	128.806	1	.000	2.668	3.782
	[MARI=3]	3.609	.285	160.429	1	.000	3.050	4.167
	[MARI=4]	3.890	.286	185.594	1	.000	3.330	4.450
	[MARI=5]	4.196	.286	214.787	1	.000	3.635	4.757
	[MARI=6]	4.560	.287	251.674	1	.000	3.996	5.123
Location	RACE	.072	.023	9.599	1	.002	.026	.117
	AGE	.254	.040	40.300	1	.000	.176	.333
	GEN	.151	.053	8.122	1	.004	.047	.256
	GRA	.068	.044	2.375	1	.123	-.018	.155
	HIS	.126	.078	2.596	1	.107	-.027	.280

Table 38

Parameter Estimates

		B	Std. Error	95% Wald Conference Interal		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
				Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of marijuana use lifetime=1]	2.855	.2851	2.297	3.414	100.316	1	.000	17.380	9.940	30.389
	[Frequency of marijuana use lifetime=2]	3.225	.2857	2.665	3.785	127.365	1	.000	25.145	14.363	44.021
	[Frequency of marijuana use lifetime=3]	3.609	.2865	3.047	4.170	158.670	1	.000	36.921	21.058	64.734
	[Frequency of marijuana use lifetime=4]	3.890	.2871	3.327	4.453	183.566	1	.000	48.917	27.865	85.873
	[Frequency of marijuana use lifetime=5]	4.196	.2880	3.632	4.761	212.352	1	.000	66.432	37.781	116.811
	[Frequency of marijuana use lifetime=6]	4.560	.2892	3.993	5.126	248.582	1	.000	95.538	54.202	168.397
Ethnicity		.072	.0231	.027	.117	9.677	1	.002	1.074	1.027	1.124
Age		.254	.0414	.173	.336	37.804	1	.000	1.290	1.189	1.399
Gender		.151	.0532	.047	.256	8.096	1	.004	1.164	1.048	1.291
Grade Level		.068	.0454	-.021	.157	2.252	1	.133	1.070	.979	1.170
Hispanic ethnicity		.126	.0783	-.027	.280	2.605	1	.107	1.135	.973	1.323

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use,

multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.087], *SE* = [.023], *Wald* = [14.216], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.091], 95% CI (1.042, 1.141)] for every one unit increase of frequency of marijuana use in their lifetime (Table 39 & 40).

The predictor variable, age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.125], *SE* = [.041], *Wald* = [9.473], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.134], 95% CI (1.043, 1.232)] compared to the reference variable: frequency of marijuana use in their lifetime (Table 39 & 40).

The predictor variable, gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.138], *SE* = [.055], *Wald* = [6.197], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.148], 95% CI (1.030, 1.279)] compared to the reference variable: frequency of marijuana use in their lifetime (Table 39 & 40).

The predictor variable, grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.177], *SE* = [.046], *Wald* = [14.966], $p < .001$. The estimated odds ratio favored a positive relationship of

nearly [n] fold [*Exp (Estimate)* = [1.193], 95% CI (1.087, 1.310)] compared to the reference variable: frequency of marijuana use in their lifetime (Table 39 & 40).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.270], *SE* = [.080], *Wald* = [11.465], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.310], 95% CI (1.120, 1.532)] compared to the reference variable: frequency of marijuana use in their lifetime (Table 39 & 40).

Table 39

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[MARI=1]	2.838	.283	100.463	1	.000	2.283	3.393
	[MARI=2]	3.225	.284	129.021	1	.000	2.669	3.782
	[MARI=3]	3.672	.285	166.096	1	.000	3.114	4.231
	[MARI=4]	3.945	.286	190.777	1	.000	3.385	4.505
	[MARI=5]	4.302	.287	225.254	1	.000	3.741	4.864
	[MARI=6]	4.674	.288	263.307	1	.000	4.109	5.238
	RACE	.087	.023	14.216	1	.000	.042	.132
	AGE	.125	.041	9.473	1	.002	.046	.205
	GEN	.138	.055	6.197	1	.013	.029	.246
	GRA	.177	.046	14.966	1	.000	.087	.266
	HIS	.270	.080	11.465	1	.001	.114	.426

Table 40

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of Marijuana use lifetime=1]	2.838	.2863	2.277	3.399	98.249	1	.000	17.083	9.747	29.943
	[Frequency of Marijuana use lifetime=2]	3.225	.2870	2.663	3.788	126.266	1	.000	25.157	14.333	44.153
	[Frequency of Marijuana use lifetime=3]	3.672	.2880	3.108	4.237	162.540	1	.000	39.388	22.369	69.182
	[Frequency of Marijuana use lifetime=4]	3.945	.2888	3.379	4.511	186.666	1	.000	51.681	29.346	91.016
	[Frequency of Marijuana use lifetime=5]	4.302	.2898	3.734	4.871	220.352	1	.000	73.882	41.862	130.392
	[Frequency of Marijuana use lifetime=6	4.674	.2913	4.103	5.245	257.459	1	.000	107.098	60.512	189.548
Ethnicity		.087	.0232	.041	.132	14.059	1	.000	1.091	1.042	1.141
Age		.125	.0426	.042	.209	8.646	1	.003	1.134	1.043	1.232
Gender		.138	.0554	.029	.246	6.178	1	.013	1.148	1.030	1.279
Grade Level		.177	.0476	.083	.270	13.777	1	.000	1.193	1.087	1.310
Hispanic Ethnicity		.270	.0799	.113	.426	11.395	1	.001	1.310	1.120	1.532

Research Question 4b

RQ4: Does the relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents? The dependent variable will be age of first marijuana use and the independent variables are ethnicity, age, gender, grade level and if they are Hispanic

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the

2015 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.086], *SE* = [.023], *Wald* = [13.829], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.090], 95% CI (1.041, 1.141)] for every one unit increase of age of first marijuana use (Table 41 & 42).

The predictor variable, age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.288], *SE* = [.041], *Wald* = [49.644], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.333], 95% CI (1.235, 1.440)] compared to the reference variable: age of first marijuana use (Table 41 & 42).

The predictor variable, gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.056], *SE* = [.053], *Wald* = [1.116], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.945], 95% CI (.851, 1.050)] compared to the reference variable: age of first marijuana use (Table 41 & 42).

The predictor variable, grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.098], *SE* = [.045], *Wald* = [4.797], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.103], 95% CI (1.014, 1.201)] compared to the reference variable: age of first marijuana use (Table 41 & 42).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.186], *SE* = [.078], *Wald* = [5.634], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.205], 95% CI (1.032, 1.406)] compared to the reference variable: age of first marijuana use (Table 41 & 42).

Table 41

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[AGEMARI=1]	2.943	.284	107.257	1	.000	2.386	3.500
	[AGEMARI=2]	3.017	.284	112.578	1	.000	2.460	3.574
	[AGEMARI=3]	3.094	.284	118.276	1	.000	2.536	3.652
	[AGEMARI=4]	3.334	.285	136.904	1	.000	2.776	3.893
	[AGEMARI=5]	4.171	.287	211.434	1	.000	3.609	4.733
	[AGEMARI=6]	6.115	.297	422.537	1	.000	5.532	6.698
Location	RACE	.086	.023	13.829	1	.000	.041	.131
	AGE	.288	.041	49.644	1	.000	.208	.368
	GEN	-.056	.053	1.116	1	.291	-.161	.048
	GRA	.098	.045	4.797	1	.029	.010	.186
	HIS	.186	.078	5.634	1	.018	.032	.340

Table 42

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Age of first marijuana use=1]	2.943	.2824	2.390	3.497	108.662	1	.000	18.980	10.913	33.010
	[Age of first marijuana use=2]	3.017	.2825	2.463	3.571	114.066	1	.000	20.429	11.743	35.538
	[Age of first marijuana use=3]	3.094	.2826	2.540	3.648	119.851	1	.000	22.064	12.680	38.392
	[Age of first marijuana use=4]	3.334	.2830	2.779	3.889	138.768	1	.000	28.056	16.110	48.859
	[Age of first marijuana use=5]	4.171	.2849	3.613	4.729	214.320	1	.000	64.784	37.064	113.238
	[Age of first marijuana use=6]	6.115	.2961	5.535	6.695	426.624	1	.000	452.612	253.350	808.594
Ethnicity		.086	.0233	.040	.132	13.666	1	.000	1.090	1.041	1.141
Age		.288	.0390	.211	.364	54.325	1	.000	1.333	1.235	1.440
Gender		-.056	.0535	-.161	.049	1.105	1	.293	.945	.851	1.050
Grade Level		.098	.0432	.014	.183	5.164	1	.023	1.103	1.014	1.201
Hispanic ethnicity		.186	.0790	.031	.341	5.555	1	.018	1.205	1.032	1.406

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.080], *SE* = [.023], *Wald* = [12.091], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.083], 95% CI (1.036, 1.133)] for every one unit increase of age of first marijuana use (Table 43 & 44).

The predictor variable, age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.231], *SE* = [.042], *Wald* = [30.187], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.260], 95% CI (1.163, 1.366)] compared to the reference variable: age of first marijuana use (Table 43 & 44).

The predictor variable, gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [-.011], *SE* = [.055], *Wald* = [.040], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [.989], 95% CI (.888, 1.102)] compared to the reference variable: age of first marijuana use (Table 43 & 44).

The predictor variable, grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.119], *SE* = [.047], *Wald* = [6.473], $p < .001$. The estimated odds ratio favored a positive relationship of

nearly [n] fold [*Exp (Estimate)* = [1.126], 95% CI (1.030, 1.232)] compared to the reference variable: age of first marijuana use (Table 43 & 44).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.218], *SE* = [.079], *Wald* = [7.545], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.243], 95% CI (1.065, 1.452)] compared to the reference variable: age of first marijuana use (Table 43 & 44).

Table 43

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[AGEMARI=1]	2.861	.284	101.497	1	.000	2.304	3.417
	[AGEMARI=2]	2.922	.284	105.806	1	.000	2.365	3.479
	[AGEMARI=3]	2.982	.284	110.121	1	.000	2.425	3.539
	[AGEMARI=4]	3.183	.285	125.151	1	.000	2.626	3.741
	[AGEMARI=5]	4.027	.287	197.560	1	.000	3.466	4.589
	[AGEMARI=6]	6.097	.299	414.625	1	.000	5.510	6.684
Location	RACE	.080	.023	12.091	1	.001	.035	.125
	AGE	.231	.042	30.187	1	.000	.149	.314
	GEN	-.011	.055	.050	1	.842	-.119	.097
	GRA	.119	.047	6.473	1	.011	.027	.211
	HIS	.218	.079	7.545	1	.006	.062	.373

Table 44

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Age of first marijuana use=1]	2.861	.2822	2.308	3.414	102.785	1	.000	17.471	10.049	30.372
	[Age of first marijuana use=2]	2.922	.2822	2.369	3.475	107.160	1	.000	18.574	10.682	32.297
	[Age of first marijuana use=3]	2.982	.2823	2.429	3.535	111.541	1	.000	19.727	11.343	34.308
	[Age of first marijuana use=4]	3.183	.2827	2.629	3.738	126.797	1	.000	24.129	13.864	41.994
	[Age of first marijuana use=5]	4.027	.2847	3.469	4.585	200.160	1	.000	56.103	32.114	98.012
	[Age of first marijuana use=6]	6.097	.2979	5.513	6.681	418.997	1	.000	444.511	247.940	796.929
Ethnicity		.080	.0228	.035	.124	12.205	1	.000	1.083	1.036	1.133
Age		.231	.0410	.151	.312	31.773	1	.000	1.260	1.163	1.366
Gender		-.011	.0552	-.119	.097	.039	1	.843	.989	.888	1.102
Grade Level		.119	.0457	.030	.209	6.796	1	.009	1.126	1.030	1.232
Hispanic Ethnicity		.218	.0792	.063	.373	7.562	1	.006	1.243	1.065	1.452

Research Question 4c

RQ4: Does the relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents? The dependent variable will be frequency of marijuana use in the last 30 days and the independent variables are ethnicity, age, gender, grade level and if they are Hispanic

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2015 YRBS. The predictor variables were tested a priori to verify there was no violation

of the assumption of no multicollinearity. The predictor variable, ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.073], *SE* = [.028], *Wald* = [7.031], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.076], 95% CI (1.019, 1.136)] for every one unit increase of frequency of marijuana use in the last 30 days (Table 45 & 46).

The predictor variable, age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.199], *SE* = [.048], *Wald* = [17.239], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.220], 95% CI (1.109, 1.343)] compared to the reference variable: frequency of marijuana use in the last 30 days (Table 45 & 46).

The predictor variable, gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.168], *SE* = [.064], *Wald* = [6.984], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.183], 95% CI (1.044, 1.340)] compared to the reference variable: frequency of marijuana use in the last 30 days (Table 45 & 46).

The predictor variable, grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.069], *SE* = [.053], *Wald* = [1.684], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.071], 95% CI (.964, 1.190)] compared to the reference variable: frequency of marijuana use in the last 30 days (Table 45 & 46).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.118], *SE* = [.093], *Wald* = [1.593], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.125], 95% CI (.937, 1.350)] compared to the reference variable: frequency of marijuana use in the last 30 days (Table 45 & 46).

Table 45

Parameter Estimate

		Estimate	Std. Error	Wald	df	Sig	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[DAMARI=1]	3.349	.338	97.935	1	.000	2.686	4.012
	[DAMARI=2]	3.864	.340	129.562	1	.000	3.199	4.530
	[DAMARI=3]	4.376	.341	164.779	1	.000	3.708	5.044
	[DAMARI=4]	4.754	.342	192.964	1	.000	4.083	5.424
	[DAMARI=5]	5.102	.344	220.140	1	.000	4.428	5.776
Location	RACE	.073	.028	7.031	1	.008	.019	.127
	AGE	.199	.048	17.239	1	.000	.105	.293
	GEN	.168	.064	6.984	1	.008	.043	.293
	GRA	.069	.053	1.684	1	.194	-.035	.172
	HIS	.118	.093	1.593	1	.207	-.065	.300

Table 46

Parameter Estimates

		B	Std. Error	95% Wald Confidence Interval		Hypothesis Test			Exp(B)	95% Wald Confidence Interval for Exp(B)	
				Lower	Upper	Wald Chi-Square	df	Sig		Lower	Upper
Threshold	[Frequency of marijuana use 30 days=1]	3.349	.3403	2.682	4.016	96.854	1	.000	28.477	14.616	55.483
	[Frequency of marijuana use 30 days=2]	3.864	.3414	3.195	4.534	128.131	1	.000	47.679	24.419	93.095
	[Frequency of marijuana use 30 days=3]	4.376	.3429	3.704	5.048	162.877	1	.000	79.491	40.595	155.652
	[Frequency of marijuana use 30 days=4]	4.754	.3443	4.079	5.429	217.398	1	.000	164.349	83.412	323.823
	[Frequency of marijuana use 30 days=5]	5.102	.3460	4.424	5.780	217.398	1	.000	164.349	83.412	323.823
Ethnicity		.073	.0277	.019	.127	7.009	1	.008	1.076	1.019	1.136
Age		.199	.0488	.103	.295	16.621	1	.000	1.220	1.109	1.343
Gender		.168	.0636	.043	.293	6.972	1	.008	1.183	1.044	1.340
Grade Level		.069	.0539	-.037	.174	1.622	1	.203	1.071	.964	1.190
Hispanic Ethnicity		.118	.0933	-.065	.300	1.592	1	.207	1.125	.937	1.350

An ordinal logistic regression analysis to investigate if there is a relationship between marijuana use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) was conducted on the 2017 YRBS. The predictor variables were tested a priori to verify there was no violation of the assumption of no multicollinearity. The predictor variable, ethnicity, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.081], *SE* = [.027], *Wald* = [8.747], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.085], 95% CI (1.027, 1.145)] for every one unit increase of frequency of marijuana use in the last 30 days (Table 47 & 48).

The predictor variable, age, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.025], *SE* = [.049], *Wald* = [.260], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.025], 95% CI (.927, 1.133)] compared to the reference variable: frequency of marijuana use in the last 30 days (Table 47 & 48).

The predictor variable, gender, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.188], *SE* = [.067], *Wald* = [7.962], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.207], 95% CI (1.059, 1.375)] compared to the reference variable: frequency of marijuana use in the last 30 days (Table 47 & 48).

The predictor variable, grade level, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.226], *SE* = [.055],

Wald = [17.129], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.254], 95% CI (1.121, 1.403)] compared to the reference variable: frequency of marijuana use in the last 30 days (Table 47 & 48).

The predictor variable, being Hispanic, in the ordinal logistic regression analysis was found to contribute to the model. The [ordered log-odds (Estimate)] = [.302], *SE* = [.095], *Wald* = [10.034], $p < .001$. The estimated odds ratio favored a positive relationship of nearly [n] fold [*Exp (Estimate)* = [1.352], 95% CI (1.121, 1.630)] compared to the reference variable: frequency of marijuana use in the last 30 days (Table 47 & 48).

Table 47

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[DAMARI=1]	3.301	.337	95.810	1	.000	2.640	3.962
	[DAMARI=2]	3.856	.338	129.761	1	.000	3.192	4.519
	[DAMARI=3]	4.384	.340	166.131	1	.000	3.717	5.050
	[DAMARI=4]	4.793	.342	196.610	1	.000	4.123	5.463
	[DAMARI=5]	5.213	.344	229.207	1	.000	4.538	5.888
Location	RACE	.081	.027	8.747	1	.003	.027	.135
	AGE	.025	.049	.260	1	.610	-.071	.120
	GEN	.188	.067	7.962	1	.005	.057	.318
	GRA	.226	.055	17.129	1	.000	.119	.334
	HIS	.302	.095	10.034	1	.002	.115	.488

Table 48

Parameter Estimates

				95% Wald Confidence Interval		Hypothesis Test				95% Wald Confidence Interval for Exp(B)	
		B	Std. Error	Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold	[Frequency of marijuana use 30 days=1]	3.301	.3408	2.633	3.969	93.790	1	.000	27.135	13.913	52.924
	[Frequency of marijuana use 30 days=2]	3.856	.3421	3.186	4.526	127.072	1	.000	47.273	24.180	92.422
	[Frequency of marijuana use 30 days=3]	4.384	.3437	3.710	5.057	162.647	1	.000	80.120	40.848	157.149
	[Frequency of marijuana use 30 days=4]	4.793	.3455	4.116	5.470	192.458	1	.000	120.646	61.297	237.459
	[Frequency of marijuana use 30 days=5]	5.213	.3480	4.531	5.895	224.393	1	.000	183.626	92.836	363.202
Ethnicity		.081	.0276	.027	.135	8.624	1	.003	1.085	1.027	1.145
Age		.025	.0512	-.076	.125	.234	1	.629	1.025	.927	1.133
Gender		.188	.0666	.057	.318	7.943	1	.005	1.207	1.059	1.375
Grade Level		.226	.0574	.114	.339	15.567	1	.000	1.254	1.121	1.403
Hispanic Ethnicity		.302	.0956	.114	.489	9.959	1	.002	1.352	1.121	1.630

Summary

The research evaluated the relationships between alcohol and marijuana use with risky sexual behaviors and sociodemographic characteristics. The secondary data that was used was from the YRBS in 2015 and 2017 which was conducted by the CDC. Five matched questions were used for demographic information from the 2015 and 2017 YRBS. Twelve matched questions were used on alcohol consumption, marijuana use and risky sexual behaviors from the 2015 and 2017 YRBS. Data was entered into SPSS 25 for analysis with ordinal logistic regression and the data from the 2015 and 2017 were compared to determine if relationships still existed between these variables in Florida compared to previous studies.

In the first two research questions, alcohol use was analyzed with risky sexual behaviors and sociodemographic characteristics. The age of when adolescents started drinking alcohol, frequency of consuming alcohol and the frequency of binge drinking. In both 2015 and 2017 YRBS, most adolescents reported never having an alcohol except for a few sips. The largest age range of adolescents reporting having more than a few sips was 15 to 16 years old. Of the adolescents that reported using alcohol it was mainly 1 to 2 days in the last thirty days. When adolescents did report drinking alcohol only about 5 to 6 percent reported binge drinking in the last thirty days. In the 2017 YRBS one question asked about the frequency of alcohol consumption during a lifetime, but this question was omitted in the analysis because this question was not asked in 2015 so no comparison could be done to show any trends that may or may not be happening.

The last two research questions, marijuana use was analyzed with risky sexual behaviors and sociodemographic characteristics. The frequency of marijuana uses in the adolescents' lifetime, age of when they first started using marijuana and the frequency of marijuana use in the last thirty days were all questions covered in the YRBS. In both the 2015 and 2017 YRBS over sixty percent of adolescents reported never using marijuana. Of the adolescents that did report using marijuana they started around 13 to 14 years old in both years. Adolescents that did report using marijuana also reported that the frequency of use in the last thirty days was 1 or 2 times.

In the first and third research question risky sexual behaviors were evaluated with alcohol consumption and marijuana use. These behaviors were if the adolescent was sexually active, age of sexual debut, number of partners in the last thirty days and in their

lifetime, alcohol or marijuana use before last sexual intercourse and condom use before last sexual intercourse. Over fifty percent of adolescents reported not ever having sexual intercourse in the YRBS for 2015 and 2017. For the adolescents that did report being sexually active, the age of sexual debut was about 15 years old in both years. When asked about number of partners in the last thirty days and over their lifetime of the adolescents that reported having sex, they mainly had only 1 partner in the last thirty days or over their lifetime. Using alcohol and marijuana before last sexual intercourse was not similar in both years. In 2015, of the adolescents that reported having sex about twenty-seven percent did not use alcohol or marijuana before last sexual intercourse but in 2017 about 27% did report using these substances before last sexual intercourse. In both years, adolescents that were sexually active a majority reported using condoms.

In Chapter 5 this data will be interpreted and the gap in the literature will be reiterated when comparing this study to the review of literature, and to the theoretical foundation of this study. The limitations, recommendations and social implications of this study will also be discussed in this chapter.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of my study was to evaluate the relationship between alcohol and drug use and risky sexual behaviors in adolescents that participated in the YRBS in Florida. In this study, I used the information that was collected from the 2015 and 2017 YRBS. The risky sexual behaviors that were reported in this study are multiple sexual partners, condom use and early initiation of sexual intercourse. When looking at reported alcohol and drug use the frequency of using these substances and the age in which the adolescents started using were considered. Researchers have indicated in past studies that adolescents that report using alcohol or drugs were more likely to exhibit these risky sexual behaviors (Asby et al., 2012; Bryan et al., 2012; Chung et al., 2017).

In this chapter, I discuss my interpretations of the findings from the 2015 and 2017 YRBS and relate them back to studies that I discussed in the literature review. Following the interpretation of findings there will be discussions of the limitations and recommendations. Next, I will consider the implications for social change as they relate to my four research questions.

RQ1: Is there a. relationship between alcohol use and adolescents exhibiting risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse).

RQ2: Does the relationship between alcohol use and adolescents' risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents.

RQ3: Is there a relationship between marijuana use and adolescents' risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse).

RQ4: Does the relationship between marijuana use and adolescents' risky sexual behaviors (condom use, multiple sexual partners, and early initiation of sexual intercourse) differ by sociodemographic characteristics of the adolescents.

In this chapter, I discuss the interpretations of the findings from the 2015 YRBS and the 2017 YRBS and relate them to earlier studies that were examined in the literature review. Following the interpretations of the findings I will discuss the limitations and recommendations. Afterwards, I will discuss the implication for social change as it relates to my research question and the relationship between alcohol and marijuana use in adolescents exhibiting risky sexual behaviors. This chapter will end with my conclusions of the study.

Interpretation of Findings

My purpose was to determine if there was any significant difference in risky sexual behaviors and drug and alcohol use in adolescents in Florida. The YRBS is

administered every 2 years and with many programs being implemented in Florida to educate youth on these risk factors there is no study that has shown if there has been a decrease in these different behaviors.

In this study the 2015 and 2017 YRBS results were compared and looking at the different types of alcohol questions on the survey such as age of first drink, frequency of drinking and binge drinking there were only slight differences between the years. In 2015, using alcohol and marijuana before sexual intercourse was a positive predictor of the age of when an adolescent would have their first alcoholic drink, but it was no longer a predictor in 2017. In 2015, using condoms before last sexual intercourse decreased the likelihood of increasing age of alcoholic drinks but that changed in 2017 it increased the probability of using a condom and increase in age before having their first drink. When looking at the frequency of drinking alcohol there was an increase chance of being sexually active and using condoms before sexual activity from 2015 to 2017. There was less a chance of using alcohol or marijuana before sexual intercourse regarding the frequency of drinking from 2015 to 2017. When looking at frequency of binge drinking among adolescents from 2015 to 2017 there was an increased likelihood that they were sexually active and using condoms.

The second research question, I looked at the same alcohol questions but was now looking at factors such as age, gender, race, grade level and being Hispanic. Gender was never a predictor for both YRBS when looking at how often adolescents drank and when they first started drinking. In both years, age, grade level and being Hispanic were predictors of when adolescents first started drinking. For how much alcohol was

consumed by these adolescents all the sociodemographic characteristics were predictors until 2017 when age and gender no longer became a predictor of how often they drank alcohol.

In this study, marijuana use was also evaluated with risky sexual behaviors and different sociodemographic characteristics. The frequency of marijuana uses in general, and the frequency of marijuana use over the last 30 days and the age of first-time using marijuana use were compared from the YRBS 2015 and 2017. When analyzing the frequency of marijuana use all the all the factors of risky sexual behavior were positive predictors except for condom use before last sexual intercourse in 2015 but by 2017 condom use had become a positive predictor and age of sexual debut, number of sexual partners in last three months and using alcohol or marijuana before last sexual encounter were no longer predictors. When analyzing the age of when adolescents first starting using marijuana age of sexual debut, number of partners in their lifetime, being sexually active and using alcohol or marijuana were predictors in 2015 but using a condom before last sexual intercourse was not but by 2017 condom use was the highest predictor and using alcohol or marijuana before sex was no longer a predictor of age of first using marijuana. Age of sexual debut was one of the highest predictors for both years. When evaluating frequency of marijuana use in the last 30 days whether a student was sexually active and using a condom before last sexual intercourse were not predictors in 2015 but became predictors in 2017 with age of sexual debut having the highest odds ratio of 100.733 in the entire study. Age of sexual debut and using alcohol or marijuana before last sexual encounter were predictors in 2015 but by 2017, they no longer were. When

analyzing sociodemographic characteristics, it was found that age of the participant was a significant positive predictor for age of when they first starting using marijuana and the frequency, they use marijuana. In 2017 the frequency of using marijuana in the last 30 days was still a positive predictor but it was not statistically significant. When evaluating the age of when adolescents start using marijuana all factors were significant positive predictors except for gender in both 2015 and 2017. In 2015 parts of the research question about frequency grade level and being Hispanic were both positive predictors but were not statistically significant but by 2017 they were significant positive predictors.

Sociodemographic Characteristics

In both the 2015 and 2017 YRBS, the predominant ethnicity that took the survey was Caucasian adolescents followed by Latinx and then African American adolescents. A large portion of the adolescents that participated in this survey were between the age 15 and 16 with the next largest age group of respondents was 17 years old. In both years of the survey, there was about an equal number of males and females that participated in the survey. The two grade levels with the most respondents were Grade 9 and 10 in both years and Grade 11 and 12 had less respondents. Over half of the respondents reported being Hispanic.

Alcohol Consumption

In both 2015 and 2017 less than half of the respondents reported never having an alcoholic drink other than a few sips. It was also shown that in both years adolescents reported that they had their first drink at age 15 to 16. Adolescents were asked in the last 30 days how many days did they have a least one drink and over half of them in both

years stated that they did not have any alcoholic drinks in the last 30 days. One to two days was of drinking in the last 30 days was the most common if they did report any drinking. In both years a large majority of the adolescents reported no binge drinking in the last 30 days. If binge drinking was reported it was only about one day in the last 30 days.

Marijuana Use

In both years when adolescents were asked if they have used marijuana in their lifetime over half of them reported never using it. In 2015, 100 or more times using marijuana in their lifetime was the highest reported after not using at all. In 2017 this drastically changed because 1 or 2 days of using marijuana in their lifetime was the next highest reported, but 100 or more times was only .1 off from 1 or 2 days. In 2015, 1 or 2 days was 1.7% lower than 100 or more times of using marijuana in their lifetime. Adolescents reported first using marijuana between the ages 13 and 14 years old if they had ever used marijuana in both 2015 and 2017. In the last 30 days most of the adolescents reported not using marijuana but if they did report using it was only 1 or 2 days in both years.

Sexual Intercourse

Adolescents in both years reported not ever having sexual intercourse more than having sexual intercourse. As most adolescents reporting not ever having sexual intercourse the ones that did the most common age of their first sexual intercourse was at 15 years old. These same adolescents that reported having sexual intercourse mostly reported only have one partner in their lifetime. Of the adolescents that did report having

sexual intercourse only a small percentage had sexual intercourse in the last 30 days in both years but if they did have sex in the last 30 days it was only with on partner. In both years of the adolescents that did report having sexual intercourse stated that they did not use drug or alcohol before their last sexual intercourse more times than using these substances. A higher percentage of adolescents that were sexually active in both years reported using a condom.

Research Question Findings

For the first research question, I was determining if there was a relationship between alcohol use and adolescents exhibiting risky sexual behaviors. The risky sexual behaviors were non-condom use, multiple sexual partners, and early initiation of sexual intercourse and alcohol or marijuana use before sexual intercourse. All these factors were associated with age of first alcoholic drink (Table 36). Age of initiation of sexual intercourse, number of multiple sexual partners in their lifetime, using a condom during last sexual intercourse and alcohol or marijuana use before last sexual intercourse were all significant positive predictors of the age of when the adolescent had their first alcoholic drink. Age of first sexual intercourse and using alcohol or marijuana before last intercourse were the strongest predictors. Given that the odds ratio for age of initiation of sexual intercourse is 1.370, there is an increased probability of being at an older age of first sexual intercourse as the age of first alcoholic drink increases. Alcohol or marijuana use before last sexual intercourse had an odds ratio of .84 which means that there is a decreasing probability of using these substances as the age of first alcoholic drink increases.

For 2017 data, the same risky sexual behaviors were analyzed, and all factors except for alcohol and marijuana use before sexual intercourse and if they have ever had sexual intercourse were statistically significant to the adolescents age of first alcoholic drink (Table 38). Age of first sexual intercourse, the number of sexual partners and using a condom before sex were all significant positive predictors of the age of when adolescents had their first alcoholic drink. The main difference when comparing the 2015 and 2017 YRBS is that in 2017 alcohol and marijuana use before sexual intercourse was not a significant positive predictor like it was in 2015. The highest predictors were age of first sexual intercourse and condom use during last sexual intercourse. The odds ratio for age of initiation of sexual intercourse was 1.334 which means there is an increasing probability of being an older age of first sexual intercourse as the age of first alcohol drink increases. Condom use before last sexual intercourse had an odds ratio of 1.264 which is the same as the last factor that there is an increasing probability of using a condom before sexual intercourse as the age of first alcohol drink increases.

The next part of this research question I looked at the frequency of adolescent drinking and the different risky sexual behaviors. In 2015, all the factors were significant to the frequency of drinking alcohol except for age of first sexual intercourse. The number of sexual partners in their lifetime, the number of sexual partners in the last three months and whether they used alcohol or marijuana before their last sexual intercourse were all significant positive predictors of the frequency of alcohol consumption in adolescents (Table 40). The highest predictor of frequency of alcohol consumption was alcohol or marijuana use before last sexual intercourse. The negative predictors were

whether they were sexually active, age of first sexual intercourse and condom use before last sexual intercourse. The odds ratio of using alcohol or marijuana before last sexual intercourse was 4.330 which means there is an increasing probability that the adolescent used alcohol or marijuana as the frequency of alcohol consumed increases. Having multiple sexual partners in their lifetime or over the last 3 months had an odds ratio of 1.126 and 1.289, respectfully. This means there is an increasing probability that an adolescent will have more multiple sexual partners in their life and over the last three months as the frequency of alcohol consumed increases.

In 2017, all factors where significant to frequency of alcohol use except for age of first sexual intercourse which is like 2015 data. Multiple sexual partners over a lifetime, over the last three months, condom use before last sexual intercourse and whether the adolescent was sexually active are all significant positive predictors of the frequency of alcohol use (Table 42). The negative predictors were age of first sexual intercourse and condom use before last sexual intercourse. In 2015 whether an adolescent was sexually active was a negative predictor and in 2017 it became a positive predictor. It was the highest predictor of all the factors and had an odds ratio of 41.819 which means there is an increasing probability that the adolescent was sexually active as the frequency of alcohol consumption increases. This is different from 2015 because then there was a decreasing probability that a person was sexually active as the frequency of alcohol drinks increases.

The last part of the first research question I analyzed adolescents' frequency of binge drinking and risky sexual behaviors. In 2015, whether an adolescent was sexually

active, the number of partners in their lifetime and the last three months and if they used alcohol or marijuana before their last sexual intercourse and condom use, were all significant factors. Age of first sexual intercourse was the only factor that was not significant. Multiple sexual partners in the last three months and over their lifetime and alcohol or marijuana use before last sexual encounter were all significant positive predictors of the frequency of binge drinking in adolescents (Table 44). Alcohol use and marijuana use before sexual intercourse had the highest predictor of frequency of binge drinking and it had an odd ratio of 4.679 which means there is an increasing probability that as individuals reported using these substances, they also reported higher number of frequencies of binge drinking. Multiple sexual partners in the adolescent's lifetime had an odds ratio of 1.142 and multiple sexual partners in the last three months had an odds ratio of 1.238. There was an increasing probability that as the number of sexual partners individuals had there was an increase in the amount of binge drinking that occurred.

In 2017, only three of the factors analyzed were significant which are whether the adolescent was sexually active, multiple sexual partners in the last three months and alcohol, or marijuana use before last sexual intercourse. Adolescents being sexually active and multiple sexual partners in the last three months were the only significant positive predictors of frequency of drinking. Condom use and multiple sexual partners in their lifetime were positive predictors, but they were not significant. This is different from 2015 because condom use and multiple sexual partners in their lifetime were both significant. An adolescent being sexually active was the highest positive predictor and had an odds ratio of 59.117 which is an increasing probability that as adolescents

reported being sexually active there was an increase in the frequency of binge drinking. The highest predictor in 2015 was alcohol or marijuana before last sexual intercourse was the highest predictor. Multiple sexual partners in their lifetime and last three months also had odds ratios over one so there was an increasing probability that as they had more sexual partners there was an increase in frequency of binge drinking.

As stated in the literature review age is a major contributor to negative sexual health. The reason for this is that the younger the individual is they are less likely to have the knowledge and attitudes to know what risky sexual behaviors are and how to cope with them because they have peer pressures to copy the social norms in their environment (Cox et al., 2014; Dalmida et al., 2018; Hulland et al., 2015). During adolescence, individuals tend to start exploring their sexuality and the types of reactions from peers and parents whether they be negative or positive can affect their attitudes towards being sexually active (Cox et al., 2014; Hulland et al. 2015). Previous studies have shown the associations between alcohol use and risky sexual behaviors (Asby et al., 2012; Bryan et al., 2012; Dir et al., 2018; Jackson et al. 2015; Luk et al., 2016; Simons et al., 2010). It was reported that the earlier an adolescent starts to drink the more alcohol-related problems they will have when they are older (Morean, 2018). An age-graded trend was also discovered which indicates that at the same time adolescents are exploring their sexuality they are also beginning to consume alcohol more frequently (Garcia et al., 2019). This study showed that there is still a relationship with age of first sexual intercourse and age of first alcohol drink in both 2015 and 2017.

Risky sexual behaviors have been associated with alcohol consumption in past studies (Aspy et al., 2012; Chung et al., 2017; Dir et al., 2017; Ewing et al., 2016; Gillman et al., 2018; Green et al., 2017; Jackson et al., 2015; Lee et al., 2014; Mustanski et al, 2013; Shorey et al., 2015). The frequency of alcohol consumed effects and individuals' judgement and decision-making skills, so the data reported in this study shows that these problem behaviors do co-occur. When comparing the years in 2015 it showed that using alcohol or marijuana use had more of an effect on the frequency of alcohol consumption while in 2017 it was whether the adolescent was sexually active or not.

Binge drinking is when an individual consumes five or more alcohol drinks in a single period (Curtis et al., 2018; Jan et al., 2017; National Institute on Alcohol Abuse and Alcoholism, 2017). It was reported in a previous study of the relationship between binge drinking and being sexually active that adolescents that drank heavily were more likely to have sexual intercourse (Garcia et al., 2019). Another study reported that students that had risky alcohol use were more likely to be sexually active and use alcohol or drugs during sexual intercourse (Strandberg et al., 2019). In this study it was shown that there are still the same associations happening with binge drinking and risky sexual behaviors.

The second research question I evaluated if there was a relationship between alcohol use and sociodemographic characteristics such as race, age, gender, grade level and whether they were Hispanic. When evaluating age of first alcoholic drink all factors of age, race, gender, grade level and being Hispanic were significant. All these factors

except for gender were significant positive predictors of the age of first alcoholic drink (Table 48). The two highest predictors were age and grade level. The odds ratio of age of adolescent was 1.257 so there is an increasing probability that as the age of the participants increases the age of first alcoholic drink also increases. Grade level also had an odds ratio over one at 1.254 so there is also an increasing probability that as the grade level increases of the participants the age of first alcoholic drink also increases. Gender was the only negative predictor of age of first alcoholic drink.

In 2017, all the factors were significant just like it was in 2015. The only negative predictor was gender which was also like 2015. Race, age, grade level and being Hispanic were all significant positive predictors of age of first alcoholic drink (Table 50). Age and grade level and being Hispanic were the highest positive predictors. Grade level had the highest odds ratio at 1.298 which states that there is an increasing probability that as grade level of the participants increases the age of first alcoholic drink also increases. Age and being Hispanic also had odds ratio of over one so there was also an increasing probability that as age of participants increased and them being Hispanic the age of first alcoholic drink increased. These results shown there was not much difference when comparing these two years.

The next part of the second research question I looked at the sociodemographic characteristics and the frequency of drinking alcohol. In 2015, all factors except for gender were significant to the frequency of alcohol consumption. Race, age, gender, grade level and being Hispanic were all significant positive predictors but gender as stated before was not statistically significant (Table 52). The highest predictors were race,

grade level and being Hispanic. All the sociodemographic characteristics also had odds ratio of over one. The odds ratio for race was 1.173 which means there is an increasing probability with the different races that there is an increase in the frequency of alcohol consumption. The second highest odds ratio was 1.174 so there was an increased probability of being Hispanic increasing the frequency of alcohol consumption.

In 2017, race, gender, grade level and being Hispanic were all significant except for age when evaluating frequency of consuming alcohol (Table 54). Race, grade level and being Hispanic were all significant positive predictors which differs from the previous YRBS because age and gender were also positive predictors of frequency of alcohol consumption. Hispanic and grade level were the highest predictors. The odds ratio for Hispanic was 1.622 which means there is an increased probability that that an individual is Hispanic as frequency of alcohol consumption also increases. Grade level also had one of the highest odds ratios at 1.488 which means as the grade level of the respondents goes up so does the frequency of drinking alcohol. In 2017, both grade level and being Hispanic had a higher odds ratio than back in 2015 so the probability of increases alcohol consumption between 2015 and 2017 with these factors had increased. Also in 2017, gender was not a positive predictor like it was in 2015.

The last part of the second research questions I looked at the frequency of binge drinking and the different sociodemographic characteristics. In 2015, race, gender, grade level and being Hispanic were all significant in frequency of binge drinking except for age of participant (Table 56). All the factors were positive predictors with age being the only one that was not statistically significant. The highest predictors were gender, grade

level and being Hispanic. Gender had an odds ratio 1.266 so there was an increasing probability that gender increased the frequency of binge drinking. Grade level had the second highest odd ratio at 1.229 so as the grade level of the respondent increased the frequency of binge drinking also increased.

In 2017, gender instead of age was not statistically significant in frequency of binge drinking. Age and gender were also negative predictors while race, grade level and being Hispanic were all positive predictors of frequency of binge drinking. The highest predictors were similar with 2015 being grade level and being Hispanic. Grade level had an odds ratio of 1.650 which means there was an increased probability that as the respondent's grade level increased so did the frequency of binge drinking. Hispanic had the next highest odds ratio at 1.618 so being Hispanic increased the likelihood of frequency of binge drinking.

Most individuals start drinking alcohol as adolescents because of the arousal effects and to conform with their peers (Soundararajan et al, 2017). Previous studies have also reported that early age at first drink increases the likelihood of complications from alcohol later in life (Aiken et al., 2017; Liang & Chikritzhs, 2013; Soundararajan et al., 2017). It is also reported that early age of drinking increases the risk of binge drinking and higher consumption in later high school years (Aiken et al., 2017). In this study alcohol problems later in life were not studied but the data does show that as age and grade level increased in the adolescents that they reported a higher age of taking their first alcoholic drink.

Drinking alcohol is one of the leading preventable risk factors in health for diseases and the consumption of alcohol can vary between different sociodemographic characteristics (Chaiyasong et al., 2018). In a previous study age and gender both affected an individual's levels of alcohol consumption but in this study, gender did not seem to play a big role in frequency of consuming alcohol. As stated, age does play a role because in an individual's adolescent years, they are influenced in large by the people they are around. Adolescents' behaviors are motivated by their social group and their attitudes and identities in these groups (Montgomery et al., 2020). So, if they are around peer groups that are engaging in this risky behavior, they are more likely to also be involved.

Binge drinking in the YRBS in 2017 reported that 14% of the 30% of adolescents that reported drinking reported binge drinking. The cut-off of five or more drinks in a single period that defines binge drinking was made with adults in mind so given that adolescents have a lower weight the number of drinks should be lowered to be considered binge drinking (Addolorato et al., 2018). Another study also reported that adolescents were more likely to engage in heavy drinking when compared to others (Addolorato et al., 2018; Chaiyasong et al., 2018). In this study age was a positive predictor in 2015 but it was not significant and in 2017 it was a negative predictor of frequency of binge drinking. Esser (2017) reported that non-Hispanic Caucasian adolescents were more likely to binge drink then Hispanic or African American adolescents. In this study being Hispanic was a significant positive predictor for both years.

The third research question I evaluated marijuana use with risky sexual behaviors. The first part of the question looked at the frequency of marijuana use in an adolescent's

lifetime. In 2015, multiple sexual partners over their lifetime and using alcohol or marijuana and a condom before last sexual intercourse were all significant factors on the frequency of marijuana use (Table 25). These same factors were also all positive predictors. Condom use was a negative predictor of frequency of marijuana use. The highest predictor was using alcohol or marijuana before last sexual intercourse which also had an odd ratio of 5.711 so the likelihood of an individual using alcohol or marijuana before last sexual intercourse increased the frequency of how often they used marijuana. The next highest predictor was the number of sexual partners over their lifetime. This had an odds ratio of 1.290 so the more sexual partners an adolescent had increased the frequency of marijuana use.

In 2017, only if the adolescent was sexually active, the number of sexual partners in their lifetime and using condom and using alcohol or marijuana before their last sexual intercourse were significant to frequency of marijuana use (Table 27). These same factors were all positive predictors except for using alcohol or marijuana before last sexual intercourse. This changed from 2015 because age of first sexual intercourse, the number of sexual partners in the last three months were all positive predictors of how much an adolescent used marijuana. Condom use before sexual intercourse was a negative predictor in 2015 but by 2017 it was a positive predictor of frequency of marijuana use. The highest predictor was whether an adolescent was sexually active the odds ratio was 68.219 which means that there is an increased probability that if an adolescent is sexually active, they have increased frequency of using marijuana.

The next part of the third research question I evaluated the age of when adolescents first used marijuana with risky sexual behaviors. In 2015, all the factors were significant except for using a condom before last sexual intercourse (Table 29). The positive predictors of the age when adolescents starting using marijuana were whether the adolescent was sexually active, age of sexual debut, number of sexual partners in their lifetime and using drugs or alcohol before last sexual intercourse. The number of sexual partners in the last three months and using a condom before last sexual intercourse were both negative predictors of when adolescents starting using marijuana. The highest predictor was using alcohol or marijuana before sexual intercourse, and it had an odds ratio of 1.733 which means there is an increased probability that if the adolescent used one of these substances before last sexual intercourse there was an increase in age of when they first used marijuana. The next highest predictor was age of sexual debut, and it had an odds ratio of 1.316 so as the age of sexual debut increased there was an increased probability that the age of marijuana uses for the first time also increased.

In 2017, all factors were considered significant to when adolescents first started using marijuana even if the adolescent was sexually active which was not significant in 2015. Age of sexual debut, the number of partners over their lifetime, whether the adolescent was sexually active and if they used a condom before last sexual intercourse were all positive predictors of age of when adolescents first started using marijuana (Table 31). The number of sexual partners in the last three months and using alcohol or marijuana before last sexual intercourse were negative predictors. The highest predictor was condom use before last sexual intercourse and it had an odds ratio of 1.398 which

means there is an increased probability that if individuals used condoms during there last sexual encounter there was an increase in age of first use of marijuana. The second highest predictor was age of sexual debut, and the odds ratio was 1.233 so as age of becoming sexually active increased so did the probability of increases age of first marijuana use. Age of sexual debut was one of the highest predictors in both 2015 and 2017.

The last part of the third research question I looked at the frequency of marijuana use in the last 30 days and risky sexual behaviors. In 2015, the number of sexual partners in their last time and the last three months, condom use and using alcohol or marijuana before last sexual intercourse were all significant in the frequency of marijuana use for adolescents in the last 30 days (Table 33). Age of sexual debut, number of partners in the last three months and lifetime and using alcohol or marijuana before last sexual intercourse were all positive predictors of frequency of using marijuana over last 30 days. Whether and adolescent was sexually active or used a condom before last sexual intercourse were both negative predictors. The highest predictor was using alcohol or marijuana before last sexual intercourse, and it had an odds ratio of 6.186 which means there is an increased probability that if they were using alcohol or marijuana before sex last time then they have an increased frequency use in the last 30 days. The next highest predictor was the number of partners they had in their lifetime the odds ratio was 1.233 so there was an increasing likelihood that if they had more sexual partners, they had a higher frequency of marijuana use in the last 30 days.

In 2017, all factors were significant except for age of sexual debut. Age of sexual debut and using alcohol or marijuana before last sexual intercourse were both negative predictors of frequency of marijuana use in the last 30 days. The number of partners in the last three months and during their lifetime, whether they were sexually active and using a condom during last sexual intercourse were all positive predictors. In 2015, age of sexual debut and alcohol or marijuana use before sexual intercourse were positive predictors but became negative predictors by 2017. The highest predictor was the adolescent being sexually active. The odds ratio for this was 100.733 which means that there is an increasing probability that if the adolescent is sexually active there is an increasing frequency of marijuana use in the last 30 days. The second highest predictor was using a condom before last sexual intercourse and the odds ratio was 1.261 so there was an increasing probability that if they used a condom before last sexual intercourse then they had a higher frequency of using marijuana the last 30 days.

In the U.S., marijuana is the most used drug among adolescents (Banks et al., 2017; Barton et al., 2018; Buckner et al., 2016; Dir et al., 2018; HHS, 2019; Hill & Mrug, 2015; Kliewer & Parham, 2019; Mcdade et al., 2015; Shih et al., 2017; Simons et al., 2010; Swartzendruber et al., 2016; Taggart et al., 2018; Vidourek et al., 2017; Zaharakis et al., 2018). A trend has been seen over the last decade where alcohol use has been decreasing among adolescents, but marijuana use in adolescents has been increasing (American Academy of Child & Adolescent Psychiatry, 2019; Banks et al., 2017; HHS, 2019). Past studies have also shown that marijuana use is associated with adolescents early sexual debut, not using condoms, and having multiple sexual partners (Agrawal et

al., 2016; Buckner et al., 2018; Dir et al., 2018; El-Menshawi et al., 2019; Gillman et al., 2018; Jackson et al., 2015; Ritchwood et al., 2016; Ross et al., 2015; Vidourek et al., 2017). This study shows that these relationships between marijuana use, and risky sexual behaviors are still relevant.

About 50% of adolescents reported using both marijuana and alcohol in their lifetime (Dir et al., 2018; Gillman et al., 2018). This study and previous studies have shown that using alcohol or marijuana does increase the likelihood of adolescents exhibiting risky sexual behaviors because it impairs decision-making skills and their judgment (Asby et al., 2012; Bryan et al., 2012; Chung et al., 2017). These effects on the brain causes individuals to not be able to process or react as fast as if they were sober (Simons et al., 2010). A past study reported that the earlier an adolescent starts using marijuana especially if it's below the age of 15 had a significant association with current marijuana use and more frequent use of marijuana (Azagba et al., 2019). This study shows that these types of relationships are still occurring because so many of the risky behavior factors are predictors of how early an adolescent starts using marijuana.

In the last research question the same questions on marijuana use were used to evaluate with the sociodemographic characteristics such as race, age, gender, grade level and being Hispanic. In 2015, all these factors were significant to the frequency of marijuana use except for grade level and being Hispanic (Table 37). Race, age, gender were all positive predictors. Grade level and being Hispanic were also positive predictors but they were not statistically significant. The highest predictor was age of the respondent. The odds ratio for age was 1.290 which means there was an increased

probability that as the age of the respondent increased so did the frequency of marijuana use.

In 2017, all factors were significant to frequency of marijuana use and they were all positive predictors as well (Table 39). The highest predictor was being Hispanic and grade level. When comparing to 2015 grade level and being Hispanic were positive predictors but they were not statistically significant. Being Hispanic had an odds ratio of 1.310 which means there is an increasing probability of the adolescent being Hispanic and more frequently using marijuana.

The next part of this research question I looked at the age of when adolescents first started using marijuana. In 2015, all factors were significant and positive predictors except for gender (Table 41). Gender was found to be a negative predictor, but it also was not statistically significant. The highest predictors were age and being Hispanic. The age of the respondent had an odds ratio of 1.333 so there was an increased probability that as the respondents age increased so did the age of when they first started using marijuana. Being Hispanic had an odds ratio of 1.205 so there was an increased chance that if the individual was Hispanic then they had a higher age of when they first started using marijuana.

The 2017 data that was evaluated was like 2015 because all factors were significant and positive predictors of age of when adolescents first start using marijuana. Gender was the only factor that was a negative predictor, but it was also not statistically significant. The highest predictor was age and had an odds ratio of 1.260 which means there was an increased probability that as age of the respondents increased so did the age

of the first-time using marijuana. Being Hispanic had the second highest predictor just like in 2015 and the odds ratio was 1.243 so there was an increased probability of being Hispanic and having an older age of when starting to use marijuana.

The last part of this research question I looked at the frequency of marijuana use over the last 30 days and sociodemographic characteristics. In 2015, race, age and gender were significant and positive predictors of frequency of marijuana use over the last 30 days (Table 45). Grade level and being Hispanic were positive predictors but they were not statistically significant. The highest predictor was age with an odds ratio of 1.220 so there was an increased probability that as the age of the participant increased the more frequently, they used marijuana in the last 30 days.

In 2017, race, gender, grade level and being Hispanic were all significant positive predictors of frequency of marijuana use in the last 30 days (Table 47). Age was still a positive predictor like in 2015 but it was not statistically significant. The highest predictor was being Hispanic and grade level. If an individual adolescent was Hispanic, the odds ratio was 1.352 so there was an increased probability that if they were Hispanic, they more frequently used marijuana in the last 30 days. The next highest predictor was grade level the odds ratio was 1.254 so there was an increased likelihood that as the grade level of the adolescents that participated increased there was also an increase in the frequency of using marijuana in the last 30 days.

Marijuana use typically begins during adolescence with one study reporting that 29.6% of adolescents reporting using marijuana by the age of 16 years old (Wasserman et al., 2021). It was also reported that in 2016, 14% of adolescents in grade 10 and 23% of

adolescents in grade 12 had reported using marijuana in the last 30 days (HHS, 2019). In 2018, those percentages increased with 16.7% of adolescents in grade 10 and 22.20% of adolescents in grade 12 using marijuana in the last 30 days (NIDA, 2019). This study shows that age and grade level still play a role in frequency of marijuana use in their lifetime or in the last 30 days. Age was a always a positive predictor of frequency of marijuana use in both years except for in 2017 when looking at frequency in last 30 days. It was still a positive predictor, but it was not statistically significant. Adolescence is a time in an individual's life where there are a lot of changes in their personal life and social changes around them (Azagba et al., 2019). At younger ages there is more peer pressure that adolescents can be vulnerable to which can increase the likelihood of using marijuana at an early age and how frequently they are using.

Findings within the Theoretical Framework

The theoretical framework that was used in this study was the problem behavior theory which was originated in Jesser in 1987 and it was originally developed to study alcohol abuse and other problematic behaviors in a tri-ethnic small community. This framework has been used not only for alcohol abuse but for assess of drug use, tobacco use, and other risky behaviors. There are three constructs to this theory which are perceived-environment, personality, and behavior (Bryan et al., 2012). In the perceived environment construct it includes the approval of peers and the having the disapproval of parental figures along with other environmental factors in their environment (Bryan et al., 2012; Neppl et al., 2016). The construct of behavior states that adolescents that engage in a problematic behavior will usually engage in another type of problem behavior (Bryan et

al., 2012). The construct of personality includes impulsivity exhibited by adolescents and external behaviors.

The risky behaviors in this study included alcohol and marijuana use and risky sexual behaviors. The perceived environment construct of this theory shows the role adolescents peers and parents have on this individual. When an individual is starting high school there is a lot of pressure of wanting to fit in or be part of the cool crowds. They are not the only one feeling this way their whole group of friends will have the same pressures. As the school years progress, they will see behaviors exhibited that they believe is what making an individual popular and so they want that same popularity so they will engage in those behaviors. If they are the only person in their friend group that has not drunk alcohol or used marijuana that puts a pressure on them to conform to the social norms of that group. Some adolescents will have the mentality that they will do anything to fit in. During this same time adolescents are known to rebel from their parents and will do things that they know their parents will not approve of which is usually a risky behavior.

In the personality construct it focuses on their external behaviors and impulsivity which can lead them to make decisions about their life without thinking of any of the consequences that could come from these decisions. An adolescent might be with a group of friends, and they are all drinking so that adolescent will drink to fit in but not think of the consequences such as how are they going to get home or what is going to happen when their parents find out. These behaviors make them have bad judgment so they might decide to drive home with alcohol in their system which can impair their driving

and make it dangerous for not only them but for everyone on the road. These impulse decisions can also be applied to risky sexual behaviors. If an adolescent is drinking or using marijuana, they might engage in risky sexual behaviors such as not using a condom which can lead to them transmitting an STI or getting pregnant.

The last construct is behavior, and this is where the whole study can be evaluated. The above constructs address what leads to an adolescent engaging in certain behaviors but here we see that once they engage in one type of behavior, they are more likely to engage in another. In this study relationships were found with risky sexual behaviors and alcohol and marijuana use. Adolescents that were having sex at an early age were also shown to be drinking alcohol already or using marijuana. Adolescents that were using alcohol or marijuana were found to be more sexually active and have a larger number of partners or not use condoms. One type of risky behavior is what leads to the rest of these behaviors hence why these relationships are still existing.

Limitations of the Study

There were several limitations to this study. First, the adolescents that were surveyed by the CDC had to be enrolled in either a public or private high school. If a student is home schooled, then they would not have been able to participate. Second, this study is from only a single point of time in two different years. So, all the associations described were on from that point in time. Another limitation of this study included generalization which means the results of this study cannot be generalized to all populations across the U.S. because this was only high school students that lived in Florida. Despite this limitation, the findings from this study can be aligned with other

studies and can be used in further research regarding risky sexual behaviors and alcohol and drug use.

Social desirability bias is when an individual has the tendency to underreport attitudes and behaviors that are socially undesirable and will overreport on attributes that are more desirable (Latkin et al. 2017). There are two components to social desirability bias which are impression management and self-deception (Latkin et al. 2017). Impression management is when a person purposefully presents themselves to fit into a situation or to please people (Latkin et al. 2017). This could apply to high school students because they tend to be pressured by their peers to do certain things or act a certain way to fit in. Self-deception is when a person is motivated to maintain a positive self-concept, but it could be unconscious (Latkin et al. 2017). This could also apply to the students that took this survey because they may be concerned with adults seeing their responses and thinking differently of them or feel that they need to portray themselves a certain way.

Recall bias is when participants do not remember events or experiences that have previously happened. There are two factors that can play a role in a person's recall ability. The first is the language that is used on the questionnaires (Moreno-Serra et al. 2022). As stated, before in this study about half of the respondents reported being Hispanic. If English was not their primary language, then they could have a hard time with answering the questions. Another factor is that a person's ability to recall something decreases over time (Moreno-Serra et al. 2022). Even though the respondents in this study were adolescents they still could have decrease in memory especially if an event

happened several years ago. Also, drug and alcohol use can alter a person's mind and if consumed at high enough amounts can alter their memory.

Recommendations

The YRBS has six constructs that are covered in the survey. Behaviors that contribute to unintentional injuries and violence, Sexual behaviors related to unintended pregnancy and sexually transmitted diseases, alcohol and other drug use, Tobacco use, Unhealthy dietary behaviors, and inadequate physical activity (CDC, 2020). There were no studies that were found that compared 2015 and 2017 YRBS to see if there was any change to the relationships that were found to be statistically insignificant. While the findings in this study gave data that could be used to help fill this literature gap, one area that could be developed more is the breakdown of regions in Florida. In Florida, there are 67 counties and around 17 million people (Florida Association of Counties [FAC], 2022). This is a very dynamic state and throughout different counties an individual could be in an urban region or a rural region. This could give a clearer picture if location has any correlation on adolescents' behaviors and attitudes.

In this study, the only data that was used was from the 2015 and 2017 YRBS. The CDC allows for researchers to have access to the data from all the years the YRBS was administered. Other studies can be done using a bigger range of years to analysis the long-term trends which could also guide youth programming.

Another recommendation is to develop strategies on how to improve or strengthen educational programs that are offered in Florida and to provide evidence of the importance of sex education classes in high school. In Florida, sex education is not

mandated. Comprehensive health education is required to be taught including instruction on teen pregnancy, but the curriculum is not required to be comprehensive, and it must teach abstinence as the expected social standard. Not being comprehensive means, it is not teaching safer sex practices and contraception. The United States has one of the highest teen birth rates when compared to other developed countries (Mark & Wu, 2021). Previous research has shown that abstinence-only programs have been ineffective in reducing teen birth rates in the U.S. (Heels, 2019) (Mark & Wu, 2021) (Stranger-Hall & Hall, 2011).

Implications

Positive Social Change

As it relates to social change the impact of this study is the change that can happen in prevention programs and sexual education programs which target adolescents in Florida. If governmental agencies and school systems used the YRBS results to define risky behaviors that are prevalent in their community, they will be able to use this information to help establish effective preventive programming and develop protocols on implementation of different programs that could benefit the students in that community.

When students learn the benefits of engaging in healthy behaviors this will not only effect that one student but could be something that more and more students feel is important and so they are less likely to engage in the risky behaviors because they see the importance of their health outcomes not just wanting to fit in. These social changes do not only stay in the school but can extend out to the communities and information can then be disseminated to community leaders or parental figures to help adolescents

understand the consequences of their behaviors and the benefits that can come from engaging in healthy behaviors.

This study showed the relationships between different types of risky behaviors in high schools that need to be addressed. These relationships between alcohol and marijuana use and risky sexual behaviors are not new, so this study is adding to the field and information on what trends are happening with these behaviors. With this knowledge schools can focus on after school and community programs that can target these risky behaviors and teach adolescents healthy behaviors that will eventually help in decreasing high risk behaviors.

In practice, I believe that more schools should participate in the YRBS in Florida so that the results can become a basis for different community outreach and change. Throughout years there is always change in the environment of adolescents such as what clothes are trending, commercial products, social media, and all of these can influence adolescents. Using the results from the YRBS over all the years can show what trends are happening with these risky behaviors. Programs can be either modified or new programs can be developed to address these concerns. Since schools are where adolescents spend most of their day it is imperative that school administration and superintendents use these results to help build programs in their schools that are developed from the needs of their students in that county.

Conclusions

Much research has been done over the years looking at the data that is collected by the YRBS and the six constructs that are covered by this survey but there has been no

study that looked at the years 2015 and 2017 to see if there was any significant difference in the relationships that were found between adolescents that use alcohol or marijuana and risky sexual behaviors and sociodemographic factors. This study did find that all these relationships were still prevalent with only few minor changes on what was the best predictor of alcohol or marijuana use. This leads to showing that these programs that in are Florida to help educate adolescents in risky sexual behaviors have not been as impactful as one would hope. One thing that would help make these programs more impactful is making sure all youth have easy access to these programs whether they are implemented in the school, made part of the curriculum, or advertised in places that adolescents would see them. More adolescents would use these services if they knew where to find them and how to access them.

The purpose of this study was to investigate the similarities and differences between the YRBS in 2015 and 2017. There were four research questions, two of which looked at alcohol use and risky sexual behaviors and sociodemographic characteristics and the other two looked at marijuana use and risky sexual behaviors and sociodemographic characteristics. The overall conclusion is that most of the relationships still existed between both years but there were few minor changes where one factor would be a positive predictor but not in the next year.

Risky sexual behaviors are not a simple task to fix especially with the normalcy in adolescents' behaviors. The theoretical framework that as used was the problem behavior theory and this study showed that adolescents that exhibited one risky behavior had a higher likelihood of participating in another risky behavior. One focus could be on the

social norms that adolescence social groups have. So many adolescents just want to fit in that they will succumb to the peer pressures of participating in risky behaviors. As stated, before once they start participating in one type, they are more likely to exhibit more risky behaviors. This is ongoing cycle that adolescents need to break and getting proper education and having access to programs that Florida has to offer is one way to help break that cycle.

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Appendix A: Frequency Distribution Tables on Variables

A 1

Frequency distribution of ethnicity 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Am Indian/Alaska Native	41	.6	.7	.7
	Asian	182	2.9	2.9	3.6
	Black or African American	1193	18.8	19.3	22.9
	Native Hawaiian/Other PI	42	.7	.7	23.5
	White	2391	37.6	38.6	62.1
	Hispanic/Latino	344	5.4	5.6	67.7
	Multiple–Hispanic	1755	27.6	28.3	96.00
	Multiple–Non–Hispanic	247	3.9	4.0	100.0
	Total	6195	97.4	100.0	
Missing	System	164	2.6		
Total		6359	100.0		

A 2

Frequency distribution of ethnicity 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Am Indian/Alaska Native	38	.6	.6	.6
	Asian	191	3.1	3.2	3.8
	Black or African American	1227	19.9	20.3	24.1
	Native Hawaiian/Other PI	39	.6	.6	24.8
	White	2115	34.3	35.0	59.8
	Hispanic/Latino	375	6.1	6.2	66.0
	Multiple–Hispanic	1775	28.8	29.4	95.4
	Multiple–Non–Hispanic	275	4.5	4.6	100.0
	Total	6035	97.8	100.0	
Missing	System	136	2.2		
Total		6171	100.0		

A 3

Frequency distribution of age 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	12 years old or younger	22	.3	.3	.3
	13 years old	12	.2	.2	.5
	14 years old	693	10.9	10.9	11.5
	15 years old	1670	26.3	26.4	37.9
	16 years old	1668	26.2	26.4	64.2
	17 years old	1411	22.2	22.3	86.5
	18 years old or older	854	13.4	13.5	100.0
	Total	6330	99.5	100.0	
Missing	System	29	.5		
Total		6359	100.0		

A 4

Frequency distribution of age 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	12 years old or younger	25	.4	.4	.4
	13 years old	13	.2	.2	.6
	14 years old	735	11.9	12.0	12.6
	15 years old	1601	25.9	26.1	38.7
	16 years old	1644	26.6	26.8	65.4
	17 years old	1392	22.6	22.7	88.1
	18 years old or older	731	11.8	11.9	100.0
	Total	6141	99.5	100.0	
Missing	System	30	.5		
Total		6171	100.0		

A 5

Frequency distribution of gender 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	3199	50.3	50.9	50.9
	Male	3081	48.5	49.1	100.0
	Total	6280	98.8	100.0	
Missing	System	79	1.2		
Total		6359	100.0		

A 6

Frequency distribution of gender 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	3142	50.9	51.7	51.7
	Male	2937	47.6	48.3	100.0
	Total	6079	98.5	100.0	
Missing	System	92	1.5		
Total		6171	100.0		

A 7

Frequency distribution of grade levels 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	9th grade	1745	27.4	27.7	27.7
	10th grade	1785	28.1	28.3	56.0
	11th grade	1473	23.2	23.4	79.3
	12th grade	1279	20.1	20.3	99.6
	Ungraded or other grade	24	.4	.4	100.0
	Total	6306	99.2	100.0	
Missing	System	53	.8		
Total		6359	100.0		

A 8

Frequency distribution of grade levels 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	9th grade	1709	27.7	28.0	28.0
	10th grade	1720	27.9	28.1	56.1
	11th grade	1525	24.7	25.0	81.1
	12th grade	1144	18.5	18.7	99.8
	Ungraded or other grade	14	.2	.2	100.0
	Total	6112	99.0	100.0	
Missing	System	59	1.0		
Total		6171	100.0		

A 9

Frequency distribution of Hispanic 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2099	33.0	33.7	33.7
	No	4127	64.9	66.3	100.0
	Total	6226	97.9	100.00	
Missing	System	133	2.1		
Total		6359	100.0		

A 10

Frequency distribution of Hispanic 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2152	34.9	35.5	35.5
	No	3918	63.5	64.5	100.0
	Total	6070	98.4	100.0	
Missing	System	101	1.6		
Total		6171	100.0		

A 11

Frequency distribution of age of first alcohol drink 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had a drink of alcohol other than a few sips	2861	45.0	45.9	45.9
	8 years old or younger	355	5.6	5.7	51.6
	9 to 10 years old	205	3.2	3.3	54.9
	11 or 12 years old	423	6.7	6.8	61.7
	13 or 14 years old	1055	16.6	16.9	78.6
	15 or 16 years old	1068	16.8	17.1	95.8
	17 years old or older	263	4.1	4.2	100.0
	Total	6230	98.0	100.0	
Missing	System	129	2.0		
Total		6359	100.0		

A 12

Frequency distribution of age of first alcohol drink 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had a drink of alcohol other than a few sips	2679	43.4	47.4	47.4
	8 years old or younger	332	5.4	5.9	53.2
	9 to 10 years old	218	3.5	3.9	57.1
	11 or 12 years old	382	6.2	6.8	63.8
	13 or 14 years old	913	14.8	16.1	80.00
	15 or 16 years old	959	15.5	17.0	96.9
	17 years old or older	174	2.8	3.1	100.0
	Total	5657	91.7	100.00	
Missing	System	514	8.3		
Total		6171	100.0		

A 13

Frequency distribution of frequency of alcohol consumption 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 days	4122	64.8	67.3	67.3
	1 or 2 days	1051	16.5	17.2	84.5
	3 to 5 days	434	6.8	7.1	91.7
	6 to 9 days	232	3.6	3.8	95.3
	10 to 19 days	149	2.3	2.4	97.8
	20 to 29 days	53	.8	.9	98.6
	All 30 days	83	1.3	1.4	100.00
	Total	6124	96.3	100.00	
Missing	System	235	3.7		
Total		6359	100.0		

A 14

Frequency distribution of frequency of alcohol consumption 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 days	4257	69.0	73.3	73.3
	1 or 2 days	899	14.6	15.5	88.7
	3 to 5 days	325	5.3	5.6	94.3
	6 to 9 days	155	2.5	2.7	97.0
	10 to 19 days	79	1.3	1.4	98.3
	20 to 29 days	24	.4	.4	98.8
	All 30 days	72	1.2	1.2	100.0
	Total	5811	94.2	100.0	
Missing	System	360	5.8		
Total		6171	100.0		

A 15

Frequency distribution of frequency of alcohol use in lifetime 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 days	2444	39.6	43.5	43.5
	1 or 2 days	989	16.0	17.6	61.1
	3 to 9 days	846	13.7	15.1	76.2
	10 to 19 days	473	7.7	8.4	84.6
	20 to 39 days	348	5.6	6.2	90.8
	40 to 99 days	237	3.8	4.2	95.0
	100 or more days	279	4.5	5.0	100.0
	Total	5616	91.0	100.0	
Missing	System	555	9.0		
Total		6171	100.0		

A 16

Frequency distribution of frequency of binge drinking 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 days	5266	82.8	84.8	84.8
	1 day	380	6.0	6.1	90.9
	2 days	225	3.5	3.6	94.5
	3 to 5 days	171	2.7	2.8	97.2
	6 to 9 days	70	1.1	1.1	98.4
	10 to 19 days	39	.6	.6	99.0
	20 or more days	62	1.0	1.0	100.0
	Total	6213	97.7	100.0	
Missing	System	146	2.3		
Total		6359	100.0		

A 17

Frequency distribution of binge drinking 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 days	5215	84.5	87.3	87.3
	1 day	309	5.0	5.2	92.5
	2 days	185	3.0	3.1	95.6
	3 to 5 days	135	2.2	2.3	97.8
	6 to 9 days	54	.9	.9	98.7
	10 to 19 days	21	.3	.4	99.1
	20 or more days	55	.9	.9	100.00
	Total	5974	96.8	100.0	
Missing	System	197	3.2		
Total		6171	100.0		

A 18

Frequency distribution of frequency of marijuana use in lifetime 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	3981	62.6	64.4	64.4
	1 or 2 times	481	7.6	7.8	72.1
	3 to 9 times	426	6.7	6.9	79.0
	10 to 19 times	252	4.0	4.1	83.1
	20 to 39 times	233	3.7	3.8	86.9
	40 to 99 times	223	3.5	3.6	90.5
	100 or more times	590	9.3	9.5	100.00
	Total	6186	97.3	100.0	
Missing	System	173	2.7		
Total		6359	100.0		

A 19

Frequency distribution of frequency of marijuana use in lifetime 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	3905	63.3	66.4	66.4
	1 or 2 times	461	7.5	7.8	74.3
	3 to 9 times	435	7.0	7.4	81.7
	10 to 19 times	219	3.5	3.7	85.4
	20 to 39 times	225	3.6	3.8	89.2
	40 to 99 times	178	2.9	3.0	92.2
	100 or more times	456	7.4	7.8	100.0
	Total	5879	95.3	100.0	
Missing	System	292	4.7		
Total		6171	100.0		

A 20

Frequency distribution of age of first marijuana use 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never tried marijuana	3976	62.5	64.2	64.2
	8 years old or younger	108	1.7	1.7	66.0
	9 or 10 years old	103	1.6	1.7	67.6
	11 or 12 years old	309	4.9	5.0	72.6
	13 or 14 years old	795	12.5	12.8	85.4
	15 or 16 years old	745	11.7	12.0	97.5
	17 years old or older	156	2.5	2.5	100.00
	Total	6192	97.4	100.0	
Missing	System	167	2.6		
Total		6359	100.0		

A 21

Frequency distribution of age of first marijuana use 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never tried marijuana	3950	64.0	66.1	66.1
	8 years old or younger	88	1.4	1.5	67.5
	9 or 10 years old	78	1.3	1.3	68.9
	11 or 12 years old	240	3.9	4.0	72.9
	13 or 14 years old	780	12.6	13.0	85.9
	15 or 16 years old	717	11.6	12.0	97.9
	17 years old or older	125	2.0	2.1	100.00
	Total	5978	96.9	100.0	
Missing	System	193	3.1		
Total		6171	100.0		

A 22

Frequency distribution of frequency of marijuana use in last 30 days 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	4931	77.5	79.0	79.0
	1 or 2 times	448	7.0	7.2	86.2
	3 to 9 times	307	4.8	4.9	91.1
	10 to 19 times	158	2.5	2.5	93.7
	20 to 39 times	112	1.8	1.8	95.5
	40 or more times	283	4.5	4.5	100.0
	Total	6239	98.1	100.0	
Missing	System	120	1.9		
Total		6359	100.0		

A 23

Frequency distribution of frequency of marijuana use in last 30 days 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	4815	78.0	80.4	80.4
	1 or 2 times	431	7.0	7.2	87.6
	3 to 9 times	282	4.6	4.7	92.3
	10 to 19 times	144	2.3	2.4	94.7
	20 to 39 times	102	1.7	1.7	96.4
	40 or more times	216	3.5	3.6	100.0
	Total	5990	97.1	100.0	
Missing	System	181	2.9		
Total		6171	100.0		

A 24

Frequency distribution of sexual intercourse 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No sexual intercourse	3428	53.9	61.1	61.1
	Yes sexual intercourse	2184	34.3	38.9	100.0
	Total	5612	88.3	100.0	
Missing	System	747	11.7		
Total		6359	100.0		

A 25

Frequency distribution of sexual intercourse 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No sexual intercourse	3590	58.2	63.7	63.7
	Yes sexual intercourse	2049	33.2	36.3	100.0
	Total	5639	91.4	100.0	
Missing	System	532	8.6		
Total		6171	100.0		

A 26

Frequency distribution of age of first sexual intercourse 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3415	53.7	61.1	61.1
	11 years old or younger	189	3.0	3.4	64.5
	12 years old	117	1.8	2.1	66.6
	13 years old	223	3.5	4.0	70.6
	14 years old	438	6.9	7.8	78.4
	15 years old	556	8.7	10.0	88.4
	16 years old	423	6.7	7.6	96.0
	17 years old or older	225	3.5	4.0	100.0
	Total	5586	87.8	100.0	
Missing	System	773	12.2		
Total		6359	100.0		

A 27

Frequency distribution of age of first sexual intercourse 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3577	58.0	63.8	63.8
	11 years old or younger	155	2.5	2.8	66.5
	12 years old	96	1.6	1.7	68.2
	13 years old	181	2.9	3.2	71.5
	14 years old	399	6.5	7.1	78.6
	15 years old	578	9.4	10.3	88.9
	16 years old	415	6.7	7.4	96.3
	17 years old or older	208	3.4	3.7	100.0
	Total	5609	90.9	100.0	
Missing	System	562	9.1		
Total		6171	100.0		

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A 28

Frequency distribution of sexual intercourse partners in lifetime 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3423	53.8	61.2	61.2
	1 person	831	13.1	14.9	76.1
	2 people	443	7.0	7.9	84.00
	3 people	285	4.5	5.1	89.1
	4 people	153	2.4	2.7	91.8
	5 people	99	1.6	1.8	93.6
	6 or more people	358	5.6	6.4	100.00
	Total	5592	87.9	100.0	
Missing	System	767	12.1		
Total		6359	100.0		

A 29

Frequency distribution of sexual intercourse partners in lifetime 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3590	58.2	63.9	63.9
	1 person	887	14.4	15.8	79.7
	2 people	389	6.3	6.9	86.6
	3 people	244	4.0	4.3	91.0
	4 people	125	2.0	2.2	93.2
	5 people	90	1.5	1.6	94.8
	6 or more people	293	4.7	5.2	100.00
	Total	5618	91.0	100.0	
Missing	System	553	9.0		
Total		6171	100.0		

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A 30

Frequency distribution of sexual intercourse partners 3 months 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3425	53.9	61.2	61.2
	I have had sexual intercourse, but not in the past 3 months	693	10.9	12.4	73.6
	1 person	1083	17.0	19.3	92.9
	2 people	190	3.0	3.4	96.3
	3 people	71	1.1	1.3	97.6
	4 people	32	.5	.6	98.1
	5 people	12	.2	.2	98.4
	6 or more people	92	1.4	1.6	100.00
	Total	5598	88.00	100.0	
Missing	System	761	12.00		
Total		6359	100.0		

A 31

Frequency distribution of sexual intercourse partners 3 months 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3586	58.1	63.8	63.8
	I have had sexual intercourse, but not in the past 3 months	624	10.1	11.1	74.9
	1 person	1062	17.2	18.9	93.8
	2 people	176	2.9	3.1	96.9
	3 people	63	1.0	1.1	98.1
	4 people	22	.4	.4	98.5
	5 people	13	.2	.2	98.7
	6 or more people	74	1.2	1.3	100.00
	Total	5620	91.1	100.0	
Missing	System	551	8.9		
Total		6171	100.0		

A 32

Frequency distribution of alcohol or drug use before last sexual intercourse 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3414	53.7	60.9	60.9
	No alcohol or drugs before sex	1737	27.3	31.0	91.9
	Yes alcohol or drugs before sex	456	7.2	8.1	100.00
	Total	5606	88.2	100.0	
Missing	System	753	11.9		
Total		6359	100.0		

A 33

Frequency distribution of alcohol or drug use before last sexual intercourse 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3571	57.9	63.5	63.5
	No alcohol or drugs before sex	369	6.0	6.6	70.1
	Yes alcohol or drugs before sex	1682	27.3	29.9	100.0
	Total	5622	91.1	100.0	
Missing	System	549	8.9		
Total		6171	100.0		

A 34

Frequency distribution of condom use before last sexual intercourse 2015 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3415	53.7	61.7	61.7
	No condom use	750	11.8	13.5	75.2
	Yes condom use	1372	21.6	24.8	100.00
	Total	5537	87.1	100.0	
Missing	System	822	12.9		
Total		6359	100.0		

A 35

Frequency distribution of condom use before last sexual intercourse 2017 YRBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have never had sexual intercourse	3578	58.0	64.3	64.3
	No condom use	1217	19.7	21.9	86.1
	Yes condom use	771	12.5	13.9	100.00
	Total	5566	90.2	100.0	
Missing	System	605	9.8		
Total		6171	100.0		