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Social Ecological Factors Affecting Marijuana Use Among Young Adults in the United States

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2021

Abstract

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M.Sc., University of Jos/Nigeria, 1995

B.Sc., University of Jos/Nigeria, 1991

Doctoral Study Submitted in Partial Fulfillment

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Abstract

Current knowledge of young adults' marijuana use centers around individual risk factors and negative health effects (i.e., mental disorder), with less focus on contextual circumstances. In this study, I examined the association between demographic (i.e., gender, race, education, employment, income, and population density), social (i.e., risk perception and religious beliefs influence), living context (i.e., difficulty getting marijuana, poverty level, and county metro status), and marijuana use among young adults. The social-ecological model guided this study. In this quantitative cross-sectional study, data from the 2019 U.S. National Survey on Drug Use and Health that included 14,226 young adults aged 18 to 25 years old were analyzed. Logistic regression for demographic factors showed lower odds of marijuana use among non-Hispanic/Hispanics compared to Whites ($OR = .723$, 95% CI [.675-.774, $p < 0.001$), higher odds among the college educated ($OR = 1.207$, 95% CI [1.126-1.293, $p < 0.001$) compared to those with high school education, and lower odds among the unemployed ($OR = .678$, 95% CI [.630-.728], $p < 0.001$). Among social factors, odds of marijuana use were less among young adults seeing great risk in frequent use ($OR = .420$, 95% CI [.361-.489], $p < 0.001$) and higher among those who disagree with the importance of friends sharing religious beliefs ($OR = 1.390$, 95% CI [1.256-1.538], $p < .05$). For living context factors, odds were high for those who perceive marijuana as easy to acquire ($OR = 5.879$, 95% CI [5.385-6.419], $p < 0.001$). Findings of this study can be used to inform marijuana risk reduction and prevention policies and programs to improve the quality of life for young adults in this vulnerable age group, leading to positive social change.

Social-Ecological Factors Affecting Marijuana Use Among Young Adults in the United

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Dedication

To my kids - Metaire, Mudiaga, Mamuyovwi, and Mamuruemu – the possibilities are infinite.

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Section 1: Foundation of the Study and Literature Review

Marijuana (*Cannabis sativa*) has been called different names at different times, such as weed, ganja, joint, pot, grass, stone, and Mary Jane. These names usually mask the substance because it may be illicit or illegal, though it is legal in many parts of the world (National Institute of Drug Abuse, 2019). Marijuana can be ingested in many ways: rolled up in joints like cigarettes, smoked in pipes and water pipes, brewed like tea, and drank especially for medicinal purposes, used in vaporizers, or included in edible foods such as cookies or mixed vegetables (National Institute of Drug Abuse, 2019; Ocampo & Rans, 2015; Szaflarski & Sirven, 2017; Volkow et al., 2014). The psychoactive component of marijuana, called tetrahydrocannabinol (THC), is what causes the "high" that most consumers seek, and it resides in the leaves and flower buds of the cannabis plant vegetables (National Institute of Drug Abuse, 2019).

The adventurist and exuberant nature of the adolescence period may coincide with young people's lives when they are open to trying things out. Beginning from tobacco and alcohol, they often graduate to the initiation of illicit substance use; however, there may be differences based on location (i.e., counties, states, or countries) in the levels, types, and sequences of substance use in young adults, which may mean that substance use among young adults depends on their social context (Degenhardt et al., 2016). In the transitory period during puberty, young adults complete their education, begin employment, and form longer-term intimate relationships. There is usually greater independence with increased responsibility as well as a shift in emotional regulation and increased risky behavior such as substance use (Hall et al., 2016).

During this period, institutional support, and parental influence decrease for young adults; therefore, the social environment plays a more prominent role in influencing them (Goodman et al., 2011; Kirst et al., 2014). It is possible that during this period, there are increased opportunities to generally experiment, thus leading to risky behaviors (Pedrelli et al., 2011). Some studies showed that many young adults initiate or progress in their smoking behavior while in postsecondary education because 25%–37% start smoking and 25%–39% smoke cigarettes more often during this period. Furthermore, binge drinking, and depression are regular during this transition period for young adults (Kirst et al., 2014; Pedrelli et al., 2011).

Marijuana is the most commonly used illicit drug among young adults in the United States (Phillips et al., 2018). With the legalization of marijuana for recreational purposes in many states and the District of Columbia, there are fears regarding an increase in the use of an already abused drug (Phillips et al., 2018). On many occasions in the discourse around marijuana use, fears and concerns expressed usually border around possible negative consequences, but the importance of context and its influence in drug use development is mainly ignored (Asbridge et al., 2014).

Research findings have indicated connections between context, such as neighborhood factors, and youth antisocial and deviant behaviors (Foster & Brooks-Gunn 2013; Snedker et al., 2013), young adult substance use, and young adult marijuana use (Tucker et al., 2013.). Tucker et al. (2013) suggested that factors such as neighborhood unemployment, neighborhoods with high residential turnover, parental drug use, and mental health histories are early indicators of social and environmental influences that

translate to individual risk behaviors among young adults. The association between neighborhood characteristics and substance use during adolescence and young adulthood may also explain the increased exposure to and opportunities for drug use (Debra et al., 2015).

Problem Statement

In the United States, approximately 53.2 million people aged 12 and older used illicit drugs in 2017, with marijuana being the most popular, used by 43.5 million people or 15.9% of the total U.S. population (Substance Abuse and Mental Health Services Administration [SAMHSA], 2020a). By categorization, adolescents aged between 12 and 17 years old represented 12.5% of the population, and about 3.1 million were former users of marijuana (SAMHSA, 2020a). Over one third (34.8%) of people aged 18 and 25 used marijuana in 2018, representing approximately 11.8 million young adults (SAMHSA, 2020b). For adults over 26 years old, 13.3% (or 28.5 million people in this age group) used marijuana in the previous year. These numbers and proportions are similar to data for 2017, but by far higher than all the years before that, meaning that marijuana use may increase, especially among adolescents and young adults (SAMHSA, 2020b).

While these statistics show that there are challenges related to the health effects of marijuana use, there are also multiple challenges that confront adolescents and young adults within their communities. The use of marijuana and prescription drugs for leisure and alcohol consumption in large quantities are just a few (Connell et al., 2010; Degenhardt et al., 2016; Hall et al., 2016). These challenges can be associated with

sociodemographic and individual characteristics, like gender, age, and peer influence, on young adults' drug use (Mason et al., 2013; Schofield et al., 2015). Many authors (e.g., Anetor & Oyekan-Thomas, 2018; Bechtold et al., 2015; Gonis, 2018; Johnston et al., 2015) have provided information on marijuana use among adolescents and young adults, with most of their findings emphasizing issues around the individual and less of a focus on the external environment as factors. For example, self-esteem; impulsivity; shame; and adverse early experiences, such as sexual abuse, are factors projected as direct predictors of substance use; however, not much investigation has occurred regarding the mental and psychological processes associated (Rahim & Patton, 2015).

There is less information regarding the external environment, such as the built environment and impact of education through schools and health systems, laws, and policies. There are also not as many studies of young people in their natural environment or social context regarding substance abuse (especially alcohol and marijuana) as there are studies of adults (Phillips et al., 2018). Previous reviews also showed that more information is required to better understand how context influences young people's substance use (Bryden et al., 2013; Jackson et al., 2014).

In this study, I investigated possible contextual and environmental influences (i.e., physical, and social) that predispose young adults to marijuana use. While the negative consequences of marijuana use on adolescents and young adults are known, there is a gap in knowledge regarding neighborhood influences.

Purpose of the Study

The purpose of this study was to investigate the association between demographic characteristics, social factors, living context, and marijuana use among young adults aged 18 to 25 in the United States.

Research Questions and Hypotheses

This study's research questions are quantitative and based on secondary data analysis of the 2019 National Survey on Drug Use and Health (NSDUH). The research questions and corresponding hypotheses are as follows:

Research Question 1: Is there an association between young adults' demographic characteristics (e.g., education, gender, race) and marijuana use?

$H_0 1$: There is no association between demographic characteristics of young adults (e.g., education, gender, race) and the use of marijuana.

$H_a 1$: There is an association between the demographic characteristics of young adults (e.g., education, gender, race) and the use of marijuana.

Research Question 2: Is there an association between social factors (e.g., risk perceptions, religious beliefs influence) and the use of marijuana among young adults?

$H_0 2$: There is no association between social factors (e.g., risk perceptions, religious beliefs influence) and the use of marijuana among young adults.

$H_a 2$: There is an association between social factors (e.g., risk perceptions, religious beliefs influence) and the use of marijuana among young adults.

Research Question 3: Is there an association between living context (e.g.,

difficulty getting marijuana, poverty level) and young adults' use of marijuana?

$H_0$3: There is no association between living context (e.g., difficulty getting

marijuana, poverty level) and young adults' use of marijuana.

H_a3: There is an association between living context (e.g., difficulty getting

marijuana, poverty level) and young adults' use of marijuana.

Theoretical Foundation for the Study

The social-ecological model (SEM; Bronfenbrenner, 1977) was the theoretical

foundation for this study. In the original conception of the social-ecological framework,

Bronfenbrenner (1977, 1979) posited that human health and human development occur

across various levels - from individual and personal to populations and the larger society;

therefore, no single factor can determine young adults' predisposition to marijuana use,

while other groups may be less susceptible. To strengthen public health practice, the

SEM has been used to describe the interactions between individual characteristics and

environmental factors that affect health outcomes (Golden & Earp, 2012; McLeroy et al.,

1988). In the case of the topic under study and according to the SEM, marijuana use

among young adults is an outcome of the interaction between and among many factors

divided into five categories: intrapersonal, interpersonal, institutions, community, and

society (Bronfenbrenner, 1977/1979; World Health Organization, 2018).

The different factors that can influence young adults' use of marijuana are

depicted in Figure 1. The individual is at the center of any situation, while several factors

surround the individual in concentric circles in the order of the level of influence they

exert on the individual (Bronfenbrenner, 1979).

The SEM aligned with this study because it helped show the association between

the different levels of influencing factors and marijuana use among young adults. As the

research questions indicate, various factors can be associated with young adults'

marijuana use, and these possible factors (i.e., demographic, social, and living context)

can be located in the different social-ecological framework levels (see Figure 1).

Figure 1

SEM for Marijuana Use Among Young Adults
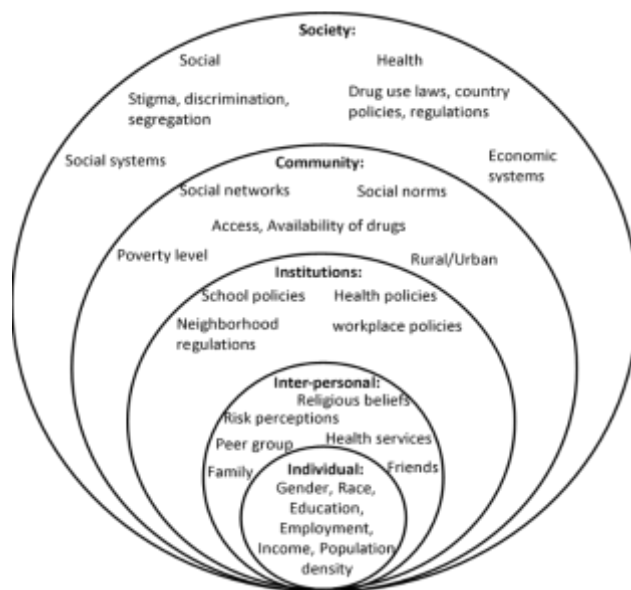
Note: Adapted from CDC (2018). *The Socio-Ecological Model: A Framework For*

Prevention.

From a public health and social change perspective, understanding the factors that

influence marijuana use aside from the prevalent peer influence and availability may

improve prevention and highlight gaps. The SEM incorporates the complex interaction

between individuals, relationships, institutions, community, and society. This holistic

approach effectively identifies gaps in the literature because it demonstrates the

interrelatedness of factors (Centers for Disease Control & Prevention [CDC], 2018),

highlighting the necessity to act across multiple levels of the SEM (Corey & Greene,

2018). Marijuana use mostly begins in early adulthood, so the focus is on young adults as

the entry point to addressing risk factors, such as community, neighborhood, and peer

influence, so that future substance abuse can be limited (Corey & Greene, 2018).

In Table 1, the specific independent variables selected from the 2019 NSDUH and

analyzed for this study are classified into the appropriate SEM levels as they fit.

Classification of these variables shows three levels, and my interpretation of analysis

results followed the same pattern.

Table 1

Classification of Variables Into SEM Levels

Intrapersonal factors (Demographic)	Interpersonal factors (Social)	Community factors (Living context)
Gender	Risk smoking marijuana once or twice a week	How difficult or easy to get marijuana
Race	Great risk smoking marijuana once or twice a week	Poverty level
Education	Religious beliefs are very important	County metro/non-metro status
Employment status	Religious beliefs influence my decisions	
Total family income	It is important that my friends share my religious beliefs	
Population density		

Nature of the Study

In this study, I employed a quantitative approach and a cross-sectional design. I

extracted data from the 2019 NSDUH implemented by the SAMHSA across all 50 states

in the United States. I used these data to explore and describe the correlates of social-

ecological factors and marijuana use among young adults (aged 18–25) in the United States. The quantitative data from the NSDUH contains variables that can determine the different licit, illicit, and prescription drugs used as well as data regarding some social-ecological factors. The data also includes demographic information, such as gender, and education, as covariates. I was, therefore, able to test the dependent and independent variables from this data set.

Literature Search Strategy

To locate extant literature for this review, I examined scholarly, peer-reviewed journal articles in the following databases accessible through the Walden University Library: PubMed, Medline, Cochrane Databases, and Google Scholar. Journal articles reviewed were published in the past 5 years (around 2015 to 2020) that contained information on social-ecological factors, the young adult age category, and marijuana use or abuse in the United States. I used keyword search terms, such as *marijuana use, young adults, social-ecological factors, predispose,* and *young adults*.

Literature Review Related to Key Variables and Concepts

Previous studies have documented the influence of one component, or the interplay of the various components, of the SEM and how these influence young adults toward marijuana use and abuse (e.g., Epstein et al., 2015; Fagan et al., 2015; Kirst et al., 2014; Shih et al., 2017; Ssewanyana et al., 2018). Factors at only one level of the SEM and/or a combination of factors from different SEM levels can influence individuals towards risk or protective behavior, such as marijuana use or nonuse.

Substance use, such as tobacco, alcohol, and marijuana, appears to be a significant public health focus concerning adolescents and young adults, because this leads to health problems like injury, overdose, infection spread, cardiovascular issues, mental disorders, and suicide (Gonis, 2018; Schlossarek et al., 2016). Illicit drug use is rampant among adolescents and young adults because they are readily available, and young adults get caught frequently with these drugs. Factors influencing drug use among young adults include cultural norms, attitudes, peer pressure, parent role models, family disruption, social deprivation, media advertisements, performance capabilities, social attachments, and availability of resources, which are factors at different levels of the SEM (Gonis, 2018; Schlossarek et al., 2016).

Other factors that may affect marijuana use, include anxiety, sensitivity, depression symptoms, single-family or blended families, and not living with parents (Schlossarek et al., 2016). These are in line with Kirst et al.'s findings (2014) who highlighted the period of late adolescence in young adulthood as an opportunity for adventurism when young adults feel the reduced institutional support and parental influence, which means that the social environment now plays a more prominent role in shaping the young adults' lives during this period. Therefore, the factors that influence marijuana use among young adults include gender, low socio-economic status, parental substance abuse, sensation seeking, perception of risks, mental health issues, school environment, and street involvement (Kirst et al., 2014).

Similarly, Hall et al. (2016) posited that the changes that occur as individuals move between adolescence and young adulthood create vulnerabilities that may enhance

the initiation and establishment of drug use and the potential outcomes of exposure to substance use. When drugs are readily available, peers circulate drugs among themselves, and adolescents begin drug use early in life (e.g., a 16-year-old who starts smoking tobacco), they may eventually use cannabis, with tobacco acting as the gateway drug (Degenhardt et al., 2016; Hall et al., 2016; Schlossarek et al., 2016). In the same vein, young people who begin smoking marijuana will often graduate into more potent drugs with time (Kirst et al., 2014).

In terms of some adverse effects of prolonged marijuana and other illicit substance use, adolescents who begin substance use early and into young adulthood are prone, for instance, to cognitive and functioning issues, such as reduced employment, lower wages, and lower job satisfaction (Hall et al., 2016). This association shows up among more males than females, and the severity of the adverse effects stated above appears to be dose-response. Adolescents who have used drugs longer will more likely have negative impacts like poor employment than those who use drugs sparingly (Hall et al., 2016; Kirst et al., 2014).

According to Johnston et al. (2019), the socio-cultural environment of drug use, is significant; for example, marijuana is available mainly because it is cheap, though this is an economic issue, the more available drugs are, the more likely they are to get used. Community norms, family relationships, and individual behavior affect risks, exposure, and drug use levels; therefore, in line with the SEM, emphasis should be placed on the gamut of personal, family, community, and environmental factors that can affect substance use (Johnston et al., 2015, 2019). With specific reference to neighborhood

environment, increased exposure and opportunities enhance marijuana use among adolescents and young adults; boarding or rooming structures in a neighborhood was predictive of marijuana use among young people (Debra et al., 2015).

The SAMHSA (2020a) reported that 38.7% of young adults aged 18–25 years (or 13.2 million) indicated using illicit substances in the past year, and 34.8% of young adults aged 18–25 years (or 1.8 million) used marijuana in the past year. With these staggering numbers, which are similar to what was recorded almost a decade ago (Epstein et al., 2015), young adult marijuana use can be considered a public health concern in the United States.

Debra et al. (2015) found that young adults living in deteriorated neighborhoods – those with dilapidated houses with no windows and many abandoned places – were more likely to use marijuana than those in stable areas. Consequently, structural neighborhood disorder, especially in a low-income, urban neighborhood, increases the odds of marijuana use among young adults (Debra et al., 2015; Reboussin et al., 2019). Similarly, neighborhoods with appearances of disorder, such as discarded drug paraphernalia, unmaintained houses, and inadequate social control, presented opportunities for marijuana use, especially when considering that drug availability is one factor that creates the opportunity to initiate marijuana use. Neighborhoods influence young adults' drug use behavior with easy access to drugs, high unemployment, and social disorganization (Delva et al., 2014).

According to Volkow et al. (2014), marijuana is associated with adverse effects, such as affecting the user's perception of time, memory, and overall coordination, which

may have negative consequences to functioning. Worse still, continued use of marijuana from adolescent ages may eventually affect the brain in educational, professional, and social achievements. The drug's effects on the individual are also made possible by general availability and societal acceptance to the extent that nobody highlights the harmful effects. Considering that there are moves towards the legalization of marijuana, there may be an increase in the number of people initiating use and experiencing the harmful effects (Volkow et al., 2014).

Definitions

Marijuana: Another name for the cannabis plant; used for medical or recreational purposes. The main psychoactive compound of marijuana is THC, one of the 483 known compounds in the cannabis plant, including at least 65 other cannabinoids. Cannabis can be used by smoking, vaporizing, or within food (Schauer et al., 2016). Using the word marijuana is contextual; sometimes it is used to refer to the whole cannabis plant and other times as the part of the plant that contains high THC, but some recognize marijuana as a distinctive strain of cannabis, the other being hemp (Potter & Decorte, 2016).

Social-ecological factors: Factors derived from a theory-based framework that depicts the multidimensional and interactive impact of individual and physical environment factors that determine behaviors and help identify health promotion opportunities within groups (see Figure 1). There are five intertwined, hierarchical SEM levels: intrapersonal, interpersonal, community, institutional, and policy (CDC, 2021; World Health Organization, 2018).

Young adults: A segment of the population in the demographic classification of 18 and 24 years of age. These individuals do not fit the adolescent or teenager categories; they are seemingly in the transitory period when they complete high school, move on to college, or get a job and start an independent life (Ashbridge et al., 2014).

Assumptions

In this study, I emphasized context, environment, and neighborhood influences that place young adults at risk of marijuana use; however, through the SEM, researchers gather that there are confounding factors from other SEM levels that may also influence marijuana use among young people. I assumed that; therefore, apart from the specific independent variables examined during this study, there may be other factors at different levels affecting the outcome (marijuana use) at the same time.

Another assumption was that the secondary data, an annual national survey collected since the 1900s, is valid, reliable, and based on an effective data collection strategy.

Scope and Delimitation

In this study, I targeted young adults aged between 18 and 25 years old in the United States. The data were disaggregated from the results of the 2019 NSDUH.

Significance, Summary, and Conclusions

Marijuana is the most popular illicit drug in the United States, especially common among adolescents and young adults, with over 11 million individuals from this age group reporting that they had used marijuana the previous year (National Institute on Drug Abuse, 2015). Young adult's substance use should, therefore, be of public health

significance. Between 22% to 35% of high school students in the United States reported current use of tobacco, alcohol, and marijuana, and the proportion of those who have ever used drugs is much higher (Kann et al., 2014). Global estimates of substance use disorders and dependence are around 6%–16% among young adults (Taggart et al., 2018).

In many Western societies, marijuana use is higher among 18- to 25-year-olds than those aged 25 and older, meaning that marijuana use is a bigger problem among young people (Gilman, 2015). Around 45% of 12th graders and over 50% of 18- to 25-year-olds have tried marijuana, with the use of the drug steadily increasing (Gilman, 2015). Use at an early age is also associated with worse outcomes because the developing brain is more vulnerable to the drug's effects (Gilman, 2015). Furthermore, marijuana use among adolescents and young adults is associated with impaired memory, difficulty in learning, poorer life outcomes, and even changes in the structure and function of specific brain regions (Gilman, 2015).

Marijuana use now surpasses cigarette smoking among adolescents in the United States. In 2014, past 30-day marijuana use rates were 6.5%, 16.6%, and 21.2% among 8th, 10th, and 12th graders, respectively, compared to 4.0%, 7.2%, and 13.6% use rates for cigarettes, respectively (Johnston et al., 2015). Only 36% of high school seniors think regular marijuana use places the user at significant risk compared to 52% in 2009 and a high of 78% in the early 1990s, showing a shift in perceptions of harm (Johnston et al., 2015). Marijuana use among adolescents and young adults is particularly troublesome

because of the long-term psychosocial effects associated with early use (Volkow et al., 2014).

Implications for Social Change

Initiating and sustaining positive social change in the lives of adolescents and young adults and improving society's development depends on investigating factors that influence risks, such as marijuana use. Since most substance use happens in early adulthood, addressing marijuana use among young adults can inhibit future substance abuse. Understanding how living context, such as neighborhoods, influences marijuana use is critical to developing effective prevention programs and policy initiatives (Reboussin et al., 2015). Members of the society, young or old, will develop and contribute effectively to communities only if they have the mental, physical, and psychological capacities; these are the strengths that marijuana use takes away from young adults, especially those who begin marijuana use in their teenage years.

In the following section, I will highlight some literature gaps by expanding the factors related to or surrounding neighborhood or living context due to marijuana use among young adults. Instead of focusing on socio-economic status, there will be an emphasis on neighborhood density, built environment, and family/neighborhood ties as well as an examination and description of their association with young adults' marijuana use.

Section 2: Research Design and Data Collection

In this study, I examined the social-ecological factors (i.e., elements possibly within communities, social systems, and institutions) associated with increased risk of marijuana use among young adults. The SEM (Bronfenbrenner, 1977) was used to assess substance use from multiple influences at the individual, peer, community, institutional, and policy levels, with emphasis on neighborhood or contextual factors to highlight a fundamental gap in addressing substance use issues concerning young adults.

In this section, I describe the research methods employed to address the research questions and purpose. This section also contains a discussion of the research design, study population, research hypotheses, data collection and analysis methods, and ethical considerations regarding the study.

Research Design and Rationale

In this study, I used a quantitative research design based on secondary analysis of cross-sectional survey data collected in 2019. The quantitative approach was directly related to the research questions posed, the study methods, the measurement of variables, and the sampling technique (see Burkholder et al., 2016). According to SAMHSA (2020a), this design focuses on naturally occurring groups formed before the study and randomly assigned into other groups.

The study methodology was also directly related to the study's purpose, which was investigating an association between the dependent and independent variables. These variables were identified and operationalized. Subsequently, responding to the research questions required data transformation. In this case, I identified and selected cases from

the 2019 NSDUH data set that fell within individuals between the ages of 18 and 25 years old. The social-ecological factors were the independent variables that cause a change in the situation or focus of study, specifically external factors, such as the built environment and population density, and living conditions, such as parents' use of marijuana or ease of obtaining marijuana. The dependent variable is usually an outcome (Burkholder et al., 2016). In this study, young adults' marijuana use was the effect or result of social-ecological factors and how they influence the individual. In other words, the outcome observed in the dependent variable (i.e., marijuana use among young adults) depended on the influence of the independent variable (i.e., social-ecological factors embodied in demographic, social, and living context factors). I examined the covariates that make up these social-ecological factors to determine their influence on the dependent variable.

Quantitative research designs are valuable to determine associations between variables (Burkholder et al., 2016). The secondary data from the 2019 NSDUH used in this study was quantitative and cross-sectional, measuring prevalence and correlates of drug use in the United States. The quantitative and cross-sectional design effectively tests different associations identified as the research questions of this study. Using a quantitative method ensures the possibility of analyzing and describing the association between demographic characteristics and marijuana use or social and contextual factors, such as risk perceptions, peer pressure, and population density (SAMHSA, 2020b).

Quantitative research provides data and information through surveys closely representing a population by using a sample of the same population. For instance, to understand the influence of risk perceptions on young adults' marijuana use in the United

States, a researcher could analyze data from interviews with a specific number of young

adults in all states to represent young adults (Creswell, 2013). However, quantitative

research can be both time-consuming and expensive because of the human resources

required at different quantitative study stages.

Methodology

Population

The NSDUH data are a sample of male and female respondents from the ages of

12 and older residing in the 50 states and the District of Colombia of the United States. I

targeted respondents in the teenage and early adulthood stages, those between 18 and 25

years old; therefore, I segregated data related to individuals in this age group from the

overall NSDUH data. As of 2018, the population of young adults in the United States was

around 42.96 million, with 21.97 million males and 20.99 million females (Statistica,

2019).

Sampling and Sampling Procedures Used to Collect Data

The sampling frame for the NSDUH was a civilian, noninstitutionalized

population aged 12 years and older residing within the United States at the time of the

survey. This population was residents of households and individuals in noninstitutional

group housing. Those excluded from the survey were individuals without an address;

military personnel abroad on duty; and residents of prisons, nursing homes, mental

institutions, and long-term care hospitals. The survey utilized probability proportionate to

size through a multistage area probability sample that allocates more interviews to the

largest 12 states (SAMSHA, 2019).

For this study, I used a stratified sampling technique to segregate the target sample. This stratification was by age categories, identifying and selecting respondents between the ages of 18 and 25 years old. The total number of male and female respondents in this target age category formed my study sample. Stratified sampling is a probability sampling technique; therefore, I could confidently generalize findings and make statistical inferences from the sample to enhance the data's external validity. Stratified sampling provided a greater degree of representativeness because it decreases the sampling error (i.e., all homogenous respondents in the age category are selected based on age category). This secondary data analysis was feasible given the size of the target population and the time and cost constraints related to conducting national quantitative surveys of this nature (see Aschengrau & Seage, 2014; Babbie, 2019; Creswell, 2009).

Statistical Power Analysis

To correctly reject the null hypothesis and ensure that the proper statistical criteria are met, I conducted a statistical power analysis. Power is the probability that a statistical test will appropriately reject the null hypothesis or the test's capability to detect an effect and is directly related to tests of hypotheses (Statistics Solutions, 2019). Type I or Type II errors occur when the researcher rejects a true null hypothesis (i.e., false positive conclusion) or does not reject a false null hypothesis (i.e., false negative conclusion), which often happens during tests of hypotheses. Power analyses help avoid these errors so that the researcher correctly rejected or accepted the null hypothesis. Power is usually around .80, and the larger the sample size, the greater the statistical power. Therefore,

power analysis facilitated the determination of an appropriate sample size to show the

effect.

To calculate power, I set the probability or alpha level at .05, meaning there was a

95% chance I eliminated Type I or II errors. The effect size was set at 0.15 to estimate if

the sample was too large or too small. Therefore, effect size, alpha, and power were

predetermined in this case's power calculation through G*Power software. Table 2 shows

the analysis for the required sample size of young adults between the ages 18 and 25 for

this study based on predetermined factors of effect size, statistical power, and probability

or alpha. The number of predictors or independent variables was a critical input to this

calculation. For this study, there were 14 predictors based on the number of variables that

make up demographic, social, and living context factors.

Table 2

A Priori Power Calculation

F tests - Linear multiple regression: Fixed model, R^2 deviation from zero			
Analysis:	A priori: Compute required sample size		
Input:	Effect size f^2	=	0.15
	α err prob	=	0.05
	Power (1-β err prob)	=	0.95
	Number of predictors	=	14
Output:	Noncentrality parameter λ	=	29.1000000
	Critical F	=	1.7473837
	Numerator *df*	=	14
	Denominator *df*	=	179
	Total sample size	=	194
	Actual power	=	0.9506010

Based on the above assumptions in the calculation, this study required a minimum

sample of 194 young adults per state and a total sample of 9,700 participants representing

the entire population to have ample power and avoid committing Type I or Type II errors.

Instrumentation and Operationalization of Constructs

Instrumentation

In this study, I analyzed quantitative secondary data collected by SAMHSA for the 2019 NSDUH to identify associations between social-ecological factors and marijuana use. The outcome of focus was marijuana use among young adults in the 18–25 age range. The 2019 NSDUH used computer-assisted personal interviewing (CAPI) and audio computer-assisted self-interviewing (ACASI) as instrumentation for data collection (SAMHSA, 2020a). Participants either responded directly to questions from the interviewer who entered answers into the tablet/computer, or respondents entered their answers into the laptop/tablet after reading questions on the screen or listening to the questions on headphones. English and Spanish language interfaces were used to configure the electronic survey instruments to improve confidentiality and ensure clarity (SAMHSA, 2020a).

The reliability of the NSDUH data was measured by SAMHSA (2020a) using the interview/reinterview approach to assess errors that may arise from response variance and consistency in responses generated from administering the instrument at two different times. This approach ensured that accurate data and population estimates were generated through the survey (SAMHSA, 2020a). For validity, the use of CAPI and ACASI increased accuracy by reducing bias due to sensitive questions or self-reported issues such as drug use (SAMHSA, 2020a) and minimizing reporting bias (Lindberg & Scott, 2018).

Operationalization of Variables

Table 3 shows the nominal, ordinal, and scale variables used in this analysis, representing both independent and dependent variables. The variables analyzed included gender, race/ethnicity, educational attainment, population density, poverty level, ease of marijuana acquisition, risk perceptions, source of marijuana, and religious beliefs. In this analysis, the dependent variable was binary (yes = 1 or no = 0), which is required for logistic regression, and the independent variables were either nominal, scale, or binary.

Table 3

Operationalization of Variables

Variable	Definition	Measurement	Levels
Marijuana	The leaves from the cannabis plant, smoked, or consumed as a psychoactive drug.	Not applicable	Not applicable
Marijuana ever use	Smoking or eating the cannabis leaves as a psychoactive drug at any point in a young adults life	Nominal	0 = No 1 = Yes
Gender	The main biological categories humans are divided based on reproductive functions	Nominal	1 = Male 2 = Female
Race/ethnicity	Human grouping of shared physical/social qualities. Self-classification of racial and ethnic identity. Here, there are two groups of Caucasian whites that are not Hispanic and all other races including Hispanics	Nominal	1 = Non-Hispanic White 2 = Non-Hispanic others/Hispanic
Education categories	The level of schooling completed segregated into those who graduate high school and those who either completed some college or graduated college fully	Nominal	1 =≤ High school graduate 2 = Some college/college graduate
Employment status	Work situation at the time of survey identified as being in some form of employment or otherwise	Nominal	1 = Employed 2 = Unemployed
Total family income	Estimated total personal earnings from any source and income from other members of the same household	Nominal	1 = Up to $49,999 2 = $50,000 and above

Variable	Definition	Measurement	Levels
Population density	Based on CBSA, this is estimated from the US Census classification of socioeconomic segments (one or more counties) having ≥1 million people and considered as urban; compared to those not within a CBSA (less population and lower socioeconomic features).	Nominal	1 = Segment in a CBSA 2 = Segment not in a CBSA
Risk perceptions	The individual knowledge, thoughts, and actions toward the continuum of risk of harm (none, slight, moderate, great) aggregated into two categories, arising from frequent marijuana use (once or twice a week).	Nominal	1 = Low risk 2 = High risk
Great risk perception	Recoded from above – perception of grave harm arising from frequent marijuana use	Nominal	1 = Otherwise 2 = Great risk
Religious beliefs	Faith-based attitudes and actions related to the central role religion may play in life, separated into three topics (importance, influence, and shared beliefs).	Nominal	1 = Agree 2 = Disagree
Difficulty getting marijuana	The ease or difficulty in terms of physical location and extent of availability of marijuana	Nominal	1 = Difficult to impossible 2 = Easy
Poverty level	US Government threshold, a combination of income, family size and #children. 100% threshold means family income = poverty threshold	Nominal	1 = Below poverty level 2 = Above poverty level
County metro or nonmetro status	Metro areas are regions within a county consisting of a densely populated urban core and its less-populated surrounding areas	Nominal	1 = Nonmetro status (rural) 2 = Small/large metro (urban)

Note. CBSA means core-based statistical area (CBSA)

Data Analysis Plan

I conducted statistical analyses using Statistical Package for the Social Sciences Version 27, on the public release version of the 2019 NSDUH data. The data were segmented to select only respondents that were 18 to 25 years old. The research questions and hypotheses for this study were as follows:

Research Question 1: Is there an association between young adults' demographic characteristics (e.g., education, gender, race) and marijuana use?

> $H_0 1$: There is no association between demographic characteristics (e.g., education, gender, race) and marijuana use among young adults.

> $H_a 1$: There is an association between the demographic characteristics (e.g., education, gender, race) and marijuana use among young adults.

Research Question 2: Is there an association between social factors (e.g., risk perceptions, religious beliefs influence) and marijuana use among young adults?

> $H_0 2$: There is no association between social factors (e.g., risk perceptions, religious beliefs influence) and marijuana use among young adults.

> $H_a 2$: There is an association between social factors (e.g., risk perceptions, religious beliefs influence) and marijuana use among young adults.

Research Question 3: Is there an association between living context (e.g., difficulty getting marijuana, poverty level) and young adults' use of marijuana?

> $H_0 3$: There is no association between living context (e.g., difficulty getting marijuana, poverty level) and young adults' use of marijuana.

> $H_a 3$: There is an association between living context (e.g., difficulty getting marijuana, poverty level) and young adults' use of marijuana.

For statistical analyses, I conducted chi-square and logistic regression tests. Frequency, cross-tabulation, and chi-square tests were utilized for descriptive statistics to show the population's attributes. A chi-square test was used to calculate the probability that a relationship found in a sample between social-ecological factors and marijuana use

was due to chance (i.e., a random sampling error). I calculated chi-square by measuring the difference between the actual frequencies in each cell of a table and the frequencies I expected to find if there were no relationships between the dependent and independent variables.

Logistic regression analyses predicted the outcome variable (marijuana use) based on the independent variables. This analysis described the relationship or showed an association between the independent variables (demographic, social, and living context factors) and the dependent variable (marijuana use). In other words, I showed the effect of demographic, social, and living context factors on marijuana use among young adults; by analyzing the odds of marijuana use based on specific variables representing demographic, social, and living context factors.

The probability level or p value determined the statistical significance of the logistic regression analyses. Therefore, analyzing for variables such as race and marijuana use in a binomial table; or with the ease of drug acquisition against marijuana use included in the variables, and accepting/rejecting the null hypotheses were based on the calculated p value being greater/lower than the predetermined p value which is usually 0.05 unless otherwise determined.

Threats to Validity

A major threat to validity is the self-reporting nature of data collection, on which most estimates, including substance use, were based (Center for Behavioral Health Statistics and Quality [CBHSQ], 2020). Although self-reported data are considered appropriate and valid, the time interval between substance use and the survey can affect

reporting accuracy through recall. Inconsistencies with recall compared to biological specimen test results create validity issues (Lindberg & Scott, 2018). If these threats are combined with small sample sizes for topics such as opioid use or stimulant self-reports and positive urine tests, reaching conclusions will be challenging (SAMHSA, 2019). The specificity required during the window of time biological specimens are taken and tested affects the detection of results responsible for inconsistencies between self-reports and specimen tests (CBHSQ, 2020).

One way to address threats is to ensure that survey questions, especially sensitive ones like substance use, are designed to remain the same for as long as possible. If historical data show that these questions are consistent over time, it is possible to reach reliable conclusions by controlling for under- or over-reporting (SAMHSA, 2020a). In other words, if the same proportion of people have similar perceptions of drug use over time, it is possible to conclude that results are valid (CBHSQ, 2020).

Missing data is another threat to validity. For example, missing values in survey data are classified as either "refused to respond" or "no"; but these missing values may have been for entirely different reasons. Therefore, surveys will be preprogrammed with skip patterns in electronic platforms like the CAPI and ACASI, where the computer system automatically skips to the next appropriate question. The skip pattern helps ensure that respondents do not answer questions that are not relevant to them, and the interviewer cannot mistakenly input data because the cells are locked. Doing this, to a large extent, minimizes the possibility of inconsistent data (SAMHSA, 2020a).

Another method of addressing the threat to validity through measurement is initiating and closely managing a logical editing process, such that responses are inferred based on most recent reports regarding the topic of interest. For instance, if recent research indicates that most young people use hashish and cannabis for leisure, this can be the same for marijuana because the drugs' names are used interchangeably. Addressing the hashish, cannabis, and marijuana ever used or use in the past 12 months is done through statistical modeling based on responses to several different but related questions (SAMHSA, 2020a).

Ethical Procedures

For this study, the data utilized were the 2019 NSDUH data which are public domain materials made available by the SAMHSA and do not require permission or approvals for use. There are no copyright laws against its public use; it can be copied and reproduced without the express permission of the SAMHSA, though SAMHSA is appropriately referenced. I selected the 18-25 age category to respond to the SAMHSA research ethics requirement that adolescents between the ages of 12 and 17 are segregated as minors. This way, data are anonymous, and I do not use data related to minors that would require permission from adults (see SAMSHA, 2020a). Since the SAMSHA data are in the public domain, utilizing them will be based on trust. SAMHSA has anonymized the data set and removed all identifying variables. Therefore, the public domain data set can be fully accessed and analyzed for all age categories without contravening any ethical principle.

There will be no risk to respondents involved in this study since this will be secondary data requiring further analysis; permission will not be required to access the data. Walden University IRB approved the data and methods for this study and provided ethical clearance (Approval Number 05-14-20-0541834).

Summary

In this section, I presented the methodology for this study based on the 2019 NSDUH survey. I discussed the research design, the target population, sampling technique, and data collection mode and analysis. I briefly discussed the operationalization of variables and how they are measured and calculated, then continued to summarize the possible threats to the validity of secondary data and ethical considerations. In the next section I presented results and findings from the data.

Section 3: Presentation of the Results and Findings

This study's data and methods reflected the purpose of investigating the

association between social-ecological factors and marijuana use among young adults.

Social-ecological factors include demographic, social, and living context factors, and

they informed the research questions and corresponding sets of hypotheses tested during

this study based on data from the 2019 NSDUH. In this section, I present results from the

descriptive and statistical analyses and describe the data collection issues and statistical

analyses conducted relative to the research questions and study hypotheses.

Data Collection

The NSDUH data are collected annually among the civilian population that are 12

years or older and identified through a multistage and stratified sampling technique. The

2019 public domain data set contained 56,136 interviews with weighted response rates

for adolescents and adults at 72% and 64%, respectively, indicating that the data are

representative and generalizable (SAMHSA, 2020a). For the purposes of this study, I

stratified the data by age using the age category variable and selected the target

population of cases in the 18–25 years old category. This sample population represents

14,226 respondents, almost double the number required by G*Power 3.1 calculation (i.e.,

9,700).

Similarly, I identified and selected variables representing the independent

variables (i.e., demographic, social, and living context factors) and the dependent variable

(i.e., ever used marijuana) for analysis. While many variables could be analyzed, the

variables I selected from the 2019 NSDUH were based mainly on completeness of data,

similarity, and relevance; therefore, I do not claim to have chosen the best variables for this study but the most appropriate and available in the data set.

<div align="center">

Study Results

</div>

Socio-Demographic Characteristics of the Sample

The characteristics of the sample population are presented in Table 4. Chi-square results indicate that all the variables show significant association with marijuana use, except for gender and county metro/nonmetro status. Marijuana use is not likely to be influenced by being male or female or by living in densely populated or less populated areas. A striking feature of the characteristics is the association between race and marijuana use. Up until the last decade, studies such as Banks et al. (2017) and Keyes et al. (2017) showed that drug use was most prominent among Black/African Americans and Hispanic young adults. That may have changed. The majority of young adults that use marijuana now are non-Hispanic Whites who have some college education, are employed full time, and reside in medium-density segments in a core-based statistical area (CBSA).

Table 4

Social-Demographic Characteristics of Selected NSDUH Sample (18-25 years old; N= *14,226)*

Young Adults Characteristics	Marijuana Ever Use	Chi-Square
	Yes	*p* value
Gender		
Male	49.5%	*p = 0.949*
Female	50.5%	
Ever used cigarettes?		*p < 0.001*
Yes	66.9%	
Ever had drink of alcoholic beverage		*p < 0.001*
Yes	96.8%	
Race/Hispanic		*p < 0.001*
1 – Non-Hispanic White	56.1%	

Young Adults Characteristics	Marijuana Ever Use	Chi-Square
2 – Non-Hispanic Black/African American	12.8%	
3 – Non-Hispanic Native American/Alaskan Native	1.8%	
4 – Non-Hispanic Native Hawaiian/Pacific Island	0.4%	
5 – Non-Hispanic Asian	3.1%	
6 – Non-Hispanic more than one race	5.3%	
7 – Hispanic	20.5%	
Education categories		
1 - Less high school	12.1%	
2 - High school graduate	31.9%	$p < 0.001$
3 - Some college/Assoc degree	41.2%	
4 - College graduate	14.9%	
Employment status		
1 - Employed full time	48.9%	
2 - Employed part time	23.1%	$p < 0.001$
3 - Unemployed	9.5%	
4 - Other	18.6%	
Total family income		
1 - Less than $20,000	26.5%	
2 - $20,000 - $49,999	33.1%	$p = 0.037$
3 - $50,000 - $74,999	13.8%	
4 - $75,000 or More	26.3%	
Population density		
1 - Segment in a CBSA with ≥1 million persons	41.5%	
2 - Segment in a CBSA with < 1 million persons	51.6%	$p = 0.013$
3 - Segment not in a CBSA	6.9%	
County metro/nonmetro status		
1 - Large metro	44.5%	
2 - Small metro	36.9%	$p = 0.131$
3 - Nonmetro	18.5%	

Note. 2019 NSDUH, unweighted sample

Statistical Assumptions

There are specific assumptions attached to the use of logistic regression analysis, including (a) there must be a large sample size for helpful analysis, (b) the dependent variable must be binary, (c) there must be one or more independent variables of either categorical or continuous, and (d) there must be no relationship between the independent variables (Wagner, 2015). Logistic regression assumes a linear relationship between independent variables that are continuous in type and the logistic odds (Wagner, 2015).

Without consideration of these assumptions, results from any logistic regression analysis may not be valid.

Binomial Logistic Regression Tests

I conducted unadjusted binomial logistic regression analyses to consider the effect of each independent variable (a total of 14 across three research questions) on the outcome variable (i.e., marijuana ever used). These bivariate analyses, grouped under the three research questions, did not control for covariates or confounders (see Appendix) but returned mostly significant results. Meaning that my independent variables may all be confounders (i.e., protective/risk) as well as be related to the dependent variable of marijuana ever used. Since the study sample was restricted by age (i.e., 18–25 years old) and the SEM compartmentalizes variables at different levels with different effects, I included all variables with sufficient data into the equation as confounders for an adjusted logistic regression analysis.

Adjusted binomial logistic regression tests determine the possible effect of an independent variable (in the case of this study, the demographic, social, and living context factors) on the dependent variable (i.e., marijuana ever use). When there is more than one explanatory independent variable (i.e., confounders) entered simultaneously in the analysis, as was the case of my study, an adjusted odds ratio is produced that considers the effect resulting from all the independent variables added to the analysis. The adjusted odds ratio controls for predictors variables and highlights the interplay between predictors (Voils et al., 2011). In other words, for each research question the

outcome variable was tested by controlling for every predictor variable identified under

demographic, social, and living context factors.

In the following subsections, I provide the results of the adjusted logistic

regression tests for each research question.

Demographic Factors and Marijuana Use

Research Question 1: Is there an association between young adults' demographic

characteristics and marijuana use?

$H_0 1$: There is no association between demographic characteristics and

marijuana use among young adults?

$H_a 1$: There is an association between demographic characteristics and

marijuana use among young adults?

I conducted binomial logistic regression to determine the association between the

demographic factors of gender, race, education, employment, total family income,

population density, and ever used marijuana (0= never used , 1 = ever used). The model

was statistically significant, omnibus χ^2 (8, $N = 14,226$) $= 36.649$, $p < .05$, indicating a

good model fit. The model explained 2.7% (Nagelkerke R^2) of the variance in marijuana

use (i.e., the outcome variable) and correctly classified 56.6% of cases.

The adjusted logistic regression results in Table 5 show that all demographic

factors except gender are associated with marijuana use among young adults. Therefore,

the null hypothesis was rejected at $p < .05$. While being male or female does not predict

marijuana use ($OR = .1.007$, 95% CI [.942-1.077], $p > .05$) the odds of using marijuana

are .723 times less for non-Hispanic others/Hispanic as opposed to non-Hispanic White

race. The odds of those with some college/college graduates using marijuana is 1.207 times higher than those with some high school/completed high school education (*OR* = 1.207, 95% CI [1.126-1.293, *p* < .05). The odds of using marijuana among young adults that are unemployed (*OR* = .678, 95% CI [.630-.728], *p* < .05) are .678 times less than those employed, while the odds of those with mid/high income using marijuana is .926 lower than that of those with low income (*OR* = .926, 95% CI [.864-.992], *p* < .05). The odds of respondents who live in population segments that are not in a CBSA (i.e., rural areas with < 1 million people) using marijuana are .793 less than those living in segments within a CBSA (*OR* = .793, 95% CI [.697-.901], *p* < .05).

Table 5

Logistic Regression Showing Association Between Demographic Factors and Marijuana Use Among Young Adults

	β	S.E.	Wald	*df*	Sig.	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
Gender								
Female*								
Male	.007	.034	.047	1	.828	1.007	.942	1.077
Race/Hispanicity								
Non-Hispanic White*								
Non-Hispanic others/Hispanic	-.325	.035	87.263	1	.<0.001**	.723	.675	.774
Education								
Some high school/high school graduate*								
Some college/college graduate	.189	.035	29.447	1	<0.001**	1.207	1.128	1.293
Employment status								
Employed*								
Unemployed	-.389	.037	111.075	1	<0.001**	.678	.630	.728
Total family income								
Up to $49,999*								
$50,000 and above	-.077	.035	4.783	1	.029**	.926	.864	.992
Population density								
Segment in a CBSA*								
Segment not in a CBSA	-.232	.065	12.685	1	<0.001**	.793	.697	.901
Constant	.350	.042	68.262	1	<0.001**	1.419		

Note.   a. Data from 2019 NSDUH (18-25 years, *N* = 14,226)

        b. Reference category is denoted with an asterisk (*): adjusted logistic regression model

        c. Statistically significant values are denoted with double asterisks (**)

Social Factors and Marijuana Use

Research Question 2: Is there an association between social factors (i.e., risk

perception, religious beliefs influence) and marijuana use among young adults?

$H_0$2: There is no association between social factors and marijuana use

among young adults.

H_a2: There is an association between social factors and marijuana use

among young adults.

I conducted binomial logistic regression to determine the association between

social factors (i.e., risk and great risk using marijuana once or twice a week, importance

of, influence of, and shared religious beliefs) and ever used marijuana (0 = never used, 1

= ever used). The model was not statistically significant, omnibus χ^2 (6, N = 13,704) =

4.986, $p > .05$, indicating that the model-data fit may not be enough. The model,

however, explained 23.5% (Nagelkerke R^2) of the variance in the outcome variable and

correctly classified 70.2% of cases.

The adjusted logistic regression results in Table 6 show that most social factors

predict marijuana use. Consequently, the null hypothesis was rejected at $p < .05$. The risk

of smoking marijuana once or twice a week is significant (OR = .235, 95% CI [.213-

.259], $p < .05$). This means that the odds of young adults that perceive high risk using

marijuana is .235 times less than for those who think there is low risk. The result is

similar for great risk using marijuana once or twice a week (OR = .420, 95% CI [.361-

.489], $p < .05$). The odds of those who identify great risk are .420 times less likely to use

marijuana as opposed to those who think otherwise. Regarding religious beliefs being

very important to young adults (OR = 1.279, 95% CI [1.151-1.422], p < .05), the odds of

those who disagree using marijuana are 1.279 times higher than those who agree.

Similarly, with the factor "important that friends share religious beliefs" (OR = 1.390,

95% CI [1.256-1.538], p < .05), the odds of young adults that disagree using marijuana

are 1.390 higher than those who agree. That religious beliefs influence young adults'

decisions is relatively insignificant (OR = 1.106, 95% CI [.993-1.232], p > .05).

Table 6

Logistic Regression Showing Association Between Social Factors and Marijuana Use

Among Young Adults

	β	S.E.	Wald	*df*	Sig.	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
Risk smoking marijuana once or twice a week								
Low risk*								
High risk	-1.447	.050	845.279	1	<0.001**	.235	.213	.259
Great risk-use marijuana 1-2 times per week								
Otherwise*								
Great risk	-.868	.078	125.025	1	<0.001**	.420	.361	.489
Religious beliefs very important								
Agree*								
Disagree	.246	.054	20.756	1	<0.001**	1.279	1.151	1.422
Religious beliefs influence decisions								
Agree*								
Disagree	.101	.055	3.354	1	.067	1.106	.993	1.232
Important that friends share religious beliefs								
Agree*								
Disagree	.329	.052	40.693	1	<0.001**	1.390	1.256	1.538
Constant	.283	.045	39.189	1	<0.001**	1.328		

Note.   a. Data from 2019 NSDUH (18-25 years, N = 14,226)

      b. Reference category is denoted with an asterisk (*): adjusted logistic regression model

      c. Statistically significant values are denoted with double asterisks (**)

Living Context Factors and Marijuana Use

Research Question 3: Is there an association between living context (i.e.,

difficulty getting marijuana, poverty level, county metro status) and young adults'

use of marijuana?

$H_0 3$: There is no association between living context and young adults' use

of marijuana.

$H_a 3$: There is an association between living context and young adults' use

of marijuana.

I conducted binomial logistic regression to determine the association between

living context factors (i.e., difficulty getting marijuana, poverty level, county

metro/nonmetro status) and ever used marijuana (0= never used , 1 = ever used). The

model was statistically significant, omnibus χ^2 (5, $N = 13{,}435) = 12.953$, $p < .05$,

indicating that the model-data fit was enough. The model explained 16.9% (Nagelkerke

R^2) of the variance in the outcome variable and correctly classified 67.8% of cases.

Based on results of the adjusted logistic regression model in Table 7, I rejected

the null hypothesis at $p < .05$. Difficulty or ease of obtaining marijuana shows an

association with marijuana use ($OR = 5.879$, 95% CI [5.385-6.419], $p < .05$), meaning

that the odds of young adults who believe marijuana is easy to get using the drug are

5.879 times higher than that of those who think marijuana is difficult to get. However,

poverty level ($OR = .969$, 95% CI [.889-1.056], $p > .05$) and county metro status ($OR =$

1.048, 95% CI [.955-1.151], $p > .05$) are not statistically significant. In other words,

whether young adults live above or below the poverty line or they live in densely populated metro county or otherwise are not associated with marijuana use.

Table 7

Logistic Regression Showing Association Between Living Context Factors and Marijuana Use Among Young Adults

	β	S.E.	Wald	*df*	Sig.	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
Difficult/easy to get marijuana								
Difficult to impossible*								
Easy	1.771	.045	1562.14 9	1	<0.001**	5.879	5.385	6.419
Poverty level								
Below poverty level*								
Above poverty level	-.031	.044	.511	1	.475	.969	.889	1.056
County Metro/Non-Metro								
Non-Metro status*								
Small/Large Metro status	.047	.048	.983	1	.321	1.048	.955	1.151
Constant	-1.172	.062	360.818	1	<0.001**	.310		

Note.   a. Data from 2019 NSDUH (18-25 years, *N* = 14,226)
b. Reference category is denoted with an asterisk (*): adjusted logistic regression model
c. Statistically significant values are denoted with double asterisks (**)

Summary of Findings

This current study had three research questions with 14 independent variables representing demographic, social, and living context factors, and ever used marijuana among young adults as the dependent variable. Binomial logistic regression tests (adjusted odds ratio) were performed on the three independent variables to determine association with marijuana ever use. The first research question on demographic factors included gender, race, education, employment, total family income, and population density. The second research question was social factors with variables around risk perceptions and religious beliefs. The third research question regarding living context

factors consisted of difficulty or ease of getting marijuana, poverty level, and county metro or non-metro status.

The risk of marijuana use among young adults based on my study aligns with the SEM philosophy that contextual and environmental factors are as significant as individual and group/peer influences. The SEM helps understand complex interactions and intersections at different levels to highlight gaps and initiate targeted prevention. Overall, 10 out of 14 factors are statistically significant, except for, gender, poverty level, county metro status, and religious beliefs influencing decisions.

In the next section, I discuss the results presented from the three research questions relative to existing literature, and situating the discussion within the SEM. I highlight some limitations of this study with implications for positive social change. I conclude with brief statements to characterize this study.

Section 4: Application to Professional Practice and Implications for Social Change

In this study, I investigated the association between independent variables of demographic, social, and living context factors and the dependent variable of marijuana ever use among young adults by analyzing data from the 2019 NSDUH. Furthermore, I explored the possibility of classifying variables into the different SEM levels to show the possibility of utilizing it towards addressing marijuana use among young adults.

In this section, I interpret the findings from binomial logistics regression analyses that show an association between demographic, social, and living context factors with the odds of marijuana ever being used among young adults in the United States, showing that, similar to the position of the SEM, many factors operating at different levels of influence (i.e., intrapersonal, interpersonal, community, institutions, and societal) affect individuals at different life stage. Furthermore, how these associations complement or disagree with the SEM will be discussed. I also present the study limitations, recommendations, and implications of this study for professional practice and social change to complete this section.

Interpretation of Findings

Demographic Factors

The study findings indicate that demographic factors were associated with marijuana use among young adults in the United States; however, being male or female (i.e., gender) was not significant in predicting marijuana use. These findings align with those of Reboussin et al. (2015) and Keyes et al. (2017) who noted that marijuana use is predominant among non-Hispanic Whites, followed by Hispanics and Black/African

Americans. Results on demographic factors from the present study align with Holmes et al. (2016) and Keyes et al. who also found that non-Hispanic White, American Indian, or multiracial adolescents and young adults are more likely to use marijuana than those who were Black/African American, Hispanic, or non-Hispanic Asian. Kirst et al. (2014) stated that race/ethnicity; gender; and education, including parents' education levels, are predictors of marijuana use. Ssewanyana et al. (2018) noted that access to disposable income makes it easy for young adults to obtain marijuana. Not attending school provides free, unsupervised time that predisposes young adults to drug use (Kirst et al., 2014). In the current study, I combined most of the demographic factors used in previous studies and showed a similar association.

Social Factors

I found social factors to be associated with marijuana use among young adults similar to the findings of Okaneku et al. (2015), Roditis et al. (2016), and Berg (2018) who identified a decrease in perceptions of significant risk related to occasional and regular marijuana use among young adults, which makes the drug socially acceptable. Findings from the present study show that peer interactions through religious beliefs influence marijuana use, in line with the findings of Kirst et al. (2014), Fagan et al. (2015), and Ssewanyana et al. (2018) who stated that there is a more profound association between peer interactions, low perceptions of risks, and legalization of medical marijuana in many states, especially that most marijuana use is social and happens among friends as noted in Tyler et al. (2016) and Holmes et al. (2016). The current study showed a significant association between religious beliefs and marijuana use, similar to Dempsey et

al. (2016) and Rivera et al. (2018) who found that religiosity inhibited or exacerbated marijuana use.

The findings of the current study related to the social context of religion and peer interactions diverge from those of previous studies. Consequently, if young adults think religion is essential and influences their decisions, then if their friends share the same view, they possibly share the same risks of marijuana use. Ssewanyana et al. (2018) stated that peer influence is an important predisposing factor to marijuana use because peers team up to overcome any barrier that may inhibit marijuana use. Hathaway et al. (2018) referred to "social supply networks" as an essential factor for young adults' source of marijuana, reporting that these networks have become normal among young people, transactions occur with minimal to no cost, and sharing is seen as normal between friends just like gifts.

Living Context Factors

As shown in the current study, various elements of the physical environment that young adults live in significantly predisposes them to marijuana use. This position supports the assertion by Taggart et al. (2018) that masculinity and neighborhood conditions influence males more than females to likely use marijuana; although, I did not find a significant association between gender and marijuana use in the current study. Many studies, such as those conducted by Delva et al. (2014), Harpin et al. (2018), and Ssewanyana et al. (2018), corroborate the results of the current study and show that neighborhoods that facilitate access to and availability of marijuana provide the

opportunity for young adults to use marijuana. Delva et al. (2014) stated that exposure to drugs like marijuana more than poverty was an influencing factor in the risk of use.

Based on the social nature of marijuana use among young adults, Ssewanyana et al. (2018) shared that proximity and affordability of marijuana within neighborhoods are factors enhancing use. Tyler et al. (2016) reported two significant findings that are directly relevant to the current study, stating that marijuana use is associated with trading sex and that economic conditions were no hindrance to the availability of marijuana. In alignment with the findings of the present study regarding population density and metro status, Shih et al. (2017) noted that young adults' perceptions of the neighborhood in the long term were associated with drug use, including marijuana.

Theoretical Application of Findings

The risk of marijuana use is a function of individual, social, and neighborhood characteristics, though gender does not play a significant role in determining the level of risks. Marijuana use is social (Phillips et al., 2018); therefore, a comprehensive approach to identifying and describing risk factors is critical. This assertion aligns with the SEM developed by Bronfenbrenner (1979), which combines multiple levels of factors to explain marijuana use. In the SEM, Brofenbrenner highlighted the influence of one group of factors (e.g., neighborhood) but acknowledged and incorporated the effects of other levels, such as the intrapersonal, interpersonal, or social, in determining outcomes like marijuana use. The overarching objective of the use of the SEM in this current study was to prevent marijuana use among young adults; therefore, this requires a thorough understanding and clarification of contributory factors. Consequently, it is imperative to

utilize a multidisciplinary approach that addresses the multiple levels in the SEM towards sustainable prevention interventions (CDC, 2018).

Limitations of the Study

CBHSQ (2020) noted that the use of self-reported data like the NSDUH 2019 utilized for the present study introduces the possibility of recall bias that may lead to over- or underreporting of marijuana use. Asking respondents to report their substance use is sensitive; it is considered an intrusion, and in some cases, can put respondents at risk of stigma (CBHSQ, 2020). Lindberg and Scott (2018) found that the biases that arises from recall vary, depending on factors like mode of data collection, context, and target population, especially regarding marijuana use. Over the years, the NSDUH has addressed this issue by encouraging ACASI, emphasizing informed consent, and promoting best estimates responses (CBHSQ, 2020). To mitigate this possible bias in the current study, marijuana ever use was the dependent variable, so that the respondent did not have to be accurate about a date, time, or place.

The 2019 NSDUH utilized a cross-sectional research design shown by studies, such as Debra et al. (2015), Tyler et al. (2016), and Taggart et al. (2018), to impede causal inferences. Respondents may report being pressured by peers, as Tyler et al. (2016) posited; for instance, the respondent may be the influencer, so it is challenging to determine cause and effect in any direction.

CBHSQ's (2020) documentation for the NSDUH focuses on the civilian, noninstitutionalized population of the United States. The survey excluded segments of the population (i.e., active-duty military, individuals in institutions [such as prisons or

hospitals], and the homeless). Consequently, if the 2019 NSDUH results are different within the included and excluded populations, the overall findings of the current study will not be generalizable to the total population, especially if prevalence estimates are considered.

However, a strength of the current study lies in the use of a large sample size and the extensive collection of annual point-in-time data for a nationally representative sample (see Okaneku et al., 2015).

Recommendations for Further Study

Findings from the current study indicate some possible areas for further research. First, as highlighted by Creswell (2013) and Burkholder and Crawford (2016), cross-sectional research designs provide only point-in-time results regarding specific locations. While these results are generalized, it would be more effective to utilize longitudinal survey designs that reflect periods and trends. Burkholder and Crawford noted that overall prevalence is provided by cross-sectional designs, while longitudinal designs better provide depth of problems or effects on populations.

Almost all the independent variables tested in the current study were statistically significant for association with marijuana use, but this is the extent to which quantitative data goes. It does not explain why or how. Contextualized information and the multifaceted factors that affect young adults putting them at risk of marijuana use could be better provided by qualitative data (Babbie, 2019). This recommendation is also imperative considering the utilization of SEM as the theoretical foundation. Context-

related issues, such as social cohesion, norms, and values, that may influence behavior require targeted qualitative research techniques.

Finally, while many young adults may be at risk of marijuana use, not all, irrespective of the neighborhood context and characteristics, will use marijuana (Taggart et al., 2018). Therefore, further research is needed to identify specific factors that enhance or inhibit marijuana use among this target population. Further research will help create an understanding of how the different aspects, both individually and when combined, influence drug use.

Implications for Positive Social Change

In the current study, I aimed to further highlight the risks of marijuana use to young adults, especially coming in light of the legalization of marijuana in almost all United States except for four states where it remains entirely illegal and coupled with related health issues. While marijuana use is both an individual and social activity (Phillips et al. 2016; Tyler et al. (2016), legalization at the societal/policy level closes the SEM loop for addressing the problem. The use of the SEM aligns with the multisectoral approaches of public health practice and provides the opportunity to prevent marijuana use before it happens (CDC, 2021), so that young adults can be steered towards positive social change.

The study findings indicate significant linkages between demographic, social, and living context factors and marijuana use among young adults (see Delva et al., 2014; Harpin et al., 2018; Shih et al., 2017). Therefore, marijuana prevention efforts should target risk areas through the complex, multilevel and multidisciplinary interactions

highlighted in the SEM (i.e., intrapersonal, interpersonal, community, institutions, and society). Using the SEM approach is one effective way to design programs to impact young adults and make them productive members of society.

Marijuana use, especially when sustained from adolescence through young adulthood, poses significant risks and may eventually cause severe health problems for individuals and the community (Bechtold et al., 2015; Berg et al., 2014; Gilman, 2015; Potter & Decorte, 2016). Therefore, this study contributes to the literature that encourages the understanding of factors surrounding young adults' risks of marijuana use and possible intervention areas to ameliorate the situation.

Conclusion

Marijuana remains the most commonly used substance among adolescents and young adults, with the proportion of past-year users among those 18–25 years old increasing from 29.8% in 2002 to 35.4% in 2019 (CBHSQ, 2020). Utilizing the 2019 NSDUH data segregated to include respondents only in the age group of 18 to 25 years old, I demonstrated the association between demographic, social, and living context factors and the odds of ever using marijuana.

The findings show that while gender did not predict marijuana use, race, educational attainment, employment, income, and population density had higher odds of affecting marijuana use among young adults. Social factors, including risk perceptions and religious beliefs, were also significantly associated with marijuana use. In terms of neighborhood or living context factors, difficulty, or ease of getting marijuana was

associated with marijuana use, but poverty level and county metro status did not predict marijuana use.

These findings are in alignment with Bronfenbrenner's (1979) conception of the social-ecological framework that addresses multiple levels of factors to explain the outcome, which was marijuana use in this case. Similar to the findings of Fagan et al. (2015), Shih et al. (2017), and Ssewanyana et al. (2018), most of the independent variables tested in the current study were shown to contribute at different levels and collectively to explain marijuana use among young adults. Results from this study can be used to provide insights to public health practitioners and contribute strategically to the development of marijuana use prevention programs targeted at adolescents and young adults.

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Appendix: Unadjusted Logistic Regression Results

Table A5

Demographic Factors and Marijuana Use – Unadjusted Results

	B	S.E.	Wald	df	Sig.	Odds Ratio	95% C.I. for Odds Ratio Lower	Upper
Gender								
Gender (1-Male)	-.002	.034	.004	1	.949	.998	.934	1.066
Constant	.121	.024	26.070	1	.000	1.128		
Race								
1-Non-Hisp White			239.710	6	.000			
2-Non-Hisp Black/Afr-Am	-.352	.051	48.514	1	.000*	.703	.637	.776
3-Non-Hisp Native Am/AK Native	.178	.141	1.588	1	.208	1.195	.906	1.575
4-Non-Hisp Native HI/other Pac Isl	-.639	.236	7.361	1	.007*	.528	.332	.837
5-Non-Hisp Asian	-1.069	.083	167.092	1	.000*	.343	.292	.404
6-Non-Hisp More than 1 race	.130	.083	2.470	1	.116	1.139	.968	1.340
7-Hispanic	-.320	.043	56.213	1	.000*	.726	.668	.789
Constant	.289	.023	151.436	1	.000	1.335		
Education								
1-High School			81.515	3	.000			
2-High School Graduate	.171	.054	10.157	1	.001*	1.187	1.068	1.319
3-Some College/Associate Degree	.368	.053	48.873	1	.000*	1.445	1.303	1.602
4-College graduate	.483	.065	55.655	1	.000*	1.620	1.427	1.839
Constant	-.147	.045	10.539	1	.001	.863		
Employment								
1-Employed full time			251.207	3	.000			
2-Employed part time	-.372	.043	75.023	1	.000*	.689	.634	.750
3-Unemployed	-.345	.060	33.620	1	.000*	.708	.630	.796
4-Other (including not in labor force)	-.678	.044	238.428	1	.000*	.507	.466	.553
Constant	.400	.026	236.396	1	.000	1.492		
Total Family Income								
1-Less than $20,000			8.446	3	.038			
2-$20,000-$49,999	.030	.044	.463	1	.496	1.030	.946	1.122
3-$50,000-$74,999	.148	.056	7.038	1	.008	1.160	1.039	1.294
4-$75,000 or more	.000	.046	.000	1	.999	1.000	.914	1.094
Constant	.090	.032	7.644	1	.006	1.094		
Population Density								
1-CBSA segment with ≥1 million persons			8.668	2	.013			
2-CBSA segment with ≤1 million persons	.033	.035	.859	1	.354	1.033	.964	1.107
3-Segment not in CBSA	-.160	.067	5.785	1	.016	.852	.748	.971
Constant	.115	.026	19.525	1	.000	1.122		

Table A6

Social Factors and Marijuana Use – Unadjusted Results

	B	S.E.	Wald	df	Sig.	Odds Ratio	95% C.I. for Odds Ratio Lower	Upper
Risk using marijuana 1/2ce weekly								
No risk			2362.852	3	.000			
Slight risk	-.892	.045	400.546	1	.000*	.410	.375	.447
Moderate risk	-1.956	.054	1299.633	1	.000*	.141	.127	.157
Great risk	-2.888	.070	1692.365	1	.000*	.056	.049	.064
Constant	1.158	.032	1270.377	1	.000	3.182		
Great Risk using marijuana 1/2ce weekly								
Great risk (1)	-2.126	.065	1072.120	1	.000*	.119	.105	.135
Constant	.396	.019	455.083	1	.000	1.486		
Religious beliefs very important								
Strongly disagree			444.450	3	.000			
Disagree	-.108	.054	3.992	1	.046*	.897	.807	.998
Agree	-.509	.047	119.157	1	.000*	.601	.549	.659
Strongly agree	-.973	.051	365.836	1	.000*	.378	.342	.418
Constant	.559	.036	235.997	1	.000	1.749		
Religious beliefs influence decisions								
Strongly disagree			472.383	3	.000			
Disagree	-.142	.050	7.953	1	.005*	.868	.786	.958
Agree	-.483	.046	111.328	1	.000*	.617	.564	.675
Strongly agree	-1.066	.053	408.835	1	.000*	.344	.311	.382
Constant	.527	.035	231.180	1	.000	1.694		
Important friends share religious beliefs								
Strongly disagree			470.141	3	.000			
Disagree	-.361	.039	86.062	1	.000*	.697	.646	.752
Agree	-.959	.052	343.813	1	.000*	.383	.346	.424
Strongly agree	-1.121	.078	208.377	1	.000*	.326	.280	.380
Constant	.485	.027	319.028	1	.000	1.623		

Table A7

Living Context Factors and Marijuana Use

	B	S.E.	Wald	df	Sig.	Odds Ratio	95% C.I. for Odds Ratio Lower	Upper
Difficulty getting marijuana								
Probably impossible			1929.107	4	.000			
Very difficult	.827	.120	47.222	1	.000*	2.287	1.806	2.895
Fairly difficult	1.584	.104	232.571	1	.000*	4.874	3.977	5.975
Fairly easy	2.176	.094	535.101	1	.000*	8.814	7.330	10.599
Very easy	3.063	.093	1087.901	1	.000*	21.389	17.830	25.659
Constant	-2.112	.089	569.081	1	.000	.121		
Poverty Level								
Living in poverty			25.251	2	.000			
Income up to 2x Federal threshold	.081	.049	2.748	1	.097	1.084	.985	1.192
Income more than 2x Federal threshold	.203	.042	23.233	1	.000*	1.226	1.128	1.331
Constant	.011	.035	.108	1	.742	1.011		
County Metro/Non-Metro status								
Large Metro			4.061	2	.131			
Small Metro	.015	.038	.150	1	.698	1.015	.943	1.092
Non-Metro	-.078	.046	2.872	1	.090	.925	.846	1.012
Constant	.129	.025	26.228	1	.000	1.138		