BOSTON COLLEGE School of Social Work

The Influence of Parenting Factors on Alcohol and Marijuana Use Among White and Mexican American Adolescents

> A dissertation By

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Dissertation Co-Chairs: Dr. Tom Crea and Dr. Oscar Martínez

Abstract

Background:

Substance use in adolescence is associated with a vast variety of behavioral and health problems contributing to a public health burden including engagement in risky sexual practices, unwanted pregnancies, increased morbidity and mortality, violent behaviors, and school dropout, among others. The use of alcohol and marijuana in adolescence and young adulthood are risk factors for subsequent substance-related adverse effects.

Parents play a key role in the prevention of substance use. This study has the aim of analyzing the influence of parenting styles used during childhood and the rearing process on alcohol and marijuana use among adolescents over time through adulthood.

Results will provide information to contribute to "Ensure healthy development for all youth" which is one of the 12 Social Work Grand Challenges introduced by the American Academy of Social Work and Social Welfare in January (2015). According to this initiative, every year, six million young people receive treatment for severe emotional, mental, or behavioral problems. Strong evidence is needed to show how to prevent problem before they emerge and by unleashing the power of prevention, and research can contribute to help youth to become healthy and productive adults (AASWSW, 2015).

For the analysis, we use the typology developed by Diane Baumrid (1971) which defines four parenting styles considering the combination of warmth and control exerted by parents: authoritative, authoritarian, neglectful, and permissive. This framework emphasizes the mechanisms behind family contextual factors impacting youth development influencing substance use. Then, we explore the association of such parenting styles stratifying by raceethnicity considering Whites and Mexican American adolescents.

Material and methods:

Multilevel, hierarchical regression analysis was conducted using three waves of the Add Health Survey data (Add Health Survey), a longitudinal study of a nationally representative sample of adolescents between 11 and 19 years old enrolled in grades 7-12 in the United States over four waves. We follow longitudinally the analytic sample of 12,143 participants where 1,640 were Mexican Americans and 10,583 were White Americans. We test the hypotheses of association of alcohol and marijuana use separately considering race-ethnicity, SES, and parenting styles and stratified analysis by parenting style and race-ethnicity for three waves collected in 1995, 2001 and 2008.

Results:

Alcohol use: Main outcomes for alcohol use were that Mexican American adolescents had no higher rates of alcohol use at baseline and were more likely to use alcohol at the 6 years follow up compared to White adolescents. The association between family SES level and alcohol use was no different at baseline (1995) but those kids in higher family SES level have higher odds of using alcohol than those low family SES in the following six and thirteen years. Regardless of race-ethnicity, adolescents from families with authoritarian parenting style were more likely to consume alcohol at baseline while those with permissive parents are less likely to use it. Adolescents from families with authoritarian parenting style used alcohol at a higher rate in the six years follow up, while those with permissive parents had lower odds of use.

Stratified analysis showed that White children whose parents were authoritarian at baseline were more likely to consume alcohol compared to those with authoritative parenting. White adolescents with permissive parenting style had fewer odds of using alcohol at baseline.

Mexican and White adolescents whose parents were authoritarian were more likely to use alcohol compared to those whose parents were authoritative at the six years follow up. Mexican American and White adolescents whose parents were permissive were less likely to use alcohol than those whose parents were authoritative at the six years follow up.

Marijuana use: Mexican American adolescents have higher rates of use of marijuana compared to White adolescents at baseline and at the 6 years follow up.

Independent of race-ethnicity, the association between family SES level and marijuana shows that those adolescents with high family SES showed higher odds of using marijuana at the 6 and 13 years follow up. In the stratified analysis, it was found that white adolescents with higher SES had more odds of using marijuana at six years and after 13 years. Independently of race-ethnicity, adolescents from families with authoritarian and neglectful parenting style were more likely to use marijuana at baseline and less likely to consume it if their parents were

permissive compared to those with authoritative parenting style. Also, those youths, whose parents were authoritarian and neglectful at baseline, were more likely to use marijuana in the six years follow up compared to those with authoritative parenting style. However, those with permissive parents had fewer odds of using it in the six years follow up and at the thirteen years follow up compared to those with authoritative parenting styles.

Authoritarian parenting style was associated with worse outcomes in terms of marijuana use for White adolescents at baseline and at the six years follow up. Permissive parenting styles was associated with less odds of marijuana use for White adolescents at baseline and at the six years follow up. Also, authoritarian parenting style was associated with higher odds of using marijuana in Mexican American adolescents at the six years follow up while permissive parenting styles was found to reduce the odds of use.

The most important gap in terms of risk of using marijuana was found for Mexican American adolescents who were found to have high odds of using marijuana if their parents had been authoritarian or neglectful at baseline, at the six and thirteen years follow up.

Findings may be beneficial to prevention specialists in developing programs targeting Mexican American youth to enhance parenting behaviors to deter alcohol and marijuana use. Actions need to be addressed to promote management of adequate parenting styles and better parent-youth relationship for both populations.

KEYWORDS

Parenting styles, family SES, acculturation, parent-youth relationship, marijuana use, alcohol use.

Dedication

To my husband, Gabriel, for having always been there for me during the last 34 years. For guiding me and our family to live a life of humbleness, honesty, compassion, and love. Your unconditional support during all these years made this achievement possible.

To Lucia and Daniel, my two wonderful and beloved children, for being my inspiration to start, breathe, and continue. For giving me the opportunity to see the world from different corners and different eyes. Thank you to my daughter Lucy for leaving with me to Boston and embarking the abroad doctoral experience alongside me. Your solidarity in stressful times made this period unforgettable.

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To all the parents who had the confidence of sharing their experiences about their children and who made me realize the importance of parental psychoeducation to deal with the rearing process to guide them. Your touching stories gave reason to my interest in giving a voice to those who as a family, struggle with a loved member with complex adversities such as substance abuse and/or mental health conditions and who, due to the lack of mental health professionalism and service delivery in Mexico, struggle to find answers and solutions. Those youths and their families who do not receive proper mental health care are my reason to advocate for the improvement of a key and utmost needed mental health service.

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"Children are educated by what the grown-up is and not by his talk." - Carl Jung

"Los valores no se enseñan, se contagian"

-Juan Lafarga

Chapter I. Introduction

Background

Substance use in adolescence

Adolescence is a unique phase of life marked by the transition from childhood into adulthood from ages 10 to 19 (WHO, 1986). It begins with the onset of physiologically normal puberty which continues until an adult identity and behavior are accepted (American Academy of Pediatrics, 1988). At this stage of human development, adolescents experience rapid changes in their psychosocial, cognitive and also physical growth which have important effects on the way they behave, feel, interact, and start making their own decisions (WHO, 1986). Some of the changes experienced during such period may be accompanied by the exposure to substance use.

Substance use in adolescence is associated with a vast variety of behavioral and health problems contributing to a public health burden including engagement in risky sexual practices, unwanted pregnancies, increased morbidity and mortality, violent behaviors, and school dropout, among others (Telzer, González, & Fulgini, 2013). For the purposes of this study, we will consider adolescents those people between 10 and 19 years old according with the definition of the World Health Organization (WHO, 2020).

Also, substance use in adolescence is a public health concern given that early initiation of substance use is a significant risk predictor for later substance use disorder (Swahn, Bossarte, & Sullivent, 2008). Drug and alcohol use in adolescence can be seen as a dynamic developmental

phenomenon with individual variations in trajectories but which is defined in most cases, by the age of substance use initiation and its progression over time (Cruz et al., 2018).

Adolescent substance misusers experience several economic, physical, and legal consequences and truncated development along their life trend. Substance use is associated with problems as poor academic performance, job instability, teen pregnancy and transmission of sexually transmitted diseases among others; also, crimes as stealing, vandalism, and violence related with heavy drug use in adolescence (Sussman, Skara, & Ames, 2008). Furthermore, the use of alcohol and marijuana in adolescence and young adulthood are risk factors for subsequent substance-related adverse effects (Marsiglia, Nagoshi, Parsai, & Gonzalez, 2014).

Adolescence is a time in human development when young people are completing their education, transitioning into employment, forming long-term relationships, and developing social skills to interact in the future with their peers and partners (Hall, Patton, Stockings, Weir, Morle, & Patton, 2016). Adolescence period can be considered starting with puberty and ending with adult transitions into economic independence or marriage or even parenthood. It should be expected that most youths could reach such goals accordingly. However, many adolescents' health risk behaviors including substance use may jeopardize the possibility that any or all of these events occur. The recent trend, in the last couple of decades, to delay achieving economic independence or marriage or to parenthood among young adults has had an effect expanding also the time frame of adolescence and also for the risk of substance use (Patton, 2007; Stone, 2012). Furthermore, during the last 20 years, an important body of research has found that neurodevelopment extends into the second and third decades of life which has heightened the concern about the neurobiological vulnerability of adolescents to the adverse effects of substance use on cognitive and emotional development (Steinberg, 2007).

The social transitions that happen during puberty and young adulthood, between 10 and 24 years, will be the hallmarks for a young person's later life trajectories. It is also a time when a shift in emotional regulation and also in risky behavior takes place: among those behaviors alcohol and illicit drug use may start with potential effects on social, psychological and health outcomes (Hall, et. al., 2016) and the transition to adulthood can be disrupted by substance use (Morris, Catalano, Jung, Toumbourou, & Hemphill, 2011). Substance use is one of the largest and most preventable causes of mortality and morbidity during and after the adolescence (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2015).

Alcohol and marijuana use

Two substances commonly used by adolescents in the United States and developed countries are alcohol and marijuana (Patrick, Kloska, Terry-McElrath, Lee, O'Malley, & Johnston, 2017; European Commission, 2012). Alcohol and marijuana use affect not only physical and mental health of the users but also their families' in the form of relationship struggle, lost income, lost years of life and even death (Wan, & Iacovou, 2018).

The use of alcohol in excess is responsible for more than 4,300 deaths among underage youth each year with an economic cost estimated for the year 2010 of U.S. \$24 billion (Center for Disease Control and Prevention, 2016). According to the Monitoring the Future Survey, alcohol use has shown a five-year decline among high school students from 2013 to 2018. In 2013, past-month use of alcohol was reported by 8.2 percent, 18.6 percent, and 30.2 percent of 8th, 10th, and 12th graders, respectively while in 2013 those figures were 10.2 percent, 25.7 percent, and 39.2 percent (National Institute on Drug Abuse, 2018).

Despite there has been a decrease in alcohol use among adolescents over the past 40 years in the United States, such trend is not homogeneous by race ethnicity and most vulnerable populations remain being Black and Hispanic youths (Johnston, O'Malley, Meich, Babhman, Schulenberg, & Patrick, 2018).

Marijuana is the most used illicit drug in the United States. According to the National Survey on Drug Use and Health, 22.2 million people used marijuana in the past month in 2015 (National Institute on Drug Abuse, 2018).

Marijuana use has become more popular among adolescents and young adults in the last decade. The discovery of potential medicinal properties of marijuana has prompted many states to establish programs for legal sale of medically prescribed marijuana. Also, the public perception of marijuana's safety has grown and several states have passed referenda legalizing recreational use of marijuana for adults.

The use of marijuana by 8th, 10th and 12th graders peaked during the 1990s and gradually declined during the mid-2000s. Past-year use of marijuana reached its lowest levels in 2016 with 10.6%, 25% and 38% of the 8th, 10th and 12th graders respectively (NIDA, 2018). This use has shown a mild increase and it is not clear yet if it is due to the legalization of medical and recreational use in several states (Johnston et. al., 2018). The increasing legalization of marijuana has contributed to the growing belief that its consumption is harmless: 26.7% of the 12th graders in 2018 reported that regular marijuana use poses a great risk, which is less than half of what it was reported 20 years ago (NIDA, 2018).

A wide body of literature keeps on documenting the risks of its use by adolescents as grave (American College of Pediatricians, 2017; CDC, 2018). The use of marijuana in excess can lead to extreme confusion, anxiety, paranoia, panic, fast heart rate, delusions, increased blood pressure and severe nausea; such reactions may lead to unintentional motor vehicle crash, poisoning among others (CDC, 2018).

Parental factors associated with substance use

Parental factors have been considered a great source of influence on protection against substance use among adolescents (Calafat, Garcia, Juan, Becona, & Fernandez-Hermida, 2014). Despite the great influence of peers during childhood and adolescence, the family context remains being a key factor impacting adolescents' decisions to use substances. (Morris, Catalano, Kim, Toumbourou, & Hemphill, 2011; Marsiglia, Nagoshi, Parsai, & Gonzalez 2014). Several longitudinal studies have demonstrated that good family management practices as monitoring of behavior, clear rules and consequences regarding for instance alcohol use, are related to reductions in teen substance use (Morris et al., 2011). On the other side, some studies have shown the link between parental attitudes favoring alcohol or other substances and the increased probabilities of substance use. Evidence has shown that parenting and family relations influence the probability of substance use in adolescents. In this sense, interventions promoting education programs for effective parenting may deter the use of substance (Wan & Iacovou, 2018).

A wide body of research has highlighted the importance of family and parenting influences on youth substance use (Baumrind, 1991; Calafat, Garcia, Juan, Becoña, & Fernández-Hermida, 2014a; Marsiglia, et al., 2014; Diaz & McClelland, 2017; Dever,

Schulenburg, & Dworkin, 2012; Domenech, Dovonick, & Croley, 2009; Johnsen, Bjornes, & Ivsen, 2008).

Different studies have demonstrated that parenting practices can be seen as predictors of adolescent substance use (Marsiglia et al., 2014). Several theoretical frameworks have demonstrated the important role that parenting has in the emotional development of their offspring which can deter and be protective against substance use. Different parenting behaviors may affect the domains of the adolescent's substance use.

Most of the literature on parenting styles and developmental outcomes has analyzed the influence of parenting dimensions of acceptance and warmth and control and limit setting. The acceptance and warmth dimension of parenting covers elements of positive affect, active support, pleasant time spent with the kids and skills to provide comfort under distressful situations. The parenting dimension of control includes clear limit setting, monitoring of the child's activities and clear implementation of behavioral expectations at home and outside (Steinberg, 2001). Some adolescents may engage in substance use as a way to cope with emotional distress in their context as a response to different triggers, but if they have warm and supportive parents, evidence shows that they may engage in less substance use. On the other hand, if parents are less firm in their limit setting adolescents may have more risks to engage in substance use (Ozer, Flores, Tschann, & Pash, 2011). In this sense, these dimensions of parenting control and warmth gave place to the parenting styles framework developed by Diane Baumrid (1971) which will be used to conduct this study. Baumrid developed a typology of four different parenting styles which will guide our analysis: authoritarian, authoritative, neglectful, and permissive.

Ethnic differences in substance use among White and Mexican Americans

Family factors as well as sociocultural processes have an important influence on adolescents' behavioral health. There is a modest understanding of the ethnic differences of sociocultural processes that influence adolescent substance use (Marsiglia et al., 2014). It is of particular importance the understanding of the influence of different cultural and ethnic backgrounds has to deter or to enhance substance use patterns among their adolescents. Such understanding is essential for planning prevention, intervention and treatment programs.

According to the Census Bureau (2015) the estimation of population of Mexican origin in the United States is of 27 million people which places this as the largest ethnic group representing 8.3% of the total population, which is expected to have a continued growth in the following decades. Mexican-origin youth constitute the largest Latino subgroup in the United States but also constitute the largest proportion of Latino adolescents who have dropped out of school (Marsiglia, Nagoshi, Parsai & Gonzalez, 2014). The Monitoring the Future study (Johnson, 2015) reported that Mexican-American 8th graders have greater frequencies of substance use (alcohol and other illicit drugs) compared to White adolescents (Marsiglia et al., 2014; Johnston et al., 2015). Acculturation differences need to be taken in consideration to understand these differences in consumption.

There is still little information about substance use development patterns among Mexican-American youth who are the largest ethnic minority group in the United States (Cruz, et al., 2018). There is evidence that Hispanic adolescents could be at a higher risk for substance use than non-Hispanics Whites (Johnston, et al., 2014). Several studies suggest that Mexican-American adolescents have higher rates of substance use compared to Whites since they begin

using drugs at an earlier age which puts them in a greater risk for developing drug use disorders in adulthood due to early drug use onset (Centers for Disease Control and Prevention, 2005; Johnston et al., 2018; Marsiglia et al., 2005). Despite the decline in alcohol use among White adolescents during the last two decades, evidence shows that alcohol and marijuana use among Mexican-American adolescents has remained high (Johnston et. al., 2018). In addition, substance use among Hispanics and Mexican American adolescents is concerning because they experience more barriers to access treatment for substance use disorders (Zapata, Gryzwacz, Cervantes, & Merten, 2016). These youths are more likely than their White counterparts to come in contact with the juvenile justice system for drug related offenses (Zapata et al., 2016). A wide body of research has analyzed the disparities by race-ethnicity in substance use consumption, harms and treatment need (Allen, Garcia, Porta, Curran, & Patel, 2016; Becoña, Martinez, Calafat, Fernandez, & Secades, 2012; Cruz, Mechamil, Bámaca, 2018; Calafat, Garcia, Juan, Becona & Fernandez, 2014; Broman, Reckase & Freedman, 2006; Terry-McElrtah & Patrick, 2018). Available studies report different outcomes regarding comparison between Mexican-American and White adolescents substance use consumption. Research has informed the important differences in the prevalence of substance use behaviors among those youth of different ethnic backgrounds but particularly among Mexican American adolescents (Cruz, King, Mechamil, & Bámaca, 2018; Domenech, Donovic, & Crowley, 2009; Kopak, 2013, Marsiglia, et al., 2014; Johnston et al., 2018; Barnes, et al., 2002). Despite the decline in alcohol use among White adolescents during the last two decades, evidence shows that alcohol and marijuana use among Mexican-American adolescents has remained high (Johnston et. al., 2018).

Significance of the Study and Specific Aims

Significance of the study

This study is designed to enhance the understanding of the parental factors associated with alcohol and marijuana use in adolescents and young adults which can have long term effects on the trajectory of use as well as on health and social consequences across the life course. This study extends existing research in two ways: we consider a long time-frame exploring the relationship between parenting styles at baseline in adolescence and substance use in adulthood. Second, we explore this relationship moderated by race-ethnicity considering White and Mexican American adolescents.

Despite the existence of an important body of literature and extensive research on family factors influencing substance use, several questions remain unanswered especially for racial and ethnic minority groups. Domenech, Donovick and Crowley (2009) have described the existence of limitations in the literature to understand parenting in Latino families, because the majority of the authors base their findings on studies developed predominantly with White, middle class families with different values, cultural norms and also different parenting expectancies. In this sense, it is important to consider ethnic differences to avoid inferences made regarding child outcomes based on parenting styles that may not apply for a different culture as the Latino, or in our case, the Mexican-American families. As per our knowledge, a comparison of the association of parenting styles and substance use among Mexican-American and White adolescents is lacking in the literature.

In this study, the association between race-ethnicity and alcohol and marijuana use is examined first. Second, analysis is developed to see how the socioeconomic status is associated

with alcohol and marijuana use in these two different ethnic groups. Third, we will explore the association between the parenting styles exerted at baseline with the substance use after six years and thirteen years of the analyzed survey. Fourth, analysis was conducted to see differences in the association between parenting styles and substance use over time among Mexican-Americans and Whites. It is not entirely clear how parenting styles among these two groups are associated with alcohol and marijuana use over time and this dissertation aims to fill these gaps in the literature.

Specific Aims, Research Questions, and Hypotheses

The specific aims, research questions and hypothesis for the study are as follows:

Main Research Question

Are there differences in the use of alcohol and marijuana use of Mexican American and White adolescents over time depending on the parenting style enforced in their families?

Aim 1

To explore if there are differences in alcohol and marijuana use among Mexican American and Whites at baseline, in the six years follow up and at thirteen years after baseline.

Research Question 1

Are there differences in alcohol and marijuana use between White and Mexican American Adolescents at baseline, in the six years follow up and at thirteen years after baseline?

Hypothesis 1

H1a: Independent of other factors, Mexican American adolescents are more likely to consume alcohol than Whites at baseline, increase use at a faster rate in the following six years and more likely to consume more at thirteen years later.

H1b: Independent of other factors, Mexican American adolescents are more likely to consume marijuana than Whites at baseline, increase use at a faster rate in the following six years and more likely to consume more at thirteen years later.

Aim 2

To explore the association of the family SES level on alcohol and marijuana use in Mexican American and White adolescents.

Research Question 2

How is the family SES level in young adulthood, measured by parental education and occupational status, associated with alcohol and marijuana use at baseline, at six and thirteen years after baseline?

Hypothesis 2

H2a: Independent of the race-ethnicity, higher SES level is associated with higher rates of alcohol use at baseline, increases use at a faster rate in the following six years and have higher use at thirteen years after baseline

H2b: Independent of the race-ethnicity, higher SES level is associated with higher rates of marijuana use at baseline, increases use at a faster rate in the following six years and have higher use at thirteen years after baseline

Aim 3

To explore the association of parenting styles on alcohol and marijuana use at baseline, in the following six years and at thirteen years after baseline.

Research Question 3

How are parenting styles associated with alcohol and marijuana use at baseline, at the trend of 0 to 6 years and at thirteen years after baseline?

Hypothesis 3

H3a: Parental style is associated with the use of alcohol use at baseline, has a different growth in the rate of alcohol use in the following six years, and in use at thirteen years.H3b: Parental style is associated with the use of marijuana use at baseline, has different growth in the rate of alcohol use in the following six years, and in use at thirteen years

Aim 4

To explore whether the association of parenting style and substance use is modified by race ethnicity over time.

Research Question 4:

Does adolescents' race/ethnicity interact with parenting style for alcohol and marijuana use at baseline, in the following six years and use at thirteen years after baseline?

Hypothesis 4

H4a: The association of parental style and alcohol use between Mexican Americans and Whites differs at baseline, in the following six years, and use at thirteen years.

H4b: The association of parental style and marijuana use between Mexican Americans and Whites differs at baseline, in the following six years, and use at thirteen years.

Chapter II Literature Review

Alcohol Use

Alcohol is the most used and abused drug among youth in the United States (Center for Disease Control and Prevention, 2015). Also, it is the substance most widely consumed by teenagers and typically initiated during the adolescence (Patrick & Schulenberg, 2014). Excessive drinking is responsible for the deaths of more than 4,300 adolescents every year (Center for Disease Control and Prevention, 2015). Despite that it is illegal for people younger than 21 to consume alcohol, 11% of all of the alcohol in the United States is consumed by youth aged between 12 and 20 years old (Center for Disease Control and Prevention, 2015). More than 90% of such alcohol is consumed in the form of binge drinking (Center for Disease Control and Prevention, 2015). The National Institute on Alcohol Abuse and Alcoholism (NIAAA) has defined binge drinking as a pattern of drinking that elevates blood alcohol concentration (BAC) levels to 0.08 g/dL. Such levels typically appear after 4 drinks in the case of women and five drinks for men in an average time period of two hours (NIAAA, 2019).

The study of alcohol use among adolescents and young adults is particularly important because this is the life period when critical components of brain development are underway mainly in the regions that control executive functions such as impulse control, decision making, learning which can be associated with propensity to engage in risky behaviors (Richter, Pugh, Peters, Vaughan, & Foster, 2016).

Underage drinking, defined as any alcohol consumption in the past month among those aged 20 and younger, is a problem for several reasons: (a) alcohol is used more widely than any other drugs by adolescents in the U.S, (b) motor vehicle crashes are the most important mortality risk for youths: only in 2015 of the 1,886 drivers aged 15-20 years old who died in car accidents, 26% of them had blood alcohol concentration above 0.01; (c) alcohol use also predisposes brain impairment, sexual assault, and academic problems; and (d) the early association of drinking is also associated with alcohol use disorder in adulthood (Substance Abuse and Mental Health Services Administration, 2017). Estimates indicate that, depending on the age of the respondents and the sample design in several US national surveys, approximately 23-40% of young people have been engaged in underage drinking (Richter, Pugh, Peters, Vaughan, & Foster, 2016).

Alcohol use is related to numerous problems such as low academic achievement, delinquency and school misconduct (Sussman et al., 2008). Some of the consequences of alcohol use among adolescents can be: school problems with higher absence and poor or failing grades, alcohol dependence, social problems such as lack of participation in activities according to their age, legal problems due to driving or hurting someone while drunk, physical problems as hangovers and illnesses (i.e. hepatic damage), unwanted, unplanned and unprotected sexual activity, sexual or physical assault while drunk, higher risk of homicide and suicide, car crashes or intentional injuries as falls, drowning or burns, memory problems, abuse of other substances, negative effects on brain development due to chronic use of alcohol and death of alcohol poisoning among others (U.S. Department of Health and Human Services, 2007; Center for Disease Control and Prevention, 2015).

Alcohol use has a considerable social cost on society. It has been estimated that excessive drinking has cost the U.S. almost \$250 billion each year. (Wan et al., 2018). Only in 2016, almost 137 million Americans aged 12 and older self-reported current use of alcohol, while 65.3 million reported binge alcohol use in the past month and 16.3 million reported heavy use of alcohol (Substance Abuse and Mental Health Services Administration, 2017). Also, 9.2% of adolescents aged 12 to 17 reported being current alcohol users, 57.1% of young adults between

18 and 25 years old were current alcohol users which is equivalent to almost 20 million young adults (Substance Abuse and Mental Health Services Administration, 2017).

In 2010, there were approximately 189,000 emergency room visits by persons under age 21 for injuries and other conditions linked to alcohol (Center for Disease Control and Prevention, 2015). Drinking was responsible for more than 4,300 deaths among underage youth, costing the U.S. \$24 billion (Center for Disease Control and Prevention, 2015). Although underage drinking by persons is illegal in all states in the nation, people aged 12 to 20 years drink 11% of all alcohol consumed and the majority of underage drinking (90%) occurs in the form of binge drinking. On average, underage drinkers consume more drinks per drinking episode than adult drinkers (Center for Disease Control and Prevention, 2016). Excessive alcohol use is the third leading cause of death in the United States, accounting for 88,000 deaths per year and 2.5 million years of potential life lost each year from 2006 to 2010 (Sudhinaraset, Wigglesworth, & Takeuchi, 2016).

Despite a decline in the lifetime prevalence of alcohol use, it remains the most used substance among teenagers (Johnston et al., 2018). Notwithstanding that it is illegal for people under 21 years old to purchase alcoholic beverages, middle school, high school, and many underage college students have had a substantial amount of experience with alcohol.

According to the Monitoring the Future Survey (MFS) 2017, lifetime prevalence of alcohol use for 8th grade students was of 23.5%, for 10th graders of 43% and for 12th grade students of 58.5% (Johnston et al., 2018)¹. Also, the annual prevalence of any use of alcohol in 2017 was of 18.7% for 8th graders, 37.8% for 10th graders and 53.3% for 12th graders. However, in the same survey, the trends of disapproval of alcohol use related to trying one or two drinks of

¹ Lifetime prevalence of alcohol use in 1995 for 8th grade students was of 54.5 %, for 10th graders of 70.5% and for 12th graders of 80.7% (Johnston, et al., 2018).

alcoholic beverage, beer, wine or liquor showed a decrease as the school grade increases: 47.4% of 8th graders, 39.6% of 10th graders and 31.3% of the seniors. (Johnston et al., 2018).

The health burden associated with alcohol consumption varies across groups defined by demographic characteristics as age, gender and also race-ethnicity. Both the National Epidemiologic Survey on Alcohol and Related Conditions and the National Survey on Drug Use and Health report that young adults between 18 and 25 years old have the highest risk of alcohol risk and unintentional injury caused by drinking (Delker & Hasin, 2016; Substance Abuse and Mental Health Services Administration, 2017).

According to the Monitoring the Future Study (MTF), in 8th grade, girls tend to have higher rates of alcohol use (13%) compared to boys (12%). But this ratio is reversed in 12th grade when 42% of boys report having used alcohol in the past 30 days compared with 38% percent of girls (Milliren, Richmond, Evans, Dunn, & Johnson, 2017). Such difference prevails until adulthood in terms of gender (Patrick & Schulenberg, 2014). Other findings related to consumption by gender depict that men have more consumption than women especially in older cohorts; also, men have a greater risk of alcohol abuse, violence after alcohol consumption, liver disease, and risky driving after drinking (Delker et al., 2016). While an important proportion of males report diverse alcohol-related consequences, females tend to report consequences of alcohol use regarding dating and sexual experiences (Delker et al., 2016; Khan, Clealand, Scheidell, & Berger, 2014).

According to the National Survey on Drug Use and Health in 2007, the prevalence rates of 30-day alcohol use in people aged 12–17 years were higher for Whites with 18.2% followed by Hispanics with 15.2 % (Substance Abuse and Mental Health Services Administration, 2017).

According to the Monitoring the Future Survey, in 2012 18% of Hispanic 8th graders reported alcohol consumption in the last 30 days compared to 12.3% of the Whites and 11.6% of the African Americans in the same grade. However, White 12th grade adolescents had the highest prevalence levels as of 43.8% compared to 40% of the Hispanics and 30% of African Americans in the same group (Patrick et al., 2014; Khan et al., 2014). Other studies found also that White adolescent respondents reported the highest prevalence of current alcohol consumption compared to other ethnic groups even that within ethnic groups there was variability among subpopulations and groups (Delker et al., 2016).

Also, in 2016, 3,398,000 adolescents, equivalent to 25% of the Whites between 12 and 15years, reported having had alcohol use in the last year. Similarly, 22.3% of the Hispanics, equivalent to 1, 281,000 youths in the same age group reported past year alcohol use in 2015. In terms of gender, 25.8% of the White girls in that same age group reported having used alcohol compared to 24.5% of White boys. And 21.1% of Hispanic boys and 23.6% of Hispanic girls did too (Substance Abuse and Mental Health Services Administration, 2017).

Evidence has shown that early and heavy use of alcohol predicts later difficulties with substances in adulthood (Patrick et al., 2011). Research reports that alcohol use during the teenage years contributes to increase the risk of developing alcohol use disorder and also could interfere in the normal development of the brain (National Institute on Alcohol Abuse and Alcoholism, 2006).

Risk factors of alcohol use

The attempts to discern which correlates of alcohol use are causes or consequences of substance use, there may be three factors affecting the analysis. First, if there are no randomized controlled experiments, the conclusions about causal connections could not be firm. Second,

alcohol use in youth is related also to risk factors inherent to development. Third, factors or consequences identified as factors for a total sample could not apply for all young people because there is heterogeneity in the developmental course (Patrick et al., 2014). One important remark is that most of the epidemiology of alcohol use among adolescents concentrates more on risk factors than on the protective factors conducting to reduce alcohol use (Mogro-Wilson, 2013).

One approach is that there are four types of alcohol use motivations theoretically identified and empirically proved: social, enhancement, coping, and conformity (Patrick, Schulenberg, O'Malley, Johnston, & Bachman, 2011). Social drinking motives are to have fun with friends; enhancement drinking motives depict reasons as to experience excitement; some adolescents drink to cope or to forget about problems but are the most prone to drink alone and to have drinking problems and misuse of alcohol; conformity reasons include drinking to fit in a group of peers (Patrick et al., 2011).

In the Monitoring the Future Study (Patrick et al., 2011) several factors influencing the risk of alcohol use among adolescents were identified:

1) Peers: it has been considered that one strong correlate to alcohol use and binge drinking among 8h and 10th graders from 1991 to 2007 was having friends who get drunk;

2) Parents: despite that one developmental transition is the movement away from parents and increasing the time spent with peers, parents play an important role in adolescent experiences. Parental monitoring is one important factor of prevention and intervention across groups, particularly for females and high risk-taking adolescents (Dever, 2012);

3) School: a wide body of literature has found that grades, educational expectations, and school bonding have a negative correlation with alcohol and substance use, while school failure,

school misbehavior and, skipping school are positively correlated with alcohol and substance use (Dever, 2012);

4) Work: by the time adolescents finish high school many of them have worked at least part-time and despite it has been recognized that hours of work are positively correlated to use of alcohol, although causal connections are not clear yet.

5) Religiosity and community attachment: those adolescents with high religious attachment or attending religious schools have lower alcohol use compared with highly religious adolescents attending non-religious schools.

6) Exercise and sports participation: while exercising should have a negative correlation with alcohol use, a positive correlation has been found between participating in team sports and alcohol use² (Mays, Thompson, Kushner, & Windle, 2010).

7) Risk taking and sensation seeking: the willingness to take risks and sensation seeking is correlated with high levels of alcohol use. This effect was partially mediated among 8th and 10th graders by school bonding that negatively affected alcohol use, but also with time with friends which positively affected alcohol use (Dever, 2012).

Marijuana Use

Marijuana³ is the second most commonly used substance among adolescents after alcohol. (Johnston et al., 2018). It is the most commonly used illicit drug in the United States

² According to the study conducted by Mays, Thompson, Kushner, & Windle (2010) where they took into account time-invariant covariates including demographics and other predictors of alcohol use, they found that greater involvement in sports during adolescence was associated with faster average acceleration in problem alcohol use over time among youths who took part in only sports where peers exhibited alcohol use pattern. Their findings also suggest, that the relationship between sports participation and problem alcohol use depends on participation in sports in combination with other activities.

³ In this study, the term marijuana will be used instead of "cannabis" which is also used in the literature. Also, the discussion of marijuana use and its consequences will refer to the non-medical use of the cannabis plant.

(Substance Abuse and Mental Health Services Administration, 2012b). The harms associated with its use for short term adverse effects can be among others: impaired short-term memory, altered judgment which can increase the risk of sexual behaviors, impaired motor coordination impacting driving skills and sudden episodes of paranoia and psychosis (Volkow, Baler, Wilson, Compton, & Weiss, 2014). Also, long term effects can be an addiction, altered brain development, poor education outcome, school drop-out, cognitive impairment, increased risk of chronic psychosis including schizophrenia and incarceration (Volkow et al., 2014).

There are different adverse health and psychosocial problems associated with marijuana use. Concerns prevail regarding the use of marijuana during pregnancy due to harm to the fetus (Volkow, 2017). One meta-analysis indicated that women who used marijuana during pregnancy could develop anemia; also, infants exposed to marijuana in utero had lower weight than those who were not exposed; infants exposed in utero were also more likely to need placement in the neonatal intensive care unit due to complications (Gunn, Rosales, Center, Nuñez, Gibson, Christ, & Ehiri, 2016).

Another important risk of harm related to marijuana use is the increased risk of fatality or injury due to intoxication while driving (Hasin, 2018). Data show that drivers who test positive for marijuana are more than twice likely as other nonusers to be involved in motor crashes. Despite epidemiologic literature does not describe cases of fatal overdose from marijuana use, a case-control study developed by the Department of Transportation of the United States found that those drivers who had tested positive to tetrahydrocannabinol⁴ (THC) had higher odds (1.25) of collision than a driver who had not used any substance, but that the association disappeared

⁴ Tetrahydrocannabinol (*THC*) is the main psychoactive constituent of marijuana.

when other confounders as alcohol level, gender, ethnicity, and age were considered (Berning, Compton, & Wochinger, 2015). Even though the effect of traffic injury due to marijuana use is small, it represents one important adverse public health outcome in terms of mortality (World Health Organization, 2016).

Despite literature does not show evidence of fatal marijuana exposure, acute symptoms in adolescents can include respiratory depression, lethargy, ataxia, and dizziness (Hasin, 2018). Main concerns regarding the use of marijuana in adolescents are about the possible harm to the developing adolescent brain (Volkow et al., 2014), poor educational outcomes, school dropout, and cognitive impairment (Fergusson, Boden, & Horwood, 2015). However, it is also noted that there is also a substantial proportion of regular adult users that do not have harmful effects due to marijuana use (Hasin, 2018).

Prevalence in the United States

Different age groups present different prevalence which depict the heterogeneity of marijuana use in 2016:

- Aged 12 to 17: 6.5 percent of adolescents self-reported as current users of marijuana equivalent to 1.6 million adolescents used marijuana in the past month. However, this percentage was lower than the percentages from 2009 to 2014 (Substance Abuse and Mental Health Services Administration, 2017).
- Aged 18 to 25: 20.8% of the adolescents in this age group were current users of marijuana equivalent to 7.2 million young adults who self-reported having used

marijuana in the past month. This percentage was higher than those between 2002 and 2013 (Substance Abuse and Mental Health Services Administration, 2017).

Aged 26 or older: 7.2 percent of adults above 26 six years old self reported as users of marijuana which is equivalent to 15.2 million adults in this age group (Substance Abuse and Mental Health Services Administration, 2017).

These data show that 24.0 million Americans older than 12 years old in 2016 were current users of marijuana during the last month which is equivalent to 8.9% of the population above 12 years (Substance Abuse and Mental Health Services Administration, 2017). Furthermore, almost 4.0 million people older than 12 years old in 2016 experienced a marijuana use disorder which represents 1.5% of that population (Substance Abuse and Mental Health Services Administration, 2017).

Since 1996, American laws about the legal use of marijuana for recreational and medical purposes have changed at the time that also the public attitudes about safety and acceptability of cannabis use have also changed (Hasin, 2018). In recent years, adolescents and also adults have been increasingly considering marijuana use as harmless which has come with the legalization of recreational use in different countries worldwide. According to the Monitoring the Future Survey of 2017, lifetime prevalence of marijuana use for 8th grade students was of 13.9%, for 10th graders of 32.6% and for 12th grade students of 49 % (Johnston et al., 2018)⁵. Also, the annual prevalence of any use of marijuana was of 10.5% for 8th graders, 27.5% for 10th graders and 35.9% for 12th graders. Furthermore, the trends of disapproval of marijuana use related to

⁵ Lifetime prevalence of marijuana use in 1995 for 8th grade students was of 54.5 %, for 10th graders of 70.5% and for 12th graders of 80.7% (Johnston, Miech, O'Malley, Bachman, Schulenberg, & Patrick, 2018).
trying marijuana decrease as the school grade increase 64.5% of 8th graders, 47.9% of 10th graders and 41.1% of the seniors. (Johnston et al., 2018).

Risk factors of marijuana use

Risk factors help in describing social or contextual, individual and family factors that predict the increased risk of marijuana use are. They cannot be considered as the cause of use but are associated with the initiation, transition to frequent use and to the development of a substance disorder. Some of the most important contextual risk factors for marijuana use are drug availability, laws, and norms favorable towards drug use, availability, accessibility, social norms that are tolerant of alcohol and drug use (World Health Organization, 2017).

Some other risk factors can be settled at the school level where adolescents can show low commitment to school, school failure, not college bound, have peer attitudes towards drugs, association with drug-using peers, have aggression toward peers, interpersonal alienation and peer rejection (World Health Organization, 2017). Another risk factor for young adults can be attendance at college and have substance-using peers (World Health Organization, 2017).

A wide variety of individual factors have been described. There can be a genetic predisposition to substance use as well as prenatal alcohol exposure. Other risk factors include exhibiting a difficult temperament during early childhood or during middle childhood. Some features at that stage could be having poor impulse control, low harm avoidance, sensation seeking, lack of behavioral self-control regulation, aggressiveness, antisocial behavior, anxiety, depression, ADHD, hyperactivity, persistent problem behaviors and early substance use. Those children during adolescence could have behavioral disengagement coping, negative emotionality, conduct disorder, favorable attitudes toward drugs, antisocial behavior, rebelliousness, early

substance use. Risk factors during young adulthood can be a lack of commitment to conventional adult roles and antisocial behavior (World Health Organization, 2017).

In terms of risk factors by demographic variables, differences were found by gender. Men are more likely to use marijuana than women (Cuttler, Mischley, & Sexton, 2016). In fact, a research study found that boys were 1.4 times more likely than girls to initiate marijuana use by young adulthood (Brook, Kessler, & Cohen, 1999). Among the main family factors that influence the risk of marijuana use are poor parent-child interaction and parent-youth relationship, parental conflict, as well as siblings and parents drug use.

Substance use trajectories need to be analyzed considering that the patterns for alcohol use differ from those of marijuana. Substance use needs to be seen as a dynamic developmental phenomenon where trajectories differ in part by the initiation of substance use and the progression of use over time. Alcohol and marijuana which are the most consumed substances in adolescence increase their use at a fast rate during adolescence in the transition from late childhood to late adolescence (Cruz, King, Mechammil, Bamaca, & Robbins, 2018). Most of the studies on longitudinal research in substance use are based in non-Hispanic White population and there is a need to have research on racial/ethnic diversity where the different trajectory patterns can be depicted in order to identify the high-risk users in the two groups for this study: White and Mexican-American adolescents.

However, there are still pending questions in order to find an explanation of the main research question of this study. We need to explore then the literature regarding the association between race-ethnicity and alcohol and marijuana use. If the socioeconomic status is associated with alcohol and marijuana use among the two different ethnic groups of our interest. Thus, it is

important to explore the body of research for the association between the parenting factors and alcohol and marijuana use especially for Whites and Mexican American adolescents.

Ethnic differences in Substance use

Substance use in adolescence is a concern in the field of public health given that early substance use initiation is associated with a higher risk for substance use in the adulthood with academic, physical and mental health consequences (Cruz et al., 2018). The understanding of factors influencing substance use among different race-ethnicities is critical for deciding how best to use limited substance use prevention, intervention and treatment resources (Terry-McElrath, 2018). The rapid growth of the Hispanic or Latino population in general and the Mexican-American subgroup, in particular, depicts the importance of the comparison analysis conducted in this study. It is beneficial to understand the association of substance use trajectories with cultural and family processes over the course of adolescence. The analysis of correlates across time would be beneficial given that those adolescents with substance use trajectories can vary from early to later onset according to changes at their developmental stages with changes also in familial profiles during the different time points of the transition from childhood to adult life (Cruz et al., 2018).

In 2017, the Hispanic population was 17.6% (equivalent to 43 million people) of the total population in the United States; it is expected that in 2060, such percentage will be of 28.6%, as many as 119 million people in this group. Non-Hispanic Whites will reduce their participation from 62.2% to 43.6% of the total population. The public health concern of early substance use is amplified with this growing share of Hispanic population where 63.3% of them, (around 27 million people), self-reported of Mexican origin in 2010 (Census Bureau, 2018) and has been

considered to have higher substance use in comparison with the rest of the Hispanic population (Cruz et al., 2018).

Despite there has been a descending trend in the use of alcohol use among adolescents during the last 30 years (Johnston et al, 2018), there are discrepancies in alcohol use. According to the Youth Risk Behavior Survey conducted by the Centers for Disease Control and Prevention (2017), the percentage of high school students who ever drank alcohol was higher among Hispanic adolescents (64.7%) than among Whites (60.5%). However, the percentage of high school students who reported binge drinking was higher among White adolescents (15.7%) than among Hispanics (14.7%). Johnston and colleagues (2017) found that Mexican American students used alcohol less frequently than White students, but binge drank more frequently. Somewhat surprisingly, among younger students, more girls than boys reported current drinking, but among older students, fewer girls reported recent drunkenness or binge drinking. Grade in school moderated a number of ethnicity and gender differences. Higher rates of alcohol use among young girls compared to young boys may signal increased risk for girls, particularly among Mexican Americans (Swaim, Wayman, & Chen, 2004).

Previous studies have found that in the early years of the 2000s, the prevalence of use of marijuana among adolescents decreased in general terms (Keyes, Wall, Feng, Cerdac, & Hasina, 2017), but were concurrent with the fact that the direction of the trend and its magnitude was heterogeneous depending on the race-ethnicity as other researchers had found (Johnson, et al. 2015). The Youth Risk Behavior Survey found for 2017 that Hispanic high school students had higher current use of marijuana (23.4%) than their Whites counterpart (25.3%).

Keyes and colleagues (2017) found that marijuana use is increasing among Black adolescents in 10th grade and also among all non-White adolescents in 12th grade which shows a

shift in terms that previously White adolescents had a higher prevalence of marijuana use. Their findings are consistent at the individual, classroom and state level including if the state has medical marijuana law prior to 2006.

SES and substance use

Understanding the relationship between socio-economic status and substance use patterns is needed to identify which socio-economic groups are at risk in order to plan specific interventions.

There is no clear consensus on the association between family SES and substance use (Huckle, You, Caswell, 2010). Research has found an association between high family socioeconomic status and substance use despite but there is no clear definition on the kind of association that exists since some discrepant results using three wealth, parent's education and income have been developed finding the association between family SES and substance use. (Conger et al., 2010; Settersten et al., 2005). Patrick and colleagues conducted a study to explore the relationship between childhood SES and substance use during young adulthood (Patrick, Wightman, Schoeni, & Schulenburg, 2015). This analysis pointed out the importance of identifying the precursors and risk factors for the period of peak in substance use to be able to identify the most appropriate targets for prevention programs. They found that affluent children have a higher risk of current alcohol use and marijuana use.

Some studies have identified that youth from families with higher SES have a greater likelihood of substance use. This could be explained in part because adolescents of more affluent families may have greater risk of engaging in anxiety or depression-related substance use because they experience greater achievement pressure and are isolated from parents who are

absent longer due to their career demands (Luthar, 2003). In fact, it has been found in specific contexts that parents with high SES may have more tolerance toward substance use that parents with low SES (Luthar & Latendresse, 2005).

Different indicators of SES have been used to examine economic conditions. However, comparisons across the association of SES constructs with substance use is difficult. Family income is used in many cases as a primary SES marker but different studies have not shown a clear association with different kinds of substance use. For instance, family income was negatively associated with heavy episodic drinking and smoking in the Youth Risk Behavior Surveillance Study (Lowry et. al., 1996), while a positively relationship was found between household income and alcohol use in an Add Health Study (Goodman & Huang, 2002; Patrick, et al., 2012).

Other measure of the economic status of the families is wealth which is defined as the total value of a household's non-liquid assets as housing equity, stocks and savings minus the value of debts as mortgage and credit card debts. Family income is correlated with wealth, but the distribution of the latter is more unequal than of income. Wealth and income have been used as economic indicators of economic status, but the relationship between parental wealth and substance use behavior among adolescents has not been studied.

Parental education has been used also as an indicator of SES given the important contribution it has to the child development. Some studies have found that low parental education has been associated with a greater risk of smoking and heavy episodic drinking (Patrick, Wightman, Schoeni, & Schulenberg, 2012). However, Johnston and colleagues found that the relationship was not homogeneous. While kids in 8th and 9th grade whose parents had the

lowest levels of education had the highest proportions of drug use, they also found a positive association between parental education and substance use at 12th grade (Johnston et. al., 2011).

Some authors have found that socioeconomic status predicts drinking patterns. Different dimensions of drinking in terms of quantity and frequency have a different association with SES: groups with a low SES drink heavier quantity, while groups with high SES drink more frequently (Huckle, Quan, & Casswell, 2010).

A study conducted to examine the associations of family SES during childhood considering income, wealth and parental education using the Panel of Study of Income Dynamics of 2005 and 2007 found that alcohol and marijuana use in young adulthood were associated with higher childhood family SES even after controlling for covariates (Patrick et al., 2012).

The study was consistent with other studies that also found that affluent children are in greater risk for current alcohol use, heavy episodic drinking and marijuana use during adolescence (Luthar, 2013; Schoenborn & Adams, 2010). They also found a convergence across the three indicators of SES in terms of the associations with alcohol and marijuana use which suggests that using just one measure by limitations of certain surveys designs would be sufficient to capture the SES-substance use linkage. Different SES indicators may provide researchers to identify substance use risk. So, if wealth is according to their study, the strongest predictor of heavy episodic drinking, using another measure of SES due to data availability may miss important nuances in the alcohol use and SES associations which some surveys do not measure (Patrick et al., 2012). Also, access to higher income contexts as universities or higher income neighborhoods may contribute to exposure to higher levels of substance use given that children could socialize with substance-using peers (Trim & Chassin, 2008).

Theoretical Framework

Theory and Previous Studies

Parenting has gained ample research attention from different scientific disciplines. Different theoretical approaches have historically explored how parental values, skills, attitudes and goals have passed from parents to the offspring. John Locke postulated in the year of 1689 that children were born with a "blank slate" to which parents and society could transmit values and beliefs (Locke, 1689; Spera, 2005). Also, Jean Jacques Rousseau considered back in 1762 that children were born "innately good" and that parents and society had to uphold and teach values inherent to children (Rosseau, 1762; Spera, 2005).

Several theoretical frameworks emphasize that parenting plays a vital role in child development. Educational and developmental psychologists today have interest in gaining understanding of the interactive socialization process that takes place for the transmission of values, goals, skills and attitudes from parents to children, which could enhance or protect children from deviant behaviors as substance use. Such process of socialization refers to the one where a child acquires skills, motives, attitudes and behaviors that he or he will need to adapt to a family or a culture. This process of socialization is bidirectional since parents convey socialization messages to their kids, but kids could have different levels of acceptance and internalization of the messages (Rodrigo, Byrne & Rodriguez, 2013).

In recent decades, several theoretical frameworks have emphasized the importance of parenting as a key role in the development of children and its relationship with substance use (Kuppens, 2018). The primary role played by the families to socialize children considering the

diverse contexts beyond the own family that have an impact on a child's development is analyzed in the social ecology theory developed by Urie Bronfenbremmer (Bronfenbrenner, 1979). He proposed that the social domains of human development can be represented by a set of nested structures, each inside the next where the structures were organized in four primary systems: microsystems, mesosystems, exosystems and macrosystems. Based on this framework, Szapocznik and Coatsworth (1999) conceptualized the ecodevelopmental theory with the multidimensional processes involved in the development of adolescent problem behavior considering the different social contexts that influence development (as family, school and peers), the interrelation among the contexts and the changes that occur in the context over time.

This approach considers that the social domains where human development takes place are represented by a set of nested structures which are organized into *microsystems*, *mesosystems* and *macrosystems Microsystems* are the settings in which the child participates directly, such as the family, school, peer group, and neighborhood. The functioning of this microsystem has within-system reciprocal relationships that increase in number and complexity with the child development. According to Szapocznik and Coatsworth, the increase in number and complexity of the relations, if they are of reciprocal nature, provide a richer context (as protection) to enhance development. *Mesosystems* are the relations between microsystems; the stronger and more complementary the linkages are between systems, the more positive influence on the child development. *Macrosystems* are society's broad ideological and cultural patterns. The structural element of the ecodevelopmental theory considers that risk ad protection can be contextualized and evidenced in the patterns of relationships and direct transactions between individuals and across the different domains and levels of the social ecology. This approach investigates how the functioning in one microsystem moderates functioning in another (for instance, how the style of parenting influences the adolescent interaction with peers), as well as the pattern of direct interactions between members of the microsystems (for instance, the quality of the parents' interactions with their adolescent's peers). In this approach, parenting behaviors and parenting styles have been identified as critical risk and protective factors for the development of drug use; but, authors consider that the risk or protective processes involved in good or poor parenting are influenced by the broader contexts of social ecology. According to this approach, parenting processes may be influenced by microsystemic relations (within the family), by macrosystemic interactions (social, cultural norms and values), or by mesosystemic relations (for example, the relationship between the parents and the child's peers). As the microsystem is the closest to the individual, the Ecodevelopmental Theory identifies the interactions that occur at that level recognizing the role of family which has been utilized to analyze how the relationships between parents and adolescents over time affect the levels of parental monitoring and how environmental risks and protective factors relate to adolescent problem behavior and substance use. The understanding of risk and protection factors against substance use must account for the contextual nature of social influences. They need to be understood in terms of the interactions with the process in each of the nested-ecological systems (Szapocznik & Coatsworth, 1999).

In order to analyze parenting, research has been conducted to consider parenting practices, parenting dimensions or, as in this study, parenting styles. When considering parenting practices, the analysis has been based on the directly observable specific behaviors that parents have to socialize with their children. These practices can be intended to promote academic achievement or to reinforce discipline or problem solving (Steinberg, 2001).

Other researchers have identified parenting dimensions that reflect similar parenting patterns and have used factor analytic techniques to model the relationships among these

parenting practices. In this line, two broad dimensions of parenting practices have been identified: parental support and parental control. Parental support is understood as the affective nature of the parent-youth relationship as involvement, acceptance, emotional availability, warmth and responsivity. Also, support has been described as the positive development of outcomes in children which can be the prevention of alcohol or substance use, depression and delinquency and externalizing problem behavior (Kuppens & Ceulemans, 2018). The control dimension has been divided into psychological and behavioral control. Parental psychological control pertains to an intrusive type of control in which parents try to manipulate children's thoughts, emotions and feelings and is associated with negative outcomes as depression, antisocial behavior and relational regression (Kuppens, 2018). Parental behavioral control refers to parental behavior which attempts to control, manage or regulate child behavior with demands and rules, disciplinary strategies or supervisory functions. The appropriate use of parental behavioral control has been associated with positively child affect development, but if it is insufficient or excessive, it has been associated with negative child developmental outcomes (Steinberg, 2001).

Parenting Styles Framework

A different approach to analyze parenting was developed emphasizing that specific combinations of parenting practices within a parent particularly impact child development rather than separate parenting practices or dimensions. Early studies on parenting styles started exploring a wide variety of dimensions in the interaction between parents and children. Some researchers developed studies to explore responsiveness vs. unresponsiveness in such interaction (Baldwin, 1948). Others tried to distinguished if parents were autocratic vs democratic (Baldwin, 1948) others analyzed emotionally involved vs. uninvolved parents (Schaefer, 1959) and also Becker (1964) described parents who exerted restrictiveness vs. permissiveness with the kids. A common finding in those studies was that parents who provided their children with nurture (which is also described as responsiveness or warmth), independence and firm control had their children with higher levels of social adeptness and competence (Spera, 2005).

In that line of research, Diana Baumrid who is considered a pioneer in the research of parenting styles, conducted extensive research with interviews and observations with parents and children and developed the parenting styles typology to explain the different kinds of interaction (Baumrid, 1971). Initially, she introduced a typology of three parenting styles with the aim of describing the differences among normal parental behaviors. She depicted distinct parenting styles types derived from two dimensions of interaction: parental control and parental warmth. Parental control is seen in terms of how much a parent intervenes in their adolescent child's life. Parental warmth is understood by how much positive affect a parent shows for their adolescent. The first three parental styles she initially introduced were: authoritative, authoritarian and permissive. Baumrid (1978) considered that authoritative parents are warm and responsive at the time that they provide their children with affection and support allowing them to explore and

pursue their own interests. But also, she found that these parents have high maturity control for their kids which could be seen as clear expectations for achievement, and manage these demands with bidirectional communication (i.e. explaining their behavior) and also encouraging independence. In this sense, this category of parents provides a clear rationale for the children's actions to enhance their socialization skills by providing them with clear consequences of their behavior. Authoritative parents have high scores of warmth and also of control in their interaction with their children (Spera, 2005).

Also, Baumrid described that authoritarian parents tried to shape, control and evaluate their children's behavior based on a rigid and absolute set of standards; she suggested that parents who were authoritarian were not warm and had high control of the children (Baumrid, 1971). They had high demands in terms of maturity of the children because they were intolerant of inappropriate behavior. This kind of parents are strict, demand obedience and use power if the children misbehave. In the process of socialization, authoritarian parents share their demands using orders and rules without communicating their children which the rationale is for those demands. One way of expressing their demands could be: "you better get good grades… because I said so", (Spera, 2005). In this sense, authoritarian parents score high in control but too low in terms of warmth and bidirectional communication (Maccoby & Martin, 1983).

Baumrid also described a third style of parenting: permissive. These parents could be moderate in their responsiveness or warmth towards their children's needs (Baumrid, 1971). They are lax in their expectations of their children's behavior and are tolerant of misbehavior. They have low control of their kids' behavior but can provide warmth to their relationship. These kinds of parents are dismissive and unconcerned when socializing with their children (Baumrid, 1971; Spera, 2005).

During the decade of the 1980s, two authors developed a new typology based on Baumrid's combination of control and warmth but considering two dimensions instead: demandingness and responsiveness. Maccoby and Martin (1983) were the first to define four different parenting styles: authoritative (with high demandingness and high responsiveness), authoritarian with high demandingness but low responsiveness), indulgent or permissive (with low demandingness and high responsiveness), and neglectful (with low demandingness and low responsiveness). Based on this last approach, Baumrid added a fourth parenting style to her typology which described low control and low warmth which was called neglectful parenting style (Baumrid, 1989).

Parenting Styles Typology		
	Warmth	Control
Authoritative	Yes	Yes
Authoritarian	No	Yes
Permissive	Yes	No
Neglectful	No	No

 Table 1

 Parenting Styles Typolog

Her research demonstrated that those adolescents whose parents were authoritative had kids with the most favorable psychological outcome as maturation, resilience, optimism, self-reliance, social competence, self-esteem and academic achievements (Baumrid, 1991; Steinberg, 1994). Authoritative parenting can be associated with the most adaptive outcomes regarding adolescent substance use. It is associated with less use of alcohol, tobacco and illicit drugs in children and adolescents (Berge, Sundell, Ojehagen, & Häkansson, 2016). Authoritative parents tend to be warm and communicative, but they exert appropriate control. Authoritative parenting style as initially described by Baumrid (1971), is associated with higher levels of competence and psychosocial maturity among adolescents compared with other peers whose parents were authoritarian, permissive or neglectful (Steinberg, 2001). Authoritarian parents exert control

while lacking warmth. Permissive parents show warmth, but do not exert control. Neglectful parents do not exert either control and do not show warmth (Steinberg, 2014).

Baumrid's findings considered that adolescents whose parents exerted authoritarian or permissive parenting style had negative developmental outcomes and those with neglectful parenting style would have the poorest outcomes (Kuppens & Ceulemans, 2018; Shakya, et al., 2012). Authoritative parenting has been seen as optimal in terms of academic success, positive peer relationships, minimal delinquent behavior, risk avoidance, and positive psychosocial adjustment as well as higher levels of psychological well-being (Shakya, et al. 2012). Research regarding authoritarian parenting styles has been associated with negative developmental outcomes as aggression, anxiety, depersonalization, somatic complaints, depersonalization and anxiety (Hoeve, Blokland, & Dubas, 2008).

Children of permissive parents could be expected to show anxiety, depression, withdrawn behavior, somatic complaints and externalizing behavior as school misconduct or delinquency (Steinberg, 1994). However, some other studies have found that also these kids develop social skills, self-confidence, self-understanding, and active problem coping (Domenech, Donovick, & Crowley, 2009; Calafat, Garcia, Juan, Becoña, & Fernandez, 2014; Becoña, Martinez, Calafat, Juan, Fernandez, & Secades, 2011).

According to this parenting styles framework, those adolescents whose parents have been neglectful have the poorest outcomes. They could be seen as youth with lack of self-regulation and social responsibility, poor self-reliance, poor social competence, poor school competence, antisocial behavior and delinquency, anxiety, depression and somatic complaints (Baumrid, 1991; Hoeve et al., 2008; Steinberg, 2001; Kupens, 2018).

Figure 1 Parenting styles framework



Ethnic Differences in Parenting Styles and Substance Use

A wide body of literature has considered the strong direct and indirect effects that different parenting styles have on the child development (Becoña, Martínez, Calafat, Juan, Fernández & Secades, 2012; Baumrid, 1991; Steinberg, 2000; Shakya et al., 2012; Steinberg, 2014). Emphasis has been given to parental control and warmth as key factors of the parenting styles practices. (Kim, Calzada, Barajas, Huang, & Brotman, 2018). Following Baumrid's framework, parental warmth and control might seem to be cross-culturally robust and that parenting styles were similar in different social contexts. However, relations between parents and child outcomes seem to have race-ethnicity as moderator (Kim et al., 2018). Non-Latino White children respond to authoritative parenting styles developing competences to achieve better outcomes than those with authoritarian parents with the same race-ethnicity; also, their academic success has been negatively associated with authoritarian and permissive parents. (Cardona, Nicholson, & Fox, 2000).

Nevertheless, literature is inconclusive when considering the Hispanic or Mexican American population. Some studies make emphasis in the fact that Mexican-origin youth represent an ethnic minority with a rapid demographic growth that also has risk for early initiation of substance use (Mechamil, 2016). Hillstrom (2009) found that Mexican-origin adolescents have not been negatively affected by authoritarian parenting style as should be expected according to Baumrid's typology. Also, other studies have described negative effects of the authoritative parenting style with younger kids (Calzada, Barajas, González, Huang, & Brotman, 2015). This could suggest that there is a differential impact of parenting styles at different stages of development in different ethnic contexts. One explanation to such difference could be that high levels of authoritarian control may be protective in adolescents who might be having negative neighborhood or peer influences in junior or high school and may not be necessary with younger kids that are not exposed to such contextual risk factors (Kim et al., 2018). Also, some studies have found that there is not an association of permissive parenting style and substance use in adolescents (Calafat, Juan, Becona, & Fernandez, 2014).

The characterization of Latino or Hispanic parenting based on the framework developed by Baumrid is inconclusive. While some studies have found that Latinos practice more authoritarian parenting style, others have considered that authoritative parenting style has been more commonly used (Ayon, Rankin, Marsiglia, Ayers, & Kiehne, 2015)

According to Mogro-Wilson, ethnicity may be important to consider when examining how parenting styles are associated with alcohol and substance use because ethnic groups may have different perspectives on parenting styles (Mogro-Wilson, 2013). Also, she found that authoritative parenting is associated with less alcohol use among White adolescents, and also reported that high amounts of parental control and low warmth (authoritarian parenting style) function positively for Hispanic families in general and Mexican American families in particular. (Mogro-Wilson, 2008).

Acculturation in Mexican-American adolescents

Acculturation may be an important dimension to understand how parenting styles influence youth substance abuse as a moderator to differentiate patterns by race-ethnicity. Acculturation can be seen as the social and psychological influences that occur because of continuous contact between individuals of a different culture (Mogro-Wilson, 2013). Acculturation has also been conceptualized on a continuum from full endorsement of the language, values, norms, interests, and behavioral patterns of the traditional culture to full adoption of the language, values, interests, and behavioral patterns of the mainstream culture (Pash, Deadorff, Tschan, Flores, Penilla, & Pantoja, 2006). It has been defined as an outgoing process through which people from one culture adjust and adapt to another culture, including the social and psychological exchanges that take place when there is continuous contact and interaction with individuals from different cultures (Berry, 2006). Acculturation, as a theoretical construct, is the adoption of those cultural traditions and values of the host society by immigrant groups. Some authors have found that acculturation can be seen also as a positive predictor of drinking variables and associated problems in Mexican Americans (Mills & Caetano, 2012).

One potentially important aspect of the acculturation process in families is that adolescents tend to acculturate more thoroughly and faster than their parents, thus creating a gap in the acculturation level of parents and adolescents (Pash et al., 2006). Parental acculturation has also been found to be a strong influence on adolescent development. Parental and adolescent acculturation can be seen as predictors of alcohol use (Vega, Gil, & Wagner, 1998).

Evidence supports that, in general, greater acculturation among the parents and the adolescent is associated with poorer outcomes among Mexican American youth (Mogro-Wilson, 2013). The assimilation process may lead to a gap between the parent's cultural values in their

home country and the environmental and social influences of the American culture. Mexican Americans who were born in the United States have significantly higher rates of psychiatric disorders than Mexican first-generation immigrants. Studies have reported that among Hispanic youth, acculturation has been linked to depressive symptoms and suicidal ideation, substance use, and delinquent behavior (Pash et al., 2006).

Acculturation also includes fluency, both in the linguistic sense and in the broader sense of the skills required to succeed in the majority group's formal institutions and informal social situations (Alaniz et al.,1999). Samaniego and Gonzales (1999), for instance, found that family conflict and maternal parenting variables mediate the relation between acculturation status and delinquent activity, highlighting the importance of including family variables in studies of acculturation. Despite these links, the extent to which acculturation differences, or acculturation gaps, between family members play a role in these processes has received scant attention.

The origins and cultures of people give rise place to different kinds of parenting styles and ways parents exert control on the youth (Pash et al., 2006). Parenting styles may be more fluid than fixed and may depend on parent's adherence to traditional values, acculturation level, and on their own personal family history (Mogro-Wilson, C., 2013). Recently immigrated Mexican families cope with a variety of stressors that come with the acculturation process given the need of socialization into the host dominant culture and the desire of becoming a part of a new community. Cultural changes involve changes of attitudes and behaviors resulting from contact with elements of the new cultural environment (Berry, 2006). Different studies have shown that the greater level of acculturation is associated with greater substance use among Mexican-American adolescents (Marsiglia et al., 2014).

The immigrant paradox is one way to describe healthier behaviors among recent immigrants compared to those who have been in a different cultural setting for longer periods. It means that recent immigrants may tend to exhibit more positive health outcomes compared to their US counterparts despite the experienced difficulties they had to migrate. The traditional cultural values first generation immigrants have been protective and enhance regulation of substance use (Kopak, 2012). The increase of substance use risk among more acculturated Mexican adolescents may be due in part to changes in the cultural orientation where traditional cultural values regulating substance use are substituted by more liberal social norms in the mainstream or the American society.

A wide body of research has suggested that the earlier that an adolescent immigrates to the United States, it is to say, the longer exposure to acculturation and language acquisition he could have, may increase the risk of use illicit drugs (Lipsky & Caetano, 2009).

Parent-youth relationship

One parenting factor that has been found to be associated with substance use is the parent-youth relationship (Mogro-Wilson, 2008; Mogro-Wilson, 2013). This parent-youth relationship involves the extent of open communication, closeness and parent-youth conflict that depict the patterns of interaction that take place between children and parents. Such interaction during early adolescence is marked by development of identity and detachment from parents to obtain independence (Rusby, Light, Crowley, Westling, 2018). However, it is also time of autonomy negotiation of youths with parents that can be challenging where conflict between both parts can arise. Also, this parent-youth relationship relates to the adolescent way of solving problems and behaviors and feelings in the interaction with the parents in order of being able to

control events that can affect them (Montgomery, 2008). Research has found that the quality of the parent-youth relationship becomes a predictor of substance use in high school adolescents (Rusby, Light, Crowley, & Westing, 2018). A study conducted with kids from 10 to 17-year-old demonstrated that substance use disorders in late adolescence and early adulthood were associated with highly conflictual parent-youth relationships (Rusby, et al., 2018). They found that the youth report of a poor relationship with parents was a stronger predictor of alcohol onset for girls than boys on their alcohol use onset, and also when youth reported parental monitoring, they found that this was more for both alcohol and marijuana use onset among adolescents.

According to Mogro-Wilson (2013), the parent-youth relationship also differs by ethnicity particularly in Hispanic families where it is a unique way of giving support and advice. The high-quality parent-youth relationship has been linked to the positive development of adolescents in areas of depression, aggression and substance abuse particularly in alcohol use in the Hispanic adolescents considering differences among U.S. born and non-U.S. born Hispanic adolescents (Mogro-Wilson, 2013, Prado, Huang, Schwartz, Maldonado-Molina, Bandiera, De la Rosa, & Pantin, 2009). However, particular attention should be given to different pathways among Mexican American, and White families in order to assess the association of parent-youth relationship with alcohol and marijuana use among these two groups to plan future interventions to deter substance use.

Chapter III – Methods

Study Design

Data and Sample

This study will use a longitudinal survey using data from four waves of the National Longitudinal Study of Add Health Survey (Add Health), developed at the University of North Carolina at Chapel Hill. Add Health was developed as a response to a mandate from the U.S. Congress to fund a study of the health of the adolescents. Add Health is a longitudinal study of a nationally representative sample of adolescents between 11 and 19 years old enrolled in grades 7-12 in the United States during the 1994-1995 school year. The Add Health cohort has been followed since 1994 into adulthood with four in-home interviews. Wave I was collected during 1994-1995, Wave II took place in 1996, Wave III from 2001 to 2002 and Wave IV was conducted from 2007 to 2008 when those in the sample were between the ages of 24 and 32 years old (Harris, Halpern, Whitsel, Hussey, Tabor, Entzel, & Udry, 2009). Add Health collects longitudinal information regarding the youth's social, economic, psychological and physical well-being and provides contextual data regarding the family, neighborhood, community, school, friendships among others. (Harris et al., 2009).

The first two waves explored the forces that influence those health and risk behaviors of the participants which include personal traits, families, friendships, romantic relationships, peer groups, neighborhoods and communities (Harris et al., 2009). Wave III was conducted when respondents were between 18 and 26 years old and were oriented to collect information on how adolescent experiences and behaviors are related to decisions, behavior and health outcomes in the transition to adulthood. Wave IV was conducted when respondents were ages 24-32 and assuming adult roles. It was aimed to allow researchers to study developmental and health trajectories across the life course from adolescence to adulthood and also expanded to collect

biological data to understand biological linkages in health trajectories which will be completed in the fifth wave of data collection. (Harris et al., 2009).

For the first wave of the study, the sampling frame for Add Health was a database collected by Quality Education Data, Inc. The use of systematic sampling methods and implicit stratification ensured that the 80 schools selected were representative of the nationwide schools with respect to a region of the country, urbanicity, size, type and ethnicity (Harris et al., 2009). Eligible high schools included 11th and 12th grades and enrolled more than 30 students. More than 70 percent of the originally sampled high schools participated. If a high school declined to participate, a school within the stratum was used to replace it. (Harris et al., 2009).

Also, participating high schools helped to identify feeder schools which are those schools that included the 7th grade and sent five students as a minimum to that high school. Also, from among those feeder schools, one was chosen with proportional probability to the number of students it contributed to the high school. In case that a feeder school was not able to participate, a replacement was chosen. The total recruitment resulted in 132 schools for the core study each associated with one of 80 communities (Harris et al., 2009).

As it can be seen in Figure 2, schools self-administered a questionnaire that was distributed to those 132 schools selected for the study and was taken from September 1994 to April 1995 for those students between grades 7 to 12 during the class hours. All students who completed the In-School Questionnaire plus those who did not complete the questionnaire but were listed on a school roster were eligible for the selection into the core in-home sample. From the 90,118 students that answered the questionnaire, a random sample was generated of 20,745 adolescents who completed the in-home interviews (Harris et al., 2009).

All the in-home interviews for the first Wave were conducted from April to December in 1995. All of the participants answered the same interview which took from one to two hours to be completed. Most of the interviews took place at the respondent's home. All data were recorded on a laptop and no paper questionnaires were used to protect confidentiality. Those questions that were not sensitive were read aloud by the interviewer who entered the respondent's answers. For the sensitive topic questions, the respondents were given earphones to listen to pre-recorded questions and they entered the answers by themselves directly. The inhome interview covered topics regarding health-status, health facility utilization, nutrition, peer networks, decision-making processes, family composition and dynamics, educational aspirations and expectations, employment experience, the ordering of events in the formation of romantic partnerships, sexual partnerships, substance use, and criminal activities. Additional questions were asked only in the cases concerning the co-occurrence of risk behaviors, as for example, using drugs or drinking while carrying a weapon. Also, a battery of questions was asked to the resident parent at the end of the interview with the adolescent regarding the family dynamics. (Harris et al., 2009).

The Wave II in-home interview collected information on the same students one year after the Wave I was conducted. For the in-home interview, 14,738 participants were visited considering those who had already been interviewed with the exception of those who in Wave I were: 12th-grade students, in the especially disabled sample or part of the 65 students or part of the 65 genetic sample students. Interviews of Wave II took place from April through August 1996, and the interview was similar to the one in Wave I without repeating those questions about attributes that would not change (Harris, et al., 2009). Add Health conducted Wave III follow-up interview with the original respondents of Wave I then aged 18-26. The in-home Wave III

sample consisted of the Wave I respondents who could be relocated and re-interviewed during the field-work period from August 2001 to April 2002. This survey was also nationwide and took place from August 2001and April 2002 (Harris, 2013). A total of 15,170 completed interviews took place with a 76% response rate. Those Wave I respondents who were abroad were omitted from Wave III. No paper questionnaires were used and data were recorded on laptop computer. Those less sensitive questions were read by the interviewer who entered the respondent's answers. But, in the case of more sensitive questions. The respondent entered the answers in privacy. Most of the interviews were conducted in the respondent's home.

Data collection of Wave IV was carried out from January 2008 to February 2009 and had a response rate of 80.3%. A total of 15,701 interviews were conducted. Survey data was collected using a 90-minute computer assisted personal interview instrument (CAPI) for less sensitive questions and a computer assisted self-administered instrument (CASI) for sensitive questions.

Wave IV was a fourth in-home interview designed as a follow up of the national representative sample of adolescents interviewed from 1994 to 1995. A comprehensive 90 minute-personal interview was administered and included biospecimen collection as well as physical measurements. In this wave, the survey maintained the longitudinal elements of data collection from previous waves but also included new questions related to the lives of those young adults (Harris et al., 2009).

For Wave I conducted between 1994 and 1995, a total of 20,745 in-home interviews were conducted for adolescents from 7th to 12th grade. A parent or guardian was interviewed during at this Wave of the study to obtain further information about the family composition and the

adolescent's health history. The questionnaire asked parents demographic and health related information about the parent or guardian and general questions about the adolescent respondent. A total of 17,670 parents were present to answer a set of questions regarding the interaction with their adolescent.

For Wave III, a total of 15,197 young adults were interviewed including 15,170 original Wave I respondents and 27 Wave II special genetic respondents⁶.

For Wave IV a total of 15,701 adults aged between 24 and 32 years old had in-home interviews in 2008⁷. It was a follow up of the Wave I respondents when cohort members were 24-32 years old and completing transition to adulthood (Harris et al., 2009).

⁶ From the 20,745 Wave I in-home respondents plus 45 Wave II only genetic respondents minus 687 Wave I cases without a weight and without a genetic sample flag that were not selected for Wave III, a total of 20,103 respondents composed the Wave III fielded sample. (Harris, et al., 2009).

⁷ Out of 20,745 Wave I in-home respondents, 19,962 cases were fielded at Wave IV. The others were determined ineligible. Of the 19,962 fielded cases, 15,701 were interviewed at Wave IV. (Harris, et al., 2009).

Figure 2 Add Health Survey Sampling Scheme



Note: reprinted from Harris, Halpern, Whitsel, Hussey, Tabor, Entzel, & Udry. (2009). The National Longitudinal Study of Adolescent to Adult Health: Research Design URL: http://www.cpc.unc.edu/projects/addhealth/design.

Data for this study were drawn from Waves I, III and IV of the Add Health Survey considering the sample of adolescents who completed in-home interviews during Waves I, III and IV^8 , and who self-identified as being Mexican Americans or Whites. Adolescents from other ethnic groups are excluded from the study as well as adolescents who were not living with both or either of their biological parents at baseline only. Baseline characteristics regarding age, gender, family SES level, respondent's educational attainment, parent's educational attainment, parent's occupation, acculturation, parenting styles and parent-youth relationship used for

⁸ Wave II was conducted in 1996 and was not considered in this study due to the proximity with Wave I.

analysis were taken from Wave I only. Alcohol and marijuana use data were obtained for Waves I, III and IV. Sample sizes were N=12,143 for Wave I, N=11, 479 for Wave III and N= 9,100 for Wave IV.

Measures

The measures that were utilized in this study are described below:

Outcome Variables

Two outcome variables were considered for two separate analyses:

Alcohol use: Adolescents were asked about how many days they consumed alcohol during the last 12 months. Responses were coded as 0 = every day or almost every day, 1 = 3 to 5 days a week, 2 = 1 or 2 days a week, 3 = 2 to 3 days a month, 4 = once a month or less, 5=1 or 2 days in the past 12 months, 6 = never. Alcohol use was considered as 0 if respondents consumed alcohol once a month or less and 1 if they consumed alcohol more than once a month.

Marijuana Use: Adolescents were asked about how often they smoked marijuana during the last 30 days. The response options were 0 = never, 1 = 1 to 7 times a month, 2 = 8 to 15 times a month, 3 = 16 to 23 times a month, 4 = 24 to 30 times a month, 5 = 40 to 60 times a month, 6 = more than 60 times a month. For the purposes of our analysis, marijuana use was considered as 0 if they did not consume marijuana and 1 if respondents had used marijuana more than once a month.

Explanatory Variables

Race/Ethnicity: This variable is derived from three self-reported items that asked the respondents of the home–interview about their ethnicity and racial background. Questions were the following:

- What is your race? This question had five possible answers: White, Black, American Indian, Asian, and Other. Those who answered as White were considered for the baseline sample.
- 2. If the answer was Other, then, the next question was: *Are you of Hispanic or Latino origin?*
- 3. If the answer to the previous question was affirmative, then the next question was What is your Hispanic or Latino background? Those who answered Mexican/American were considered for the baseline sample.

Parenting styles: Add Health survey data set contains a battery of question regarding the adolescent's parents parenting behavior. Two measures were used to assess the parenting styles following Baumrid's typology: parental control and parental warmth.

Parental control measure was adapted from prior research developed by Mogro-Wilson (2013). Seven questions were asked to adolescents to see if they made their own decisions at home regarding: "(a) the time to be at home on weekend nights? (b) the people they hang around with? (c) which clothes you wear? (d) how much television you watch? (e) which kind of TV programs you watch? (f) what time you go to go to bed on week nights? (g) what you eat? A scale was created based on previous research by Mogro-Wilson (2013) where the sum of the

seven questions was divided by 7, then multiplied by 100 to obtain a percentage. Adolescents whose parents were reported to perform parental control below the median level were categorized as low controlling. Those above or equal the median are categorized as high controlling and those below it was low controlling (Mogro-Wilson, 2008; Mogro-Wilson, 2013).

Parental warmth was adapted also from Mogro-Wilson (2013). This measure evaluated how warm and loving respondent's mother was toward them. Following previous research (Shakya, Christakis, & Fowler, 2012), father's warmth was not considered since 22% of respondents declared not to have a resident father, while only 4% reported not to have a resident mother. Parental warmth was assessed using the question: "*Most of the time, your mother is warm and loving toward you*". Answer options ranged from 5 = strongly agree, 4 = agree, 3 = neither agree or disagree, 2 = disagree, 1 = strongly disagree. A binary variable was generated categorizing those at the median level of warmth and above in the high-warmth parenting category and those below in the low-warmth parenting category. The combination of parental control and parental warmth were used to define four parenting styles following prior research methodology (Shakya, et al., 2012).

Once parental warmth and parenting control measures were obtained, four parenting styles were generated. *Authoritative parenting style* was generated considering high parental control and high parental warmth; *authoritarian parenting style* was generated considering high parental control and low parental warmth. Likewise, to obtain *permissive parenting style* low parental control and

high parental warmth were considered and for *neglectful parenting style* observations with low parental control and low parental warmth were included.

Family SES level: this measure was adapted from previous studies using data of the four waves of Add Health Survey (Guo, North, Gorden-Larsen, Bulik, & Choi. 2007). Family SES was obtained by the sum of parental education and occupation scales which were reported separately by mother and father. Education was considered ranging in scale from 1 (those in eighth grade or less or not graduated from high school) to 5 (those with professional training beyond a 4-year college or university). Occupation was ranged from 0 for homemakers to 5 for those professionals who graduated from college or reached even higher education (doctor, lawyer, scientist, teacher, librarian, nurse or military or security). Following the methodology of Guo and colleagues (2007) the higher value of father's and mother's SES scale was considered as the family SES. In the cases where only one parent was available, the SES considered as Family SES was that of the available parent. Once Family SES was obtained with values ranging from 0 to 5, a binary variable was obtained considering as High family SES those above 2.5 of Family SES variable and as Low family level to those below 2.5.

Control Variables

Gender: this variable was reported by the interviewer at the beginning of the survey with the following instruction: "Interviewer: please confirm that Respondent's sex I (male) (female). Ask if necessary".

Age: respondents were asked by the interviewer: What is your date of birth?

Respondents educational attainment: interviewers asked the adolescents "What grade are you in?". Data were recoded to obtain a binary variable for Middle School and High School.

Parents educational attainment: interviewers asked the present parent adolescents "What grade are you in?". Data were recoded to obtain three categories: High School or less, College or equivalent and, Graduate studies.

Youth Acculturation: Adolescents were asked if they were born in the US (yes/no).

Parents' Acculturation: Respondents were asked if the biological father and the biological mother were born in the US (yes/no for each). An average measure of father and mother acculturation was generated with these two variables, where 0% meant no-parents were born in the U.S., 50 % if either one of the parents was born in the U.S. and 100 % both parents were born in the U.S.

Family Acculturation (Primary Language): the adolescent was asked what language they speak at home between English and Spanish.

Parent-Youth Relationship: Following the methodology of Mogro-Wilson (2013) the measure of the parent-youth relationship was developed considering the questions asked to either of the parents interviewed after the adolescent interview: "How often would it be true for you to make each of the following statements about your child?" The response included: (a) how well do you get along with the adolescent (b) how often you make decisions together (c) how often do you trust in the adolescent. Answers ranged from 1 to 5 starting at never, seldom, sometimes, often and always. These questions were summed to create an overall score to create four categories (a) "poor" (b) "average" (c) "good" (d) excellent".

Statistical Analysis

Stata Data Analysis and Statistical Software (STATA) was used for all statistical analyses.

Missing data: Measures were taken to manage missing values in some observations in order to avoid deficiencies in the results of the study. Data were screened to identify missing values in all the considered variables. Once data screening was performed, the largest percentage of missing values was 25.12% (see Table 1A in the Appendix).

An exploratory analysis was developed first using graphical analysis to see differences in the behavior of the sample by waves to define the different segments of analysis. Then data screening and examination of descriptive data was conducted.

For each study hypotheses, we tailored a regression model based on the following principles:

A mixed effects logistic regression model that included an individual-level random effect to account for the repeated outcome measures over time, and a random effect to account for the nested structure of respondents within schools (Rabe-Hesketh & Skrondal, 2012).

The outcome included the repeated measures of alcohol use or marijuana use.

Covariates in the model, included the explanatory variable and all other independent variables to estimate the effect, independent of other factors considered in the analytic framework.

Time from baseline to outcome measure was first included as a continuous variable to evaluate whether there was a linear trend in the substance use, and as a categorical variable to reflect that the trend was not linear. A first order interaction term between time to outcome measurement and explanatory variable was included in all models.

For the hypothesis of race-ethnicity modification in the association of parental style and substance use, the model included a first order interaction term between parental style and time to outcome measurement, a first order interaction term between parental style and race-ethnicity, and race-ethnicity and time to outcome measurement. To test whether inclusion of these terms was predictive of the outcome a likelihood ratio test was computed between the full model and the reduced model.

Finally, we derived models stratified by race-ethnicity to estimate the parental style outcome association for Mexican American and White adolescents.

Four models were developed to test the hypotheses. The first model tests the association between alcohol and marijuana use in Mexican American and White adolescents. The second model tests the association between alcohol and marijuana use and family SES level in Mexican American and White adolescents. The third model tests the association of parenting styles and alcohol and marijuana use. The fourth model explores the association of parenting styles, alcohol or marijuana use in Mexican American and White adolescents.

Variables included in every model were age, gender, race-ethnicity, family SES level, wave as a continuous variable scaled by the number of years after baseline, parenting styles, respondent education attainment, youth acculturation, family acculturation, parental acculturation, parent-youth relationship and the interaction term of race-ethnicity and wave as fixed effects.

Multivariable models used to evaluate the association of interest with other covariate variables were included in the Appendix as reference.

Human/Animal Subjects Review

The present study used secondary data and does not contain any involvement with human participants or animals performed by the author. The subjects in the data have been strictly deidentified. Therefore, the present study received an exemption from the University IRB Human Subjects Review.

Chapter IV – Findings

The main research question that guided this study was to see if there are differences in the use of alcohol and marijuana among Mexican American and White adolescents depending on the parenting style enforced in their families. The understanding of such differences could better guide prevention programs targeted for different cultural and racial contexts.

Sample Demographics

In order to explore and describe the predictor as well as the control and outcome variables, univariate analysis was conducted considering data at baseline of the first wave of the Add Health Survey conducted in 1995. Table 2 presents descriptive information according to race-ethnicity.

The sample included 12,143 respondents who were interviewed in 1995, 2001 and 2008. Approximately 13% of the total sample consisted of Mexican-American youth and 87% were Whites. Mexican Americans had an average age of 15.9 years and Whites of 15.5 years ($\chi 2=120.99$, p<.001).

The majority of the Mexican American households reported to low family SES in comparison with the White households ($\chi 2=220.01$, p<.001).

The majority of Mexican American parents reported a lower educational attainment than White parents. Most of Mexican American parents had attended high school or less (56.22%) and only 17% had college studies, while White parents depicted higher educational attainment with 33% of them having college studies and 22% graduate studies ($\chi 2=623.08$, p<.001). Approximately 35% of those who self-reported as Mexican American students were not born in the U.S. compared to 24% of the White youths ($\chi 2=117.52$, p<.001). Also, almost 43% of the
Mexican-American parents were born abroad compared to 1.24% of the White parents compared to 24% of the White youths ($\chi 2=0.4$, p<.001).

One measure of the family acculturation considered for this study was the spoken language at home. Almost 46% of the Mexican American families used Spanish to communicate among themselves which is consistent with the high percentage of parents born abroad ($\chi 2=6.81$, p<.001).

In terms of parent-youth relationship, 40% of the While parents rated their relationship with their youth as "good". Approximately 31% of the Mexican American parents considered the relationship with their child as "excellent" ($\chi 2=230.60$, p<.001).

Authoritative parenting style was the most used among White adolescents (33.4%) at baseline followed by the permissive parenting style (29.17%). Permissive parenting style was the most used with the Mexican American adolescents (30.13%), followed by neglectful (23.52%) and authoritarian (23.27%) parenting style (χ 2=105.24, p<.001).

	Mex	ican Ame	ericans		Whites		Tot	al	χ2		Missing
	Ν	Mean	% or SD	Ν	Mean	% or SD	Ν	% or SD			%
Age	1,640	15.93	1.72	10,503	15.52	1.71	12,143	15.58	120.99	***	0.20
Gender											0.20
Male	836		50.98	5,232		49.80	6,068	49.96	0.78		
Female	804		49.02	5,273		50.20	6,077	50.04			
Family SES level											0.10
Low	1,094		66.71	3,602		34.29	4,696	(26.90)	220.01	***	
High	546		33.20	6,903		65.71	7,449	(73.10)			
Respondents educational attainment											0.20
Middle School	361		22.01	3,034		28.88	3,395	27.95	33.23	***	
High School Parents education attainment	1,279		77.99	7,471		71.12	8,750	72.05			1.00
No parents	340		21.05	1,104		11	1,444	11.98	623.08	***	
High school or less	908		56.22	3,556		34	4,464	37.05			
College or equivalent	278		17.21	3,443		33	3,721	30.88			
Graduate studies	89		5.51	2,331		22	2,420	20.08			
Youth acculturation											0.20
Non-US born	575		35.06	2,385		22.70	2,960	24.37	117.52	***	
US Born Family Acculturation	1,065		64.94	8,120		77.30	9,185	75.63			
Spanish	748		45.61	79		0.75	827	6.81	0.01	***	0.20
English Parents acculturation	892		54.39	10,426		99.25	11,318	93.19			4.50
Non-parent	605		43.34	130		1.27	735	(4.94)	0.00	***	
One parent	426		30.52	2,785		23.23	3,211	(25.10)			
Both parents	365		26.15	7,314		71.50	7,679	(69.96)			
Parent-youth relationship											
No parents	337		20.79	1,013		9.70	1,350	11.19	230.60	***	0.90
Poor	56		3.45	351		3.36	407	3.37			
Average	269		16.59	2,122		20.32	2,391	19.82			
Good	450		27.76	4,177		40.00	4,627	38.35			
Excellent	509		31.40	2,780		26.62	3,289	27.26			
Parenting Styles											
Authoritative	367		23.08	3,439		33.41	3,806	32.03	105.24	***	2.40
Authoritarian	370		23.27	2,285		22.20	2,655	22.34			
Permissive	479		30.13	3,002		29.17	3,481	29.30			
Neglectful	374		23.52	1,566		15.22	1,940	16.33			
Alcohol Use	326		19.94	2,137		20.37	2,463	20.31	0.16		15.80
Marijuana Use	267		16.73	1,574		15.19	1,841	15.40	2.5		16.20

Table 2 Descriptive characteristics by race at baseline

*p<.05; **p<.01; ***p<.001

Table 3 shows the distribution of descriptive statistics by socioeconomic status at baseline. Adolescents with low SES were more likely reported by 57% of those whose parents had attained high school level at the most ($\chi 2=.002$, p<.001), 85% of families were Spanish was predominantly spoken ($\chi 2=709$, p<.001), 29% of those who considered the parenting style as permissive (($\chi 2=299.2$, p<.001), and 33% that rated their parent-youth relationship as good ($\chi 2=299.2$, p<.001). High SES was more commonly reported (35.62%) in households where parents had had college studies ($\chi 2=.002$, p<.001), also in 41% of the households where the parent-youth relationship was rated as good. Authoritative parenting style was more commonly reported (37%) by adolescents with high SES ($\chi 2=299.2$, p<.001).

Table 3

Descriptive characteristics by Family SES at baseline

	Low SES		High SES		Total		χ2	p-value
	Ν	%	Ν	%	Ν	%		
Gender								
Male	2,326	49.5	3,742	50.23	6,068	49.96	0.57	
Female	2,370	50.5	3,707	49.77	6,077	50.04		
Respondents educational attainment								
Middle school	1,325	28.22	2,070	27.79	3,395	27.95	0.26	
High School	3,371	71.78	5,379	72.21	8,750	72.05		
Parents education attainment								
No parents	703	15.1	741	10.01	1,444	11.98	0.002	***
High school or less	2,668	57.4	1,796	24.26	4,464	37.05		
College or equivalent	1,084	23.3	2,637	35.62	3,721	30.88		
Graduate studies	191	4.1	2,229	30.11	2,420	20.08		
Youth acculturation								
US born	1,163	24.8	1,797	24.12	2,960	24.37	0.64	
Non-US Born	3,533	75.2	5,652	75.88	9,185	75.63		
Family Acculturation								
Spanish	4,016	85.5	7,302	98.0	11,318	93.19	709.0	***
English	680	14.5	147	1.97	827	6.81		
Parents acculturation								
Non-parent US born	561	13.2	174	2.36	735	6.32		
One parent US born	1,455	34.1	1,756	23.86	3,211	27.62		
Both parents US born	2,248	52.7	5,431	73.78	7,679	66.06		
Parent-youth relationship								
No parents	672	14.4	678	9.15	1,350	11.19	162.98	***
Poor	209	4.3	198	2.67	407	3.37		
Average	946	20.3	1,445	19.5	2,391	19.82		
Good	1,526	32.8	3,101	41.85	4,627	38.35		
Excellent	1,301	28.0	1,988	26.83	3,289	27.26		
Parenting Styles								
Authoritative	1,064	24.0	2,742	36.83	3,806	32.03	299.2	***
Authoritarian	1,154	26.0	1,501	20.16	2,655	22.34		
Permissive	1,268	28.58	2,213	29.72	3,481	29.3		
Neglectful	950	950	990	13.3	1,940	16.33		

*p<.05; **p<.01; ***p<.001

Table 4 shows the distribution of the descriptive characteristics by parenting style at baseline. Neglectful parenting style was more commonly reported by 52.5% of the girls $(\chi 2=20.7, p<.001)$. Authoritative parenting style was more commonly reported by 72% of the adolescents with high family socioeconomic status ($\chi 2=299.2$, p<.001). Authoritative parenting style was more commonly reported (24.3%) in households where parents had with college studies ($\chi 2=129.3$, p<.001), in 95.4% of families where English is spoken at home ($\chi 2=72.0$, p<.001), in 89.3% of households where both parents are US born ($\chi 2=0.1$, p<.001) and in 41.5% of families with good parent-youth relationship ($\chi 2=399.0$, p<.001). Authoritarian parenting style was more commonly reported where one of the parents is US born in 67.1% of the cases ($\gamma 2=0.1$, p<.001), and in 24.5% of the cases where the parent-youth relationship is average ($\chi 2=399.0$, p<.001). Permissive parenting style was more commonly reported in 9.1% households were none of the parents was US born ($\chi 2=0.1$, p<.001). Neglectful parenting style was the parenting style more commonly reported by of the girls ($\chi 2=20.7$, p<.001), and in 40.6% of the families where parents had attainted high school at the most ($\chi 2=129.3$, p<.001) and where the parentyouth relationship was reported as poor ($\chi 2=399.0$, p<.001).

Table 4
Descriptive characteristics by parenting style at baseline

		Parenting style										
	Authori	tative	Authori	tarian	Permi	issive	Negle	ctful	Tot	al	χ2	p- value
	Ν	(%)	Ν	(%)	Ν	(%)	N	(%)	Ν	(%)		
Gender												
Female	1,889	49.6	1,376	51.8	1,637	47.0	1,018	52.5	5,920	49.8	20.7	***
SES												
High	2,742	72.0	1,501	56.5	2,213	63.6	990	51.0	7,446	62.7	299.2	***
Respondents educational attainment												
High School	3,202	84.1	2,271	85.5	1,889	54.3	1,139	58.7	8,501	71.6	0.1	***
Parents education attainment												
No parents	418	11.1	383	14.5	300	8.7	224	11.7	1,325	11.2	129.3	***
High school or less	1,309	34.7	953	36.2	1,352	39.1	780	40.6	4,394	37.4		
College or equivalent	1,132	30.0	852	32.3	1,075	31.1	612	31.9	3,671	31.1		
Graduate studies	918	24.3	448	17.0	730	21.1	305	15.9	2,401	20.4		
Youth acculturation												
Non-US Born	1,057	27.8	542	20.4	916	26.3	407	21.0	2,922	24.6	65.0	***
Family Acculturation												
English	3,621	95.4	2,505	94.4	3,197	91.8	1,751	90.3	11,074	93.3	72.0	***
Parents acculturation												
Non-parent	218	5.7	89	3.5	315	9.1	113	6.3	735	6.3	0.1	***
One parent	189	5.0	1,693	67.1	173	5.0	1,149	63.7	3,204	27.6		
Both parents	3,398	89.3	741	29.4	2,988	86.0	543	30.1	7,670	66.1		
Parent-youth relationshi	ір											
No parents	384	10.2	377	14.3	267	7.7	195	10.1	1,223	10.4	399.0	***
Poor	67	1.8	136	5.2	62	1.8	125	6.5	390	3.3		
Average	650	17.2	647	24.5	587	17.0	465	24.2	2,349	19.9		
Good	1,568	41.5	932	35.3	1,393	40.3	689	35.8	4,582	38.8		
Excellent	1,112	29.4	548	20.8	1,151	33.3	450	23.4	3,261	27.6		

*p<.05; **p<.01; ***p<.001

The Add Health survey provides data regarding the number of times a month the adolescents consumed alcohol and marijuana for the four waves. For the purposes of this study,

alcohol use was considered as such if adolescents reported they consumed alcohol more than once a month during the last year. Also, it was considered marijuana use if they reported to have consumed marijuana more than once a month during the last 30 days.

Table 5 shows alcohol and marijuana use by race-ethnicity by wave. Alcohol use was more commonly reported by 37% of the Mexican Americans six years after baseline compared to 32% of the White adolescents (χ 2=11.91, p<.001) and also thirteen years later after baseline when 39% of the Mexican Americans reported having used alcohol compared to 35% of the Whites (χ 2=7.02, p<.001).

In the case of marijuana use, differences between the two groups at baseline were not significant. However, Whites reported higher marijuana use six years after baseline compared to Mexican Americans ($\chi 2=38.68$, p<.001). Such difference was reversed thirteen years later when 82% of the Mexican Americans reported having used marijuana compared to 76% of the Whites ($\chi 2=20.63$, p<.001.

		Mexican-A	merican	Whi	tes		
		Ν	%	Ν	%	χ2	p-value
Alcohol u	use						
Wave 1	Yes	326	19.94	2,137	20.37	.163	
	No	1309	80.06	8,353	79.63		
Wave 3	Yes	446	36.98	2,517	31.98	11.91	***
	No	760	63.02	5,354	68.02		
Wave 4	Yes	465	38.91	2,909	34.99	7.02	***
	No	730	61.09	5,405	65.01		
Marijuai	na use						
Wave 1	Yes	267	16.73	1,574	15.19	2.51	
	No	1329	83.27	8,785	84.81		
Wave 3	Yes	195	16.14	1,911	24.25	38.68	***
	No	1013	83.86	5,969	75.75		
Wave 4	Yes	981	82.09	6,342	76.17	20.63	***
	No	214	17.91	1,984	23.83		

Table 5

*p<.05; **p<.01; ***p<.001

Alcohol and marijuana use distribution by parenting style and race-ethnicity is presented in Table 6. Alcohol use was more commonly reported by Mexican American adolescents with permissive parents ($\chi 2=3.68$, p<.01) and with neglectful parents ($\chi 2=81.92$, p<.05).

Also, marijuana use was more commonly reported by Mexican American youth shoes parents were authoritarian ($\chi 2=2.16$, p<.05), permissive ($\chi 2=1.77$, p<.05) and neglectful ($\chi 2=2.09$, p<.05).

Alcohol and marijua	na use by	parental	style and r	ace-ethnic	eity			
	Mexic	an-					χ2	p-
	Ameri	ican	Whit	es	Tot	al	test	value
	Ν	%	Ν	%	Ν	%		
ALCOHOL USE								
Authoritative								
No	286	78.36	2,660	77.42	2,946	77.51	.167	
Yes	79	21.64	776	22.58	855	22.49		
Authoritarian								
No	266	72.09	1,581	69.31	1,847	69.70	1.15	
Yes	103	27.91	700	30.69	803	30.30		
Permissive								
No	416	86.85	2,691	89.76	3,107	89.36	3.68	**
Yes	63	13.15	307	10.24	370	10.64		
Neglectful								
No	304	81.5	1,282	82.02	1,586	81.92	81.92	*
Yes	69	18.5	281	17.98	350	18.08		
MARIJUANA USE								
Authoritative								
No	319	88.61	2,924	85.85	3,243	86.11	2.07	
Yes	41	11.39	482	14.15	523	13.89		
Authoritarian								
No	257	71.19	1,677	74.83	1,934	74.33	2.16	*
Yes	104	28.81	564	25.17	668	25.67		
Permissive								
No	424	90.21	2,736	92.03	3,160	91.78	1.77	*
Yes	46	9.79	237	7.97	283	8.22		
Neglectful	-							
No	295	80.82	1,293	83.96	1,588	83.36	2.09	*
Yes	70	19.18	247	16.04	317	16.64		

*p<.05; **p<.01; ***p<.001

Table 6

Exploratory Analysis

Preliminary screening of the data was conducted to see the distribution of alcohol and marijuana use by parental style and race ethnicity by wave (see Table 7). We plotted the substance use frequency by parental style and race ethnicity to evaluate whether we could model the outcomes as a linear trend over the thirteen number of years from baseline, or we should modify the approach. Figure 3 presents the trajectories of alcohol use by parenting style comparing Mexican Americans and Whites by years after baseline (0, 1, 6 and 13). In general terms, the four parenting styles depict a similar pattern with the most important rate of increase of alcohol use taking place from baseline to the first six years for both groups. The rate of increase is slower from year six to the thirteen years follow up. This pattern allowed to consider three points of analysis: at baseline, at the six and at the thirteen years follow up.

Those adolescents whose parents were authoritarian at baseline reported to have the highest proportion of alcohol use followed by those with authoritative, neglectful and permissive parents. Permissive parenting style depicted the lowest use at baseline but the highest alcohol use for both groups at six and at the thirteen years follow up.

Adolescents whose parents were authoritarian had the highest alcohol use at baseline, but reported the lowest alcohol use at the six and the thirteen years follow up for both groups.

ALCOHOL USE								
_				Whites				
	0	%	6	%	13	%	Z	p- value
Authoritative								
Yes	776	17.65	1,822	41.45	1,798	40.90	34.29	***
No Authoritarian	2,660	61.02	769	17.64	930	21.34		
Yes	700	22.95	1,198	39.28	1,152	37.77	22.04	***
No Permissive	1,581	59.15	465	17.40	627	23.45		
Yes	307	8.95	1,532	44.66	1,591	46.38	41.07	***
No Neglectful	2,691	61.86	817	18.78	842	19.36		
Yes	1,282	59.82	410	19.13	451	21.05	24.16	***
No	281	15.86	716	40.41	775	43.74		
_			Mexi	can Am	erican			
-	0	%	6	%	13	%	Z	p- value
Authoritative								
Yes	79	18.12	186	42.66	171	39.22	10.63	***
No Authoritarian	286	59.21	97	20.08	100	20.70		
Yes	103	22.29	183	39.61	176	38.10	9.76	***
No Permissive	266	60.45	83	18.86	91	20.69		
Yes	63	12.38	227	44.60	219	43.03	14.33	***
No	416	60.28	137	19.86	137	19.86		
Neglectful								
Yes	69	18.85	148	40.44	149	40.71	9.62	***
No	304	56.4	114	21.15	121	22.45		

Alcohol and marijuana use by parental style, race-ethnicity and years after baseline

Table 7

MARIJUANA USE

		Whites				
 0	%	6 %	13	%	Z	p- value

Authoritative

Yes	482	15.19	596	18.78	2,096	66.04	50.34	***
No	2,924	52.65	1.995	35.92	635	11.43		
Authoritarian	,		,					
Yes	564	24.51	1,198	39.28	1.152	37.77	30.07	***
No	1.677	49.48	1.221	36.03	491	14.49		
Permissive	,		,					
Yes	237	8.82	546	20.31	1,905	70.87	53.87	***
No	2,736	53.90	1,811	35.68	529	10.42		
Neglectful	,		,					
Yes	247	16.63	298	20.07	940	63.30	32.32	***
No	1,293	53.70	825	34.26	290	12.04		
-			Mexi	can Am	erican			
-	0	0/	C.	0/	12	0/		р-
	0	%	6	%	13	%	Z	value
Authoritative Yes	41	12.21	16	14.04	221	a 1 a 5	10.17	* * *
No	41	13.31	46	14.94	221	/1./5	18.17	* * *
Authoritarian	319			00.01	= 0	0.01		
rumornunun		52.55	238	39.21	50	8.24		
Ves		52.55	238	39.21	50	8.24		
Yes	104	52.55 28.03	238 56	39.21 15.09	50 211	8.24 56.87	12.29	***
Yes No	104 257	52.55 28.03 49.05	238 56 211	39.2115.0940.27	50 211 56	8.24 56.87 10.69	12.29	***
Yes No Permissive	104 257	52.55 28.03 49.05	238 56 211	39.2115.0940.27	50 211 56	8.24 56.87 10.69	12.29	***
Yes No Permissive Yes	104 257 46	52.55 28.03 49.05 11.89	238 56 211 47	39.2115.0940.2712.14	50 211 56 294	8.24 56.87 10.69 75.97	12.29 21.76	***
Yes No Permissive Yes No	104 257 46 424	52.55 28.03 49.05 11.89 52.93	238 56 211 47 315	 39.21 15.09 40.27 12.14 39.33 	50 211 56 294 62	 8.24 56.87 10.69 75.97 7.74 	12.29 21.76	***
Yes No Permissive Yes No Neglectful	104 257 46 424	52.55 28.03 49.05 11.89 52.93	238 56 211 47 315	 39.21 15.09 40.27 12.14 39.33 	50 211 56 294 62	 8.24 56.87 10.69 75.97 7.74 	12.29 21.76	***
Yes No Permissive Yes No Neglectful Yes	104 257 46 424 70	52.55 28.03 49.05 11.89 52.93 20.53	238 56 211 47 315 42	 39.21 15.09 40.27 12.14 39.33 12.32 	50 211 56 294 62 229	 8.24 56.87 10.69 75.97 7.74 67.16 	12.29 21.76 16.48	***

*p<.05; **p<.01; ***p<.001



Figure 3 Distribution of Alcohol use by Parental Style and Race-ethnicity

Figure 4 presents the trajectories of marijuana use by parenting style comparing Mexican Americans and Whites by years after baseline (0, 1, 6 and 13). Adolescents whose parents were authoritarian had the highest rates of use of marijuana at baseline for both groups. White adolescents whose parents were permissive had the highest rate of use at the six and thirteen years follow up. In the case of Mexican Americans, those whose parents were authoritarian had the highest rate of use at baseline and at the six years follow up. But children of those Mexican American parents who were permissive at baseline ended with the highest rate of use at the thirteen years follow up.



Figure 4 Distribution of Marijuana use by Parental Style and -Race-ethnicity

Analysis was developed to considering the following aims to corresponding hypothesis: Aim 1: To explore if there are differences in alcohol and marijuana use among Mexican American and Whites at baseline, in the six years follow up and at thirteen years after baseline.

Associations of race-ethnicity with alcohol use

Hypothesis H1a: Independent of other factors, Mexican American adolescents are more likely to consume alcohol than Whites at baseline, increase use at a faster rate in the following six years and more likely to consume more at thirteen years later.

Table 8 shows adjusted odds ratios for alcohol and marijuana use by race-ethnicity. We did not find significant association between race ethnicity and alcohol use at baseline. Adjusted by potential confounders, Mexican Americans were 22% more likely to use alcohol at the six years follow up (AOR= 1.22, 95% CI (1.02-1.46), p<.05). No significant association was found at the thirteen years follow up.

These findings support the hypothesis that Mexican American adolescents are more likely to use alcohol but only at the six years follow up.

Associations of race-ethnicity with marijuana use

Hypothesis H1b: Independent of other factors, Mexican American adolescents are more likely to consume marijuana than Whites at baseline, increase use at a faster rate in the following six years and more likely to consume more at thirteen years later.

Adjusted by potential confounders, associations showed that Mexican American adolescents were 37% more likely to use marijuana at baseline than White adolescents (AOR= 1.37, 95% CI (0.88-1.82), p<.01). Mexican Americans were 63% more likely to use marijuana than White adolescents at the six years follow up (AOR=1.63, 95% CI (0.80-0.90), p<.001) and no difference was found at the 13 years. These findings support the hypothesis that Mexican American adolescents are more likely to use alcohol but only at baseline and at the six years follow up.

Aim 2: To explore the association of the family SES level on alcohol and marijuana use in Mexican American and White adolescents.

Associations of Family SES with substance use

Hypothesis H2a: Independent of the race-ethnicity, higher family SES level is associated with higher rates of alcohol use at baseline, increases use at a faster rate in the following six years and have higher use at thirteen years after baseline.

Table 8 presents the associations of Family SES with alcohol and marijuana use. In models including all potential confounders, we observed that Family SES was not associated with alcohol use at baseline (AOR= 1.08, 95% CI (0.97-1.20), p>.05). However, adolescents in higher Family SES were 4% more likely to use alcohol at six years (AOR=1.04, 95% CI (1.18-1.65), p<.001) and 19% more likely to use alcohol after 13 years (AOR=1.19, 95% CI (1.08-1.31), p<.001).

Findings contribute to accept the hypothesis for the six and thirteen years follow up.

Using stratified analysis, we observed that White adolescents with higher SES were more 24% more likely to use alcohol after 13 years (AOR=1.24, 95% CI (1.12-1.37), p<.001).

Hypothesis 2b: Independent of the race-ethnicity, higher Family SES level is associated with higher rates of marijuana use at baseline, increases use at a faster rate in the following six years and have higher use at thirteen years after baseline.

Adjusted by potential confounders we observed that Family SES was not associated with marijuana use at baseline. However, adolescents in higher Family SES were 6% more likely to use marijuana at six years (AOR=1.06, 95% CI (1.04-1.10), p<.001) and 25% more likely to use marijuana after 13 years (AOR=1.25, 95% CI (1.06-1.39), p<.01).

Findings contribute to accept the hypothesis that higher family SES level is associated with higher rates of marijuana use at the following six years and have higher use at thirteen years after baseline.

Also, using stratified analysis we observed that White adolescents with higher SES had 4% more odds of using marijuana at six years (AOR=1.04, 95% CI (1.01-1.08), and 27% more odds of using marijuana after 13 years (AOR=1.27, 95% CI (1.06-1.08, p<.001).

		Alcoh	ol		Marijua	na
	AOR	р	CI (95%)	AOR	р	CI (95%)
Race-ethnicity						· · ·
(Mexican Americans vs Whites)						
Baseline	1.21		0.98 - 1.50	1.37	**	0.88 - 1.82
Linear trend, 0 to 6 years	1.22	*	1.02 - 1.46	1.63	***	0.80 - 0.90
Follow Up at 13 years	0.94		0.78 - 1.14	1.10		0.64 - 1.19
Family SES Level						
Baseline	1.08		0.97 - 1.20	.929		0.82 - 1.05
Linear trend, 0 to 6 years	1.04	***	0.88 - 1.25	1.06	***	1.04 - 1.10
Follow Up at 13 years	1.19	***	1.08 - 1.31	1.25	**	1.06 - 1.39
Mexican American						
Baseline	1.04		0.76 - 1.40	0.79		0.56 - 1.11
Linear trend, 0 to 6 years	1.08		0.80 - 1.45	0.81		0.53 - 1.23
Follow Up at 13 years	0.88		0.66 - 1.16	0.72		0.51 - 1.05
Whites						
Baseline	1.08		0.96 - 1.21	0.96		0.84 - 1.08
Linear trend, 0 to 6 years	1.05		0.94 - 1.17	1.04	*	1.01 - 1.08
Follow Up at 13 years	1.24	***	1.12 - 1.37	1.27	***	1.06 - 1.46

 Table 8

 Adjusted Odds ratios for Alcohol and Marijuana use by Race-ethnicity and Family SES level

*p<.05; **p<.01; ***p<.001

(1) likelihood test for effect modification of race-ethnicity on the association of family SES and substance use at baseline, 70.6, p<.000 for alcohol use and 75.120, p<.000 for marijuana use.

(2) likelihood test for effect modification of race-ethnicity on the association of family SES and substance use at 6 years follow up, 2416.5, p<.000 for alcohol use and 7271.5, p<.000 for marijuana use.

(3) likelihood test for effect modification of race-ethnicity on the association of family SES and substance use at 13 years follow up, 6.5, p>.05 for alcohol use and 16.41, p<.05 for marijuana use

Aim 3

To explore the association of parenting styles on alcohol and marijuana use at baseline, in the

following six years and at thirteen years after baseline.

Association of parenting style and alcohol use

Hypothesis 3a: Parental style is associated with the use of alcohol use at baseline, has a

different growth in the rate of alcohol use in the following six years, and in use at thirteen years.

Findings with the adjusted odds ratios for alcohol use and marijuana use by parenting

style and race-ethnicity can be found in Table 9.

Adjusted by potential confounders, associations showed that adolescents whose parents were authoritarian were 48% more likely to use alcohol at baseline compared to those whose parents were authoritative (AOR=1.48, 95% CI (1.27-1.71), p<.001). Also, youth whose parents were permissive were 42% less likely to use alcohol at baseline (AOR=.58, 95% CI (0.51-0.67), p<.001). Adolescents whose parents were authoritarian at baseline were 31% more likely to use alcohol at the six years follow compared to those with authoritative parenting style (AOR=1.31, 95% CI (1.17-1.46), p<.001), and adolescents with permissive parents were 22% less likely to use alcohol at the six years follow up compared to those with authoritative parenting style.

No association was found between authoritarian, permissive and neglectful parenting style and alcohol use at the thirteen years follow up. Findings allow to support the hypothesis of association between parenting style and alcohol use for baseline and the six years follow up only.

Association of parenting style and marijuana use

Hypothesis 3b: Parental style is associated with the use of marijuana use at baseline, has different growth in the rate of alcohol use in the following six years, and in use at thirteen years.

Adjusted by potential confounders, associations showed that adolescents whose parents were authoritarian were 87% more likely to use marijuana at baseline compared to those whose parents were authoritative (AOR=1.87, 95% CI (1.67-2.81), p<.001). Also, adolescents whose parents were permissive were 25% less likely to use marijuana at baseline to those whose parents were authoritative (AOR=.75, 95% CI (0.49-0.80), p<.001). Adolescents whose parents were

neglectful at baseline were 44% more likely to use marijuana at baseline compared to those whose parents were authoritative (AOR=1.44, 95%CI (1.03-1.82), p<.001).

Adolescents whose parents were authoritarian at baseline were 65% more likely to use marijuana at the six years follow up compared to those whose parents were authoritative (AOR=1.65, 95% CI (1.41-19.3) p<.001). Adolescents whose parents were permissive at baseline had 29% less odds of using marijuana at the six years follow up compared to those whose parents were authoritative (AOR=.81, 95% CI (0.71-0.93), p<.01). Youth whose parents were neglectful at baseline were 23% more likely to use marijuana than those whose parents were authoritative at the six years follow up (AOR=1.23, 95% CI (1.03-1.47) p<.05).

Adolescents whose parents were authoritarian at baseline were 15% less likely to use marijuana after thirteen years (AOR=0.85, 95% CI (0.72-1.01) p<.05). No association was found between permissive and neglectful parenting style and marijuana use at the thirteen years follow up.

Findings support the hypothesis that parental style is associated with the use of marijuana use at baseline, has different growth in the rate of alcohol use in the following six years, and in use at thirteen years.

Association of parenting style and race-ethnicity and alcohol use

Hypothesis 4

H4a: The association of parenting style and alcohol use between Mexican Americans and Whites differs at baseline, in the following six years, and at the follow up at thirteen years.

Alcohol use and race-ethnicity at baseline

No association was found between being Mexican American and alcohol use for those adolescents with authoritarian, permissive and neglectful parents at baseline.

However, White adolescents whose parents were authoritarian were 51% more likely to use alcohol than those whose parents were authoritative at baseline (AOR=1.51, 95% CI (0.98-2.17), p<.001). Also, White adolescents whose parents were permissive at baseline were 43% less likely to use alcohol compared to those whose parents were authoritative at baseline. (AOR=0.57, 95% CI (0.48-0.66), p<.001). No association was found at baseline for White adolescents whose parents were neglectful.

Alcohol use and race-ethnicity at the six years follow up

Mexican adolescents whose parents were authoritarian were 53% more likely to use alcohol compared to those whose parents were authoritative at the six years follow up. (AOR= 1.53, 95% CI (1.03-2.26), p<.05). Mexican American adolescents whose parents were permissive were 37% less likely to use alcohol than those whose parents were authoritative at the six years follow up (AOR=.63, 95% CI (0.43-0.93), p<.05). No significant association was found for those adolescents whose parents were neglectful at the six years follow up. White adolescents whose parents were authoritarian were 51% more likely to use alcohol at the six years follow up compared to those whose parents were authoritative (AOR=1.51, 95% CI (1.30-0.88), p<.001). White adolescents whose parents were permissive were 51% less likely to use alcohol at the six years follow up compared to those whose parents were authoritative (AOR=.49, 95% CI (0.42-0.69), p<.001). White adolescents whose parents were authoritative 7% less likely to use alcohol at the six years follow up than those whose parents were authoritative (AOR= 0.93, 95% CI (0.78-1.03), p<.01).

Alcohol use and race-ethnicity after 13 years

No association was found between alcohol use and authoritarian, permissive and neglectful parenting style for Mexican American adolescents.

No association was found between alcohol use and authoritarian and permissive parenting style for White adolescents. However, White adolescents whose parents were neglectful were 18% less likely to use alcohol after 13 years (AOR= 0.82, 95% CI (0.69-1.1), p<.05).

H4b: The association of parental style and marijuana use between Mexican Americans and Whites differs at baseline, in the following six years, and use at thirteen years.

Marijuana use and race-ethnicity at baseline

Mexican American adolescents whose parents were authoritarian were 245% more likely to use marijuana at baseline than those whose parents were authoritative (AOR=3.45, 95% CI (2.17-5.48), p<.001). No association was found at baseline for Mexican American adolescents whose parents were permissive. Moreover, Mexican American adolescents whose parents were neglectful were 201% more likely to use marijuana at baseline compared to those whose parents were authoritative (AOR=1.83, 95% CI (1.83-4.91), p<.001).

White adolescents whose parents were authoritarian were 70% more likely to use marijuana at baseline compared to those whose parents were authoritative (AOR=1.70, 95% CI (1.42-2.03), p<.001). White adolescents whose parents were permissive were 29% less likely to

use marijuana at baseline than those whose parents were authoritative (AOR=.71, 95% CI (0.60-0.85), p<.001). White adolescents whose parents were neglectful were 27% more likely to use marijuana at baseline than those whose parents were authoritative (AOR= 1.27, 95% CI (1.03-1.57), p<.05).

Marijuana use and race-ethnicity at the six years follow up

Mexican American adolescents whose parents were authoritarian were 371% more likely to use marijuana at the six years follow up compared to those whose parents were authoritative (AOR= 4.71, 95% CI (2.62-8.48), p<.001). No association was found between permissive parenting style and marijuana use for Mexican American adolescents. Mexican American adolescents whose parents were neglectful were 248% more likely to use marijuana at the six years follow up than those whose parents were authoritative (AOR=3.48, 95% CI (1.89-6.42), p<.001).

White adolescents whose parents were authoritarian were 107% more likely to use marijuana at the six years follow up compared to those whose parents were authoritative (AOR=2.07, 95% CI (1.69-2.53%), p<.001). White adolescents whose parents were permissive were 50% less likely to use marijuana at the six years follow up compared to those whose parents were authoritative (AOR=0.50, 95% CI (0.41-0.61), p<.001). White adolescents whose parents were neglectful were 28% more likely to use marijuana at the six years follow up compared to those whose parents were neglectful were 28% more likely to use marijuana at the six years follow up compared to those whose parents were neglectful were 28% more likely to use marijuana at the six years follow up compared to those whose parents were authoritative (AOR=1.28, 95% CI (0.85-1.36%), p<.05).

Marijuana use and race-ethnicity at the thirteen years follow up

No association was found for authoritarian neither permissive parenting style and marijuana use among Mexican-American adolescents at the thirteen years follow up. Mexican American adolescents whose parents were neglectful were 37% more likely to use marijuana at the thirteen years follow up compared to those with authoritative parenting style (AOR=1.37, 95% CI (0.79-2.38), p<.05).

No association was found for authoritarian, permissive neither neglectful parenting style and marijuana use among White adolescents at the thirteen years follow up.

		Ita	ee etimenty			
		Alco	hol		Mari	juana
	OR	р	CI (95%)	OR	р	CI (95%)
Parenting Style (vs A) Baseline	uthoritativ	ve)				
Authoritarian	1.48	***	1.27 - 1.71	1.87	***	1.67 - 2.81
Permissive	0.58	***	.51 - 0.67	0.75	***	0.49 - 0.80
Neglectful	1.04		.88 - 1.24	1.44	**	1.03 - 1.82
Linear Trend 0 to 6 interaction	o years					
Authoritarian	1.31	***	1.17 - 1.46	1.65	***	1.41 - 1.93
Permissive	0.78	***	0.71 - 0.86	0.81	**	0.71 - 0.93
Neglectful	0.90		0.80 - 1.01	1.23	*	1.03 - 1.47
Follow Up at 13 years						
Authoritarian	0.96		0.82 - 1.11	0.85	*	0.72 - 1.01
Permissive	0.92		0.84 - 1.04	1.08		0.94 - 1.23
Neglectful	0.81		0.69 - 0.95	1.09		0.93 - 1.31
Stratified Analysis by Authoritative)	Race-Eth	nicity fo	or Parental style	(vs		
Mexican-American Baseline						
Authoritarian	1.46		0.98 - 2.17	3.45	***	2.17 - 5.48
Permissive	0.66		0.4597	1.02		0.63 - 1.64
Neglectful	1.20		0.78 - 1.84	3.01	***	1.83 - 4.91
Whites				2.01		
Baseline						

 Table 9: Adjusted Odds ratios for Alcohol and Marijuana use by Parenting Style and Race-ethnicity

Authoritarian	1.51	***	0.98 - 2.	17	1.70	***	1.42 -	2.03
Permissive	0.57	***	0.48 - 0.	.66	0.71	***	0.60 -	0.85
Neglectful	1.05		0.87 - 1.	26	1.27	*	1.03 -	1.57
lrtest	2.56				9.15			
p value	0.46				0.02			
Linear Trend 0 to 6 year	s, intera	ction						
Mexican-American								
Linear Trend 0 to 6 ye	ars							
Authoritarian	1.53	*	1.03 - 2.	26	4.71	***	2.62 -	8.48
Permissive	.63	*	0.43 - 0.	.93	0.91		0.51 -	1.62
Neglectful	1.16		0.77 - 1.	.77	3.48	***	1.89 -	6.42
Whites								
Linear Trend 0 to 6 ye	ars							
Authoritarian	1.51	***	1.30 - 0.	88	2.07	***	1.69 -	2.53
Permissive	0.49	***	0.42 - 0.	.69	0.50	***	0.41 -	0.61
Neglectful	0.93	**	0.78 - 1.	.02	1.28	*	0.85 -	1.36
lrtest	3.06				9.12			
р	0.38				0.03			
Follow Up at 13 years								
Mexican-American								
Authoritarian	1.16		0.77 - 3	3.1	0.79		0.48	1.29
Permissive	0.86		0.61 -	1.3	1.06		0.67	1.67
Neglectful	0.68		0.46 - 1	1.8	1.37	*	0.79 -	2.38
Whites								
Authoritarian	0.91		0.78 -	1.2	0.85		0.71 -	1.02
Permissive	0.94		0.82 - 1	1.1	1.06		0.92 -	1.23
Neglectful	0.82	*	0.69 - 1	1.1	1.05		0.86 -	1.28
lr test	3.06			1	0.29			
<u>р</u>	0.38				0.01			

*p<.05; **p<.01; ***p<.001

(1) likelihood test for effect modification of race-ethnicity on the association of parenting style and substance use at baseline, 2.56, p>.05 for alcohol use and 9.5, p<.05 for marijuana use.

(2) likelihood test for effect modification of race-ethnicity on the association of parenting style and substance use at 6 years follow up, 3.06, p>.05 for alcohol use and 9.12, p<.05 for marijuana use.

(3) likelihood test for effect modification of race-ethnicity on the association of parenting style and substance use at 13 years follow up, 3.06, p>.05 for alcohol use and 10.29, p<.05 for marijuana use

Finally, multivariable models were used to evaluate the association of interest with other covariate variables. Table 2A (see Appendix) presents the adjusted odd ratios for alcohol use, race ethnicity and covariates. Girls were less likely to use alcohol at baseline compared to boys (AOR=0.73, 95% CI (0.76-0.81), p<.001) but ended being more likely than boys to use alcohol at the thirteen years follow up (AOR=1.23, 95% CI (1.13-1.35), p<.05). Those individuals who were studying high school were more likely to use alcohol at baseline than those in middle school (AOR=1.48, 95% CI (1.21-1.80), p<.001), also were more likely to use alcohol at the six years follow up (AOR=1.22, 95% CI (1.07-1.38), p<.01) and at the thirteen years follow up (AOR=1.17, 95% CI (0.99-1.38), p<.05). Those adolescents of less accultured families, who had Spanish as a language spoken at home, were less likely to use alcohol at the six years follow up compared to those who spoke English at home (AOR=0.80, 95% CI (0.64-1.01), p<.05). Children who had a poor parent-youth relationship were more likely to use alcohol at baseline compared to those with an average parent-youth relationship (AOR=1.42, 95% CI (1.08-1.85), p < .05). Those with a good parent-youth relationship were less likely to use alcohol at baseline compared to those with an average parent-youth relationship (AOR=0.79, 95% CI (0.67-0.93), p < .01). Also, those with an excellent parent-youth relationship were less likely to use alcohol at baseline compared to those with an average parent-youth relationship (AOR=0.48, 95% CI (0.40-0.58), p<.001) and at the six years follow up (AOR=0.79, 95% CI (0.69-0.89), p<.01).

Table 3A (see Appendix) presents the adjusted odd ratios for marijuana use, race ethnicity and covariates. Analysis by gender showed that girls were less likely to use marijuana compared to boys at baseline (AOR=0.83, 95% CI (0.74-0.92), p<.001) and at the six years follow up and this trend reversed at the thirteen years follow up when girls were more likely than boys to use marijuana (AOR=1.10, 95% CI (1.00-1.22), p<.001). Youths who were studying

high school were more likely to use alcohol at baseline than those in middle school (AOR=1.90, 95% CI (1.50-2.38), p<.001) and also were more likely to use alcohol at the six years follow up than those in middle school (AOR=1.26, 95% CI (1.01-1.48), p<.05).

Adolescents who were born in the U.S. were more likely to use marijuana than those who were born abroad at baseline (AOR=1.23, 95% CI (1.07-1.40), p<.01) and at the six years follow up (AOR=1.19, 95% CI (1.05-1.34), p<.01).

Those youths whose families used Spanish as language at home compared to those whose language was English were less likely to use marijuana at baseline (AOR=0.65, 95% CI (0.43-0.95), p<.05) and at the six years follow up (AOR=0.53, 95% CI (0.37-0.78), p<.001).

The measure of parents acculturation showed that those adolescents who had one of the parents born in the US were more likely to use marijuana at baseline compared to those who had both parents born abroad (AOR=1.45, 95% CI (1.00-2.11), p<.05). Furthermore, those adolescents who had both of the parents born in the US were more likely to use marijuana at baseline compared to those who had both parents born abroad (AOR=1.50, 95% CI (1.02-2.17), p<.05).

The parent youth relationship results show that those adolescents with a poor parentyouth relationship were more likely to use marijuana compared to those who had an average parent-youth relationship at baseline (AOR=1.86, 95% CI (1.40-2.47), p<.01) and also at the six years follow up (AOR= 2.12, 95% CI (1.59-2.82), p<.01). Those with a good parent-youth relationship were less likely to use marijuana compared to those who had an average parentyouth relationship at baseline (AOR=0.78, 95% CI (0.65-0.93), p<.01) and also at the six years follow up (AOR= 0.83, 95% CI (0.70-1.00), p<.05). Those adolescents who had an excellent parent youth relationship were less likely to use marijuana compared to those who had an average parent-youth relationship at the six years follow up (AOR=0.52, 95% CI (0.43-0.62), p<.001) and at the thirteen years follow up (AOR=0.94, 95% CI (0.79-1.12), p<.001).

Chapter V – Discussion

Discussion

The purpose of this study was to enhance the understanding of the parental stules associated with alcohol and marijuana use in adolescents which can have long term effects on the trajectory of use as well as on health and social consequences across the life course. This study was aimed to add to the parenting styles literature by identifying different outcomes in the sample of White and Mexican American adolescents with the information collected by the Add Health Survey longitudinally at three different time points. These findings may inform public health efforts to improve parenting interventions in order to deter substance use during adolescence, which is the period of greatest risk for substance use initiation and escalation. Also, findings of the stratified analysis contribute to clarify racial-ethnic disparities and serve as targets for interventions.

Substance use needs to be seen as a dynamic developmental phenomenon where trajectories differ in part by the initiation of substance use and the progression of use over time. Our findings show a fast rate of increase of alcohol and marijuana use during the first two waves which are consistent with the fact that alcohol and marijuana increase their use at a fast rate during adolescence in the transition from late childhood to late adolescence (Cruz, King, Mechammil, Bamaca, & Robbins, 2018).

However, most of the studies on longitudinal research in substance use are based in non-Hispanic White population compared to Hispanic population, and there is a need to have research on Mexican American population where the different trajectory patterns can be depicted in order to identify the high-risk users in the two groups for this study.

Few studies have investigated patterns among White and Mexican American adolescents because in many cases, analyses were developed analyzing the Latino population as a whole but not its subgroups (Mogro-Wilson, 2008; Mogro-Wilson, 2013). Our results comparing Mexican American and White adolescents found evidence for heterogeneity of the effects of parenting styles in alcohol and marijuana use at the three different time points of the analyzed sample.

Associations of race-ethnicity with alcohol use

Our first hypothesis that Mexican American adolescents are more likely to consume alcohol than Whites at baseline, in the six years follow up and at thirteen years after baseline was not completely supported. We found that both groups had the same odds of using alcohol at baseline which gives a new perspective on the need to disaggregate data by ethnic subgroup at different time points.

However, we found that six years later, Mexican American youths have more odds of using alcohol and this difference decreases during the next seven years when difference is nonsignificant with White adolescents. Further research is needed to understand this different because the pattern is not consistent with other studies. For example, the Monitoring the Future study developed by the University of Michigan (Johnston et. al, 2018) reported that Hispanic had higher alcohol use (reported as use during the last 30 days) than Whites at the same baseline period of the Add Health Survey (1994) and that this pattern continued over time. Our data do not support such findings that found that Mexican-Americans have higher rates of alcohol use compared to Whites at baseline.

A possible explanation to this difference six years later where Mexican Americans have higher odds of alcohol use than Whites could be the fact that Add Health Survey is conducted

among school populations and Mexican Americans have had since 1980, the lowest rates of high school completion compared to Whites and other ethnic groups which could lead to an overrepresentation of those who self-reported past 30 days use of alcohol (Gonzales, Wong, Toomey, Millsap, Dumka, & Mauricio, 2014).

However, our findings contrast support to those reported by the National Survey on Drug Use and Health in 2007, where the prevalence rates of 30-day alcohol use in people aged 12–17 years were higher for Whites with 18.2% followed by Hispanics with 15.2% (Substance Abuse and Mental Health Services Administration, 2017).

Associations of race-ethnicity with marijuana use

Adolescence is the developmental period where most of the people use marijuana for the first time. According to Kahn et. al., (2014), national data show that 23.4% of high school students reported past 30-day use of marijuana in 2013.

Additionally, in the United States, the non-medical use of marijuana has been decriminalized in 15 states and legalized in 11 states as of June 2019 (National Conference of State Legislatures, 2020). This political climate has opened a long-term debate regarding the importance to examine patterns of adolescent marijuana use to consider how they may change once marijuana becomes legally available for recreational use. Different studies have argued that there would be an increase in use because the price would change making it more affordable to young people, that it would be more available to youth and that the use would be normalized (Anderson & Rees, 2014; Friese & Grube, 2013). Other studies suggest that adolescent use will remain stable or increase marginally because the existing and proposed statutes prohibit selling to minors and illegal sale of this product would be a risk for sellers (Johnson, 2015). Also, that many states that have marijuana laws for medical use have not experienced increase and finally, and not less important, that adolescents report that before any decriminalization and legislation, they do have access to marijuana (Anderson, et al., 2014, Johnson, et al., 2015, Anderson, et al., 2014).

One fact is that marijuana use among adolescents in the United States has been decreasing during the last years, but the differences in consumption across racial/ethnic groups has not been clearly understood given that minorities maintain high levels of use (Keyes, Wall, Feng, Cerda, & Hasin, 2017). Racial-ethnic differences in trends over time are heterogeneous and despite there has been a decrease of marijuana use during the last 20 years, there is no clear understanding of the differences of use between race ethnicity. An epidemiological study found that marijuana use was traditionally more common among White than non-White adolescents during the 1990s and the following decade (Keyes et al., 2017). However, Johnson and colleagues (2015) analyzed current marijuana use among high school students using the National Youth Risk Behavior Survey and found that during the period between 1999 and 2013, 23.4% of the Hispanic (not Mexican American) adolescents had current marijuana use which was higher than the 22% of the White youth. Although comparisons are difficult to make given the differences in methodology, Compton and colleagues (2004) found that the increases in the prevalence of marijuana use were most notable among young Hispanic adolescents between 1991 and 2002.

Our hypothesis that Mexican American adolescents are more likely to consume marijuana than Whites was supported only for baseline and during the next six years, but not

thirteen years later. This could be explained because of an earlier exposure to substance use among Mexican Americans compared to Whites in Waves I and III where the gap starts closing to have no differences at Wave IV.

Also, our findings are consistent with the data of the Monitoring the Future Survey (Johnston et al., 2017), where Hispanic eight-graders in 1995 were more likely than Whites to have used marijuana in the past month (13 percent compared to 8 percent for White adolescents). At the time students reached tenth grade, both Hispanics and Whites were close to 18 percent but at 12th grade, White adolescents had higher rates compared to Hispanics in 2008 (20 percent compared to 17 percent).

Associations of Family SES with substance use

The transition from adolescence to adulthood is a part in the human development where plans can meet with realities that come after students graduate from high school. But also, it is the period of exposure to substance use which places adolescents at risk and where protective factors need to be present to deter experiences with alcohol or illicit drug use. The exposure to those experiences is differentiated and structured by the family SES (Conger, 2010; Settersen, 2005).

Consistent with other studies, we found that the Family SES is associated with substance use (Patrick, et al., 2012). Our results showed that independently of race-ethnicity, Family SES is associated with alcohol and marijuana use at the 6 years follow up and 13 years after baseline. Results demonstrate that for both substances, high family SES was positively associated with alcohol and marijuana use. Stratified analysis reported that White adolescents with high family SES level had 50% more odds of using alcohol and 27% more odds of using marijuana at the

follow up thirteen years later compared to those with low family SES. This is consistent with studies that have identified that youth from families with higher SES have a greater likelihood of substance use (Patrick, et al., 2015). This could be explained in part because adolescents of more affluent families may have greater risk of engaging in anxiety or depression-related substance use because they experience greater achievement pressure and are isolated from parents who are absent longer due to their career demands (Luthar, 2003). Our findings also concur with those of Johnston and colleagues that reported that that students in 12th grade whose parents had high average educational level would have higher 30-day prevalence of marijuana use than those with low educational level. However, they also found that 28% of the 8th graders with low average parental education had 30-day prevalence use of alcohol compared to 18% of those with high average parental education; but more than 40% of 12th graders whose parents had low average educational level had substance use compared to more than 50% of those kids in the same grade whose parents had higher educational level (Johnston et al, 2017). This could be explained in part because those adolescents whose parent have a higher educational level which could represent higher SES could have less availability to monitor and supervise their children's activities at the time they provide higher economic resources that allow them higher access to alcohol and marijuana (Luthar, 2003). Also, access to higher income contexts as universities or higher income neighborhoods may contribute to exposure to higher levels of substance use given that children could socialize with substance-using peers (Trim & Chassin, 2008).

Association of parenting style and substance use

Previous research has informed that the use of functional parental styles for the upbringing of children is of crucial importance because at this stage kids look for independence

and also may try to explore new behaviors, which, without proper guidance could be deviant (Steinberg, 2001). It is at this stage when good parenting practices can favor appropriate physical and mental development of their youth and also reduce future behavioral risks. (Steinberg, 2001). An adequate parenting style can help reducing negative influence of peers and to develop better skills to avoid the negative consequences of substance use (Becoña et. al, 2001). An inadequate parenting style can lead to aggressive behaviors, to alcohol abuse or to drugs (Lamborn, et al., 1991; Aguilar, 2004).

In our study, we found that independently of the race-ethnicity, the association of parenting style with substance use demonstrated two main outcomes: the negative effect of the authoritarian parenting style and the protective effect of the permissive parenting style.

First, adolescents whose parents were authoritarian at baseline and at the six years follow up were more likely to use alcohol than those whose parents had exerted the authoritative parenting style. Youths whose parents were authoritarian at baseline up were more likely to use marijuana at Waves I, III and IV compared to those whose parents had exerted the authoritative parenting style. Authoritarian parents, described in the literature as those who try to shape, control and evaluate their children's behavior based on a rigid and absolute set of standards, who use low warmth and high control of the children (Baumrid, 1978; Spera, 2005; Maccoby & Martin, 1983), were found to have a strong association with substance use in adolescents.

A second important finding has to do with the protective effects of the permissive parenting style. Baumrid (1971) described these parents with low control of their kid's behavior but with high warmth in their relationship, with moderate expectations regarding their children's behavior and being tolerant to misbehavior (Spera, 2005). We found that independently of raceethnicity, permissive parenting style would be more protective than authoritative parenting style

to deter alcohol and marijuana use at baseline and also along the six years linear trend. We did not find association in the long term, thirteen years later.

Association of parenting style, race-ethnicity and substance use

A wide body of literature has considered the strong effect and indirect effects that parenting styles have on the child development (Becoña, et al., 2012, Baumrid, 1991; Steinberg, 2001; Shakyea, et al. 2012). A particular emphasis has been given to parental control and warmth as key factors of the parenting styles practices (Kim, et al., 2018). It would seem that the Baumrid's framework and typology using the different levels of warmth and control would be cross-culturally robust and that parenting styles would be similar in different social contexts. However, relations between parents and children seem to have race-ethnicity as a moderator (Kim, et al., 2018).

Previous research has documented that White children respond to authoritative parenting styles achieving better outcomes than those with authoritarian parents with the same raceethnicity. Also, academic success has been negatively associated with authoritarian and permissive parents (Cardona, et al., 2000). Authoritative parenting can be associated with the most adaptive outcomes regarding adolescent substance use. It is associated with less use of alcohol, tobacco and illicit drugs in children and adolescents (Berge, Sundell, Ojehagen, & Häkansson, 2016). Authoritative parenting style as initially described by Baumrid (1971), is associated with higher levels of competence and psychosocial maturity among adolescents compared with other peers whose parents were authoritarian, permissive or neglectful (Steinberg, 2001).

However, our findings show two remarkable outcomes. First, they confirm what previous studies had reported. Baumrid's findings considered that adolescents whose parents exerted authoritarian parenting style had negative developmental outcomes as aggression, anxiety, depersonalization, somatic complaints, depersonalization, substance use and anxiety (Baumrid, 1971; Kuppens & Ceulemans, 2018; Shakya, et al., 2012; Hoeve, Blokland, & Dubas, 2008). We found that authoritarian parenting styles in White adolescents are associated with higher odds of alcohol and marijuana use at baseline and six years later. It would seem that the influence of authoritarian and permissive parenting style that a White child was exposed to would extend to the early adulthood only since no significant associations were found at the thirteen years follow up.

The most significant outcome for the White adolescents is evidenced in the association of authoritarian parenting style and marijuana use because of the higher risk of use. The odds of using marijuana are 70% higher at baseline, and 107% higher six years later in comparison with those whose parents were authoritative. This is consistent with findings in other studies that show a negative effect of authoritarian style on substance use (Aguilar, et al, 2004; Garcia & Gracia, 2009).

Second, the permissive parenting style was found to have a better protective effect than authoritative parenting style which was considered as optimal in most of the literature. Authoritative parenting has been associated with the most adaptive outcomes regarding adolescent substance use. It is associated with less use of alcohol, tobacco and illicit drugs in children and adolescents (Berge, Sundell, Ojehagen, & Häkansson, 2016; Mogro-Wilson, 2013; Baumrid, 1991; Steinberg, 1994). Nevertheless, our findings show that those White adolescents whose parents were permissive were less likely to use alcohol and marijuana at baseline and six
years later than those whose parents were authoritative. These findings are consistent with those of Lamborn and colleagues who found that permissive parenting styles may have some similarities with the authoritative parenting style because it fosters an environment of acceptance, dialogue and affection where adolescents can have as a result a strong sense of selfconfidence because their parents are warm, however, as they do not exert control properly their children have higher frequencies of substance use, misuse and school misbehavior (Lamborn, et al., 1991). Some other studies reported that also these kids whose parents were permissive develop social skills, self-confidence, self-understanding, and active problem coping (Domenech, Donovick, & Crowley, 2009; Calafat, Garcia, Juan, Becoña, & Fernandez, 2014; Becoña, Martinez, Calafat, Juan, Fernandez, & Secades, 2011).

The stratified analysis of the association of parenting styles for Mexican American adolescents evidenced a positive association of alcohol use and authoritarian parenting style in Mexican-Americans at the six years follow up. The association of authoritarian parenting style and marijuana use shows that those youths whose parents were authoritarian at baseline had 245% more odds of using marijuana at baseline and 371% more odds of using marijuana six years later in comparison with those whose parents were authoritative.

Our findings also contradict those of Mogro-Wilson who reported that authoritarian parenting style function as a protective factor against substance use for Hispanic families in general and Mexican American families in particular. (Mogro-Wilson, 2008). While some studies have found that Hispanics practice more authoritarian parenting style, others have considered that authoritative parenting style has been more commonly used in this group (Ayon, Rankin, Marsiglia, Ayers, & Kiehne, 2015).

Permissive parenting style was found to be a protective factor against substance use of Mexican American adolescents at the six years follow up only. These findings correspond with Ozier and colleagues who found that Mexican-American adolescents who perceived their mothers as permissive being more accepting and warmth but with low control of the children's behavior, reported lower levels of substance use (Ozier et al., 2011). These authors also found that strict control (authoritative parenting) was not associated with reductions in substance use.

Furthermore, the association is also important for those kids who were raised with neglectful parenting styles compared to families where authoritative parenting style was practiced. Mexican adolescents whose parents were neglectful at baseline had 248% more odds of using marijuana six years later.

It would seem that the characterization of parenting styles based on the framework developed by Baumrid is inconclusive. Race-ethnicity may be important to consider when examining how parenting styles are associated with alcohol and marijuana use because ethnic groups may have different perspectives on parenting styles.

However, previous research lead to different findings in the literature regarding parenting styles that found for Hispanic populations which contrast with our results. Some researchers consider that Mexican American parents tend to use more authoritative than authoritarian practices (Donovick & Domenech, 2008) which our findings do not support. Our results also do not correspond to those reported by Mogro-Wilson (2008) relating to the fact that high amounts of parental control and low warmth (authoritarian parenting style) function positively for Hispanic families in general and Mexican American families in particular (Mogro-Wilson, 2008).

From our perspective, further longitudinal studies are needed to see which is the magnitude of the association between high warmth and low control with substance use among these two ethnic groups. If it is corroborated that the permissive parenting style represents a protective factor deterring substance use, modifications to the parenting psychoeducational programs curriculum should be considered.

Particular attention should also be given to the acculturation variables included in the models as covariates. We used three variables to measure acculturation as the social and psychological influences that occur because of continuous contact between individuals of a different culture (Mogro-Wilson, 2013). We measured youth acculturation as the language spoken by the adolescent, family acculturation to see which language was spoken at home and parents' acculturation to see if any or both parents were born abroad.

Our findings reported significance for family acculturation, when Spanish was spoken at home, adolescents were less likely to use on substance use at baseline at the six years follow up. We find that in this sense, keeping the mother language represent that families still keep their values, norms, interest and traditional parents of the Mexican culture at home. But also, we found that youth acculturation is associated with higher odds of using marijuana at baseline and at the six years follow up. This would mean that those youth that are more accultured are more exposed to substance use. The increase of substance use risk among more acculturated Mexican adolescents may be due in part to changes in the cultural orientation where traditional cultural values regulating substance use are substituted by more liberal social norms in the mainstream or the American society (Kopak, 2012).

A wide body of research has suggested that the earlier that an adolescent immigrates to the United States, it is to say, the longer exposure to acculturation and language acquisition he

could have, may increase the risk of use illicit drugs (Lipsky & Caetano, 2009). The Add Health survey does not provide information regarding country of origin of the adolescent to see if those who are more accultured are U.S. born which would mean that they have been exposed a longer period to the American culture. Also, further research would be needed to see the association of acculturation, family SES and substance use.

Adolescents living in households where one or both parents are U.S. born have higher odds of using marijuana compared to those where none of the parents are American. Again, when parents are less accultured we could assume that traditional norms and familismo may work as a protective factor. When one or both parents are more accultured, different norms and values regarding substance use may exhibit more flexibility or acceptance of substance use. The traditional cultural values first generation immigrants have could be seen as protective which enhance regulation of substance use (Kopak, 2012). The increase of substance use risk among more acculturated Mexican adolescents may be due in part to changes in the cultural orientation where traditional cultural values regulating substance use are substituted by more liberal social norms in the mainstream or the American society.

Our findings correspond partially with previous research. Mogro-Wilson (2013) analyzed the impact of language spoken at home on parental control in Latino households and the effects of control on substance use. She found that when English is spoken in the home, there is a decrease of parental control because the Latino family and the adolescent are more accultured to the American standards and, parents have a decreased control on the adolescent's behavior which could lead to an increase in substance use. In this sense, acculturation to United States involves English speaking proficiency, and in doing so, the adolescents interactions change. One adolescent that is able to communicate with peers with greater English-speaking proficiency may

be in greater risk of coming across more pro-substances peer influences or of perceiving substance use as a normative behavior (Unger, 2000).

Recently immigrated Mexican families cope with a variety of stressors that come with the acculturation process given the need of socialization into the host dominant culture and the desire of becoming a part of a new community. Cultural changes involve changes of attitudes and behaviors resulting from contact with elements of the new cultural environment (Berry, 2006). Different studies have shown that the greater level of acculturation is associated with greater substance use among Mexican-American adolescents (Marsiglia et al., 2014).

One covariate we used in this study was the parent-youth relationship which has been found to be associated with substance use (Mogro-Wilson, 2008; Mogro-Wilson, 2013; Rusby et al., 2018).

Our analysis was consistent with such previous research showing a positive association between poor parent-youth relationship and alcohol use and a negative association when the relationship is excellent at baseline. Also, findings reported the positive association between poor parent-youth relationship and marijuana use and a negative association when the relationship is excellent at the thirteen years follow up. Research has found that the quality of the parent-youth relationship becomes a predictor of substance use in high school adolescents and our findings are consistent with those reported by Rusby and colleagues (2018).

These findings should be considering for the development of prevention programs curriculum to include tools to improve parent-youth relationship.

Conclusion

This study reaffirms the importance of understanding racial-ethnic differences in patterns of substance use among adolescents. We have informed the existing differences in alcohol and substance use among White and Mexican American adolescents using the Add Health Survey data. We reported the association of high family socioeconomic status with substance use mainly in White adolescents.

Our findings emphasize the need to give special attention to Mexican American adolescents given the strong association of parenting styles and substance use in Mexican American adolescents. Our findings suggest that this group is at higher risk of substance use than the American youths.

Health policies should consider the role of parental styles to enhance protective factors to deter substance use. It is critical to understand that parents play an important role in preventing, deterring and reducing the odds of substance use. We reported a strong association between authoritarian parenting style and marijuana use in Mexican American adolescents needs to be addressed.

Additional cultural factors need to be taken into account to complement the parenting styles framework which may not be clearly addressing the needs of this population. Some researchers have questioned the universal suitability of the model that was developed for middle class Americans which could not reflect cultural norms of other populations as the Hispanics (Domenech Rodriguez et al., 2009).

In this sense, we consider that further research is needed for Mexican American adolescents to also analyze the association of acculturation and the parent-youth relationship with marijuana use. Our findings evidence an association of youth acculturation, parents acculturation and family acculturation with marijuana use. We also found an association between parent-youth relationship with marijuana use which needs to be considered for targeted interventions.

This is important to emphasize the need for conducting additional adaptation studies with alternative evidence-based parenting interventions to target different ethnic populations (Parra-Cardona, Bybee, Sullivan, Domenech, Dates, Tams, Bernal, 2017). Efforts need to be done to deter substance use that puts adolescents in higher risk of school problems due to absences and poor or failing grades, social problems as lack of participation in activities according to their age, legal problems due to driving or hurting someone while drunk or under the effects of marijuana , physical problems as hangovers and illnesses (i.e. hepatic damage), unwanted, unplanned and unprotected sexual activity, sexual or physical assault while intoxicated, higher risk of homicide and suicide, car crashes or intentional injuries as falls, drowning or burns, memory problems, abuse of other substances, negative effects on brain development due to chronic use of alcohol and marijuana.

The 2011 Health and Human Services Action Plan to Reduce Racial and Ethnic Health Disparities invited researchers to analyze disparities and propose initiatives to reduce health gaps (Kohn, Graham, & Glied, 2011). Social workers need to evaluate where and how to best use substance use prevention, intervention and treatment resources with the understanding of

substance use patterns to support and provide services among adolescents who identify with different ethnic groups (Galvan & Caetano, 2003).

However, many parents of Mexican-American adolescents face additional challenges in comparison with parents of White adolescents. Mexican origin parents, but particularly those who are undocumented immigrants face stressful and impoverished environments and challenges related to poverty, limited English proficiency, documentation status, acculturation and more recently, risks of being deported and separated of their families. These factors affect the sense of self-efficacy of parents and target oriented interventions focused on these families are needed (Ayon, Rankin, Marsiglia, Ayers, & Kiehne, 2015). Although positive outcomes of interventions conducted to improve parenting have been documented many practitioners also experience difficulties engaging families into programs because in many cases parents experience fear of attending public places where they fear being asked for documents proving legal residence. For that reason, community-based programs are relevant to promote confidence among participants.

Limitations

While this study contributes to the knowledge base on the influence of the parenting styles on substance use, it has several limitations. One of the primary limitations is that data for the analysis were collected between 1995 and 2008 meaning that the records are more than ten years old.

Second, most of the studies on longitudinal research in substance use are based in non-White population compared to Hispanics population, and there is a need to have research on Mexican American population where the different trajectory patterns can be depicted in order to identify the high-risk users in the two groups for this study.

A third limitation of the study is that despite we utilize longitudinal data, one important assumption was that the parental style parents had at baseline would prevail during all of the adolescence. In this sense, the assumption would mean that parenting was the same during all of the developmental process of their kids, which not necessarily happened.

However, we find that being this one of the few studies comparing the outcomes among White and Mexican-America adolescents, findings may be beneficial for the planning of social work interventions in Mexican-American communities mainly and to take into consideration ethnic differences when working with heterogeneous race-ethnic groups.

We assumed that social constructs of Mexican American families of acculturation and *familismo* did not suffered significant changes during the period between 1995 and 2008 and were kept during the time transition of the cohort from adolescence to adulthood. However, some findings found thirteen years later could be affected for psychological and developmental

changes over this period which could not be necessarily influenced by the parenting styles but more by the context each respondent had after thirteen years.

Despite the typology developed by Diane Baumrid (2001) has been of great influence for parenting research, recent research has highlighted the fact that this typology pays little attention to the role of psychological control because it considers only the practices that parents have to socialize with the goal of integrating the child to the family and the society (Kuppens & Ceulemans, 2018).

A fourth limitation is that our study considers that maternal and parental parenting styles have a joined impact on the child development. Add Health survey questionnaire is developed to have one parent answering the additional questions in the in-home interview. Such answers are given by the parent living with the kid and in 78% of the cases was the mother. Our results depicting parenting styles describe a whole set of attitudes and practices described by the mothers assuming that could extend to both parents.

Another important limitation of the study is that the parenting styles framework was conceptualized using majority White, middle class families' values, cultural norms and parental expectancies (Domenech, 2009). In this sense, many of the inferences made regarding adolescent's outcomes may be based on parenting styles which may not capture the full range of parenting styles used by parents of Mexican American families.

Another limitation of this study is that the Baumrid framework does not consider the parent-youth relationship as a parental factor that we have reported to influence the use of alcohol or marijuana. The analytical framework should be widened to analyze longitudinal data regarding incorporating also variables of acculturation when analyzing Mexican American adolescents' behavioral patterns.

Finally, this study is restricted to school youth and cannot be generalizable to other population.

Implications for Policy, Practice, and Research

Implications for practice

Social work research has been increasingly called to propose, design and elaborate prevention curriculum to address the challenge of adolescent substance use. According to the American Academy of Social Work and Social Welfare (AASWSW), everyday behavioral health problems in childhood and adolescence take a heavy toll on millions of lives which, for decades, have been addressed treating them after they have been identified. Such approach has had a high and ongoing cost to young people, families and communities. A wide body of research has been emerging in the last decades showing that behavioral health problems can be prevented. For that reason, AASWSW formulated twelve Social Work Grand Challenges in 2015.

Our study was developed in accordance with the 12th Grand Challenge that embraces the need of prevention to advance policies, programs, funding and workforce preparation needed to prevent behavioral health problems among young people, but especially those at greatest disadvantage or risk. This 12th Grand Challenge was defined to "Ensure healthy development for all youth" which demanded to develop strong evidence to prevent (AAASWSW, 2015).

Results from this dissertation are particularly relevant in the light of the need to reduce the negative consequences of alcohol and marijuana use among adolescents. We have tried to demonstrate the effects along that substance misuse can have in their life trajectories. Adolescents will transition to adult life and it is demanding to provide parents with enough skills to prevent that they jeopardize their academic life and future for the negative effects of the use of alcohol and or marijuana. If we consider that according to the Surgeon General, the cost of substance misuse to society is estimated in \$442 billion each year considering that 10 million full-time workers have

a substance use disorder, it is clear that there would be a benefit to develop timely evidence-based interventions and would be well justified. (Surgeon General, 2020).

Implications for Policy

Adolescents do not simply use alcohol or marijuana because they are morally weak but because there are a wide range of individual, social, environmental factors that influence their decision (Spooner, 1999).

This study emphasizes the need of considering racial differences between groups but also to understand differences within groups. We have seen that same parenting styles may influence substance use in different ways and that optimal parenting is not so easy to define.

For this reason, it is critical to expand access to effective and evidence-based interventions to guide parents to develop skills to deter that their youths engage in substance use.

There is an increasing need of prevention curriculums from evidence-based model programs that can be funded at the federal, state or county levels that can be implemented to increase prevention of substance use among adolescents. In this sense, social workers play a critical role in raising issues in the process of designing and testing culturally grounded prevention models based on evidence and created in partnership with other discipline professionals and also teachers, students, counselors and parents. Evidence-based interventions and programs need to be used to reduce the negative consequences that alcohol and marijuana use have on adolescents, their families and their communities as a whole.

When attention is not given to prevention programs the cost to society of the development of substance use misuse can be translated in healthcare costs, lost productivity,

school drop-out, criminal justice costs, partial and even direct or indirect deaths. In fact, substance used disorders are a leading cause of disability which could have been prevented.

Parents, schools, faith communities and social service organizations should be involved in the delivery of evidence-based prevention programs. The development of feasible effective parenting programs demands approaches that apply theory-based interventions of parenting to specific groups but also, engagement of participant representatives in the development of the intervention (Parra-Cardona, et. al, 2008).

Parenting programs to enhance skills and improve parent-youth relationship should be widely delivered considering school settings or community-based organizations. Parenting programs should be designed to address the common risk and protective factors that influence substance use that affect adolescents. However, parents, teachers and community members should be able to develop basic skills to provide guidance and support to the youths.

Implications for Research

An important interest in the understanding of parent behaviors and its influence on children health risk behaviors is present in public health research with the aim of developing programs to modify parenting behaviors which can lead to beneficial health outcomes for children (Jackson & Dickinson, 2009).

In this sense, we consider that identifying only risks factors could misguide researchers and planners to consider if emphasis is not given to enhance the counterpart that are the protective factors when developing prevention programs. There is a need to improve parenting ways of control and monitoring of the youth activities as well as finding better ways to provide

warmth and affection to their youth with the help of psycho educational interventions could act as a restraint to drug use and the family can act as a restraining force against deviant behavior.

If we consider that according to the Surgeon General, the cost of substance misuse is estimated to cost society \$442 billion each year considering that 10 million full-time workers have a substance use disorder, the benefit of evidence-based interventions is well justified. (Surgeon General, 2020).

Importance should be given to provide parenting programs to deter substance use at an early stage of development. The role that individuals, families, organizations and communities should be considered to address use the major issue of alcohol and marijuana among adolescents. The particular effects that alcohol and/or marijuana have on the brain of the adolescents place them at an increased risk of developing a substance used disorder during their life spam. For this reason, it is critical to expand access to effective and evidence-based interventions to guide parents to develop skills to deter that their youths engage in substance use.

According to our findings, interventions should consider race-ethnicity and cultural background when developing and addressing parenting interventions because of the heterogeneity of the family behaviors facing adolescent development.

For instance, our results depict that in the case of the White adolescents, especial emphasis should be given to families with high SES level who cannot address correctly parenting tasks due to distance with their own children due to their professional activities. Improvement of parenting skills at the school settings could provide parents with basic tools to be able to provide their kids and adolescents with high parental warmth and clear limits that are negotiated.

Research has shown that parenting is one of the main tasks in the lives of the Latino parents in general (Parra-Cardona, et. al, 2008) and Mexican-American parents in particular

(Mogro-Wilson, 2013). However, lack of knowledge and parenting skills in this group has demonstrated that use of authoritarian or neglectful styles are associated with alcohol but mainly with marijuana use of their kids.

Evidence-based interventions are needed considering the protective factor that family acculturation has to deter alcohol and marijuana use among Mexican American adolescents which could be explained by the features of *familismo* in those households where one or both of the parents were born in Mexico.

This dissertation did not analyze the legal status of Mexican American adolescents and parents, but it is important to consider that unauthorized legal status is associated with a wide range of psychological and contextual risks mechanisms that both parents and children experience. Permanent fear of deportation of any of the family members and the hardship of being undocumented that means being excluded of schools, workplaces, community services, as well as social welfare programs have psychological impact that needs to be analyzed to develop parenting programs for this particular community.

Despite parenting programs have shown to be effective to prevent behavioral and emotional difficulties with children, special attention should be given to the context and culture where the program is going to be delivered. There is a need of particular policies to provide families with unauthorized status to access psychoeducational programs which would be beneficial to provide them with skills to manage the parenting challenges. These families could eventually deal differently with the adversities of their unauthorized status which translates into psychological stress that could lead to adverse effects of an inadequate parenting style. Special attention should be given to those youths whose parents have been deported because it would be important in case they are US citizens that they can stay within their own community during their

transitional foster care. And it would be important as well to provide with parenting skills to foster care parents of these kids to manage the additional psychological distress they experience. Additional research should be conducted to measure the impact on parenting styles and family interactions of the changes to the migration policy that since 2017 have increased or prioritized deportation or detention of unauthorized status immigrants. Recent studies have found that detention or deportation of a family member is associated with alcohol use and significant externalizing behaviors among Latino adolescents (Roche, White, Lambert, 2020).

Appendix

Missing values by variable

	Ν	%
Race Ethnicity	81	0.02
Age	87	0.02
Gender	81	0.02
Family SES Level	81	0.02
Respondents educational attainment	81	0.02
Parents education attainment	369	1.01
Youth Acculturation	81	0.02
Family Acculturation	81	0.02
Parents Acculturation	1,641	4.50
Parent-youth relationship	324	0.90
Parenting styles	870	2.40
Alcohol Use Wave 1	47	0.39
Alcohol Use Wave III	3,068	25.21
Alcohol Use Wave IV	2,663	21.88
Marijuana Use Wave I	217	1.78
Marijuana Use Wave III	3,058	25.12
Marijuana Use Wave IV	2,651	21.78

	Alcohol								
	Baseline			6	6 years	follow up	1	3 years	follow up
	AOR	р	CI (95%)	AOR	р	CI (95	%) AOR	р	CI (95%)
Parenting styles									
Authoritarian	1.48	***	1.27 - 1.71	1.31	***	1.17 - 1	.46 0.96		0.82 - 1.11
Permissive	0.58	***	0.51 - 0.67	0.78	***	0.71 - 0	.86 0.92		0.84 - 1.04
Neglectful	1.04		0.88 - 1.24	0.90		0.80 - 1	.01 0.80		0.69 - 0.95
Race Ethnicity									
Mexican American					**	0.92 - 0	.99		
Age	1.25	***	1.02 - 1.56	1.11	***	1.08 - 1	.15 0.90	***	0.86 - 0.93
Gender									
Female	0.73	***	0.67 - 0.81	1.05		0.99 - 1	.12 1.23	***	1.13 - 1.35
Family SES									
High	1.07		0.97 - 1.19	1.17	***	1.09 - 1	.26 1.17	**	1.06 - 1.29
Respondents educational attainment									
High School	1.48	***	1.21 - 1.80	1.22	**	1.07 - 1	.38 1.17	*	0.99 - 1.38
Youth acculturation									
US born	1.04		0.93 - 1.17	1.04		0.96 - 1	.12 0.95		0.85 - 1.05
Family Acculturation									
Spanish	0.82		0.58 - 1.15	0.80	*	0.64 - 1	.01 0.88		0.64 - 1.22
Parents acculturation									
One parent	1.10		0.80 - 1.53	1.01		0.81 - 1	.26 0.97	1	0.71 - 1.32
Both parents	1.18		0.86 - 1.64	1.03		0.82 - 1	.27 0.86		0.63 - 1.18
Parent-youth relationship									
Poor	1.42	*	1.08 - 1.85	1.16		0.94 - 1	.44 0.80		0.60 - 1.06
Good	0.79	**	0.67 - 0.93	0.95		0.84 - 1	.07 1.11		0.94 - 1.31
Excellent	0.48	***	0.40 - 0.58	0.79	***	0.69 - 0	.89 1.06	-	0.89 - 1.25
*p<.05; **p<.01; ***p<.001									
	Ν	12143		N N groups (schools) N groups			20191	N	9809
	N groups		140			ups ols) ups	140	N grou	ups 140
	Chi2		722.8		(kids)	~P 0	11517	Chi2	93.03
					Chi2	4	328.67		

Table 2A Adjusted Odd ratios for alcohol use, race ethnicity and covariates

	Marijuana use											
		seline	6	years	follow u	р	13 years follow up					
	AOR	р	CI (9	5%)	AOR	р	CI (9	5%)	AOR	р	CI	(95%)
Parenting styles												
Authoritarian	1.869	***	1.67	- 2.8	1.65	***	1.41 -	1.93	0.85	***	1.41	- 1.93
Permissive	0.75	***	0.49	- 0.8	0.81	**	0.71 -	0.93	1.08	**	0.71	- 0.93
Neglectful	1.44	**	1.03	- 1.8	1.23	*	1.03 -	1.47	1.09	*	1.03	- 1.47
Race Ethnicity												
Mexican American	1.45	**	1.15	- 1.82	1.69	***	1.32 -	2.15	1.09		0.88	- 1.35
Age	1.10	***	1.04	- 1.15	0.967		0.92 -	1.01	1.05	*	1.01	- 1.10
Gender												
Female	0.83	***	0.74	- 0.92	0.63	***	0.57 -	0.69	1.10	*	1.00	- 1.22
Family SES												
High Respondents educational attainment	0.95		0.83	- 1.06	1.06		0.95 -	1.19	0.90	*	0.81	- 1.00
High School	1.90	***	1.50	- 2.38	1.26	*	1.01 -	1.48	0.87		0.73	- 1.03
Youth acculturation												
US born	1.23	**	1.07	- 1.40	1.19	**	1.05 -	1.34	1.00		0.89	- 1.12
Family Acculturation												
Spanish	0.65	*	0.43	- 0.95	0.53	***	0.37 -	0.78	1.78		1.18	- 2.69
Parents acculturation							-					
One parent	1.45	*	1.00	- 2.11	1.37		0.96 -	1.94	1.00		0.69	- 1.45
Both parents	1.50	*	1.02	- 2.17	1.36		0.96 -	1.92	1.07		0.74	- 1.55
Parent-youth relationship												
Poor	1.86	**	1.40	- 2.47	2.12	***	1.59 -	2.82	0.95		0.69	- 1.29
Good	0.78	**	0.65	- 0.93	0.83	*	0.70 -	1.00	0.80		0.90	- 1.30
Excellent	0.45		0.37	0.6	0.52	***	0.43 -	0.62	0.94	***	0.79	- 1.12
*p<.05; **p<.01; ***p<.001												
	Ν		12143			N N groups (schools) N groups (kids) Chi2		20064		N		9100
	N groups	5	140					140		N groups		140
	Chi2		579.88					11479		Chi2		101.09
								664.57				

Table 3A Adjusted Odd ratios for marijuana use, race ethnicity and covariates

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