2018

# Illegal Drug Use, Suicidal Ideation, and Attempted Suicide Among New York Adolescents

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2018

Abstract

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MPH, Florida A&M University, 2009

BS, Albany State University, 2007

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

August 2018

## Abstract

Suicide, ranked as one of the top five causes of death among adolescents, aged 15 to 19, claims numerous lives within the state of New York. Driven by the social cognitive theory, the objective of this quantitative cross-sectional study was to investigate the association among being offered, sold, or given illegal drugs, illegal drug use, being bullied, age, gender, ethnicity, suicidal ideation, and attempted suicide among adolescents in New York. The Centers for Disease Control 2015 Youth Risk Behavior Surveillance data for 89,068 New York adolescents, Grades 9-12, were utilized in this study. There was increased risk of suicide ideation among those who were offered/sold/given drugs on school property (OR = 1.665), used heroin (OR = 2.735 - 4.186), Hispanic/Latino (OR = 1.466) or American Indian/Alaskan Native (OR = 1.802), aged 12 or younger (OR = 6.762), were bullied (OR = 2.728), and female (OR = 2.248). There was an increased risk of attempted suicide among those who were offered/sold/given drugs (OR = 1.578), currently used marijuana on a monthly basis or more (OR = 1.366-1.634), used heroin (OR = 5.023-20.267), aged 12 or younger (OR = 3.209), Black (OR = 1.443), Hispanics/Latino (OR = 1.976), American Indian/Alaskan Native (OR = 2.497), or of multiple races (OR = 2.121), were bullied (OR = 2.032) and female (OR = 1.822). These results served to support all the study's alternative hypotheses and the theoretical foundation of this study, and were consistent with findings of previous research. This study has implications for positive social change: the results could be used by Public Health practitioners to affect adolescent suicidal ideation and potentially suicide with the possibility of reducing adolescent morbidity and mortality.

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# Dedication

This Doctoral Study is in dedication to my irreplaceable, wise and loving parents. To my mother you continue to be my anchor throughout all storms. Mom and Dad it was through both of your encouragement that I continued to forge ahead. I am honored to dedicate this body of work to the both of you. Please know we have accomplished this tremendous mission together. I love you and thank you both for your unconditional love and support.

# Acknowledgments

I would be remiss if I did not take the opportunity to acknowledge God who has truly been the second pair of footsteps in the sand as I walked this arduous journey. I must also thank the village of family, friends, and colleagues who have been my cheerleaders and provided me with invaluable pearls of wisdom. I also would like to acknowledge my committee chair, Dr. Peter Anderson and second committee member, Dr. James Rohrer. The insight and guidance that you both provided was a true asset while crafting this doctoral study.

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## Introduction

Among adolescents who use illegal drugs, some use them as a result of the problems they face in their lives (National Institute on Drug Abuse, 2014): difficulties in academics, health problems, and difficulties among others (National Institute on Drug Abuse, 2014). Suicide has been studied over the course of the last two decades as a cause of death among adolescents (Chakravarty, Shah, & Lotfipour, 2013).

According to Inman, van Bakergem, LaRosa, & Carr, (2011) individuals who used illegal drugs were at a higher risk of committing suicide than those who did not use any illegal drugs. The outcome of this research may play a role in the reduction of deaths that could be related to suicide. There is a need to come up with prevention approaches and intervention strategies for this issue (Conner, Bagge, Goldston, & IIgen, 2014). The studies conducted in the recent past are national studies and are not specific to adolescents in Grades 9-12 in New York (Pompili et al., 2012). They may have general implications for the public, but may not be relevant to this study's target population. Knowledge acquired from the study may provide a deeper understanding of how to reduce and prevent suicidal attempts by some adolescents. This study investigated the association between illegal drug use, suicidal ideation, and attempted suicide among adolescents in Grades 9-12 in New York. The study has implications for positive social change: It could (a) alert a small group of educators/parents of adolescents as to whether an adolescent is at risk of suicidal ideation and/or attempted suicide and (b) save an adolescent's life.

Included in this chapter are the following topics: the problem statement, purpose of the study, research questions and hypotheses, framework, theoretical foundation for the study, nature of the study, literature review, definitions, assumptions, scope, delimitations, significance, summary, and conclusions that makes clear the need to explore the association between illegal drug use, suicidal ideation, and attempted suicide among adolescents in Grades 9-12 in New York. The theoretical framework that I used to investigate the association between illegal drug use and attempted suicide and suicidal ideation is also outlined. Additionally, research questions and hypotheses are listed within this chapter. In this chapter, I have also detailed the literature search strategy.

## Problem Statement

Illegal drug use, suicidal ideation, and suicide attempts are common problems among adolescents (Sharma, Nam, Kim, & Kim, 2015). Use of illegal drugs correlates with suicidal tendencies among the general population (Lopes, Nobrega, Del Prette, & Scivoletto, 2013) indicating the use of alcohol and drugs among adolescents are closely related to the presence of suicidal behavior. The topic of adolescent suicide and drug use has recently received extended reviews by scholars (Sharma, Nam, Kim, & Kim, 2015). The role of illegal drug use in the pathogenesis and presentation of suicidal behaviors in adolescents is an interesting area that awaits detailed empirical studies (Sharma, Nam, Kim, & Kim, 2015). According to Sharma, Nam, Kim, and Kim (2015), illegal drug use in adolescents increases the likelihood of suicidal ideation. According to Neinstein (2013), suicide has been identified as the third top cause of death amid adolescents

between the ages of 15 and 19 and is associated with various factors; among them is illegal drug use.

The purpose of this study was to test whether there is an association between illegal drug use and attempted suicide and suicidal ideation among adolescents in Grades 9-12 in New York State. While some recent studies have been conducted on the association between illegal drug use and suicide (Brockie et al., 2015; Cohen, Spirito, & Brown, 2013; Liu, Case, & Spirito, 2014; Wong, Zhou, Goebert, & Hishinuma, 2013), little has been done focusing upon this specific demographic. Although national studies may have general implications for the public, they may not be relevant to this study's target population. Furthermore, this research filled a gap in the literature while building upon previous research in testing a relationship among a specific group of adolescents (e.g., Grades 9 – 12 in New York).

## Purpose of the Study

The purpose of this quantitative, cross-sectional study was to investigate the association between illegal drug use, suicidal ideation, and attempted suicide among adolescents in Grades 9-12 in New York State. Attempted suicide and suicidal ideation were the dependent variables; the independent variables were the availability of an illegal drug on school property, illegal drug use, being bullied, age, gender, and ethnicity. A multiple logistic regression model was used with all six independent variables and the control measures.

## Research Questions and Hypotheses

The following research questions were tested:

$RQ_1$ –What is the association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_2$ –What is the association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_3$ –What is the association between age and attempted suicide among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between age and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between age and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_4$ –What is the association between ethnicity and attempted suicide among

adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between ethnicity and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between ethnicity and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_5$ –What is the association between being bullied and attempted suicide among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between being bullied and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between being bullied and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_6$ –What is the association between gender and attempted suicide among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between gender and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between gender and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_7$ –What is the association between the availability of an illegal drug on school property and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between the availability of an

illegal drug on school property and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between the availability of an illegal drug on school property and suicidal ideation among adolescents in Grades 9-12 in New York.

$RQ_8$ –What is the association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York.

$RQ_9$ –What is the association between age and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between age and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between age and suicide among ideation adolescents in Grades 9-12 in New York.

$RQ_{10}$ –What is the association between ethnicity and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between ethnicity and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between ethnicity and suicidal

ideation among adolescents in Grades 9-12 in New York.

$RQ_{11}$ –What is the association between being bullied and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between being bullied and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between being bullied and suicide among ideation adolescents in Grades 9-12 in New York.

$RQ_{12}$ –What is the association between gender and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between gender and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between gender and suicidal ideation among adolescents in Grades 9-12 in New York.

A multiple logistic regression model was used with all six independent variables—being offered, sold, or given an illegal drug on school property, using an illegal drug, being bullied, age, gender, and ethnicity—to predict the most parsimonious model of the outcome.

## Framework

The most appropriate public health theory for this research study was the social cognitive theory, it is based on the understanding of the impact that other social interactions, media influences, and personal experiences have on the acquisition of knowledge (Basen-Engquist et al., 2013). The theory provided a clear platform of

understanding whether suicidal thoughts were connected to the behavior of engaging in illegal drug use (Szanto et al., 2012). For the purposes of this research study, illegal drugs refer to marijuana and heroin.

## Theoretical Foundation for the Study

The objective of this study was to establish how illegal drug use is related to attempted suicide and suicidal ideation among adolescents in Grades 9-12 in New York. I employed the social cognitive theory (SCT) as a framework to help explain the outcomes of this study. Numerous social theories have been formulated to explain the developmental changes that people experience throughout their lives. One of the theories is the social cognitive theory, which was developed to explain the developmental changes that adults and adolescents undergo during their lives (Bjorklund & Causey, 2017). It is an interpersonal level theory that focuses on the dynamic interaction between people, their environment, and their behavior. The three main constructs of this theory are personal factors, their behavior and their environments.

Social cognitive theory employs reciprocal determinism to illustrate the association among personal factors, people's environments, and their behaviors. These factors constantly influence one another (Young, Plotnikoff, Collins, Callister, & Morgan, 2014). SCT can be used to show the positive outcome of performing a positive behavior (Miranda et al., 2012).

The logical connection between the key constructs of the theory is as follows: Our environment affects both our behavior and personal factors (Young, Plotnikoff, Collins, Callister, & Morgan, 2014). At the same time, our behavior is affected by our personal

factors (Young, Plotnikoff, Collins, Callister, & Morgan, 2014). In turn, our behavior affects our environment. Illegal drug use is a behavior that may be influenced by the environment of the user. As a result, the personal factor (suicidal ideation, age, ethnicity, being bullied, and gender) affects the behavior of the user (illegal drug use, availability, attempted suicide). Additionally, the effect of the environment (school property) can be investigated to determine its influence on illegal drug use (Young et al., 2014).

The SCT emphasizes the changes in the psychosocial operation of both adults and adolescents. According to Ramirez, Kulinna & Cothran (2012), human development is not a monumental process. Instead, human abilities are determined by their psychobiologic origin. Thus, human development entails a myriad of different patterns and types of changes (Ramirez, Kulinna & Cothran, 2012). For the purposes of the study, it was important to examine if there was a correlation between the two factors under investigation (Miranda et al., 2012). Young et al. (2014) asserted that variety in social practices generates extensive individual differences in proficiencies, some of which are cultured and some remain uncultivated. Young et al. (2014) further asserted that human beings tend to acquire beliefs about the environment and themselves over the course of their development. These beliefs are based on a personal sense of worth, lovability, and control (Young et al., 2014). They can be maladaptive or adaptive, depending on the long-term experiences with significant situations and people (Young et al., 2014).

Table 1

*The Link Between Theory Constructs and Study Variables*

| Social cognitive theory constructs | Study variables |
|---|---|
| Personal factors | Suicidal ideation, age, ethnicity, being bullied, gender |
| Environment | School property |
| Behavior | Illegal drug use, availability, attempted suicide |

## Nature of the Study

Quantitative research, the basis of this study, is consistent with testing whether there is an association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York. This cross-sectional study used cross-sectional data with a series of regression analyses, which consisted of the main set of analyses that was conducted for this study. During this study, I examined the objective responses of adolescents in Grades 9-12 in New York. This quantitative analysis helped pinpoint if there was any association between the independent variables (being bullied, being offered, sold, or given an illegal drug, illegal drug use and were offered, sold, or given an illegal drug on school property) and dependent variables (suicidal ideation and attempted suicide). Furthermore, I utilized the SCT as a framework for this research. The co-variates of this study were age, gender, and ethnicity. For the purposes of this study, availability was defined by the characteristics of being offered, sold, or given (CDC, 2015a).

I used the Center for Disease Control and Prevention's (CDC) 2015 Youth Risk Behavior Surveillance (YRBS) survey data set. This instrument emphasized selected

attributes of adolescent behavior (Johnston, O'Malley, & Bachman, 2012).These behaviors include those that are likely to result in intentional, or in some cases—also common—unintentional injuries, illegal drug use, deviant sexual behaviors, as well as dietary inconsistencies. Further, this instrument used a cluster sampling design, which was implemented in three stages. In this case, the selected sample was 89,068 New York students in Grades 9–12. The 2015 YRBS sampling frame was made up of the entire student population, including regular and private schools, in at least one of the Grades 9-12 across the country (Johnston et al., 2012). In this study, the weighting factor/relative probability (used for calculating the weighted mean) was used to assess each student's record to make adjustments for nonresponses, and the likelihood of oversampling Black and Hispanic students. The study observed the survey protocols by allowing free and fair participation without coercion to protect the privacy of the students willing to participate in the questionnaire. Before the survey was conducted, the regulations, which guided similar discourses, were adhered to sustain the empirical validity on the survey.

After obtaining the 2015 YRBS data, the Statistical Package for Social Sciences (SPSS) was used for analysis. Through SPSS, a univariate analysis of the collected data was executed. Regression analysis was applied where appropriate. In addition, the analysis of the variance for manifold dependent variables by one or more factor variables, covariates was executed. For example, logistic regression was used as the statistical analysis method to validate the probability of attempted suicide and suicidal ideation events in relation to illegal drug use It is a technique that determines the association among the independent variables or the binary dependent variable by approximating odds

using a logistic function (Laerd Statistics, 2013a).The factor variables subdivided the sampled group into clusters before examining interactions between factors, as well as the effects of discrete factors.

## Literature Search Strategy

To identify relevant literature, the following databases were used: Google Scholar, Pub Med, Academic Search Complete, DATA USA, EBSCO ebooks, Google books, SAGE Stats, and ProQuest. To establish the current background, only references from the last 5 years were used. Additional literature was sought in the reference lists of the chosen scholarly articles.

The following keywords were used for the search: *adolescent suicide, attempted suicide, illegal drug use, adolescents and substances, illegal drugs, ethnicity and use of substances, obtaining substances, adolescents and illegal drugs, adolescents and suicidal ideation, suicidal ideation, suicide and adolescents, YRBSS, YRBS, adolescents and illegal drug use at school, adolescents obtaining substances at school,* and *adolescents purchase substances, adolescents age and substances, adolescents and illegal drugs, being bullied, adolescents and prescription medications*, and *adolescents and use of prescription medications*.

## Literature Review Related to Key Variables and/or Concepts

### Adolescent Suicide

Internationally, suicide ranks fourth among the major causes of adolescents' deaths (Peltzer & Pengpid, 2015). Suicide ranks as the third major cause of adolescents' deaths in the United States; it is second in Europe (Shlosberg et al., 2014). In the United

States, deaths among people among the ages of 10 and 24 are primarily related to auto accidents, accidental injuries, homicide, and suicide (accounting for 17%; Shlosberg et al., 2014). According to Kann et al. (2016), researchers have also established that 14.6% of the students at the national level had prepared a plan to commit suicide. The rate for attempted suicide was at 8.6%. Although these adolescent suicide rates exist the investigation of illegal drug use in association to attempted suicide and suicidal ideation specifically among adolescents between Grades 9 and 12 in New York remains undone. Ninety percent of adolescents who complete suicide have an associated psychiatric disorder–the most common being depression. Previous research has suggested that suicidal ideation and suicide attempts are on a continuum of risk with suicidal ideation representing an important precursor of more severe levels of suicidal behavior. As such, I sought to research the extent to which illegal drug use may affect the rate of attempted suicide and suicidal ideation among adolescents in Grades 9-12 in New York.

**Suicidal Ideation**

According to Klonsky et al. (2016), suicidal ideation is categorized as thoughts of self-injurious conduct with suicidal intent. From this definition, suicidal ideation can be viewed as a mental health condition. As a result of the deaths caused by suicide among adolescents, there has been considerable attention given to the issue of suicidal ideation nationally. Suicide is a major public health issue in the U.S. and across the world.

Klonsky et al. (2016) further stated that it is important to have accurate knowledge of the facts about adolescent suicidal ideation to understand the issue of illegal drug use and suicidal ideation. It is difficult to predict suicidal behavior just as the

comparison of findings and integration of knowledge across studies has been arduous. Several factors associated with suicidal behavior such as depression and psychiatric disorders. According to Hamilton and Klimes-Dougan (2015), suicide is considered a significant mental health problem for adolescents between the ages of 10 and 19. In the practical sense, it may be assumed that the instances of completed suicide are based on suicidal ideation, which essentially links it to a mental health condition that incorporates undesirable behaviors influenced by potential underlying causes.

Suicidal ideation exists in adolescents along a continuum that incorporates passive wishes or thoughts for death on one hand and intent and purposefully obtained means on the other hand (Klonsky et al., 2016). There are various risk factors including a history of illegal drug use and access to illicit drugs that may lead to suicidal ideation (Klonsky et al., 2016).

**History of Illegal Drug Use**

More than 25% of all suicide cases are attributed to illegal drug use (Poorolajal, Haghtalab, Farhadi, & Darvishi, 2015). Illegal drug use is a significant risk factor associated with suicide in adolescents. Esposito-Smythers et al. (2012) argued that illegal drug use can increase aggression, heighten psychological distress, and inhibit adaptive coping strategies, thus heightening a desire to complete suicidal plans.

A strong correlation between illegal drug use and suicidal ideation can be drawn from the results of research brought forward by Wong, Zhou, Goebert, & Hishinuma (2013). One of the explanations given in relation to this is that the intoxicating substance might lead to impulsivity and lower inhibitions, and as a result, predispose illegal drug

users to attempt suicide (Wong, Zhou, Goebert, & Hishinuma, 2013). Additionally, illegal drug use has been considered a possible risk for suicide because it may worsen the power and extent of depression (Wong, Zhou, Goebert, & Hishinuma, 2013). Illegal drug use can also heighten the possibility of association challenges with peers, relatives, and others, that are acknowledged as some of the most compelling reasons for committing suicide (Wong, Zhou, Goebert, & Hishinuma, 2013). Adolescents who use illegal drugs and exhibit suicidal tendencies are also more likely to use maladaptive coping methods as compared to others who do not use illegal drugs. For instance, these adolescents may consider the use of alcohol and other drugs to stop depression and hold the perception that people should cope with depression rather than seeking professional assistance (Wong, Zhou, Goebert, & Hishinuma, 2013).

Illegal drug use is considered a risk for suicide because it is also linked to comorbid psychopathology and increased stress, which are considered risk factors for suicide attempts (Lopes et al., 2013). Therefore, adolescent use of illegal drugs like marijuana and heroin can be associated with attempted suicide, and thus adolescents using illicit drugs may be considered more likely to commit suicide (Lopes et al., 2013).

Wong, Zhou, Goebert, & Hishinuma (2013) sought to find variations in the mechanisms by which drugs influence suicidality among adolescents. They indicated that previous studies had all linked marijuana with suicidality. Nonetheless, they observed that these links have not been consistent with studies that use comprehensive controls. The authors also observed that studies involving self-report on illicit drug use linked the behavior to suicidality. Again, they observed that studies on injection and solvent drugs

have all been linked with suicidal behaviors among adolescents. The researchers established that the most important predictor of suicidal ideation as a result of illegal drug use is the history of using that drug. Wong et al. also established that out of 10 studies investigated, the strongest influence on suicidality was the use of illicit drugs as compared to legal ones, with the greatest ratio of self-reported suicide being linked to the use of heroin. In addition, they observed that the number of illegal drugs one has used in his or her lifetime is a major predictor of suicidality. Furthermore, they observed that different types of illegal drugs result in a different odds ratio in tendencies to commit suicide. The researchers viewed this as an indicator that people develop different risk profiles in committing suicide when they use different illegal drugs. They also concluded that each drug has a different effect on behavior that heightens suicide risk.

Comorbidity in drug use among adolescents is another major issue. Use of one substance among alcohol, tobacco, and marijuana is said to increase the risk of using others (White, Walton, & Walker, 2015). Comorbidity in the use of these drugs is associated with the heightened risk of their concurrent use in later stages of life (White, Walton, & Walker, 2015). There is also the risk of negative outcomes such as addiction and mental health problems, and involvement in other health risk behavior (White, Walton, & Walker, 2015). Use of one drug in adolescence can thus be a gateway to the use of others (White, Walton, & Walker, 2015). Similarly, comorbidity in drug use and the existence of psychological illnesses are considered to be risk factors for suicide attempts (Klimkiewicz, Klimkiewicz, Jakubczyk, Kieres-Salomoński, & Wojnar, 2015). Adolescents with co-occurring conduct disorders and high rates of illegal drug use are

considered to be at a greater risk of attempted suicide and suicidal ideation compared to their peers without such comorbidity (Klimkiewicz et al., 2015). From a practical perspective, comorbidity may be considered as an aspect that worsens pre-existing behavioral problems because illicit drugs may often heighten psychological factors in terms of their effects and possibilities of emergence.

A history of illegal drug use is associated with co-occurring mental disorders and suicidal ideation in a complex web that can be difficult to sort out. According to Wong, Zhou, Goebert, and Hishinuma (2013), an individual with a past of illegal drug use is more susceptible to suicidal ideation or a suicide attempt. The researcher's findings based on a national survey conducted among high school students within the U.S. over a decade indicated that illicit drugs such as heroin have the strongest influence in suicidality as contrasted to legal drugs such as alcohol. In the study, the high school students using heroin were observed to have the greatest chance for self-reported thoughts of committing suicide compared to the use of other illegal drugs. According to Wong, Zhou, Goebert, & Hishinuma (2013), it is important to note that a link exists between an individual having a history of illegal drug use and the increase in the use of drugs including illegal drugs.

Furthermore, the gap existed in that the available research on illegal drug use in association to attempted suicide and suicidal ideation may not specifically yield the same outcomes among adolescents between Grades 9 and 12 in New York as the outcomes determined by national studies. In this regard, I investigated the association between marijuana and heroin in relation to attempted suicide and suicidal ideation in adolescents

between Grades 9 and 12 in New York. Identifying illegal drug use as a risk factor for suicide could help to tailor suicide prevention strategies for New York adolescents.

**Availability of Illegal Drugs on School Property**

Marijuana has been described as a gateway drug and often leads to the use of more addictive drugs that are shown to have a stronger association with suicidality (Nkansah-Amankra & Minelli, 2016). Marijuana is a commonly used illicit drug among adolescents in the United States (Hughes, Lipari, & Williams, 2015). In 2012, 37%, 69%, and 82% of Grade 8, Grade 10, and Grade 12 respectively reported that marijuana was very easy to access (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2017). Of high school and middle school students 60% and 32%, respectively, stated that students use and sell drugs on their schools' grounds (Johnston et al., 2017). Of the students that sell drugs, 91% sell marijuana, 24% sell prescription drugs, 9% sell cocaine and 7% sell ecstasy (Johnston et al., 2017). Most reported obtaining these drugs from other students selling within the school premises, from other dealers outside the school, from stores and others from home (Johnston et al., 2017). The increase of availability of illegal drugs to students in private schools was reported to have increased by 50% from 2011 to 2012 (Johnston et al., 2017). Nearly half of all high school students know a student who sells drugs at their school (Johnston et al., 2017). Ease of drug availability is a risk factor that predisposes an adolescent to drug use (Hadland, Marshall, Kerr, Lai, Montaner, & Wood, 2012).

I investigated the association between the availability of illegal drugs on school property suicidal ideation, and attempted suicide in Grades 9-12 in New York. These

findings may be used to develop prevention strategies effective in improving the school environment for adolescents.

**Adolescent Ethnicity and Suicide**

Progress has been made in identifying risk factors for suicidal thoughts and behaviors. However, whether these findings are meaningful to ethnically diverse populations remains to be elucidated. Cha et al. (2017) evaluated the methodology and sampling practices of studies on risk factors for suicidal thoughts and behaviors. They found that these studies did not frequently report participant race and ethnicity.

Additional research is needed to help us better understand the context of suicidal tendencies among adolescents of different ethnic backgrounds. Additional studies examining culture-specific risk factors that predispose adolescents to suicidal behavior are necessary. The research that I conducted helped to bridge this identified gap in the literature. In studies that have examined race and ethnicity, the findings have revealed considerable variation across minority populations within the context of suicide risk (Matthay, Galin, & Ahern, 2017).

It is important to accurately target intervention programs and to understand that specific factors may pose varying risks to ethnic groups (Cha et al., 2017). This finding is underscored by the fact that suicide rates vary by race and ethnicity (CDC, 2015b). Among American Indians and Alaska natives, suicide rates peaked during adolescence and young adulthood, then declined (CDC, 2015b). This pattern is very different from other ethnic groups, who experienced peak suicide rates later in adulthood (CDC, 2015b).

Although completed suicide rates for non-Hispanic adolescents are higher than those for Hispanic adolescents. Hispanic adolescents more frequently report feelings of discouragement, thoughts of suicide, and attempts of suicide (CDC, 2015b). The number of culturally relevant prevention and intervention programs for suicidal adolescents seems to be very limited (Choi et al., 2016).

Culturally appropriate community-based efforts may be especially useful in suicide prevention. For example, Choi et al. (2016) found that a culturally sensitive internet-based suicide prevention program would be a very relevant and efficient strategy for promoting early detection of suicidal behavior and for promoting intervention among Asian American students. Although Asian Americans have exhibited higher rates of suicidal ideation and suicidal attempts than white students, Asian-American students are less likely to seek mental healthcare than non-Hispanic white students (Choi et al., 2016). Finding ways to address cultural differences in attitudes toward suicidal behavior will be effective in developing prevention strategies. These findings underscore that prevention and intervention strategies should reflect the different underlying cultural challenges and ethnic disparities involving suicidal behavior to assist in identifying adolescents who are at risk.

The objective of this research was to determine whether there is an association between adolescent suicide and ethnicity in 9th-12th graders in New York. Identification of any high-risk groups can facilitate the development of prevention and intervention programs tailored to those specific cultural groups and communities as described by Choi et al. (2016).

**Association of Suicide With Age**

Adolescents at higher risk of suicide often have a history of illegal drug use (Poorolajal, Haghtalab, Farhadi, & Darvishi, 2015). Providing a brief counseling session solely based on the individual's behavior limits the scope of an intervention strategy. Rather, suicide intervention and prevention strategies should evaluate the individual's history of illegal use within the broader context of potentially escalating illegal drug use.

Nkansah-Amankra and Minelli (2016) concluded that attention should be placed on marijuana and other illegal drugs in some population groups particularly in the age group of 15 and younger. Intervention strategies should be aimed at discouraging marijuana use particularly at the earliest age. Marijuana use in early adolescence increased the probability of illegal drug use in older adolescence. However, users of mental health services in adolescence were less likely to use drugs in older adolescence (Nkansah & Minelli, 2016). Therefore, recognizing mental illness and drug use in early adolescence can potentially lead to a reduction in illegal drug use, a risk factor for suicidal behavior.

## Definitions

The following terms are commonly used throughout this study.

*Suicide*: A self-evident category of death. It entails the intentional ending of own life because of incapacity to appropriately handle stress that emerges (Cheng, Li, Silenzio, & Caine 2014).

*Attempted suicide:* It is a behavior in which a victim tries to end his or her life. The term also refers to a potentially injurious habit that is self-directed and non-fatal. The

affected adolescent develops this behavior with the intention of dying, and it can repeatedly occur throughout the period of illegal drug use (Latakienė & Skruibis, 2015).

*Suicidal ideation:* Thinking or planning to commit suicide. The term also refers to thoughts highlighting an individual's desire to die. Often, an active plan for executing the death accompanies the troubling thoughts (Li, Bao, Li, & Wang, 2016).

*Obtaining substances:* Ways through which adolescents get access to illegal drugs and other illegal substances. Often, adolescents obtain illegal drugs and other substances from illegal dealers and sellers on the streets (Osilla et al., 2014).

*Illegal drug use:* Perilous consumption of synthetic and naturally occurring psychoactive substances, marijuana, heroin, and other illegal drugs that cause dependence syndrome among the users (Sanders, 2012; Rifenbark & Waltz, 2016).

*Illegal drug availability*: the characteristics of being offered, sold, or given an illegal drug (CDC, 2015).

*Age:* A statistical trait of the human population. It shows the duration in which a person has lived since the time of birth (Edgar & Bunker, 2013).

*Ethnicity:* A group of people who subscribe to common culture, ancestral origin, national experiences, and language. In this study, the term will also be used to represent racial background and association (Blashill, Calzo, Griffiths, & Murray, 2017).

*Social cognitive theory*: A concept that explains people's social interactions and experiences as determinants of their behaviors. The theory relies on two main constructs that include outcome expectations and self-efficacy. Self-efficacy equips individuals with

confidence to control their social and health habits while evaluating consequences of their behavior (Young, Plotnikoff, Collins, Callister, & Morgan, 2014).

*Availability*: The characteristics of being offered, sold, or given an illegal drug (CDC, 2015a).

## Assumptions

After a review of the questionnaire responses, I assumed that all participants were adolescents in Grades 9-12 in New York State. Secondly, I assumed that all participants responded voluntarily and without the use of intimidation and were not under duress. I also assumed that all study participants can read and write in English without assistance.

Additionally, I assumed that participants answered honestly and openly. Lastly, I assumed that the study participants are willing participants. These are all necessary assumptions to secure the anonymity and optional participation of the study participants. Thus, ensuring the positive welfare of study participants.

## Scope

In this study I examined whether there was an increase or decrease in the relationship between illegal drug use, suicidal ideation, and attempted suicide among adolescents in Grades 9-12 in New York State. Firstly, this population was chosen because adolescents in Grades 9 through 12 experience life events that may be stressful, that involve interpersonal problems with reduced social support, among other challenges (Pompili et al., 2012). In the process of solving these problems, adolescents may result to using illegal drugs to alter their cognition (National Institute on Drug Abuse, 2014). When this seems to be unsuccessful, they may proceed to commit suicide (Borden et al.,

2014). Secondly, the demographic consideration was expressly for adolescents in the state of New York. This was because (a) the state provided a diverse pool of participants and thus a variety of responses; (b) during 2014 New York had 1,700 deaths attributed to suicide and in 2014 the state was awarded the National Strategy for Suicide Prevention Substance Abuse and Mental Health Services Administration grant, which aimed to integrate suicide prevention into the healthcare system (New York State Office of Mental Health, 2016); and 3) the number deaths in the state of New York attributed to suicide has increased by 32% within the past decade (New York State Office of Mental Health, 2016).

Furthermore, due to the current increasing rates of suicide as a leading cause of death among adolescents in the state of New York there is a heightened need to study the relationship of illegal drug use, suicidal ideation, and attempted suicide among adolescents in Grades 9-12 in New York. In New York, suicide is the second leading cause of death for ages 15-34 and third leading cause of death for ages 10-14 (American Foundation for Suicide Prevention, 2016).

## Delimitations

Mentioned, but not thoroughly discussed, is the fact that, among adolescents other sources of death besides suicide are caused by the effect of illegal drug use. Secondly, adolescents among different age groups from different locales may endure similar encounters. However, the study focused on the aforementioned particular adolescent group residing in the state of New York. These two areas were not considered because they do not provide the quantitative aspect of the content required for the study.

## Significance, Summary, and Conclusions

Researchers have consistently indicated that suicide is one of the major causes of death in adolescents; it ranks third in studies conducted on U. S. samples (Kann et al., 2016). Researchers have also shown that suicidal ideation and planning is present in a large portion of the adolescent population and that illegal drug use and suicidality are associated given that increased illegal drug use is related to increased suicidality (Kann et al., 2016, Poorolajal et al., 2015). Wong, Zhou, Goebert, & Hishinuma (2013) found that the type of illegal drug usage, the legality of the drug, the history of drug usage (Wong, Zhou, Goebert, & Hishinuma, 2013) and the number of illegal drugs used (Klimkiewicz et al., 2015) are related to suicidality. Hadland et al. (2012) found that the ease of drug availability was a risk factor for adolescent drug usage.

According to Cha et al. (2017) studies have rarely included ethnicity when attempting to understand the risk factors related to suicidality, although those that examined suicidal risk have found considerable variation as a function of ethnicity (Matthay et al., 2017). Understanding the relationship among ethnicity and illegal drug use with suicidal ideation and attempted suicide is important in that intervention programs can be developed to meet the needs of specific cultures and ethnic groups (Choi et al., 2016).

The SCT focuses on the interaction of personal factors, behaviors and environmental variables and how each influences the other in the developmental process. SCT was used as the theoretical framework in the current study in that the variables under investigation included personal variables (suicidal ideation, age, gender, being

bullied and ethnicity), an environmental variable (school property) and behavioral variables (illegal drug use, availability of illegal drugs, and attempted suicide).

The current study assessed the relationship of illegal drug use, being bullied, availability of illegal drugs, ethnicity, gender and age with suicidality in a sample of Grades 9-12 in the state of New York. Several researchers have reported that illegal drug use is associated with increased probability of suicidal behavior (Lopes et al., 2013; Sharma et al., 2015; Inman et al., 2011). These studies have been conducted on national samples and therefore represents the relationship that would be expect in the United States as a whole. The relationship between illegal drug use and suicidality has not been studied within New York State with a Grades 9-12 sample and therefore it has not been determined if research on national samples generalizes down to a specific population, such as Grades 9-12 in New York State. National sampling also does not allow for an assessment of the relationship of personal variables—such as ethnicity, gender, being bullied, and age—and their possible interaction with illegal drug use in predicting suicidal behavior in Grades 9-12 in the State of New York. This study will also examine the relationship of school-based availability of illegal drugs with illegal drug use, suicidal ideation, and attempted suicide. This will allow for an assessment of the relationship of an environmental variable (school property) with behavioral variables (illegal drug usage and attempted suicide).

Suicide is ranked third as the top cause of death in adolescents ages 15 to 19 and has been found to be correlated with other factors, including mental illness and illegal drug use. Therefore, the study of variables that help predict suicidal behavior was

important. Further study of the relationship between illegal drug use, suicidal ideation, and attempted suicide with Grades 9-12 students within New York State allowed for an understanding of the strength of the relationship between these variables within this specific population. It could assist mental health practitioners in the identification process of individuals who are at higher risk for suicidality and assist in the development of more tailored treatment programs. Practice and policy could be affected by these results in that an association between illegal drug use, suicidal ideation, and attempted suicide could lead to a more careful assessment of suicidality when examining individuals who use illegal drugs. Ultimately, understanding of the illegal drug use/attempted suicide/suicidal ideation relationship can lead to life-saving measures that may prevent an adolescent from engaging in suicidal behaviors that can lead to serious medical problems and possible death.

Understanding the relationship between illegal drug usage, age, gender, being bullied, ethnicity and availability with suicidal ideation and attempted suicide can lead to positive social change in that assessment and prevention can be improved. Once the relationships are established within the Grades 9th-12th student population in New York, the identified correlates of attempted suicide and suicidal ideation can be used to better identify those at risk, thereby improving assessment and prevention. Improved identification can help those at risk of suicide to get the much-needed treatment that can help them adjust and function in society.

The present study addressed some of the gaps in the current literature, including whether the illegal drug usage/attempted suicide/suicidal ideation relationship found on

national samples generalized down to Grades 9th-12th in New York State. It provided greater information on the relationship among ethnicity, age, being bullied, gender, availability of illegal drugs and illegal drug usage with suicidal ideation and attempted suicide. In addition, this research provided information about the possible interactions among the personal variables (ethnicity, age, being bullied, gender), an environmental variable (school property) and a behavioral variable (illegal drug use) in predicting a behavioral variable (attempted suicide) and a personal variable (suicidal ideation).

The current research used quantitative methods to address the research questions regarding the illegal drug usage/suicidality relationship in Grades 9th-12th in New York State, as well as the relationship of age, gender, being bullied, ethnicity and availability to suicidal ideation and attempted suicide. Archival data from the CDC's 2015 YRBS was the source of the research information. The relevant data from the YRBS was subjected to multiple and logistical regression analyses to determine association between ethnicity, age, gender, being bullied, availability of illegal drugs, illegal drug usage with suicidal ideation and attempted suicide. The following section will outline the methodology that was utilized in this study in greater detail.

Section 2: Research Design and Data Collection

## Introduction

Suicide has been found to be one of the most frequent causes of death among adolescents between the ages of 15 and 19 (Nock et al., 2013). Thus, the purpose of this quantitative, cross-sectional study was to explore the relationship between illegal drug use, suicidal ideation, and attempted suicide among adolescents in Grades 9-12 in New York State.

In Section 2, the following topics will be covered: research design and rationale, methodology, population, sampling and sampling procedures, instrumentation and operationalization of constructs, data analysis plan, threats to validity, ethical procedures, and summary. In the research design and rationale section I presented the variables that were analyzed, the research design and its relationship to this study's research questions, time and resource constraints pertaining to the study design choice and how the design choice was consistent with research designs needed to advance knowledge in this field. Next, in the methodology section, I discussed this study's proposed population, sampling and sampling procedures that will be used to collect the data analyzed, instrumentation and operationalization of constructs, and the data analysis plan. Next, in the section devoted to threats to validity, the discussion was focused upon threats to external and internal validity and in what manner they will be resolved. Finally, in the ethical procedures section I described the treatment of human participants as well as treatment of the data.

## Research Design and Rationale

The dependent variables consisted of measures relating to suicide, including that of suicidal ideation. The independent variables consisted of being offered, sold, or given illegal drugs (i.e., drug availability), illegal drug use, age, gender, being bullied, and ethnicity. No additional mediating or moderating variables were proposed for inclusion in this study, while a series of important control variables was incorporated into the regression model that was conducted. To predict attempted suicide, previous research identified major affective disorders (Fawcett et al., 1990) and the factors of gender, perceived early pubertal development, use of alcohol, not living with both parents, and poor self-worth (Wichstrom, 2000). These measures were included, where possible, as controls in the regression analysis.

I used a quantitative methodology for the purposes of hypothesis testing. In order for a hypothesis to be tested, statistical analysis is required which results in a calculated probability level (Frankfort-Nachmias, Nachmias, & DeWaard, 2015); this probability level is then compared with the alpha level, which is generally .05, in order to decide whether the null hypothesis being tested is rejected or not rejected (Frankfort-Nachmias et al. 2015). On this basis, a series of regression analyses were proposed to test this study's hypotheses, with an alpha of .05 being selected for use. Additionally, a cross-sectional research design, selected specifically for this study, with the focus of this study being on the examination of quantitative variables derived from the same group of respondents, with the aim of the analyses conducted being to determine whether there is a relationship between the variables measured (Frankfort-Nachmias et al. 2015). In contrast

to this research design, this study did not aim to be merely descriptive, and was also not an experimental study (Laerd Statistics, 2013b) as I was unable to directly manipulate levels of the independent variables. Additionally, a quasi-experimental design (Frankfort-Nachmias et al. 2015) was also not used in this study, as the participants in the surveys whose data is proposed for use in this study were not randomly assigned to treatment groups.

Finally, this area, in general, required quantitative methodologies in order to further the aim of determining the correlates of adolescent suicide. While qualitative research may provide the benefit of exploring, in terms of meaning and personal thoughts and causes behind attempted adolescent suicide, a qualitative methodology cannot be used for the purposes of hypothesis testing, and for this reason, cannot be used to empirically determine the correlates of attempted adolescent suicide. This highlighted the need for the use of a quantitative methodology in order to advance knowledge in this discipline (Frankfort-Nachmias et al. 2015). Additionally, this study specifically proposed the use of a cross-sectional methodology. An examination of other research design choices illustrated why this specific choice of methodology is most appropriate in order to further advance knowledge within this discipline. First, a descriptive methodology would not be particularly useful due to the fact that simply describing relevant data would not provide the basis for hypothesis testing, and again could not be able to be used to empirically determine the association between measures, and more specifically, those measures, which related to attempted adolescent suicide (Laerd Statistics, 2013b). Next, a quasi-experimental research design would not be ethical

(Frankfort-Nachmias et al. 2015), as I could not include only a portion of the sample in a treatment group, which is hypothesized to be associated with reduced suicide. In this case, those in the control group would be expected to have a significantly higher likelihood of suicide, making such a quasi-experiment unethical. Finally, a true experiment would not be possible due to the fact that it is not possible for me to directly manipulate these independent variables under study (Frankfort-Nachmias et al. 2015). However, in a cross-sectional research design, only a single group of respondents is analyzed, with the focus of the study being on the effect that one or more independent variables have on the dependent variable, within this group of subjects (Frankfort-Nachmias et al. 2015). This was in line with the aim of this study, which focuses on predictors of suicide attempts in adolescents. In summary, a cross-sectional research design, such as that proposed in the present study, was the most appropriate research design choice in the advancing of knowledge within this discipline.

## Methodology

### Population

The target population proposed for the study consisted of adolescents in Grades 9-12 in New York State. Additionally, the target population size was approximately 812,000 based on data collected from the 2015-2016 academic year (New York State Education Department, 2017).

### Sampling and Sampling Procedures

I did not perform sampling; instead, I used archival data from the CDC's 2015 Youth Risk Behavior Surveillance System (YRBSS; CDC, 2017). Therefore, all matters

of sampling related back to the sampling strategies and methods that were used by the CDC within this specific survey. The YRBSS data are derived from several resources, as well as a nationwide school-based questionnaire, which is executed by the CDC and state, tribal, and sizeable urban school district surveys of high school students (CDC, 2013). The surveys, which are not conducted by the CDC, are conducted by other education and health agencies (CDC, 2013). The surveys used for this dataset have been conducted every 2 years starting from 1991 and include samples of high school students in Grades 9-12 (CDC, 2013).

The sampling used was fairly uniform across all of the various surveys, which compose the YRBSS (CDC, 2013). First, all state, territorial, tribal, and large urban school district surveys incorporated into the YRBS dataset used a two-stage, cluster sample design in order to achieve a representative sample within their jurisdiction of students in Grades 9-12. PCSample was used for the purposes of sample selection. Sampling frames include both public and private schools in Ohio and South Dakota, with all other states only incorporating public schools. Additionally, within large urban school districts, the samples incorporated only schools located within the funded school district as opposed to the entire area. In nearly all cases, the first sampling stage consisted of selecting schools with a probability for selection being proportional to the size of school enrollment (CDC, 2013). The second sampling stage consisted of randomly selecting intact classes of a required subject or intact classes during a required period. All students within the selected classes are then eligible to participate within the study. Any samples included within the YRBS dataset, which are weighted, used a sample selection

methodology equivalent to that just described, incorporated relevant documentation pertaining to the selection of schools and classrooms, and incorporated an overall response rate of at least 60% (CDC, 2013). These requirements were put into place in order to ensure that only representative samples of students in Grades 9-12 would be incorporated into the YRBS dataset. Unweighted data were also incorporated into this dataset, with these samples consisting of surveys which did not have an overall response rate of 60% or above, or which lacked sampling documentation (CDC, 2013).

Within the surveys, the target population consisted of all public and private school students in Grades 9-12 in all 50 states and the District of Columbia, while US territories were omitted from the sampling frame (CDC, 2013). With regard to the national surveys, the first-stage sampling frame included primary sampling units, which incorporated large counties or groups of smaller adjacent counties. With regard to more local surveys, the sampling frame consisted of a list of schools within the site's jurisdiction, which also included the number of students in each school in Grades 9-12 (CDC, 2013).

For the processes of recruitment, participation, and data collection, after schools were selected, state-, district-, and school-level clearances were then obtained in order to conduct the survey within the selected schools (CDC, 2013). These schools were then contacted for the purposes of selecting classes, scheduling data collection, and obtaining parental permission for participation in the research study. Additionally, data collectors were hired and trained, data collection was coordinated, and data was weighted and prepared for the purposes of analysis (CDC, 2013).

I gained access to this dataset by first submitting an IRB application to the Research Office of Walden University. Once this was approved, I then downloaded the associated data and began the process of data cleaning for the purposes of analysis. The YRBS dataset consists of archival, secondary data, is publicly available, and can be downloaded at the following webpage: https://www.cdc.gov/healthyyouth/data/yrbs/data.htm. Besides the aforementioned IRB application, no further permissions were required in order for me to gain access to the data. Walden University's IRB approval number for this study was 12-14-17-0401474.

A power analysis was also conducted to determine the appropriateness of the sample size of the survey to this study. While normally, a priori power analysis is conducted to determine the minimum sample size required to achieve a certain level of statistical power, in this study, secondary data analysis was conducted (Frankfort-Nachmias et al. 2015). In this case, the total sample size was already predetermined, while the benefit of conducting a priori power analysis even in this case was to determine whether the sample size included in the dataset proposed for analysis was sufficient to fulfill my aims. The total YRBS sample size is approximately 10,000 students per year in New York State (CDC, 2017). Based on the proposed analyses, one power analysis was conducted in total, and was conducted specifically in relation to a logistic regression analysis. The power analysis conducted in relation to the proposed logistic regressions used G*Power 3.1.9.2 (Frankfort-Nachmias et al. 2015), assumed a two-tail test, a small odds ratio of 1.2, an alpha of .05, and a minimum statistical power of .80. A small effect size was used, as I wanted to be able to detect small effects as statistically significant,

with .05 used as the alpha and .80 used as the level of power as these are standard in statistics. This produced a total minimum sample size of 971 respondents to achieve this minimum statistical power of .80. Ordinal logistic regression is not supported by G*Power, while further power analyses were not thought to be necessary as this initial power analysis conducted indicated that the available sample size is much larger than that required to achieve an acceptable level of power when conducting a logistic regression. These results indicated that the dataset proposed for this study incorporated a sample size, which was much larger than what was needed to find statistically significant a small effect.

In order to determine the effect size for use in this study's power analyses, the results of the analyses conducted by Wong, Zhou, Goebert, & Hishinuma (2013) were used. Specifically, their multivariate analysis controlled for 13 potential confounders and determined odds ratios for a set of substances in relation to the outcome of suicide risk. These odds ratios were found to be the following: at least one lifetime use of heroin (OR = 1.9–4.3), hallucinogens (OR = 1.8–3.4), methamphetamine (OR = 1.9–3.2), cocaine (OR = 1.7–2.9), ecstasy (OR = 1.6–2.9), steroids (OR = 1.8–2.7), inhalants (OR = 2.0–2.5), marijuana (OR = 1.4–1.8), tobacco (OR = 1.3–1.9), and alcohol (OR = 1.5–1.7). Alcohol and tobacco were omitted from this effect size calculation as they are not illegal substances. The midpoints of each of the remaining odds ratios were then calculated, with the mean of these midpoints then calculated, which resulted in an odds ratio of 2.3625.

This power analysis specified a two-tailed test, an odds ratio of 2.3625, a null hypothesis probability of the dependent variable being equal to one if the independent

variable is equal to one of .45, an alpha of .05, and a minimum statistical power of .80. This produced a minimum sample size of 59.

**Instrumentation and Operationalization of Constructs**

For the YRBS research instrument, a series of methodological studies have been conducted, including two studies of test-retest reliability conducted by the CDC (2013). These results indicated high reliability. Additionally, a review by the CDC provided results suggesting the validity of self-reported data for each type of behavior quality (CDC, 2013). The specific variables used in this study were discussed in the context of the appropriateness of the current study and with regard to populations with whom these variables were previously used. With respect to these study variables, these were first used in 1991 and were developed by the CDC (CDC, 2013). The chosen variables related specifically to the research questions and hypotheses included within this study, and allowed for the testing of all hypotheses included within this study. While this specific set of survey questions is not known to have been used with all populations other than the specific population examined in this study, it has been broadly used within the United States among adolescents in Grades 9-12—the target population of this study (see Cleary, 2000; Huey et al., 2004; May & Klonsky, 2011).

*Attempted suicide*: This will be measured using the following three questions from the YRBS:

- During the past 12 months, did you ever seriously consider attempting suicide?

- During the past 12 months, did you make a plan about how you would attempt suicide?
- During the past 12 months, how many times did you actually attempt suicide?

*Offered, Sold, or Given Illegal Drugs:* This will be measured using the following question from the YRBS:

- During the past 12 months, has anyone offered, sold, or given you an illegal drug on school property?

*Illegal Drug Use:* This will be measured using the following three questions from the YRBS:

- How old were you when you tried marijuana for the first time?
- During the past 30 days, how many times did you use marijuana?
- During your life, how many times have you used heroin (also called smack, junk, or China White)?

*Age:* This will be measured using the following question from the YRBS:

- How old are you?

*Gender:* This will be measured using the following question from YRBS:

- What is your sex?

*Being Bullied:* This will be measured using the following question from YRBS:

- During the past 12 months, have you ever been bullied on school property?

*Ethnicity:* A single variable with seven-levels calculated from associated race and ethnicity questions. These original race and ethnicity questions have changed over time, with this composed measure coded to account for these changes over time (CDC, 2017).

First, regarding the three questions asking respondents about suicide, the first two measures (i.e. *During the past 12 months, did you ever seriously consider attempting suicide? and During the past 12 months, did you make a plan about how you would attempt suicide?)* are dummy variables, and were coded "0" for "no" and "1" for "yes." Next, with regard to how many times the respondent actually attempted suicide in the past 12 months, this was coded "0" for "zero times," "1" for "one time," "2" for "two or three times," "3" for "four or five times," and "4" for "six or more times."(CDC, 2017)

Of the remaining variables, illegal drug use incorporated three measures. First, "How old were you when you tried marijuana for the first time?" will be coded as "0" for "I have never tried marijuana," "1" for "8 years old or younger," "2" for "9 or 10 years old," "3" for "11 or 12 years old," "4" for "13 or 14 years old," "5" for "15 or 16 years old," and "6" for "17 years old or older." Next, the questions of "During the past 30 days, how many times did you use marijuana?" and "During your life, how many times have you used heroin (also called smack, junk, or China White)?" were coded as "0" for "0 times," "1" for "1 or 2 times," "2" for "3 to 9 times," "3" for "10 to 19 times," "4" for "20 to 39 times," and "5" for "40 or more times."

(CDC, 2017) None of these questions were combined in the proposed analyses.

Next, having been offered, sold, or given illegal drugs as well as attempted suicide were dummy variables, and were coded "0" for "no" and "1" for "yes." (CDC, 2017) Cronbach's alpha was calculated on this set of items to determine whether they had an acceptable level of internal consistency reliability, which would justify combining this set of measures into a single scale (Frankfort-Nachmias et al. 2015). If the Cronbach's alpha for this set of items was 0.70 or greater, combining these items was planned; otherwise, these items were evaluated as a distinct set of measures (Frankfort-Nachmias et al. 2015). Next, age was coded as "12" for "12 years old or younger," "13" for "13 years old," "14" for "14 years old," "15" for "15 years old," "16" for "16 years old," "17" for "17 years old," and "18" for "18 years old or older."(CDC, 2017)
Finally, ethnicity, was coded as "1" for "American Indian/Alaska Native," "2" for "Asian," "3" for "Black or African American," "4" for "Hispanic/Latino," "5" for "Native Hawaiian/Other Pacific Islander," "6" for "White," and "7" for "Multiple Races (Non-Hispanic)." (CDC, 2017).

## Data Analysis Plan

IBM SPSS 23 was used for all proposed analyses. Initially, a series of descriptive statistics were conducted on these data to present an initial illustration of the data included within this dataset and these respondents. All variables included in this study were categorical, and frequency tables were constructed illustrating the sample sizes and percentages of response for each response category associated with the dependent variables of attempted suicide and suicidal ideation, and the independent variables of

having been offered, sold, or given illegal drugs (access), illegal drug use, respondent ethnicity, respondent gender, being bullied and respondent age.

The following research questions and hypotheses were tested:

The following research questions were tested:

$RQ_1$ –What is the association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_2$ –What is the association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_3$ –What is the association between age and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between age and attempted

suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between age and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_4$ –What is the association between ethnicity and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between ethnicity and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between ethnicity and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_5$ –What is the association between being bullied and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between being bullied and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between being bullied and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_6$ –What is the association between gender and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between gender and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between gender and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_7$ –What is the association between the availability of an illegal drug on school

property and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between the availability of an illegal drug on school property and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between the availability of an illegal drug on school property and suicidal ideation among adolescents in Grades 9-12 in New York.

$RQ_8$ –What is the association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York.

$RQ_9$ –What is the association between age and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between age and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between age and suicide among ideation adolescents in Grades 9-12 in New York.

$RQ_{10}$ –What is the association between ethnicity and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between ethnicity and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between ethnicity and suicidal ideation among adolescents in Grades 9-12 in New York.

$RQ_{11}$ –What is the association between being bullied and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between being bullied and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between being bullied and suicide among ideation adolescents in Grades 9-12 in New York.

$RQ_{12}$ –What is the association between gender and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between gender and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between gender and suicidal ideation among adolescents in Grades 9-12 in New York.

Prior to the regression analyses being conducted, a series of bivariate analyses were conducted to determine whether there are significant relationships between the independent and dependent variables included in this study, with these analyses focusing only on one specific independent variable at a time. All variables included in this study were categorical, and were either measured on the nominal or ordinal level of measurement. Specifically, regarding the dependent variables, the two questions with

"yes" or "no" responses were both nominal and dichotomous, with the remaining measure being ordinal. With regard to the independent variables, the questions relating to drugs are both nominal and dichotomous, with respondent ethnicity also were nominal and respondent age measured on the ordinal level of measurement. In regard to the proposed bivariate analyses, non-parametric difference in medians tests were conducted in all cases (Laerd Statistics, 2013c). These analyses served to determine whether there are significant differences in responses to these three dependent variables based on the independent variables included within this study. Non-parametric tests were used in all cases as the assumption of normality is violated with regard to these three outcome measures, which are either dichotomous or ordinal (Frankfort-Nachmias et al. 2015).

The primary analyses conducted serving to test this study's hypotheses consisted of a series of regression analyses. First, multiple logistic regression analyses was proposed for the questions relating to whether the respondent had ever seriously considered attempting suicide during the past 12 months, and whether the respondent made a plan about how they would attempt suicide in the past 12 months. This method of regression is appropriate due to the fact that both dependent variables are dichotomous, with responses of only "no" or "yes" being present (Frankfort-Nachmias et al. 2015). Within these models, the independent variables consisted of being offered, sold, or given illegal drugs, illegal drug use, being bullied, and respondent ethnicity, gender, and age.

Additionally, a multiple ordinal logistic regression was also proposed for the third variable relating to suicide, which measures the number of times the respondent actually attempted suicide during the past 12 months. Ordinal logistic regression was selected for

use in this analysis as the dependent variable of the number of times the respondent attempted suicide and was measured on the ordinal level of measurement (Frankfort-Nachmias et al. 2015). Within this model, the independent variables consisted of being offered, sold, or given illegal drugs, illegal drug use, being bullied, and respondent ethnicity, gender, and age. In this analysis, the Brant test was also conducted in order to test the assumption of parallel lines (Frankfort-Nachmias et al. 2015). Specifically, within ordinal logistic regression, the distances between the categories of response associated with the dependent variable were assumed to be equal, with this assumption positing that the regression coefficients of the predictors were the same for each level of the dependent variable. If violated, the estimates associated with ordinal logistic regression may be heavily biased (Frankfort-Nachmias et al. 2015). For this reason, if this assumption was violated, which would be indicated through a significant result associated with the Brant test, generalized ordered logistic regression would instead be conducted as an alternative using Stata 13 (Frankfort-Nachmias et al. 2015).

## Threats to Validity

Threats to validity can include threats to external validity, internal validity, and construct or statistical validity. This study relied upon the analysis of secondary data and as these data do not relate to an experimental or quasi-experimental design, the concerns associated with external validity were not relevant to this study (Frankfort-Nachmias et al. 2015). This study had a high degree of external validity due to the analysis of a dataset, which incorporated random sampling techniques. Specifically, the use of random sampling within the methodology used in the YRBSS allowed for the generalization of

the results of any analyses conducted on these data to the larger population (Frankfort-Nachmias et al. 2015).

Threats to internal validity can relate to factors inclusive of but not limited to statistical regression, history, and maturation (Frankfort-Nachmias et al. 2015). Again, due to the use of secondary data analysis, and with these data not relating to either an experimental or quasi-experimental methodology, the majority of these factors did not pose risks to the internal validity of the present study (Frankfort-Nachmias et al. 2015). However, as in any study, confounding poses a real threat to internal validity. Specifically, the effect of one or more of the independent variables included in this study may in fact be due to some unknown confounding variable, which is not measured or included in the analysis (Frankfort-Nachmias et al. 2015).

Construct validity as high as the measures, which was examined in this study, do not appear to deviate from what they claim to be measuring (Frankfort-Nachmias et al. 2015). Conclusion validity, relates to the conclusions made about the associations between the variables examined being reasonable (Frankfort-Nachmias et al. 2015). Threats to this type of validity consist of rejecting null hypotheses when they should not be rejected, and failing to reject null hypotheses when they should be rejected (Frankfort-Nachmias et al. 2015). The former relates to the alpha level incorporated within the study, which in this case, was .05. This indicates that with respect to any particular test, there is a .05 probability that a null hypothesis is rejected when it should not be. The latter relates to the statistical power associated with the study in question. While this cannot be calculated until the analyses have been completed, the a priori power analysis

conducted here suggested that the statistical power associated with the analyses included within this study was very high (Frankfort-Nachmias et al. 2015). This suggests a very low risk of failing to reject null hypotheses that should be rejected (Frankfort-Nachmias et al. 2015). The Bonferroni correction is extremely conservative (Beenstock, 2012), and it has been suggested that it not be used at all for this reason (McDonald, 2014). Essentially, these types of corrections are so conservative that they may have very little power to reject the null hypothesis (Gray & Kinnear, 2012). For this reason, this correction was not made in the present study. Overall, this suggested minimal threats to statistical conclusion validity.

## Ethical Procedures

Access to the proposed dataset used for this study, the YRBSS, was formalized through the university's Institutional Review Board. This was a straightforward process as only secondary, archival data are proposed for use within this study, and I did not have any direct contact with human subjects. The original surveys were designed to allow for the voluntary and anonymous participation of all respondents. No further permissions were required in order for me to gain access to the data. Walden University’s IRB approval number for this study was 12-14-17-0401474.

YRBS data were protected and stored on an encrypted personal drive of a password-protected computer. Additionally, the data were stored for a period of 5 years and were handled in accordance with YRBS participant's rights. While these data are not confidential, as this dataset is publicly available, the data contained are anonymous, and it would not appear possible to identify the individuals in question associated with any

particular case included within this dataset. No concerns were present in regard to either anonymity or confidentiality, as these data have already been anonymized, and as they are publicly available, no potential concerns exist with regard to breaching the confidentiality of the data in question. Additionally, no other ethical concerns were identified, such as conflict of interest or power differentials.

## Summary

A quantitative, cross-sectional study design was proposed for the current study due to the focus on the association between variables. Descriptive analyses was used in this study, followed by a series of preliminary bivariate analyses, and followed finally by a series of three regression analyses, which serve to test this study's hypotheses. The independent and dependent variables were described in detail within this Section 2, along with their operational definitions. Sampling and sampling procedures were described, while as secondary data analysis is proposed, these details relate specifically to those procedures, which were used in the original surveys conducted. A power analysis was also conducted to determine the sufficiency of the sample size for this study. Threats to validity were discussed, along with ethical concerns. Section 3 will discuss the results of the analyses conducted for this study.

Section 3: Presentation of the Results and Findings Section

## Introduction

The purpose of this quantitative cross-sectional study was to investigate the association between illegal drug use, suicidal ideation, and attempted suicide among adolescents in Grades 9-12 in New York State. In this section, the results of the analyses conducted for this study are presented and discussed. First, a series of descriptive statistics were conducted, which included a frequency table reporting the sample sizes and percentages of response for each response category for all variables included in this study. This was followed by two multivariate regression analyses, which were then supplemented with a large set of univariate regressions; these results were also reported and discussed in this section. I sought to answer the following questions and test the following hypotheses:

$RQ_1$ –What is the association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between the availability of an illegal drug on school property and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_2$ –What is the association between illegal drug use and attempted suicide

among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between illegal drug use and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_3$ –What is the association between age and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between age and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between age and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_4$ –What is the association between ethnicity and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between ethnicity and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between ethnicity and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_5$ –What is the association between being bullied and attempted suicide among adolescents in Grades 9-12 in New York?

$H_{0:}$ There is no statistically significant association between being bullied and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between being bullied and

attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_6$ –What is the association between gender and attempted suicide among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between gender and attempted suicide among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between gender and attempted suicide among adolescents in Grades 9-12 in New York.

$RQ_7$ –What is the association between the availability of an illegal drug on school property and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between the availability of an illegal drug on school property and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between the availability of an illegal drug on school property and suicidal ideation among adolescents in Grades 9-12 in New York.

$RQ_8$ –What is the association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between illegal drug use and suicidal ideation among adolescents in Grades 9-12 in New York.

$RQ_9$ –What is the association between age and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between age and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between age and suicide among ideation adolescents in Grades 9-12 in New York.

$RQ_{10}$ –What is the association between ethnicity and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between ethnicity and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between ethnicity and suicidal ideation among adolescents in Grades 9-12 in New York.

$RQ_{11}$ –What is the association between being bullied and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between being bullied and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between being bullied and suicide among ideation adolescents in Grades 9-12 in New York.

$RQ_{12}$ –What is the association between gender and suicidal ideation among adolescents in Grades 9-12 in New York?

$H_0$: There is no statistically significant association between gender and suicidal ideation among adolescents in Grades 9-12 in New York.

$H_1$: There is a statistically significant association between gender and suicidal ideation among adolescents in Grades 9-12 in New York.

## Data Collection of Secondary Data Set

Data for the the secondary data set were collected during 2015 (CDC, 2017). For recruiting, parental permission was obtained first; students then completed the self-administered questionnaire during a class period (CDC, 2013). Each student participant recorded his or her responses directly on an answer sheet or computer-scannable booklet (CDC, 2013). Among states, the response rate ranged from 70–100%, with student response rates ranging from 64–90% (CDC, 2013). Additionally, overall response rates ranged from 60–84% (CDC, 2013). No discrepancies were present in the use of the secondary data set from the plan presented in Section 2. Regarding how representative the sample is of the population of interest, representative sampling was used in this study, indicating that the sample is representative of the population and that a high degree of external validity was present in this study (CDC, 2013).

## Study Results Descriptive Analysis

Table 2 indicates the baseline descriptive and demographic characteristics of the sample. As shown, close to 14% of respondents considered suicide, and close to 9% had attempted suicide at some time. Close to one quarter of respondents were offered, sold, or given an illegal drug on school property, with approximately two thirds of the sample having tried marijuana when they were 17 years old or older. Approximately 18% of respondents were found to use marijuana on a monthly basis or more frequently, with close to 3% using heroin once a month or more. Next, 14% of respondents indicated they

experienced being bullied, with slightly over one third of the sample of Hispanic or Latino, slightly over 27% White, slightly over 23% Black or African-American, and 9% Asian. All remaining categories of response with respect to race each represented less than 3% of the entire sample. With respect to age, the vast majority of the sample was between the ages of 14 and 17, with the sample also almost evenly split based on gender.

Table 2

*Frequencies of Study Variables*

| Measure | *N* | % |
|---|---|---|
| Considered suicide | | |
| No | 75,670 | 85.0 |
| Yes | 12,188 | 13.7 |
| Missing | 1,210 | 1.4 |
| Total | 89,068 | 100.0 |
| Attempted suicide | | |
| 0 times | 68,113 | 76.5 |
| 1 time | 3,514 | 3.9 |
| 2 or 3 times | 1,789 | 2.0 |
| 4 or 5 times | 426 | .5 |
| 6 or more times | 697 | .8 |
| Missing | 14,529 | 16.3 |
| Total | 89,068 | 100.0 |
| Offered, sold, or given an illegal drug on school property | | |
| No | 39,811 | 44.7 |
| Yes | 13,106 | 14.7 |
| Missing | 36,151 | 40.6 |
| Total | 89,068 | 100.0 |
| Initiation of marijuana use | | |
| Never tried marijuana | 1,325 | 1.5 |
| 8 years old or younger | 1,146 | 1.3 |
| 9 or 10 years old | 3,622 | 4.1 |
| 11 or 12 years old | 11,391 | 12.8 |
| 13 or 14 years old | 8,999 | 10.1 |
| 15 or 16 years old | 1,353 | 1.5 |
| 17 years old or older | 58,058 | 65.2 |
| Missing | 3,174 | 3.6 |

Table continues

| | | |
|---|---|---|
| Total | 89,068 | 100.0 |
| Current marijuana use | | |
| 0 times | 70,415 | 79.1 |
| 1 or 2 times | 5,658 | 6.4 |
| 3 to 9 times | 3,811 | 4.3 |
| 10 to 19 times | 1,876 | 2.1 |
| 20 to 39 times | 1,349 | 1.5 |
| 40 or more times | 2,446 | 2.7 |
| Missing | 3,513 | 3.9 |
| Total | 89,068 | 100.0 |
| Ever heroin use | | |
| 0 times | 80,692 | 90.6 |
| 1 or 2 times | 826 | .9 |
| 3 to 9 times | 443 | .5 |
| 10 to 19 times | 320 | .4 |
| 20 to 39 times | 164 | .2 |
| 40 or more times | 557 | .6 |
| Missing | 6,066 | 6.8 |
| Total | 89,068 | 100.0 |
| Being bullied | | |
| Yes | 6,550 | 7.4 |
| No | 40,287 | 45.2 |
| Missing | 42,231 | 47.4 |
| Total | 89,068 | 100.0 |
| Race | | |
| Am. Indian / Alaska Native | 1,157 | 1.3 |
| Asian | 7,730 | 8.7 |
| Black or African American | 20,092 | 22.6 |
| Hispanic/Latino | 30,208 | 33.9 |
| Native Hawaiian/other PI | 1,020 | 1.1 |
| White | 23,221 | 26.1 |
| Multiple - Non-Hispanic | 2,332 | 2.6 |
| Missing | 3,308 | 3.7 |
| Total | 89,068 | 100.0 |
| Age | | |
| 12 years old or younger | 283 | .3 |
| 13 years old | 1,172 | 1.3 |
| 14 years old | 14,787 | 16.6 |
| 15 years old | 22,782 | 25.6 |
| 16 years old | 23,094 | 25.9 |
| 17 years old | 19,405 | 21.8 |
| 18 years old or older | 7,347 | 8.2 |

| | | |
|---|---|---|
| Missing | 198 | .2 |
| | | Table continues |
| Total | 89,068 | 100.0 |
| Sex | | |
| Female | 45,858 | 51.5 |
| Male | 42,820 | 48.1 |
| Missing | 390 | .4 |
| Total | 89,068 | 100.0 |

## Regression Analyses

A series of univariate and multivariate ordinal logistic regression analyses were conducted in order to investigate the relationships between each of the two dependent variables, having considered suicide and attempted suicide, and the independent variables, including availability of an illegal drug on school property, illegal drug use, being bullied, age, gender, ethnicity. All variables were categorical variables. For each dependent variable, a series of univariate ordinal logistic regression analyses were first performed. Independent variables that were statistically significantly associated with the dependent variable were then included in the multivariate ordinal logistic regression analysis. For all analyses, missing responses were not included.

Table 3 indicates the results of the logistic regression analysis conducted on having considered suicide. When considering the results of the full analysis along with the univariate results, statistical significance was indicated regarding all predictors included within these models. In regards to the univariate results, having been offered, sold, or given marijuana was associated with a lower likelihood of having considered suicide ($B = -.710$, $p < .001$). Compared with individuals who never tried marijuana, significantly reduced likelihoods of having had considered suicide were found among

those who first tried marijuana when aged 8 or younger (B = -.506, p < .001), 9-10 (B = -.722, p < .001), 11-12 (B = -1.003, p < .001), 13-14 (B = -1.183, p < .001), 15-16 (B = -1.387, p < .001), and 17 or older (B = -1.612, p < .001). Compared with those who did not currently use marijuana, increased risks of having considered suicide were found with those who used marijuana 1-2 times (B = .554, p < .001), 3-9 times (B = .617, p < .001), 10-19 times (B = .764, p < .001), 20-39 times (B = .705, p < .001), and 40 or more times (B = .993, p < .001). Regarding heroin use, as compared with no use, increased risk of having considered suicide was associated with having used heroin 1-2 times (B = 1.324, p < .001), 3-9 times (B = 1.546, p < .001), 10-19 times (B = 1.605, p < .001), 20-39 times (B = 1.339, p < .001), and 40 or more times (B = 2.015, p < .001).

Next, in regard to race, as compared with whites, significantly reduced risk of having considered suicide was found among blacks (B = -.141, p < .001), and increased among Hispanics/Latinos (B = .100, p < .001), American Indians/Alaskan Natives (B = .269, p < .01), and those of other or multiple race (B = .367, p < .001). Regarding age, compared with those aged 18 or above, significantly reduced risk of having considered suicide was found among those aged 12 or younger (B = -1.921, p < .001), 13 (B = -1.947 p < .001), 14 (B = -1.920, p < .001), 15 (B = -1.983, p < .001), 16 (B = -2.021, p < .001), and 17 (B = -2.003, p < .001). Being bullied was associated with reduced risk of having considered suicide (B = -2.136, p < .001), while females were associated with increased risk of having considered suicide (B = .623, p < .001).

Additionally, in regard to the multivariate results, increased risk of having considered suicide was found among those offered/sold/given drugs on school property

(OR = 1.665, p < .001), with reduced risk of having considered suicide found among those who first tried marijuana at age 9-10 (OR = .563, p < .05), 11-12 (OR = .402, p < .001), 13-14 (OR = .320, p < .001), 15-16 (OR = .272, p < .001), or 17 or older (OR = .257, p < .001). Next, regarding heroin use, significantly increased risk of having considered suicide was found among those who tried heroin 1-2 times (OR = 2.735, p < .001), 3-9 times (OR = 2.771, p < .05), or 10-19 times (OR = 4.186, p < .05). Regarding race, increased risk of having considered suicide was found among Hispanic/Latinos (OR = 1.466, p < .001) and American Indians/Alaskan Natives (OR = 1.802, p < .05). Increased risk of having considered suicide was also found with respect to being aged 12 or younger (OR = 6.762, p < .05), being bullied (OR = 2.728, p < .001) and females (OR = 2.248, p < .001).

Table 3

*Logistic Regression Analysis With Having Considered Suicide*

| Predictor | *B* (*SE*) | Wald $\chi^2$ (*df*) | Exp (*B*) | Univariate (*SE*) |
|---|---|---|---|---|
| Offered/Sold/Given | | 58.977*** (1) | | |
| Yes | .510 (.066) | 58.977*** (1) | 1.665 | -.710*** (.027) |
| No | Ref | | | |
| Age First Marijuana | | 63.706*** (6) | | |
| 8 or younger | -.306 (.296) | 1.064 (1) | .737 | -.506*** (.091) |
| 9-10 | -.574 (.246) | 5.458* (1) | .563 | -.722*** (.071) |
| 11-12 | -.911 (.232) | 15.409*** (1) | .402 | -1.003*** (.064) |
| 13-14 | -1.139 (.240) | 22.529*** (1) | .320 | -1.183*** (.066) |
| 15-16 | -1.302 (.355) | 13.423*** (1) | .272 | -1.387*** (.099) |
| 17 or older | -1.358 (.234) | 33.801*** (1) | .257 | -1.612*** (.060) |
| Never | Ref | | | |
| Marijuana use | | 1.018 (5) | | |
| 1-2 times | .064 (.127) | .256 (1) | 1.066 | .554*** (.036) |
| 3-9 times | -.030 (.140) | .045 (1) | .971 | .617*** (.042) |
| 10-19 times | -.065 (.204) | .102 (1) | .937 | .764*** (.057) |
| 20-39 times | -.047 (.219) | .046 (1) | .954 | .705*** (.068) |

| | | | | |
|---|---|---|---|---|
| 40+ times | .113 (.196) | .335 (1) | 1.120 | .993*** (.048) |
| Not currently use | Ref | | | |
| Heroin use | | 26.398*** (5) | | |
| 1-2 times | 1.006 (.271) | 13.786*** (1) | 2.735 | 1.324*** (.078) |
| | | | | Table continues |
| 3-9 times | 1.019 (.463) | 4.844* (1) | 2.771 | 1.546*** (.108) |
| 10-19 times | 1.432 (.619) | 5.344* (1) | 4.186 | 1.605*** (.130) |
| 20-39 times | 1.119 (.695) | 2.590 (1) | 3.062 | 1.339*** (.185) |
| 40+ times | .686 (.352) | 3.792 (1) | 1.985 | 2.015*** (.088) |
| Not currently use | Ref | | | |
| Race | | 42.415*** (5) | | |
| Asian | .032 (.127) | .065 (1) | 1.033 | -.072 (.039) |
| Black/African Am. | .101 (.092) | 1.198 (1) | 1.106 | -.141*** (.029) |
| Hispanic/Latino | .382 (.082) | 21.809*** (1) | 1.466 | .100*** (.025) |
| Am. Indian/Alaskan | .589 (.229) | 6.602* (1) | 1.802 | .269** (.082) |
| Multiple/other | .616 (.151) | 16.611 (1) | 1.851 | .367*** (.049) |
| White | Ref | | | |
| Age | | 12.100 (6) | | |
| 12 or younger | 1.911 (.746) | 6.563* (1) | 6.762 | -1.921*** (.155) |
| 13 | .076 (.250) | .092 (1) | 1.079 | -1.947*** (.132) |
| 14 | .221 (.151) | 2.135 (1) | 1.247 | -1.920*** (.131) |
| 15 | .186 (.146) | 1.610 (1) | 1.204 | -1.983*** (.131) |
| 16 | .051 (.147) | .118 (1) | 1.052 | -2.021*** (.132) |
| 17 | .069 (.149) | .216 (1) | 1.072 | -2.003*** (.134) |
| 18 or above | Ref | | | |
| Being bullied | | 186.456*** (1) | | |
| Yes | 1.004 (.073) | 186.456*** (1) | 2.728 | -2.136*** (.016) |
| No | Ref | | | |
| Gender | | 164.333*** (1) | | |
| Female | .810 (.063) | 164.333*** (1) | 2.248 | .623*** (.020) |
| Male | Ref | | | |
| Constant | -1.124 (.228) | 24.230*** (1) | .325 | |

*Note*. *$p$<.05, **$p$<.01, ***$p$<.001. Ref: reference category.

Table 4 indicates the results of the ordinal logistic regression conducted with attempted suicide. Ordinal logistic regression was used as the Brant test of the parallel lines assumption was not found to achieve statistical significance. Again, when

considering both the primary and univariate results, statistical significance is indicated regarding all predictors included within these models.

First, regarding the univariate results, reduced risk of attempted suicide was found among those offered/given/sold drugs (B = .726, p < .001), with increased risk of attempted suicide found among those who first tried marijuana aged 8 or younger (B = 2.657, p < .001), 9-10 (B = 1.806, p < .001), or 11-12 (B = 1.146, p < .001), with reduced risk of attempted suicide found among those who first tried marijuana aged 13-14 (B = .586, p < .001), 15-16 (B = .283, p < .001), or 17 or older (B = .231, p < .05). Marijuana use was alternatively found to be associated with reduced risk of attempted suicide among those whose use was 1-2 times (B = .619, p < .001), 3-9 times (B = .812, p < .001), or 20-39 times (B = .849, p < .001), and higher among those who used 10-19 times (B = 1.055, p < .001) or 40 or more times (B = 1.521, p < .001). All categories of heroin use were associated with increased risk of attempted suicide: 1-2 times (B = 2.215, p < .001), 3-9 times (B = 2.888, p < .001), 10-19 times (B = 2.959, p < .001), 20-39 times (B = 2.965, p < .001), and 40 or more times (B = 3.732, p < .001). Increased risk of attempted suicide was found among those aged 12 or younger (B = 2.323, p < .001) and 17 (B = .295, p < .001), and reduced among those aged 16 (B = -.251, p < .001). Regarding race, reduced risk of attempted suicide was found among Asians (B = -.119, p < .05), with increased risk of attempted suicide found among blacks (B = .210, p < .001), Hispanics/Latinos (B = .478, p < .001), American Indian/Alaskan Natives (B = .703, p < .001), and those of multiple or other race (B = .552, p < .001). Being bullied was

associated with increased risk of attempted suicide (B = 1.064, p < .001), with females associated with reduced risk (B = .406, p < .001).

Additionally, pertaining to the multivariate results, increased risk of attempted suicide was found among those offered/sold/given drugs (B = .456, p < .001), and among those who first tried marijuana at ages 9-10 (B = .941, p < .001), 11-12 (B = .708, p < .001), or 13-14 (B = .296, p < .05). Increased risk of attempted suicide was also found among those who used marijuana 1-2 times (B = .312, p < .05), 3-9 times (B = .346, p < .05), or 40 or more times (B = .491, p < .05). Increased risk of attempted suicide was also found regarding all categories of heroin use: 1-2 times (B = 1.614, p < .001), 3-9 times (B = 2.145, p < .001), 10-19 times (B = 2.251, p < .001), 20-39 times (B = 3.009, p < .001), and 40 or more times (B = 2.614, p < .001). Increased risk of attempted suicide was also found among those aged 12 or younger (B = 1.166, p < .01), with reduced risk of attempted suicide found among those aged 17 (B = -.354, p < .05). With regard to race, increased risk of attempted suicide was found among blacks (B = .367, p < .01), Hispanics/Latinos (B = .681, p < .001), American Indians/Alaskan Natives (B = .915, p < .01), and those of multiple or other race (B = .752, p < .001). Finally, increased risk of attempted suicide was found for those being bullied (B = .709, p < .001) and females (B = .600, p < .001).

Table 4

*Ordinal Logistic Regression with Attempted Suicide*

| Category | *B* (*SE*) | Wald (*df*) | Univariate (*SE*) |
|---|---|---|---|
| Offered/sold/given | | 32.549*** (1) | |
| Yes | .456 (.080) | 32.549*** (1) | .726*** (.036) |

| | | | |
|---|---|---|---|
| No | Ref | | |
| Age first marijuana | | | |
| 8 or younger | .492 (.262) | 3.530 (1) | 2.657*** (.062) |
| 9-10 | .941 (.265) | 12.656*** (1) | 1.806*** (.075) |
| 11-12 | .708 (.165) | 18.477*** (1) | 1.146*** (.051) |
| 13-14 | .296 (.124) | 5.644* (1) | .586*** (.037) |
| 15-16 | -.030 (.145) | .042 (1) | .283*** (.044) |
| 17 or older | -.298 (.368) | .659 (1) | .231* (.111) |
| Never | Ref | | |
| Marijuana use | | | |
| | | | Table continues |
| 1-2 times | .312 (.154) | 4.123* (1) | .619*** (.046) |
| 3-9 times | .346 (.167) | 4.322* (1) | .812*** (.052) |
| 10-19 times | .260 (.234) | 1.227 (1) | 1.055*** (.067) |
| 20-39 times | .419 (.251) | 2.781 (1) | .849*** (.084) |
| 40+ times | .491 (.215) | 5.204* (1) | 1.521*** (.053) |
| Not currently use | Ref | | |
| Heroin use | | | |
| 1-2 times | 1.614 (.245) | 43.566*** (1) | 2.215*** (.080) |
| 3-9 times | 2.145 (.378) | 32.224*** (1) | 2.888*** (.103) |
| 10-19 times | 2.251 (.415) | 29.451*** (1) | 2.959*** (.120) |
| 20-39 times | 3.009 (.497) | 36.595*** (1) | 2.965*** (.171) |
| 40+ times | 2.614 (.288) | 82.638*** (1) | 3.732*** (.086) |
| Not currently use | Ref | | |
| Age | | | |
| 12 or younger | 1.166 (.445) | 6.869** (1) | 2.323*** (.136) |
| 13 | .047 (.273) | .030 (1) | .203 (.108) |
| 14 | -.218 (.173) | 1.590 (1) | -.080 (.053) |
| 15 | -.126 (.165) | .587 (1) | -.080 (.050) |
| 16 | -.325 (.167) | 3.769 (1) | -.251*** (.051) |
| 17 | -.354 (.172) | 4.257* (1) | .295*** (.053) |
| 18 or above | Ref | | |
| Race | | | |
| Asian | .133 (.159) | .695 (1) | -.119* (.056) |
| Black/African Am. | .367 (.114) | 10.422** (1) | .210*** (.038) |
| Hispanic/Latino | .681 (.099) | 47.271*** (1) | .478*** (.033) |
| Am. Indian/Alaskan | .915 (.276) | 11.019** (1) | .703*** (.103) |
| Multiple/other | .752 (.187) | 16.224*** (1) | .552*** (.064) |
| White | Ref | | |
| Being bullied | | 63.455*** (1) | |
| Yes | .709 (.089) | 63.455*** (1) | 1.064*** (.041) |
| No | Ref | | |
| Gender | | 62.948*** (1) | |

| | | | |
|---|---|---|---|
| Female | .600 (.076) | 62.948*** (1) | .406*** (.027) |
| Male | Ref | | |

*Note*. *$p$<.05, **$p$<.01, ***$p$<.001. Ref: reference category.

## Summary of Results

The results of the analyses conducted for this study indicated that all independent variables were significant in predicting the two outcomes of having considered suicide and having attempted suicide. These results served to support all of the study's alternative hypotheses. With regard to both outcomes, statistically significant associations were found with the availability of an illegal drug on school property (Research Questions 1 and 7), with increased risk found of both having considered suicide and having attempted suicide, and with increased risk found of having considered suicide and having attempted suicide with more significant drug use, especially heroin use (Research Questions 2 and 8). Significant associations were next found with age, with younger individuals found to be at increased risk of having considered suicide and having attempted suicide (Research Questions 3 and 9). Ethnicity was also significantly associated with these predictors, with minorities generally found to be at increased risk of having considered suicide and having attempted suicide (Research Questions 4 and 10). Being bullied was associated with increased risk of having considered suicide and having attempted suicide (Research Questions 5 and 11), with females also at increased risk of having considered suicide and having attempted suicide (Research Questions 6 and 12).

A number of discrepancies were found when comparing the univariate and multivariate results. All discrepancies will be noted here, whether found to achieve statistical significance or not. First, with regard to having considered suicide, having been

offered, sold, or given marijuana was associated with reduced risk of having considered suicide in the univariate results, but increased risk of having considered suicide in the multivariate results. Next, having used marijuana 3-9 times, 10-19 times, or 20-39 times was associated with increased risk of having considered suicide in the univariate results, but decreased risk of having considered suicide in the multivariate results. Regarding race, Asians and Black/African Americans were associated with reduced risk of having considered suicide in the univariate results, but increased risk in the multivariate results. Finally, with respect to age, all age categories present in the analyses were associated with reduced risk of having considered suicide in the univariate results, but increased risk in the multivariate results. Discrepancies such as these can be due to the inclusion of the additional predictors in the multivariate analyses (Denis, 2015). By controlling for these additional predictors, the results associated with any specific independent variable will change (Denis, 2015).

Regarding the analyses conducted on attempted suicide, having first tried marijuana at ages 15-16 or 17 or older was associated with increased risk of attempted suicide in the univariate results, but decreased risk of attempted suicide in the multivariate results. Additionally, being aged 17 was associated with increased risk of attempted suicide in the univariate results, and reduced risk of attempted suicide in the multivariate results. Finally, Asians were associated with reduced risk of attempted suicide in the univariate results, but were associated with increased risk of attempted suicide in the multivariate results.

As mentioned in Section 2, the Bonferroni correction is extremely conservative (Beenstock, 2012), and it has been suggested that it not be used at all for this reason (McDonald, 2014). Essentially, these types of corrections are so conservative that they may have very little power to reject the null hypothesis (Gray & Kinnear, 2012). By performing the correction, you decrease Type I error, but increase Type II error. For this reason, this correction was not used in the present study. Overall, this suggests minimal threats to statistical conclusion validity.

In Section 4, I will reintroduce the study by reiterating the purpose and nature of the study and summarize key findings. Furthermore, in Section 4 I will provide an interpretation of the findings, discuss study limitations, share recommendations, indicate implications for professional practice and social change, and discuss conclusions.

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

## Introduction

The purpose of this quantitative cross-sectional study was to investigate the association between illegal drug use, suicidal ideation, and attempted suicide among adolescents in Grades 9-12 in New York. Among adolescents who use illegal drugs, some use them as a result of the problems they face in their lives (National Institute on Drug Abuse, 2014). The problems include difficulties in their academics, problems in their health, and their environment among others (National Institute on Drug Abuse, 2014). Suicide has been studied over the course of the last two decades as a cause of death among adolescents (Chakravarthy, Shah, & Lotfipour, 2013). According to Inman, van Bakergem, LaRosa, & Carr, (2011) individuals who used illegal drugs were at a higher risk of committing suicide than those individuals who did not use any illegal drug. The outcome of this research may play a role in the reduction of deaths that could be related to suicide. There is a need to come up with prevention approaches and intervention strategies on the issue (Conner, Bagge, Goldston, & IIgen, 2014). The studies conducted in the recent past were national studies and do not have specificity to the target population of adolescents in Grades 9-12 in New York (Pompili et al., 2012). These national studies may have general implications for the public, but may not be relevant to the target population. Attempted suicide and suicidal ideation were the dependent variables, with the independent variables consisting of the availability of an illegal drug on school property, illegal drug use, being bullied, age, gender, and ethnicity.

The CDC 2015 YRBS data for 89,068 adolescents in Grades 9-12 in New York were utilized in this study. 13.7% of the participants considered suicide and 7.2% have had attempted suicide at some point. 14.7% of respondents were offered, sold, or given an illegal drug on school property. 17.0% of respondents were found to have used marijuana on a monthly basis or more frequently. 2.6% of respondents were found to have used heroin one or more times during their life time. 7.4% of respondents indicated they experienced being bullied. Slightly over one third of the sample (33.9%) were Hispanic or Latino, 26.1% were White, 22.6% were Black or African-American, and 8.7% were Asian. The majority of the sample was between the ages of 14 and 17, with the sample also almost evenly split based on gender.

The results of the logistic regression analyses indicated that increased risk of having considered suicide (suicide ideation) was found among those who were offered/sold/given drugs on school property (Odds Ratio (OR) = 1.665), used heroin (OR = 2.735 - 4.186), Hispanic/Latinos (OR = 1.466) or American Indians/Alaskan Natives (OR = 1.802), aged 12 or younger (OR = 6.762), were bullied (OR = 2.728) and females (OR = 2.248). However, current use of marijuana was not associated with suicide ideation.

Additionally, increased risk of attempted suicide was found among those who were offered/sold/given drugs (OR = 1.578), currently used marijuana on a monthly basis or more (OR = 1.366-1.634), used heroin (OR = 5.023-20.267), aged 12 or younger (OR = 3.209), Blacks (OR = 1.443), Hispanics/Latinos (OR = 1.976), American Indians/Alaskan Natives (OR = 2.497), or multiple races (OR = 2.121), were bullied (OR

= 2.032) and females (OR = 1.822). Reduced risk of attempted suicide was found among those age 17 or older (OR = 0.702).

The results of the analyses conducted for this study indicated that all independent variables were significant in predicting the two outcomes of having considered suicide and having attempted suicide. These results served to support all of the study's alternative hypotheses.

## Interpretation of the Findings

The CDC 2015 YRBS data utilized in this study revealed that, among the 89,068 adolescents in Grades 9-12 in New York, 13.7% have considered suicide and 7.2% have had attempted suicide at some point. These findings are compatible to the prevalence rates of suicide behaviors nationwide observed in previous studies. For example, in the 2013 national YRBS, 17.0% of adolescent respondents reported suicide ideation, 13.6% reported planning for a suicide attempt, and 8.0% had attempted suicide at least once in the past year (CDC, 2016). In the 2015 national YRBS, nationwide, 17.7% of adolescents had seriously considered attempting suicide, 14.6% of adolescents had made a plan about how they would attempt suicide, and 8.6% of adolescents had attempted suicide one or more times during the 12 months before the survey (Kann et al., 2016). Also, using data obtained from the National Survey on Drug Use and Health pooled across survey years 2008–2013, with a combined sample of 108,560, youth ages 12–17, Harford, Chen, & Grant (2016) reported that 3.4% (N = 3,895) of the adolescents had attempted suicide for the combined years from 2008 to 2013. Utilizing data coming from the National Longitudinal Study of Adolescent Health (Add Health; Harris et al., 2009), consisting of

7th- to 12th-grade students from 134 United States schools (N = 4,834), Ammerman, Steinberg, and McCloskey (2018) discovered that 12.8% of students indicated suicidal ideation and 3.7% indicated having attempted suicide in the prior 12 months. These results indicated that the prevalence of suicidal ideation and behavior among adolescents is alarming both concurrently and prospectively due to the potential detrimental consequences and the negative outcomes associated with adolescent suicidal ideation and behavior, such as mental disorder (Nock et al., 2013), increased anxiety or illegal drug use (Andover, Morris, Wren, & Bruzzese, 2012), and psychopathology in later life (Brière, Rohde, Seeley, Klein, & Lewinsohn, 2015).

I found that 14.7% of respondents were offered, sold, or given an illegal drug on school property, 17.0% of respondents had used marijuana on a monthly basis or more frequently, and 2.6% of respondents had used heroin one or more times during their life time. These findings are consistent with the previous studies. For example, after an examination of data from the 2001 to 2009 YRBS, Wong, Zhou, Goebert, & Hishinuma (2013) reported that out of the 73,183 participants, 2.7 % of the adolescents have used heroin and 39.1% of the adolescents have used marijuana at least once in their lifetime. In the 2015 national YRBS, nationwide, 21.7% of students had been offered, sold, or given illegal drug by someone on school property during the 12 months before the survey (Percentages ranged from 14.7% to 29.8% across 32 states), 21.7% of students had used marijuana one or more times during the 30 days before the survey (Percentages ranged from 12.4% to 25.3% across 32 states), 2.1% of students had used heroin one or more times during their life (Percentages ranged from 0.9% to 5.9% across 32 states) (Kann et

al., 2016). More recently, utilizing data of 4,834 adolescents from the National Longitudinal Study of Adolescent Health, Ammerman et al. (2018) found that 23% of participants endorsed having used marijuana in the past 12 months. These findings may indicate that regarding the safety of the individual student and the larger school community as at-school illegal drug use is associated with increased rates of violence and delinquency (Dudovitz, McCoy, & Chung, 2015). Neurobiologically, the brain development of an adolescent may place teenagers at higher risk for illegal drug abuse due to impulsivity and sensation seeking, and a higher tendency to respond to reward stimuli (McLoughlin, Gould, & Malone, 2015). Illegal drug use is a special accelerant to adolescents, especially when mental mechanisms for resisting impulsivity are not fully matured (McLoughlin, Gould, & Malone, 2015). Adolescence is an evolving moment discernable by the occurrence and increase of dangerous behavior (Collado, MacPherson, Kurdziel, Rosenberg, & Lejuez, 2014). Thus, students found using illicit drugs (ex: marijuana and heroin) at school should be immediately and carefully screened for other serious health risks that pose significant present dangers, as this may represent a critical opportunity to identify troubled youth (Dudovitz, McCoy, & Chung, 2015).

I found that increased risk of suicide ideation was associated to being offered/sold/given drugs on school property, use of illegal drugs (use of heroin), being a member of a cultural minority (Hispanic/Latinos or American Indians/Alaskan Natives), aged 12 or younger, being bullied, and being female. Furthermore, I also found that increased risk of attempted suicide was associated to being offered/sold/given drugs, use of illegal drugs (currently using marijuana on a monthly basis or more and use of heroin),

aged 12 or younger, being a member of a cultural minority (Blacks, Hispanics/Latinos, American Indians/Alaskan Natives, or multiple races), being bullied, and being female.

The findings of this study regarding the relationships between suicidal behaviors and risk factors, including illegal drug availability/use, gender, ethnicity, bully, and age are also consistent with findings of past research. An ample amount of studies have shown that suicide behavior was associated to illicit drug use (Cleary, 2000; Wong, Zhou, Goebert, & Hishinuma, 2013; Dudovitz, McCoy, & Chung, 2015; McLoughlin, Gould, & Malone, 2015; Poorolajal et al., 2016; Ammerman et al., 2018). For example, Cleary (2000) examined the association between victimization of bullying (i.e., being threatened with a weapon, property damaged, and felt unsafe at school) and suicidal behaviors among 1,569 high schools students in New York State (excluding New York City) and found that bully-victimized students were at greater risk for suicidality. Wong, Zhou, Goebert, & Hishinuma (2013) reported that among the ten illegal drugs examined (heroin, methamphetamine, steroids, cocaine, inhalants, hallucinogen, ecstasy, alcohol, tobacco, and marijuana), univariate analysis demonstrated that participants indicating a past of heroin use had the greatest link with suicidal ideation, and attempted suicide in the previous twelve months. Illicit drug use may be a risk factor for suicide due to many reasons. Illicit drug users are more likely to have a lack of impulse control, be more psychopathological, and experience family dysfunction and social isolation (Darke & Ross, 2002). Therefore, illicit drug users may exacerbate the intensity and duration of depression, worsen a person’s distress and increase the difficulties for maintaining a

normal relationship with family, peers, and partners, and hence lead to suicidal behaviors (Beautrais, Joyce, & Mulder, 1997; Wong, Brower, & Craun, 2016).

As discovered in this current study, ethnicity has been shown to be one of the risk factors of suicide in the literature (Wong, Sugimoto-Matsuda, Chang, & Hishinuma, 2012; Demetry, 2014; Cheref, Lane, Polanco-Roman, Gadol, & Miranda, 2015; McLoughlin, Gould, & Malone, 2015; Harford, Chen, & Grant, 2016; Chan et al., 2017; Choo, Harris, Chew, & Ho, 2017). Across the world, a similar pattern of high suicidality among cultural minorities is evident among adolescent populations (McLoughlin, Gould, & Malone, 2015). For example, Chan et al. (2017) found that the percent of suicide attempts in the last 12 months was highest among Pacific islanders (8.24%) and Maori (6.50%) (while the percentage of suicide attempt was 2.69% for New Zealand Europeans) based on findings from a nationally representative New Zealand high school survey (N = 8,500). Similarly, in Europe, adolescents (15 to 19 years old) among the indigenous ethnic minority of Ireland (Irish Travelling Community) have a completed suicide rate that is over 2.5 times the rate of the general Irish population (Walker, 2008). Using adolescent data of YRBS 1999-2009 (N = 88,532), Wong, Sugimoto-Matsuda, Chang, & Hishinuma (2012) found that overall, Native Hawaiian/Pacific Islander, multiracial, and American Indian/Alaska Native adolescents reported a significantly higher risk for suicide-related behaviors compared to their Asian, Black, Hispanic, and White peers. More recently, in the 2015 US national YRBS results, nationwide, the prevalence of having attempted suicide was 6.8% for White, 8.9% for Black, and 11.3% for Hispanic youth, and the prevalence of having seriously considered attempting suicide was 17.2%

for White, 14.5% for Black, and 18.8% for Hispanic youth (Kann et al., 2016). The reasons for the ethnic divergence in prevalence of suicide behaviors are unclear, but may reflect cultural norms around accepted ways of coping wiith distress (Stack & Kposowa, 2016). Previous researchers have suggested that acculturative stress, low self-esteem, hopelessness, and perceived discrimination could be the main contributors to the increased risk for suicidality among minority races (Gomez, Miranda, & Polanco, 2011; Roman & Miranda, 2013; Assari, Moghani Lankarani, & Caldwell, 2017). Furthermore, prior research has confirmed racial and ethnic disparities in experiences of depression, one of the leading risk factor of suicide. For example, minority individuals experience depressive symptoms more severely than White individuals (Williams et al., 2007). One study reported that biracial (African American/Latino) adolescents exhibited greater levels of depressive symptoms than their African American, Latino, and European American counterparts (Ramos, Jaccard, & Guilamo-Ramos, 2003). High rates of hopelessness and suicidality have also been noted among Latina adolescents and emerging adults, with hopelessness and loneliness positively predicting suicidality in undergraduate Latina students (Chesin & Jeglic, 2012). Conflict between emerging autonomy and parental cultural expectations was suggested to be a risk factor for depression (Chang, Hirsch, Sanna, Jeglic, & Fabian, 2011) and suicidality (Zayas, Gulbas, Fedoravicius, & Cabassa, 2010) among Latina emerging adults. These findings are evidence of culture's influence on suicidality in minority individuals.

Bullying or peer victimization was found to be associated with both suicidal ideation and suicide attempts for adolescents in this study. This finding agreed with the

findings of several meta-analysis studies (Klomek, Sourander, & Gould, 2010; Van Geel, Vedder, & Tanilon, 2014; Holt et al., 2015) and longitudinal studies (Fisher et al., 2012; Lereya et al., 2013; Heikkilä et al., 2013). Being a victim of bullying may result in feelings of depression and social isolation, thwarted belongingness, and perceived burdensomeness (due to frequent need for assistance and support from peers and family) (Joiner, 2005; Bauman, Toomey, & Walker, 2013). Being a victim of bullying may also erode positive relationships with peers and increase feelings of social rejection and exclusion (Henry et al., 2014). For the developing adolescent in which the value placed on being accepted makes the experience of victimization such an acutely devastating experience, bullying can accelerate a pathway to suicide via the creation of variable levels of mental distress (McLoughlin, Gould, & Malone, 2015).

In this study, females were found to be more likely to have both suicidal ideation and suicide attempts than males. The higher prevalence rate of suicidal behaviors among females is comparable to the findings in other investigations, where females had about twice the odds of considering suicide/attempting suicide (Harford, Chen, & Grant, 2016; Teevale et al., 2016; Assari, Moghani Lankarani, & Caldwell, 2017; Chan et al., 2017). Some studies indicated that the gender differences in suicidal behaviors may be related to pubertal developmental differences between boys and girls, which causes mood disorders/depression to occurr more often for girls, and hence eventually results in more prevalent suicidal behaviors (Lewinsohn, Rohde, Seeley, & Baldwin, 2001; Nock et al., 2008; Kumar, Walls, Janz, Hutchinson, Turner, & Graham, 2012).

Finally, mixed findings of age effects on suicides were discovered in this study, where being aged 12 or younger was associated with increased likelihood of suicide ideations and attempts, while reduced risk of attempted suicide was found among those aged 17. According to the nationwide results of the 2015 YRBS, the percentage of respondents seriously considering was 18.2%, 18.3%, 17.7%, and 16.3% for Grades 9-12 students respectively; the percentage of attempted suicide was 9.9%, 9.4%, 8.0%, and 6.2% for Grades 9-12 students respectively (Kann et al., 2016). The similar data distributions were also seen in the results reported in Wong, Sugimoto-Matsuda, Chang, & Hishinuma (2012), where prevalence of suicide ideation was 17.2%, 17.6%, 16.4%, and 15.1% for Grades 9-12 students, and prevalence of suicide attempt was 9.4%, 8.8%, 6.9%, and 5.3% for Grades 9-12 students. Both findings seemed to suggest a decreasing trend of suicide behaviors for grade (age), which aligned with the findings of this study.

Illegal drug use, suicidal ideation, and suicide attempts are common problems among adolescents (Sharma, Nam, Kim, & Kim, 2015). While some recent studies have been conducted focusing upon the association between illegal drug use and suicide (Brockie et al., 2015; Cohen, Spirito, & Brown, 2013; Liu, Case, & Spirito, 2014; Wong, Zhou, Goebert, & Hishinuma, 2013), little has been done focusing upon the adolescent population in the United States. The findings of this study demonstrated that among school-going adolescents in the State of New York, being offered/sold/given drugs on school property, use of heroin, being a member of a cultural minority, aged 12 or younger, being bullied, and being female, were risk factors of suicidal ideation and suicide attempts, based on a nationally representative sample in the United States.

Therefore, this research filled a gap in previous research by identifying the significant predictors for suicidal ideation and suicide attempts of the school-going adolescents in the State of New York.

These findings support the theoretical foundation of this study and are consistent with findings of past research. The social cognitive theory was the theoretical foundation of this study, which assumes that three factors, personal factors (suicidal ideation, age, ethnicity, being bullied, gender), behaviors (illegal drug use, availability, attempted suicide), and environments (school property) constantly interact by either influencing or being influenced by each other. As there were significant relationships between suicidal behaviors and risk factors (illegal drug availability/use, gender, ethnicity, bully, and age), the interaction of the three factors of social cognitive theory (personal factors, behaviors, and environments) was evident.

## Limitations of the Study

One of the limitations of this study is the cross-sectional design of the YRBS survey, which restricts the capability to distinguish the potential course of interconnection among suicide and study variables of interest (e.g., illegal drug use). The other limitation of the study included the reliance on self-report of the survey assessment and hence may not be completely valid, which place constraints on the depth of the information obtained. The absence of contextual variables in the data set limits on the ability to account for socio-economic status, family factors, academic performance and other potential confounders known to predict risky health behaviors, such as identification of comorbid psychological disorders.

## Recommendations for Future Research

Future research could employ qualitative interviews to explore the relationships and processes underpinning risk and protective factors, suicide intent, opportunity for rescue, and other factors that might be relevant for understanding lethality of attempted suicide in different ethnic communities. Moreover, further evidence is required to assess and compare the association between suicide outcomes and different types of illicit drugs, dose–response relationship and the way they are used. It is also critical to explicate the root causes for these findings. Further research is needed on how culture and cultural identification influence methodological and psychological issues of risk factors for suicide.

## Implications for Professional Practice and Social Change

The findings of this study are in alignment to the prevalence rates of suicide behaviors nationwide observed in previous studies (CDC, 2016). The findings of this study can assist mental health practitioners in the identification process of individuals who at higher risk for suicidality and assist in the development of more tailored treatment programs. Public Health practice and policy could be affected by the findings of this study in that the identified association between illegal drug use and suicidal behavior could lead to a more careful assessment of suicidality when examining adolescents who use illegal drugs. Ultimately, understanding of the illegal drug use/suicidality relationship can lead to life saving measures that prevent adolescents from engaging in suicidal behaviors that can lead to serious medical problems and possible death.

## Conclusion

The prevalence of suicidal ideation and suicide attempt was found to be associated with a number of factors among school-going adolescents in the State of New York. Conclusively, being offered/sold/given drugs on school property, use of heroin, being a member of a cultural minority, aged 12 or younger, being bullied, and being female were associated with increased risk of suicide ideation and suicide attempts, while currently using marijuana on a monthly basis or more was only associated with increased risk of suicide attempts. I also found a high percentage of illegal drug availability and usage on school property in comparison to previous research (Wong, Zhou, Goebert, & Hishinuma, 2013; Kann et al., 2016). Recognition of illegal drug use as a significant risk indicator is a vital element of suicide risk measurement; furthermore, detecting and remedying adolescents with a history of illegal drug use may be critical in the continuing efforts to prevent suicidal ideation and/or attempted suicide. The risks at-school users are more likely to exhibit have serious and immediate implications for adolescent health and may not be identified by adults in other settings. Identification of at-school illegal drug use represents a critical opportunity to screen for and identify other serious health risks and to ensure that adolescents receive the necessary support and assistance to avoid serious morbidity and mortality. I believe that suicidal behaviors prevention intervention is essential for adolescents, and should focus on prevention of violence against adolescents, encouraging healthy peer relationships, promoting the supportive role of parents and educators and, controlling health risk behaviors, such as the initiation of illicit drug use in adolescence. Largely, the results underline the significance of allowing

for every category of risk factors in the investigation of suicidal ideation and attempted suicide.

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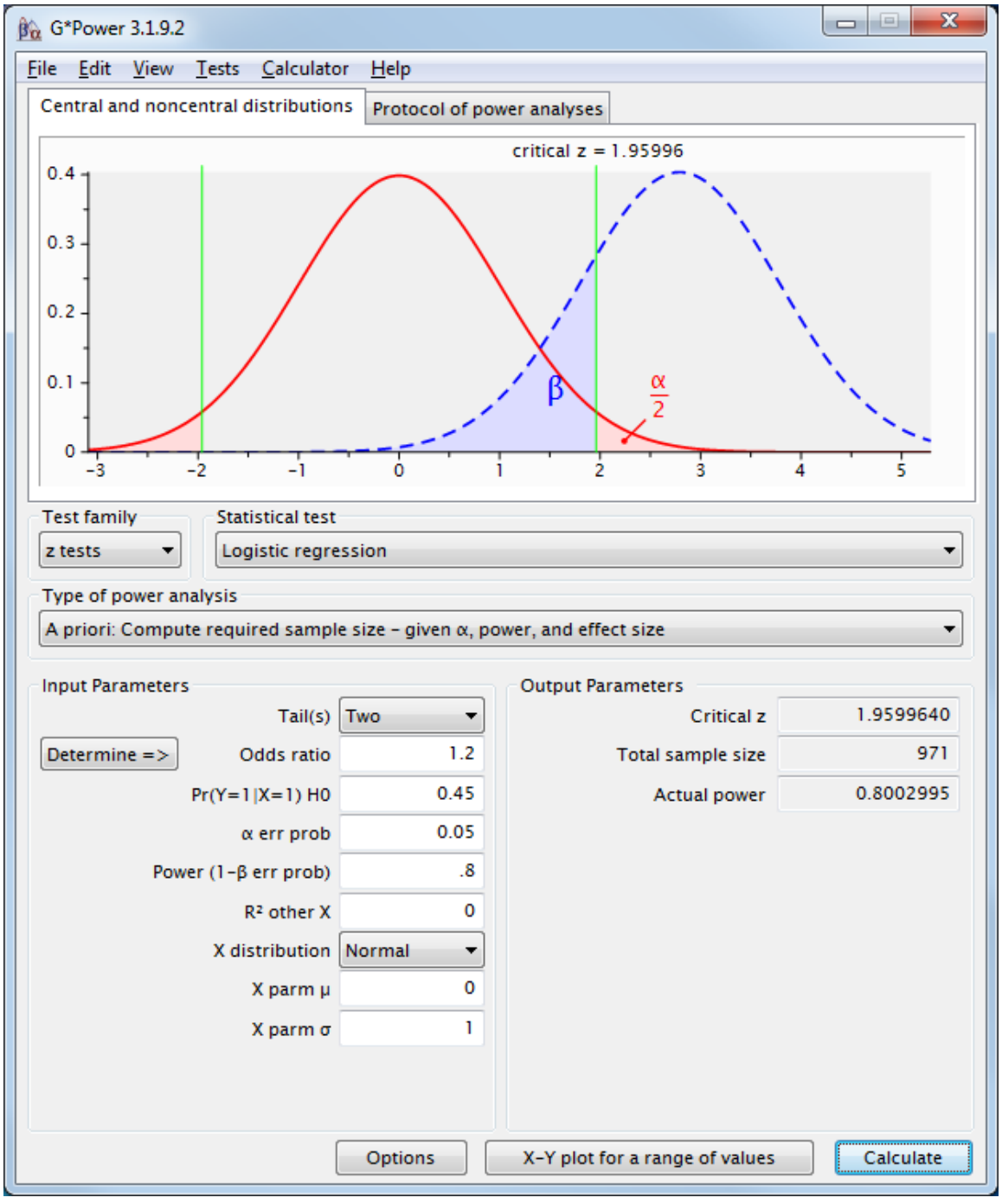
# Appendix A: Power Analysis



# Appendix B: Results of Power Analysis