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Sex, Sexual Orientation, and Sexual Victimization as Predictors of Suicidality among U.S. High School Students: Results from the 2015 Youth Risk Behavior Survey

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Abstract

Title: Sex, Sexual Orientation, and Sexual Victimization as Predictors of Suicidality among U.S. High School Students: Results from the 2015 Youth Risk Behavior Survey

By: A. Elise Barnes

Date: June 28, 2018

Introduction: In 2015, suicide was the second leading cause of death among youth aged 15-24 years old in the United States. In the U.S., data shows substantial gender differences in suicidality reporting. Yet, it is unknown if these gender differences in suicidality reporting remain among certain high-risk groups.

Aim: The purpose of this study is to 1) examine if there are gender differences in reported suicidal ideation and behaviors among U.S. high school students; 2) assess if any initially observed gender differences remain across sexual orientations and among those with previous history of sexual victimization among a nationally representative sample of U.S. high school students using results from the 2015 Youth Risk Behavior Survey (YRBS).

Methods: Data from the 2015 YRBS was used to conduct secondary analyses (N = 15,624). Bivariate and multivariate logistic regressions were performed using SAS 9.4 statistical software to determine if there were significant gender differences in reported suicidal ideation and behaviors (consideration, planning, attempt, injurious attempt).

Results: Sex, sexual orientation and sexual victimization were significantly associated with all four suicide outcomes of interest. Compared to males, heterosexual/straight and gay or lesbian females had significantly increased odds of suicide consideration. Moreover, when compared to males, females that had ever experienced sexual victimization had significantly increased odds of suicide consideration and planning compared to male peers.

Conclusion: There were significant gender differences observed for suicidality when sex alone was considered. Hence, more targeted messaging is necessary to ensure all sub-populations at risk are being effectively reached.

Sex, Sexual Orientation, and Sexual Victimization as Predictors of Suicidality among U.S. High School Students: Results from the 2015 Youth Risk Behavior Survey

by

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B.A., Eckerd College

A Thesis Submitted to the Graduate Faculty
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Approval Page

Sex, Sexual Orientation, and Sexual Victimization as Predictors of Suicidality among U.S. High
School Students: Results from the 2015 Youth Risk Behavior Survey

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Author's Statement Page

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CHAPTER I

Introduction

1a. Background

While suicide is preventable, it is hard to predict; the prevalence of suicide in the U.S., and globally, is alarmingly high. In 2015, suicide was the second leading cause of death among individuals 15-24 years old in the United States (Centers for Disease Control and Prevention [CDC], 2018). This statistic only captures fatal suicide acts, which does not reflect the larger proportion of youth that may be afflicted by suicidal ideation and behaviors. Schrijvers, Bollen, & Sabbe (2011) suggest individuals may progress through various chronological stages of suicidality before reaching death by suicide. These stages, which are referred to as the "suicide process," begin with suicidal ideation, suicide planning, suicide attempt, and then suicide (fatal). Although this framework cannot be directly applied to the current study due to the cross-sectional nature of the data, which prevents understanding of whether the reported suicide outcomes occurred chronologically, this research suggests that there may be different risk factors involved for the various "stages" of suicidality. Applying this finding to the current study by examining the potential risk factors for all four suicide indicators used in the survey and how they vary may increase understanding of the population at risk of suicide.

Teenagers may be at risk for suicidal ideation, behaviors and fatal suicide acts for a variety of reasons. Generally, it is recognized that adolescence can be a difficult time for many individuals (Manceaux, Jacques, & Zdanowicz, 2015). Not only are physical and hormonal changes occurring, but also personal, social and psychological changes as well. These teenage and young adult years are critical for development, experimentation, and self-discovery (Manceaux et al., 2015). However, these aspects of growing up can often be challenging to navigate, not to mention the

additional factors involved in teenagers' lives that must be considered, such as relationships with their families, peers, romantic partners, stress of school and the influence of media. In many ways, it is not surprising why this may be a vulnerable time for adolescents. However, that makes it even more important to better understand the risk factors of suicidal ideation and behaviors to inform prevention strategies that can be widely implemented, so fewer young lives are cut short too soon.

Some studies have examined risk and protective factors for suicidal ideation and behaviors (McLean, Maxwell, Platt, Harris, & Jepson, 2008; Taliaferro & Muehlenkamp, 2014). Previous research has indicated that there are gender differences related to suicidal ideation and behaviors and suicide fatalities (Hamilton & Klimes-Dougan, 2015; Kaess et al., 2011; Supple et al., 2015). More specifically, a larger proportion of females tend to report having suicidal ideation and non-fatal suicidal behaviors compared to males; conversely, males tend to report having less suicidal ideation and non-fatal behaviors, yet males have higher rates of suicide fatality. This finding was referred to as the "gender paradox" of suicidal behaviors by Canetto & Sakinofsky (1998). Aside from gender, two additional risk factors of interest in this current study are sexual orientation and sexual victimization. Studies have found that sexual minorities (non-heterosexual individuals, i.e. gay, lesbian, bisexual, etc.) have greater risk of suicidal ideation and behaviors (Bouris et al., 2016; DeCamp & Bakken, 2016; Stone et al., 2014). Additionally, history of sexual victimization may also increase risk (Black et al., 2011; Dworkin, Menon, Bystrynski, & Allen, 2017; Santaularia et al., 2014). Both of these factors are particularly important for teenage populations, largely because this is a period of self-discovery, and typically a time when they may begin questioning their sexual identities, having romantic (and often sexual) relations, and also potentially being exposed to violence (sexual, physical, intimate partner violence/dating violence) during this period or,

unfortunately, maybe even earlier (although obviously, ideally, they never have to experience violence).

There are a multitude of other potential risk factors that may influence suicidality. Some of these risk factors were included in the current study as potential covariates, such as missing school due to safety concerns at or on the way to school, physical dating violence, sexual dating violence, bullying at school, electronic bullying, and feelings of sadness/hopelessness (indicator of depression). These covariates were selected for inclusion in this study due to previous literature finding these factors to be significantly associated with suicidality.

In a review of the literature on this topic, previous studies had examined gender, sexual orientation, and sexual victimization (individually or in some combination), and many more factors as potentially influence the risk for suicide among various populations. However, no studies were found which specifically examined gender differences in suicidality, as well as considered sexual orientation and sexual victimization as risk factors among a nationally representative sample of U.S. high school students. As mentioned above, this is a particularly vulnerable time for adolescents, but it can also be viewed as a promising opportunity to lower the incidence of suicidal ideation, behaviors and fatalities using widespread, targeted intervention and prevention strategies informed by evidence, which is why continued research is necessary for better understanding of risk factors and protective factors.

1b. Purpose of Study

The purpose of this study is to determine if there are significant gender differences in suicidality (from consideration and planning to suicide attempt and injurious attempt requiring treatment by a healthcare provider) among U.S. high school students, using results from the 2015 Youth Risk Behavior Survey (YRBS) (CDC, 2017). This will be examined to determine if the

"gender paradox" of suicidal ideation and behaviors applies to this specific, nationally-representative population of U.S. teenagers (9th-12th grade students). The second aim is to investigate if any initially observed gender differences remain across sexual orientations, as well as by previous history of sexual victimization. The purpose of this research is to better understand the gender differences in suicidality and whether these gender differences remain when considering sex in combination with other risk factors that may affect U.S. high school students.

These three main predictors of interest (sex, sexual orientation and sexual victimization) selected for inclusion have been identified as risk factors for suicidal ideation and behaviors, however, do not appear to have been previously examined together among a nationally-representative sample of U.S. high school students. In 2015, for the first time, questions regarding sexual orientation were included on the national Youth Risk Behavior Survey (YRBS), which is why results from that year were selected for analysis in this current study (CDC, 2017). Prior to 2015, the decision to include questions asking the student participants about their sexual identity was made individually by each state, therefore, not all states chose to include those questions, which prevented any state-level results from being generalizable to the larger population of U.S. high school students.

Understanding any gender differences in suicidality, as well as other risk and protective factors, could help inform prevention strategies and better tailor them to specific audiences. The field of public health seems to increasingly recognize the importance of targeted prevention and intervention strategies by using research-based evidence to inform the process from development to implementation, which may result in increased effectiveness of the strategies. By targeting specific populations or sub-groups, there is greater potential to have a significant and/or sustained impact on a person's (or population's) health, or in this case, have the potential to save a life.

1c. Research Questions

1. Question #1: Does the sex of U.S. high school students predict suicidal ideation and behaviors?

   Null Hypothesis #1: The sex of U.S. high school students does not predict suicidal ideation and behaviors.

   Alternate Hypothesis #1: The sex of U.S. high school student does predict suicidal ideation and behaviors.

2. Question #2: Does the sexual orientation of U.S. high school students predict suicidal ideation and behaviors?

   Null Hypothesis #2: The sexual orientation of U.S. high school students does not predict suicidal ideation and behaviors.

   Alternate Hypothesis #2: The sexual orientation of U.S. high school students does predict suicidal ideation and behaviors.

3. Question #3: Does previous history of sexual victimization among U.S. high school students predict suicidal ideation and behaviors?

   Null Hypothesis #3: Previous history of sexual victimization among U.S. high school students does not predict suicidal ideation and behaviors.

   Alternate Hypothesis #3: Previous history of sexual victimization among U.S. high school students does predict suicidal ideation and behaviors.

CHAPTER II

Review of Literature

2a. Gender Differences in Reported Suicidal Ideation and Behaviors

Previous research indicates that there are gender differences in suicidal ideation, behaviors, and fatal suicides (Hamilton & Klimes-Dougan, 2015; Kaess et al., 2011; Supple et al., 2015). Findings from studies in the U.S. and some other western countries over the years largely appear to consistently support the notion of the "gender paradox" of suicidal behavior, as it is referred to by Canetto & Sakinofsky (1998). This gender paradox refers to differences in suicidal behavior by gender; more specifically, research has consistently found the prevalence rates of suicidal ideation and suicidal behaviors to be significantly higher among women compared to men, however, men account for a much larger proportion of the fatalities from suicide (Canetto & Sakinofsky, 1998).

According to Schrijvers et al. (2012), the literature suggests the male-to-female ratio of fatal suicides in the U.S. is approximately four to one (4:1), and in Western Europe, the male-to-female ratio of suicide fatalities is about two to one (2:1). However, as the authors imply, while the "gender paradox" has been well-supported by various studies in the U.S., this does not apply to many other countries. According to the World Health Organization (WHO), in 2015, the global age-adjusted male-to-female ratio of suicide rates was 1.7, so on average, across the globe, a higher proportion of the fatalities from suicide were male than female. However, the variation by country provides a more complete view of gender differences in suicide fatalities, with Eastern European countries having the highest age-adjusted male-to-female ratios (≥4.0) while China appears to have a higher proportion of female suicide fatalities than men (age-adjusted male-to-female ratio <1.0). In the U.S. and most of Western Europe, the age-adjusted male-to-female ratio for suicide rates in 2015 was between 3.0 and 3.9.

Additionally, using the online CDC tool, WISQARS (Web-based Injury Statistics Query and Reporting System), national violent deaths data can be easily retrieved and viewed. As previously mentioned, the CDC (2018) reported that suicide was the second leading cause of death among individuals aged 15-24-year-old in 2015, with a total of 5,491 suicide fatalities for both sexes and all races. However, when stratified by sex, males account for approximate 79% (N = 4,359) of suicide fatalities for this age group compared to 21% for females (N = 1,132).

Schrijvers et al. (2012) provide a comprehensive review of the available literature on gender differences in suicidal ideation and behaviors, attempting to not only identify the gender-related factors that are most relevant to understanding the gender paradox, but also determining if these factors have differing gender-dependent suicide-risk. Some of these risk factors considered by the authors are psychosocial life stressors, sexual abuse, psychiatric (co)morbidities, anti-depressants, suicide methods and reported suicide, cognitive processes and differing help-seeking behavior for males and females, and cultural beliefs and societal attitudes. For an example, on one of these aspects, suicide method and reported suicide is commonly used as an explanation for gender differences in suicide fatalities. The argument is that men choose more lethal methods for their suicides than women, additionally, men also tend to reach the point of lethality earlier than women. According to the stages of suicide progression, often people will have multiple non-fatal suicide attempts prior to fatal suicides, however, some evidence supports the idea that men have fewer non-fatal attempts than women, therefore, the duration of the suicide process is not as lengthy for men as it is on average for women (in the U.S.). A majority of these statistics have focused on fatal suicide, since unfortunately death data is easier to count. However, evidence also indicates that men likely under-report suicidal ideation and non-fatal suicide attempts compared to women due to social stigma. All of these factors play into each other, such as the cultural context

and men using more lethal means, getting to the point of fatal suicide sooner, often larger perceived stigma of appearing "weak" which limits help-seeking and also contributes to under-diagnosis of depression in men (Schrijvers et al., 2012).

2b. Overview of Sexual Victimization as a Predictor of Suicidality

Sexual victimization is just one of many factors that may increase the risk of suicidal ideation and behaviors. Just as the prevalence of suicide in the U.S. is alarmingly high, the same is true for the prevalence of exposure to sexual violence. The term sexual violence is a catch-all term that is used to refer to a variety of sexual unwanted sexual acts, including forcible rape, rape facilitated by drugs and/or alcohol (willing or forcible consumption does not matter), being made to penetrate someone else, sexual coercion, unwanted sexual contact, and non-contact sexual experiences (typically involves exposing the victim to something they would not like to see or making them expose themselves, e.g. flashing, unsolicited pictures of genital sent via text/email, etc.) (Black et al., 2011).

According to 2010 summary results from a nationally-representative survey on intimate partner violence and sexual violence, in the U.S., the lifetime prevalence of rape (completed, attempted and/or completed penetration facilitated by drugs or alcohol) is approximately 18% for women and 1.4% for men (Black et al., 2011). For female victims of completed rape, 12.3% were first raped when they were 10 years-old and under, 29.9% were first raped at 11-17 years-old, and 37.4% were first raped between the ages of 18-24 years-old, which means approximately 80% of female rape victims were first raped before the age of 25 years-old. About one-fourth of male victims of rape are first raped before the age of 10 years-old. Approximately one-third of female rape victims that were first raped as minors are also raped as adults (Black et al., 2011). For these reasons, it is essential to consider the impact sexual victimization may have on suicide risk, as well

as continue working towards implementing policies targeting younger populations. It is common to have programming to prevent sexual violence on college campuses but waiting until college to begin these conversations is too late and misses large proportions of the population that have already been exposed to sexual violence.

Experiencing sexual violence can often have profound, lasting consequences for victims, which can involve physical, psychological, and social aspects. A study using results from the 2011 Kansas Behavioral Risk Factor Surveillance System (BRFSS) found that female victims of any completed sexual assault (lifetime questions, e.g. have you ever experienced…) had an adjusted prevalence rate ratio of 3.64 for suicide ideation (Santaularia et al., 2014). Dworkin et al., (2017) conducted a review of the existing literature on sexual assault and associated psychopathological outcomes. They found that victims of sexual assault had substantially increased risk for suicidal ideation and suicide attempts, in fact, compared to other conditions, history of sexual assault was linked to the largest increases in risk of suicidal ideation and behaviors (Dworkin et al., 2017). Finally, using data from the National Survey of Children's Exposure to Violence, Turner, Finkelhor, Shattuck, & Hamby (2012), found that youth who were sexually assaulted in the past year prior to the survey had 3.4 times greater risk of suicidal ideation than those who had not experienced sexual assault in the past year.

All of these highlighted studies reflect the impact that exposure to sexual violence can have on risk of suicidal ideation and behaviors. Due to the high prevalence of sexual victimization, particularly considering the fact that exposure is often early (~80% of female rape victims are first raped before age 25 years-old), the increased risk of suicide and other health consequences, and the cyclical nature of violence (~1/3 of female rape victims first raped as minors are also raped as

adults), it is essential to account for this exposure and work towards better prevention of sexual assault, in addition to working on suicide prevention.

2c. Overview of Sexual Orientation as a Predictor of Suicidality

Sexual orientation status may also influence risk of suicidal ideation and behaviors. Specifically, studies have found that sexual minorities (individuals that identify as gay, lesbian, or bisexual) may be at increased risk of suicidal ideation and behaviors. Therefore, sexual orientation is particularly important to consider for the population of interest in this current study. As previously mentioned, high school students are at a stage in development where they are likely beginning (or have already begun) to navigate their sexuality and discovering more about themselves, which can already be challenging for most adolescents, but particularly for those individuals that are not heterosexual (since heterosexuality is considered the norm in U.S. society) or may be questioning their sexual identity/orientation.

Sexual minority youth often experience a wide array of challenges, typically at higher rates than their heterosexual peers. Sexual minority youth may face social rejection, diminished support from peers and family members, isolation, depression, lowered self-esteem and body issues, bullying/abuse (physical, verbal and/or electronic), and discrimination (DeCamp & Bakken, 2016). Individuals that experience these problems may end up at greater risk for other risky behaviors, such as risky sexual behaviors, alcohol or substance use to cope, etc., that can often to continue to contribute to the initial challenges faced (DeCamp & Bakken, 2016). When considering these experiences and risky behaviors, it is unsurprising that sexual orientation can be a risk factor for suicidal ideation and behaviors.

One study using aggregated data from five local Youth Risk Behavior Surveys (YRBS) from 2001-2015 found that regardless of measure of sexual orientation being used (either self-

reported sexual identity or sex of sexual contacts), sexual minority youth (gay, lesbian or bisexual) had increased odds of all four suicide risk outcomes (suicidal ideation, planning, attempt and medically serious suicide attempt) (Stone et al., 2014). Using data from the Delaware YRBS (from years 2005, 2007, and 2009), DeCamp & Bakken (2016) found that sexual minority youth had significantly higher rates of non-suicidal self-injury and suicide ideation compared to their heterosexual peers when stratified by gender; some additional factors that were generally associated with those two outcomes of interest were bullying victimization, depression, fighting, substance use, and unhealthy dieting behaviors.

Finally, Bouris et al. (2016) used results from the 2011 Chicago YRBS to run structural equation modeling to evaluate the effects of sexual orientation (direct, indirect and total) on suicidal ideation and behaviors via seven measures of victimization. They found sexual minority youth reported significantly higher rates of suicidal ideation, planning, and attempt within the past year prior to the survey compared to their heterosexual peers. Additionally, sexual minority youth reported higher rates of discrimination based on their sexual orientation/identity, electronic bully, sexual abuse and skipping school. However, the effect of sexual orientation on suicidal ideation and behaviors was not direct, instead operating indirectly through two different types of school-based victimization, including being threatened or injured by a weapon and experiencing sexual orientation/identity-specific harassment. Authors also found that sexual minority youth that skipped school decreased their suicidal ideation and behaviors, likely since these students are reducing their exposure (maybe just temporarily) to the school-based victimization directly associated with these suicidal outcomes (Bouris et al., 2016). This finding could be important for informing policy changes to better protect students, so they can feel safer in their school

environments and not have to sacrifice their education for their physical safety and mental wellbeing.

2d. Cost/Burden of Suicide in the U.S.

It is difficult to estimate the cost of suicide in the United States since these estimates cannot enumerate the emotional burden of experiencing loss. However, it is common to attempt to calculate the estimated monetary burden of various health outcomes. When solely based on reported numbers, authors estimated the annual cost of suicides and suicide attempts in the U.S. in 2013 to be around $58.4 billion, a majority of this figure represents lost productivity (Shepard, Gurewich, Lwin, Reed, & Silverman, 2016). However, after adjusting for under-reporting the number of suicides in the U.S., the total estimated cost for 2013 was $93.5 billion. This estimate is substantial more (2.1-2.8 times) than those from previous studies, but the authors explain the reason for the differences and suggest that their estimate is likely a more adequate reflection of actual costs. Some of the reasons for this larger estimate are due to adjustment for under-reporting instead of only using reported numbers of suicides, more recent data (which had increased numbers of suicides than survey years used for estimates in previous studies and inflation increased), and different sources being used to estimate earnings (average annual earnings from U.S. Census results by decade of age were used for the current study compared to bi-weekly earnings from the U.S. Census being used to estimate cost in a previous study) productivity (Shepard et al., 2016).

<center>**CHAPTER III**</center>

<center>**Methods and Procedures**</center>

3a. Data Source

For this study, secondary analyses were run using the national results from the 2015 Youth Risk Behavior Survey (YRBS) conducted by the Centers for Disease Control and Prevention's (CDC) Division of Adolescent and School Health (DASH) (CDC, 2017). The Youth Risk Behavior Surveillance System (YRBSS) was first developed in 1990 to gather information on risk factors related to morbidity, mortality, and social problems among adolescents in the U.S. This survey collects information on unintentional injuries and violence, sexual behaviors, alcohol, drug and tobacco use, diet and exercise, as well as monitors the prevalence of asthma and obesity.

The YRBSS includes national surveys of U.S. high school students, which are conducted by the CDC, as well as state, territorial, tribal, and local surveys of 9th-12th graders, which are conducted by local education and health agencies and tribal governments. In addition to the these national, state, territorial, tribal and local surveys of high school students, the YRBSS has also surveyed middle school students when these smaller entities (states, local agencies, etc.) have been interested (CDC, 2017).

The Youth Risk Behavior Surveys are conducted every two years using a three-stage cluster sampling design in order to ensure the sample is representative of high school students in the U.S. Responses are weighted to account for non-response or any over-sampling of minorities populations. Selection of schools and classes of students within each school was systematic with random and probabilistic methods being utilized (CDC, 2017). The use of YRBS datasets have been previously approved by the Georgia State University Institutional Review Board, who

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consider the data to be not human subjects research and, therefore, exempt from additional approval requirements.

3b. Study Population

The population included for analysis in the current study are U.S. high school students (9th-12th graders) sampled from public, private and Catholic schools across all 50 states and the District of Columbia that agreed to participate in the survey. Parental permission for students' participation was obtained in accordance with local policies. Participation was completely voluntary, and the results were anonymous.

For the 2015 YRBS, 180 schools were sampled (CDC, 2017). Of those schools, 125 agreed to participate, resulting in a school response rate of 69%. The student response rate was 86%, with 15,713 students submitting the survey out of 18,165. Prior to releasing the results, the data was edited by the CDC to check for valid responses (e.g. only one answer was selected, information fits within expected range for height and weight, etc.). Responses found to be invalid after data editing were set to missing. In 2015, of the 15,713 students that submitted a survey, 15,624 were usable, resulting in an overall response rate of 60% (CDC, 2017).

3c. Variables

Variable	Variable Type	Response	Binary Recoded Variable, if Applicable	Binary Recoded Response, if Applicable
What is your sex?	Predictor	Female	N/A	N/A
		Male		
Which of the following best describes you?	Predictor	Heterosexual/Straight	Identify as gay, lesbian or bisexual	Yes
		Gay or Lesbian		
		Bisexual		No
		Not sure		
Have you ever been physically forced to	Predictor	Yes	N/A	N/A

have sexual intercourse when you did not want to?		No		
During the past 12 months, did you ever seriously consider attempting suicide?	Outcome	Yes No	N/A	N/A
During the past 12 months, did you make a plan about how you would attempt suicide?	Outcome	Yes No	N/A	N/A
During the past 12 months, how many times did you actually attempt suicide?	Outcome	0 times 1 time 2 or 3 times 4 or 5 times 6 or more times	Attempted suicide 1 or more times in the past 12 months	Yes No
If you attempted suicide during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?	Outcome	I did not attempt suicide during the past 12 months Yes No	Suicide attempt in the past 12 months resulting in injury that required treatment	Yes No
During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to or from school?	Covariate	0 days 1 day 2 or 3 days 4 or 5 days 6 or more days	Did not go to school at least 1 day in the past 30 days due to safety concerns	Yes No
During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose?	Covariate	I did not date or go out with anyone during the past 12 months 0 times 1 time 2 or 3 times 4 or 5 times 6 or more times	Experienced physical dating violence 1 or more times in the past 12 months	Yes No

During the past 12 months, how many times did someone you were dating or going out with forced you to do sexual things that you did not want to do?	Covariate	I did not date or go out with anyone during past 12 months 0 times 1 time 2 or 3 times 4 or 5 times 6 or more times	Experienced sexual dating violence 1 or more times in the past 12 months	Yes No
During the past 12 months, have you ever been bullied on school property?	Covariate	Yes No	N/A	N/A
During the past 12 months, have you ever been electronically bullied?	Covariate	Yes No	N/A	N/A
During the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some usual activities?	Covariate	Yes No	N/A	N/A

The variables considered in this study were obtained from the national 2015 Youth Risk Behavior Survey results. The main variables (predictors and outcomes) of interest analyzed in this study are sex, self-described (sexual) identity, whether participants ever experienced physically forced sexual intercourse, whether participants seriously considered attempting suicide during the past 12 months prior to the survey, whether participants made a plan about how to attempt suicide during the past 12 months, how many times participants attempted suicide during the past 12 months, and how many times a suicide attempt resulted in injury, poisoning or overdose that required treatment by a doctor or nurse during the past 12 months.

The following covariates were also included for analyses: how many days during the past 30 days participants did not attend school because they felt they would be unsafe at school or on the way to or from school, how many times participants were physically hurt on purpose by someone they were dating or going out with during the past 12 months, how many times participants were forced to do sexual things they did not want to do by someone they were dating or going out with during the past 12 months, whether participants had ever been bullied at school during the past 12 months, whether participants had ever been electronically bullied during the past 12 months, and whether participants ever felt so sad or hopeless almost every day for 2 weeks or more in a row that they stopped doing some usual activities during the past 12 months.

The SAS file with the results from the 2015 YRBS was downloaded from the YRBSS page of the CDC website and read in using the suggested accompanying code for inputting and formatting the data (CDC, 2017). There was also code provided to create additional binary variables and responses from the categorical variables. The responses were already weighted to account for the complex sampling methods.

Binary variables were created from variables with multiple response categories using the code provided on the CDC website to assist with ease of analysis, as well as prevent cell sizes from becoming too small to provide valid results (CDC, 2017). The covariates included for analysis were selected because previous studies found that they may influence the risk of suicidal ideation and behaviors or because they are closely related to the predictors of interest.

3d. Statistical Analysis

The SAS software package (version 9.4) was used to organize and analyze the data for this study. To account for the complex sampling frame, over sampling of certain population groups (specifically Black/African-Americans and Hispanics), and non-response, appropriate

sample weights were utilized in all analyses. Survey procedures were used for analyses in SAS, which allowed for statement options regarding strata, cluster, and weight.

Frequency tables were produced to understand the distribution of responses for the key variables of interest. Bivariate logistic regression analyses were used to compute crude odds ratios between the predictors of interest (sex, self-described sexual identity/orientation, and ever physically forced sexual intercourse) and the four suicide-related outcomes of interest (suicide consideration, suicide plan, suicide attempt, and injurious suicide attempt). The sexual identity variable was run using the original multiple (4) response categories. For suicide attempt and injurious suicide attempt, the binary responses of yes or no were used instead of the original five possible response options for how many times participants had attempted suicide and the three possible response options for suicide attempts that resulted in injury requiring treatment from a doctor or nurse.

To assess if any gender differences initially observed in the crude odds ratios produced in the bivariate logistic regression analyses remained across sexual orientation and sexual victimization status, odds ratios examining the various risks of each sexual identity response by sex for each suicide outcome were produced. This was repeated for sexual victimization by sex for each suicide outcome.

Finally, multivariate logistic regressions were performed with the potential covariates included to adjust for their potential influence on the outcome variables of interest and odds ratios were produced. The binary responses for the covariates are included, as well as binary responses for all four of the suicide-related outcomes of interest. Sexual identity is the only variable included in the model with multiple response categories. All analyses used a p-value of 0.05 and confidence interval of 95% to determine statistical significance.

CHAPTER IV

Results

Of the 18,165 U.S. high school students sampled, 15,624 agreed to participate and completed usable survey responses that were included in the 2015 YRBS dataset. Of those, 48.7% (N = 7,551) were female and 51.3% (7,955) were male. Table 1 summarizes the weighted frequency (N) and percent of students' responses for each of the variables included in this study. For sexual identity, 88.8% described themselves as heterosexual/straight, 2.03% of respondents selected gay or lesbian, 5.98% chose bisexual, and 3.19% of participants said they were not sure. For the final independent variable of interest, ever experienced physically forced sexual intercourse, 6.71% had experienced this and 93.29% (13,797) had not ever been physically forced to have sexual intercourse when they did not want to.

For the dependent outcomes of interest, 17.74% of respondents had seriously considered suicide during the past 12 months prior to the survey and 82.26% had not; additionally, 14.6% had made a plan about how they would attempt suicide and 85.4% had not planned a suicide attempt. When asked how many times during the past 12 months they had attempted suicide, 91.44% of respondents had not attempted suicide during the past 12 months (0 times), 4.6% had attempted suicide 1 time, 2.55% had 2 or 3 times, 0.67% had 4 or 5 times, and 0.75% had attempted suicide 6 or more times during the past 12 months. As for injurious suicide attempt during the past 12 months, 91.45% had not attempted suicide during the past 12 months, 2.76% had a suicide attempt that resulted in injury, poisoning or overdose that required treatment by a doctor or nurse, and 5.79% had not had a suicide attempt that resulted in injury, poisoning or overdose that required treatment by a doctor or nurse during the past 12 months prior to the survey.

Table 2 presents the results of bivariate logistic regression analyses, which were used to produce crude odds ratios for the three main predictors of interest (sex, sexual identity, and sexual victimization), using one response category as a reference, for each of the four outcomes of interest. The recoded binary responses were used for the two outcomes of interest that were not already binary prior to recoding (suicide attempt and injurious suicide attempt). All of the p-values produced by these bivariate analyses were significant at the .05 level, indicating there is a statistically significant difference between the reference and other response categories for the predictors on each suicide outcome of interest.

Table 3 was produced to address the second aim of the study, which was to assess if any gender differences in suicidality initially observed remained across sexual orientations and previous history of sexual victimization when stratified by sex. The odds ratios displayed in Table 3 were produced for each response option for the variables sexual orientation and sexual victimization. These examined the odds of each suicide outcome of interest, comparing females to males.

In Table 3 for the outcome of suicide consideration, the following results were statistically significant: 1) among those that identity as heterosexual/straight, the odds of seriously considering suicide was twice as likely for females compared to males in this study population, 2) among gay or lesbian individuals, females had increased odds (OR= 1.97) of suicide consideration compared to males, 3) females had increased odds of considering suicide compared to males in both groups for ever physically forced sexual intercourse, yes and no, with ORs of 2.12 and 1.97, respectively. For the outcome of suicide plan, among heterosexual/straight individuals, females had almost twice the odds of having planned a suicide attempt compared to males. This difference was significant. Additionally, for both groups of respondents to ever

physically forced sexual intercourse (yes and no), females had significantly increased odds of having made a suicide plan compared to male, however the OR among those that had not experienced physically forced sexual intercourse was higher (OR= 2.00) than those that had experienced forced sexual intercourse (OR= 1.64). For the outcome of suicide attempt in Table 3, there are significant gender differences among heterosexual/straight females and males, with females having increased odds (OR= 1.92) of attempting suiciding during the past 12 months compared to males. There are no significant gender differences in suicide attempts for those that identify as gay or lesbian, bisexual, or not sure. Among those that had ever experienced physically forced sexual intercourse (yes), there are no significant gender differences between females and males; however, there are significant gender differences in suicide attempt among individuals that had not ever experienced physically forced sexual intercourse, with females having increased odds compared to males (OR= 1.94). Finally, the same is found for injurious suicide attempt, with females having increased odds of injurious attempts compared to males for all sexual identities, except for not sure where males have increased odds, but only the findings for heterosexual/straight individuals are statistically significant. Among those that had ever experienced physically forced sexual intercourse, the odds of an injurious suicide attempt are actually lower for females compared to males (OR= 0.66), however these results are not statistically significant. For individuals that had not ever been physically forced to have sexual intercourse, females had significantly increased odds of an injurious suicide attempt compared to males (OR= 1.82).

Table 4 displays the results of multivariate logistic regression for each of the four suicide outcomes of interest and includes all covariates in the models to adjust for their potential influence. Odds ratios were produced for each predictor variable (main predictors of interest and

covariates) with each of the response option being used for reference denoted as such by the term "REF."

As for the main predictors of interest, sex is only significant in one of the four models, with females having slightly increased odds of having planned a suicide attempt compared to males (OR= 1.21). Compared to individuals that have never experienced physically forced sexual intercourse, those that have ever experienced it have significantly increased odds of each suicide outcome, except for injurious suicide attempt, which is not significant. Compared to the reference group of heterosexual/straight individuals, gay or lesbian, bisexual, and not sure individuals all have significantly increased odds of suicide consideration, plan, and suicide attempt. Only bisexual individuals have significantly increased odds for injurious suicide attempt compared the heterosexual/straight individuals (OR= 2.13). The ORs of potential covariates are not discussed here but can be found in Table 4 as well.

Table 1. Descriptive Summary of Study Variables from the 2015 Youth Risk Behavior Survey

Variable	Variable Label	Response	Frequency (N)	Percent (%)
What is your sex?	Sex	Female	7,551	48.70
		Male	7,955	51.30
Which of the following best describes you?	Sexual Identity	Heterosexual/Straight	13,004	88.80
		Gay or Lesbian	297.97	2.03
		Bisexual	875.12	5.98
		Not sure	467.70	3.19
Have you ever been physically forced to have sexual intercourse when you did not want to?	Ever Physically Forced Sexual Intercourse	Yes	992.27	6.71
		No	13,797	93.29
During the past 12 months, did you ever	Suicide Consideration	Yes	2,738	17.74

seriously consider attempting suicide?		No	12,694	82.26
During the past 12 months, did you make a plan about how you would attempt suicide?	Suicide Plan	Yes	2,209	14.60
		No	12,920	85.40
During the past 12 months, how many times did you actually attempt suicide?	Number of Suicide Attempts	0 times	12,633	91.44
		1 time	635.58	4.60
		2 or 3 times	352.09	2.55
		4 or 5 times	91.96	0.67
		6 or more times	103.72	0.75
If you attempted suicide during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?	Injurious Suicide Attempts (3 categories)	I did not attempt suicide during the past 12 months	12,283	91.45
		Yes	371.28	2.76
		No	777.12	5.79
During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to or from school?	Safety Concerns at School	0 days	14,686	94.39
		1 day	423.01	2.72
		2 or 3 days	261.63	1.68
		4 or 5 days	74.62	0.48
		6 or more days	113.31	0.73
During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose?	Number of Physical Dating Violence	I did not date or go out with anyone during the past 12 months	4,756	31.38
		0 times	9,395	62.00
		1 time	407.97	2.69
		2 or 3 times	305.96	2.02
		4 or 5 times	107.93	0.71
		6 or more times	180.53	1.19
During the past 12 months, how many times did someone	Number of Sexual Dating Violence	I did not date or go out with anyone during the past 12 months	4,476	30.88
		0 times	8,962	61.82

you were dating or going out with forced you to do sexual things that you did not want to do?		1 time	451.62	3.12
		2 or 3 times	301.10	2.08
		4 or 5 times	124.07	0.86
		6 or more times	181.41	1.25
During the past 12 months, have you ever been bullied on school property?	School Bullying	Yes	3,121	20.19
		No	12,336	79.81
During the past 12 months, have you ever been electronically bullied?	Electronic Bullying	Yes	2,403	15.55
		No	13,053	84.45
During the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some usual activities?	Sad or Hopeless	Yes	4,609	29.87
		No	10,821	70.13

Table 2. Bivariate Logistic Regression Analyses Examining the Influence of Each Predictor on the Outcomes of Interest Using the 2015 Youth Risk Behavior Survey

Predictor Variable	Outcome Variable							
	Suicide Consideration		Suicide Plan		Suicide Attempt		Injurious Attempt	
	Crude OR (95% CI)	P-value	Crude OR (95% CI)	P-value	Crude OR (95% CI)	P-value	Crude OR (95% CI)	P-value
Sex								
Female	2.20 (1.92-2.51)	<.0001	2.21 (1.92-2.54)	<.0001	2.24 (1.74-2.89)	<.0001	1.94 (1.31-2.88)	<.0001
Male	REF		REF		REF		REF	
Ever Physically Forced Sexual Intercourse								
Yes	4.79 (3.98-5.76)	<.0001	5.23 (4.15-6.58)	<.0001	6.60 (5.23-8.32)	<.0001	8.61 (6.18-12.00)	<.0001
No	REF		REF		REF		REF	
Sexual Identity								
Heterosexual/Straight	REF		REF		REF		REF	
Gay or Lesbian	2.94 (1.77-4.86)	0.0001	3.19 (2.09-4.87)	<.0001	3.98 (2.39-6.64)	<.0001	2.48 (1.11-5.53)	0.0271
Bisexual	4.87 (3.99-5.95)	<.0001	5.13 (4.08-6.44)	<.0001	6.86 (5.43-8.68)	<.0001	5.87 (3.93-8.76)	<.0001
Not Sure	2.70 (2.10-3.47)	<.0001	2.86 (2.22-3.69)	<.0001	2.34 (1.62-3.37)	<.0001	2.38 (1.30-4.36)	0.0064

Table 3. Bivariate Logistic Regression Analyses Examining the Influence of Sexual Identity and Sexual Victimization When Stratified by Sex on Each Suicide Outcome of Interest Using Results from the 2015 Youth Risk Behavior Survey

Predictor Variable	Outcome Variable											
	Suicide Consideration			Suicide Plan			Suicide Attempt			Injurious Attempt		
	Percent (%)		OR (95% CI) F:M	Percent (%)		OR (95% CI) F:M	Percent (%)		OR (95% CI) F:M	Percent (%)		OR (95% CI) F:M
	Yes	No		Yes	No		Yes	No		Yes	No	
Sex by Sexual Identity												
Female												
Heterosexual/Straight	19.61	80.39	2.05 (1.77-2.37)	15.68	84.32	1.98 (1.67-2.33)	8.39	91.61	1.92 (1.43-2.58)	2.60	97.40	1.71 (1.12-2.62)
Gay or Lesbian	40.18	59.82	1.97 (1.19-3.26)	36.34	63.66	2.08 (0.88-4.93)	25.80	74.20	2.02 (0.73-5.57)	5.24	94.76	1.06 (0.19-5.93)
Bisexual	47.86	52.14	1.46 (0.79-2.71)	43.19	56.81	1.66 (0.90-3.06)	34.15	65.85	1.75 (0.91-3.38)	11.22	88.78	1.37 (0.52-3.57)
Not Sure	32.65	67.35	1.08 (0.60-1.96)	29.32	70.68	1.34 (0.70-2.57)	11.73	88.27	0.70 (0.33-1.45)	3.81	96.19	0.61 (0.17-2.23)
Male												
Heterosexual/Straight	10.65	89.35	--	8.60	91.40	--	4.55	95.45	--	1.54	98.46	--
Gay or Lesbian	25.46	47.54	--	21.50	78.50	--	14.71	85.29	--	4.96	95.04	--
Bisexual	38.53	61.47	--	31.36	68.64	--	22.82	77.18	--	8.47	91.53	--
Not Sure	30.88	69.12	--	23.59	76.41	--	16.02	83.98	--	6.09	93.91	--
Sex by Ever Physically Forced Sexual Intercourse												
Female												
Yes	51.14	48.86	2.12 (1.51-2.97)	45.00	54.00	1.64 (1.09-2.47)	32.46	67.54	1.22 (0.74-2.02)	13.57	86.43	0.66 (0.37-1.21)
No	19.97	80.03	1.97 (1.70-2.30)	16.34	83.66	2.00 (1.72-2.31)	8.81	91.19	1.94 (1.49-2.53)	2.52	97.48	1.82 (1.13-2.93)
Male												
Yes	33.10	66.90	--	33.26	66.74	--	28.26	71.74	--	19.10	80.90	--
No	11.23	88.77	--	8.92	91.08	--	4.74	95.26	--	1.41	98.59	--

Footnote: These analyses were used to assess if gender differences remain across sexual orientation and sexual victimization status when stratified by sex. Female to male ORs (i.e. male was reference group) were produced for each response option for sexual orientation and sexual victimization.

Table 4. Multivariate Logistic Regression Analyses for Each Outcome of Interest with Main Predictors of Interest and Potential Covariates Using 2015 Youth Risk Behavior Survey

Predictor Variable	Outcome Variable							
	Suicide Consideration		Suicide Plan		Suicide Attempt (Binary)		Injurious Suicide Attempt (Binary)	
	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Sex								
Female	1.10 (0.94-1.30)	0.2288	1.21 (1.03-1.41)	0.0188	1.04 (0.77-1.40)	0.8065	0.84 (0.55-1.28)	0.3999
Male	REF							
Ever Physically Forced Sexual Intercourse								
Yes	1.92 (1.51-2.44)	<.0001	2.13 (1.67-2.72)	<.0001	1.64 (1.22-2.20)	0.0015	1.60 (0.99-2.58)	0.0513
No	REF							
Sexual Identity								
Heterosexual/ Straight	REF							
Gay or Lesbian	2.39 (1.27-4.48)	0.0081	2.67 (1.41-5.05)	0.0035	4.02 (1.70-9.52)	0.0023	1.99 (0.73-5.40)	0.1730
Bisexual	2.10 (1.62-2.72)	<.0001	2.14 (1.59-2.88)	<.0001	3.05 (2.22-4.17)	<.0001	2.13 (1.36-3.33)	0.0016
Not Sure	2.05 (1.25-3.35)	0.0054	2.57 (1.62-4.09)	0.0002	1.81 (1.06-3.09)	0.0315	1.64 (0.84-3.22)	0.1454
Safety Concerns at School								
Yes	0.99 (0.75-1.34)	0.9898	0.99 (0.73-1.33)	0.9244	1.71 (1.15-2.54)	0.0097	2.17 (1.45-3.25)	0.0004
No	REF							

Physical Dating Violence								
Yes	1.85 (1.29-2.66)	0.0014	1.52 (1.17-1.98)	0.0029	2.39 (1.52-3.76)	0.0004	2.52 (1.62-3.91)	0.0001
No	REF							
Sexual Dating Violence								
Yes	1.40 (1.03-1.91)	0.0342	1.20 (0.90-1.59)	0.2072	1.35 (0.95-1.93)	0.0966	1.76 (1.19-2.62)	0.0061
No	REF							
School Bullying								
Yes	1.98 (1.65-2.38)	<.0001	1.89 (1.56-2.30)	<.0001	1.58 (1.15-2.16)	0.0061	1.35 (0.91-2.02)	0.1328
No	REF							
Electronic Bullying								
Yes	1.41 (1.16-1.71)	0.0010	1.36 (1.13-1.63)	0.0017	1.77 (1.31-2.39)	0.0004	1.92 (1.33-2.79)	0.0010
No	REF							
Sad or Hopeless								
Yes	8.42 (6.47-10.96)	<.0001	5.97 (4.63-7.69)	<.0001	6.33 (4.65-8.63)	<.0001	7.59 (4.57-12.62)	<.0001
No	REF							

CHAPTER V

Discussion and Conclusion

5a. Discussion

Previous studies have found that much of the universal suicide prevention messaging is largely ineffective for males, which is problematic since males tend to represent a greater proportion of suicide fatalities. It is necessary to develop more relevant and targeted prevention programs using evidence-based findings to ensure all populations at risk are reached by sufficient and impactful messages against suicide. The findings from this study in particular are important for identifying different risk factors in suicidality, as well as differing risks among subpopulations.

The objective of the current study was to determine if there are significant gender differences in suicidality, and if any observed gender differences remain when stratified by risk factors of interest (sexual identity/orientation and sexual victimization) among U.S. high school students using the results from the 2015 YRBS. The 2015 YRBS data was utilized because this was the first year questions regarding sexual identity were included on the national survey questionnaire. Previously, this question was optional and only included on state-level surveys if requested.

There are significant gender differences observed among all four suicide outcomes of interest, with 23.41% of females and 12.22% of males who considered suicide, with 19.41% of females and 9.82% of males who planned a suicide attempt, with 11.56% of females and 5.51% of males who attempted suicide, with 3.65% of females and 1.91% of males who were injured during a suicide attempt during the past 12 months prior to the survey (Table 2). Moreover, certain gender differences remain significant when stratified by sex and sexual identity.

Specifically, there are significant gender differences among heterosexual/straight individuals, with 19.61% of female and 10.65% of males, and gay or lesbian individuals, with 40.18% of females and 25.46% of males, for those that responded "yes" for suicide consideration (Table 3.1). For those who responded "yes" to suicide plan, significant gender differences are only observed among heterosexual/straight individuals, with 15.68% of females and 8.60% of males; the same was found for suicide attempt, with 8.39% of females and 4.55% of males, and for injurious suicide attempt, with 2.60% of females and 1.54% of males (Table 3).

Significant gender differences remain when stratified by sex and sexual victimization. There are significant gender differences among those who responded both "yes" and "no" to ever physically forced sexual intercourse for suicide consideration and suicide plan. Among those that responded "yes" to ever physically forced sexual intercourse 51.14% of females and 33.10% of males had considered suicide during the past 12 months; additionally, 45% of females and 33.26% of males responded "yes" to suicide plan (Table 3). For individuals that responded "no" to ever physically forced sexual intercourse, but "yes" to suicide consideration, 19.97% were female and 11.23% were male, whereas 16.34% of females and 8.92% of males responded "yes" to suicide plan (Table 3). However, among those that responded "yes" to ever physically forced sexual intercourse, there are not statistically significant gender differences for suicide attempt and injurious suicide attempt (Table 3). For those that responded "no" to ever physically forced sexual intercourse, gender differences remain, with 8.81% of females and 4.74% of males having attempted suicide during the past 12 months, while 2.52% of females and 1.41% of males reported having a suicide attempt that resulted in injury requiring medical treatment.

Contrary to earlier findings when only sex or sex stratified by sexual identity and sexual victimization was examined and significant gender differences were found, after adjusting for

covariates in the logistic regression model, sex is no longer a significant predictor for three of the four suicide outcomes of interest, including suicide consideration, attempt and injurious attempt. Sexual victimization ("yes" to ever physically forced sexual intercourse) significantly increased the odds of three suicide outcomes compared to those that had not been sexually victimized. The only exception was injurious suicide attempt, which had an increased odds ratio, however, it was not statistically significant. For sexual identity, using heterosexual/straight as the reference, individuals who identify as gay or lesbian have significantly increased odds of all suicide outcomes, except for injurious suicide attempt; yet, individuals that identify as bisexual have significantly increased odds of all suicides outcomes when compared to the heterosexual/straight reference group. Participants that responded "not sure" for sexual identity had significantly increased odds of suicide consideration and plan compared to the heterosexual/straight reference.

Students that missed at least one day of school due to safety concerns had significantly increased odds of suicide attempt and injurious suicide attempt compared to those without safety concerns. Exposure to physical dating violence resulted in significantly increased odds of all suicide outcomes when compared to the unexposed reference group. Individuals that experienced sexual dating violence within the past 12 months had significantly increased odds of suicide and injurious suicide attempt. Compared to those that did not experience bullying at school, those that were bullied at school had significantly increased odds of all suicide outcomes except for injurious suicide attempt. Whereas, exposure to electronic bullying increased the odds of all four suicide outcomes compared to the unexposed reference group. Sad or hopelessness, a direct indicator of depression, was identified as the most important explanatory variable in the multivariate logistic regression model, resulting in the largest increase in odds ratios for all suicide outcomes.

5b. Limitations and Strengths of the Study

The findings of this study have several limitations that should be noted. One limitation was all analyses were performed using secondary data. Despite the comprehensive methodologies behind the sample selection and data collection performed by the CDC, the cross-sectional nature of this data limits the inferences that can be made. The YRBS only collects information from each student surveyed at one specific timepoint, so no causal relationships can be established—rather, only associations.

Another limitation is due to the complex, cluster sampling design. Any variables included in the logistic regression models (i.e. predictors, outcomes, and covariates) with missing or incomplete information resulted in these observations being excluded in the analyses to adjust for the cluster design, therefore resulting in decreased observations included in the models due to excluding missing and possibly influencing the interpretation of the results. This default can be overwritten to include missing observations, however, the fit of these logistic regression models would be significantly poorer at predicting the outcomes of interest, because additional assumptions must be made to compensate for the unknown.

Finally, many of these outcomes and predictors of interest have relatively low prevalence, such as the number of students that identify as non-heterosexual/straight, the amount that have ever experienced physically forced sexual intercourse, attempted suicide in the past 12 months, and attempted suicide that resulted in injury requiring medical treatment in the past 12 months. The frequency of these reported responses was fairly uncommon individually. Therefore, when these variables were examined together in the models, despite the often increased odds ratios that were produced, the results were not significant due to the wide range of the confidence intervals.

One of the many strengths of using the 2015 YRBS data is that students are carefully selected for participation using complex sampling designs to ensure the results are representative of the study population, which are U.S. high school students. Additionally, the 2015 survey was the first time the national YRBS questionnaire included questions regarding students' sexual identity.

5c. Conclusions

Gender differences were observed among each of the four suicide outcomes of interest when sex was the sole predictor variable being examined. However, when sex was stratified by sexual identity and sexual victimization, significant gender differences were not consistently observed for the four suicide outcomes of interest; some of this obscurity in the findings may be explained by small cell sizes. However, when covariates were included in the logistic regression models, many of those additional variables were better predictors of each suicide outcome than sex.

The findings of this study support the notion introduced in previously reviewed literature that suicide may have different risk factors depending on the outcome of interest being examined (i.e. consideration, plan, attempt, or injurious attempts) The predictive power of these risk factors is dependent on the study populations, the factors being considered, and the suicide outcomes being examined. The results of this study highlight the importance of considering gender differences when conducting research on suicide indicators to develop effective suicide prevention programs, strategies and messaging.

5d. Future Directions

A similar study should be conducted using the results of the 2017 YRBS upon their release in June 2018. This data could be useful for comparison to the 2015 YRBS results to

determine if there are significant differences in the findings, particularly with regards to

examining the influence of sex and sexual identity on suicide outcomes since the 2015 YRBS

was the first year sexual identity was incorporated into the questionnaire. Merging the two years

of data into one dataset may increase the amount of sexual minority respondents sampled,

resulting in improved analytical power. Future studies should include additional demographic

variables to assess the amount of risk they contribute to each suicide outcome of interest to

ensure more complete understanding. Furthermore, future studies should continue to examine the

varying degrees of influence that certain risk factors have on predicting suicidality among

females and males.

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