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Assessing Behavioral Risk Factors and Suicidality Among Sexual Minority Adolescents from the 2015 and 2017 Youth Risk Behavior Surveillance Surveys (YRBSS)

Loren Makhoul

ABSTRACT

Assessing Behavioral Risk Factors and Suicidality Among Sexual Minority Adolescents from the 2015 and 2017 Youth Risk Behavior Surveillance Surveys (YRBSS)

By

LOREN MAKHOUL

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INTRODUCTION: Suicide is the second leading cause of death among adolescents (CDC, 2017). Teens who identify as gay, lesbian bisexual, or questioning (LGBQ) their sexual orientation are at an increased risk for mental disorders and suicide than their heterosexual counterparts (Meyer, 2003; Hill & Pettit, 2012). Meyer's sexual minority stress theory and Joiner's Interpersonal Theory of Suicide both assess the stressors and behavioral risk factors associated with suicidal ideation and attempts (Meyer, 2003; Van Orden, et al., 2010).

AIM: The purpose of this study is to determine the relationship between sexual minority adolescents and at-risk behavioral factors, and their interaction, on suicide attempts. Additionally, this study will assess suicide prevention programs for their effectiveness in and outside of schools.

METHODS: The 2015 and 2017 national Youth Risk Behavior Surveillance Surveys (YRBSS) were analyzed as they are the only two surveys to include questions on adolescent sexual identity and sex of sexual contacts. Bivariate logistic regression analyses were completed to assess the interactions between sexual orientation and behavioral risk factors on suicide attempts in the 12 months prior to the surveys, as well as the relationships between sexual orientation and behavioral risk factors on suicide attempts.

RESULTS AND DISCUSSION: In line with the literature, depressed sexual minority adolescents were more likely to attempt suicide in the 12 months prior to the 2015 and 2017 survey administrations than their heterosexual peers. Additionally, bisexual identifying adolescents who responded to the 2015 YRBSS and currently smoke, vape, and drink alcohol are at a greater risk for attempting suicide than those who did not, while 2017 YRBSS respondents who are questioning their sexual orientation and currently smoke and vape are at a greater risk for suicide.

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by

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Author's Statement Page

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Loren Makhoul
Signature of Author

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I. Introduction

Adolescents who identify as gay, lesbian, bisexual, or questioning (LGBQ) their sexual orientation are more likely to suffer from mental disorders, like depression than their heterosexual or peers (America's Health Rankings, 2020; Russell & Joyner, 2001). Their depression may be due to the increased stigma and discrimination that is often associated with general non-heterosexuality, but may be exacerbated due to adolescence (Russell & Joyner, 2001; Meyer, 2003). As a result, adolescents who suffer from mental disabilities and identify as a sexual minority are at a greater risk for suicide attempts (America's Health Rankings, 2020; Russell & Joyner, 2001).

Suicide is a serious, but preventable, global health issue among 15 to 29-year-olds, and through the study of Joiner's Interpersonal Theory of Suicide there is now more research and understanding of what may lead an individual to engage in lethal suicidal behavior (Van Orden, et al., 2010; WHO, 2019). Understanding the signs and symptoms of suicidal risk behavior is important for adolescents, but if paired with protective environments for those who identify as LGBQ, greater prevention for suicide may be possible (Stone, Holland, Bartholow, Crosby, Davis, & Wilkins, 2017). Therefore, it is important to understand the relationship between sexual minority adolescents and suicide attempts, as well as the interaction between sexual minority adolescents and at-risk behaviors to determine if there are associated increases in suicide.

II. Literature Review

2.1 Overview of suicide in the U.S.

Suicide is an increasing public health problem as it is the second leading cause of death among young people aged 10 to 25 years (CDC, 2017). Children and adolescents may exhibit warning signs of suicide, such as verbal suicidal threats by wishing themselves dead or telling

someone they will not be a problem for them to deal with much longer (American Academy of Child & Adolescent Psychiatry, 2018). Observational warning signs include changes in eating or sleeping patterns, frequent or chronic sadness, social withdrawal, frequent complaints of stomach-aches, headaches, or fatigue, declination in schoolwork productivity and quality, and preoccupations with death and dying (American Academy of Child & Adolescent Psychiatry, 2018). Other warning signs include increased stress, aggressive, disruptive, or impulsive behaviors, bullying, feelings of hopelessness or learned helplessness, an acute loss or rejection, familial history of suicide attempts, sexual orientation and identity, and/or exposure to physical or sexual violence (American Academy of Child & Adolescent Psychiatry, 2018; Brent & Mann, 2005; Fergusson, Boden, & Horwood, 2008; Russell & Joyner, 2001). While these warning signs are vast and vary in severity, they are the most commonly observed among teens and young adults.

According to previous studies girls have higher rates of suicidal ideation and attempted suicide than boys, while boys have overall higher rates of suicide (America's Health Rankings, 2020; Eaton, D.K., et al, 2008). Hispanic youth living in the U.S. have higher rates of suicidal ideation and attempts compared to youth of other ethnic backgrounds (America's Health Rankings, 2020; Eaton, et al., 2008). Specifically, among young Latinas, their higher rates of suicidal ideation and attempts may be attributable to the quality of their mother-daughter relationships (America's Health Rankings, 2020; Zayas, Lester, Alvarez-Sanchez, & Cabassa, 2009). Non-Hispanic black high schoolers are more likely to think about and attempt suicide, suffer from mental health issues, such as generalized anxiety disorder (GAD), and live in the Northeast United States, compared to non-Hispanic black teens living in the Southern or Western United States (Joe, Baser, Neighbors, Caldwell, & Jackson, 2009). Teens who identify as gay,

lesbian, or bisexual (LGB) are significantly more likely to attempt suicide than their heterosexual counterparts (America's Health Rankings, 2020; Russell & Joyner, 2001). According to the American Association of Suicidology (n.d.) and previous data from the Youth Risk Behavior Surveillance Survey (YRBSS), LGB high school students and those unsure of their sexual orientation are almost three times more likely to attempt suicide than their heterosexual peers (CDC, 2018).

In 2017, the rate of suicide was 11.8 per 100,000 young people aged 15 to 24, which rose to about 14 per 100,000 young people in 2018 (AFSP, 2018). Between 2000 and 2010, an increasing trend of suicides was noticed among females aged 15 to 19 years with an annual percent change (APC) beginning at 1.8% and increasing to 8.2% between 2010 and 2017 (Miron, Yu, Wilf-Miron, & Kohane, 2019). While this overall APC = 10% is large, it is not as large as the APC among male adolescents between 2000 and 2017 (Miron, Yu, Wilf-Miron, & Kohane, 2019). Male adolescents aged 15 to 19 years experienced a significantly different effect in their suicide rates as the APC decreased by 2.2% between 2000 and 2007, and has since been on the rise with an APC = 2.6% between 2007 and 2015 and skyrocketed to 14.2% between 2015 and 2017 (Miron, Yu, Wilf-Miron, & Kohane, 2019). While there is no single cause or warning sign for suicide, researchers have various hypotheses outlining how previous suicide attempts and depression are the most common combination of warning signs to be associated with suicide (AFSP, 2018; American Association of Suicidology, n.d.).

2.2 Risk factors for suicide

As mentioned previously there are a variety of risk factors that may influence a teen to think about, attempt, and/or complete suicide. Among adolescents, the most common risks include: depression or other mental health issues, alcohol or drug use, stress, social isolation,

familial discord, feelings of hopelessness or helplessness, adverse childhood experiences, and mood disturbances (American Academy of Child & Adolescent Psychiatry, 2018; Van Orden, et al., 2010; Gould, King, Greenwald, et al., 1998; Kovac, Goldston, & Gatsonis, 1993). About 85% of adolescents who have been clinically evaluated for major depressive disorder (MDD) will experience suicidal ideation, 32% will attempt suicide during the adolescence, and the association between repeated suicide attempt and depression will continue to grow (Kovacs, Goldston, & Gatsonis, 1993; Pfeffer, Kerman, Hurt, et al., 1993; Brent, Kolko, Wartella, et al., 1993). In a previous study, about 68% of adult male suicide attempters had a chronic substance use disorder and 84% previously attempted suicide at some point in their lifetime (Suominen, Isometsa, Haukka, & Lonnqvist, 2004). Therefore, it cannot be ruled out that their chronic substance use disorder began in adolescence.

Out of the aforementioned list, the major predictors for suicidal behavior are previous suicide attempts, depression, and social isolation (Van Orden, et al., 2010). Teens who experience only social isolation have the strongest and most reliable predictor of suicidal ideation, attempts, and lethal behavior amongst varying ages and nationalities (Conwell, 97; Dervic, Brent, & Oquendo, 2008; Joiner & Van Orden, 2008; Trout, 1980). But teens with previous lethal suicide attempts have the strongest and most reliable risk factor predictor for future lethal suicide attempts (Van Orden, et al., 2010; Christansen & Jensen, 2007; Haw, Bergen, Casey, & Hawton, 2007; Suominen, Isometsa, Haukka & Lonnqvist, 2004).

2.3 The Interpersonal Theory of Suicide

Lethal suicide attempts are defined as methods of suicide that have a high fatality rate, such as using firearms or jumping from buildings or bridges (Suicide Prevention Resource Center, n.d.). In order to prevent lethal suicide attempts it is important to make access to these

objects and opportunities more difficult, such as putting barriers on bridges and buildings, removing firearms from the home, or reducing the availability of over-the-counter and prescription medications in the home (America's Health Rankings, 2020). The Interpersonal Theory of Suicide looks at how constructs such as thwarted belongingness, perceived burdensomeness, and acquired capability for suicide contribute to one's access and means to suicide (Van Orden, et al., 2010). This theory assumes that the previously mentioned risk factors most likely contribute to near-lethal and lethal suicide attempts, as an individual who dies by suicide does so because they desire to and are capable of doing so (Van Orden, et al., 2010).

Thwarted belongingness is a dynamic state that is influenced by both inter- and intra-personal factors in which the individual perceives that meaningful and mutually supportive connections are completely absent (Van Orden, et al., 2010). This absence is usually defined as the lack of social integration, therefore thwarted belongingness is the most observable indicator that a fundamental human psychological need is unmet (Van Orden, et al., 2010). Maslow previously defined the psychological need of belongingness to be among friends and intimate partners and as these needs go unmet, motivation to continue self-growth to reach one's ideal-self decreases (McLeod, 2020). Like Maslow, Durkheim and Shneidman previously hypothesized that a lack of social integration or increase in psychological pain creates a lack of connectedness and social isolation, one of the primary risk factors related to lethal suicidality among adolescents (Jones, 1986; Shneidman, 1987; Van Orden, et al., 2010).

For an adolescent, social isolation in the forms of loneliness, social withdrawal, living alone, or lack of social or familial supports is the strongest and most reliable predictor of suicidal ideation, attempts, and lethal suicidal behaviors among varying ages and nationalities (Van Orden, et al., 2010; Dervic, Brent, & Oquendo, 2008; Joiner & Van Orden, 2008; Trout, 2008).

As long as belongingness is thwarted, a lack of social integration may create an increased magnitude of social isolation through negative implications of one's cognition, behavior, self-regulation, executive functioning, and pro-social, aggressive, and unintentional self-defeating behaviors, all of which can lead to a desire for suicide (Van Orden, et al., 2010). This desire for suicide is a form of passive suicidal ideation but can be chronic and persistent as long as an individual's fundamental need to belong goes unmet (Van Orden, et al., 2010).

Perceived burdensomeness is a causal factor that can lead a teen to lethal suicidal behavior when they believe they are expendable to their family and friends (Van Orden, et al., 2010). This expendability may be spoken verbally when a teen wishes themselves dead or tells another individual that they may not have to deal with them much longer, but it can also be shown by a teen disengaging from their normal activities, friends, family, stop planning for their future, and/or giving away their possessions (American Academy of Child & Adolescent Psychiatry, 2018). A teen may interpret parental attitudes that he or she is not needed in their family, feel that they are so flawed, is a liability to others, and/or feel intense self-hatred that they make things worse for others and would be better off dead for all those involved (American Academy of Child & Adolescent Psychiatry, 2018; Van Orden, et al., 2010).

Perceived burdensomeness can be viewed dichotomously through liability and the self-hatred factors (Van Orden, et al., 2010). These factors can be viewed on a continuum of severity with the liability factor usually being a misperception by the individual that they are a burden to others and should not have to be worried about, while the self-hatred factor includes an individual's own perception of low self-esteem, self-blame, and shame (Van Orden, et al., 2010). For example, disclosing one's sexual identity to family and friends has been associated with greater levels of perceived burdensomeness for individuals with a decreased affirmation in their

identity (Velkoff, et al., 2016). Further, perceived burdensomeness has been shown to mediate the relationship between sexual orientation victimization and suicidal ideation (Baams, Grossman, & Russell, 2015). While these factors are important to the Interpersonal Theory, it is important to understand that all individuals hold their own perception of burdensomeness on others in their life and it only becomes problematic when a certain threshold of perceived burdensomeness is met that is difficult to revert (Van Orden, et al., 2010).

Thwarted belongingness and perceived burdensomeness often occur at the same time for individuals who feel socially alienated, experienced childhood abuse, and suffer from mental health disorders (Van Orden et al., 2010). The simultaneous feelings of thwarted belongingness and perceived burdensomeness increase the risk of lethal suicidality, but it does not mean that this individual is lacking the physical and perceived connections to others (Van Orden et al., 2010). Rather, the individual may belong to and have connections to family members or others in specific social groups or settings, but they still feel like they are unwanted, do not belong, and a burden to those involved (Van Orden, et al., 2010). Previous research has shown that among sexual minority women their previous suicide attempts were predictable based on their simultaneous experiences of perceived burdensomeness and thwarted belongingness (Velkhoff, Forrest, Dodd, & Smith, 2016).

Perceived burdensomeness and thwarted belongingness may be assessed simultaneously, but when done so, perceived burdensomeness continues to remain significant compared to thwarted belongingness (Hill & Pettit, 2012, 2019; Lamis & Lester, 2012). Therefore, it is important to understand that while these constructs are similar, they are distinct with a moderating magnitude of effect, $r = 0.58$ (Van Orden, Witte, Gordon, Bender, & Joiner, 2008; Guiterrez, Pease, Matarazzo, Monteith, & Hernandez, 2016; Van Orden et al., 2010). While

thwarted belongingness and perceived burdensomeness both contribute to one's desire for suicide, suicidal desire is not sufficient on its own to lead to suicide (Van Orden, Witte, Gordon, Bender, & Joiner, 2008).

A third construct, known as acquired capability, is necessary in order for passive suicidality to become active suicidality, where lethal self-harm may lead to death by suicide (Van Orden, Witte, Gordon, Bender, & Joiner, 2008; Van Orden, et al., 2010). Activation of opponent processes and habituation to decrease one's physical pain tolerance and reduce fear allows for the repeated exposure to lethal suicidal behaviors to lose their painful emotional effects and create relief and analgesic effects (Van Orden, et al., 2010). With repeated exposure to these injurious self-harm behaviors, habituation allows the individual to work through the pain and fear-inducing experiences in order to create more of a calm and relief-oriented experience to numb their pain associated with thwarted belongingness and perceived burdensomeness (Van Orden, et al., 2010). The most direct route to acquiring capability for suicide is engaging in suicidal behavior, i.e. previous suicide attempts, suicidal ideation, practicing suicidal attempts, exposure to others who have engaged in suicidal behaviors, or imagining death by suicide (Van Orden, et al., 2010).

In addition to the three aforementioned constructs of the Interpersonal Theory of Suicide, each construct builds into four hypotheses that when combined, create the most lethal form of suicidal behavior (Van Orden, et al., 2010). The first, passive suicidal ideation, begins with interpersonal feelings of thwarted belongingness or perceived burdensomeness where an individual may experience either one of these constructs alone and wish they were dead (Van Orden, et al., 2010). Their feelings of not belonging or being a burden do not exceed suicidal

ideation when experienced independently and therefore this hypothesis does not go beyond the form of passive suicidality (Van Orden, et al., 2010).

However, the second hypothesis outlining suicidal desire is not as clear cut because passive or active suicidality are possible outcomes (Van Orden, et al., 2010). In order for passive suicidality to intensify, an individual feeling completely thwarted to belong must also have an overall perception of burdensomeness and/or hopelessness in order to create an active form of suicidal desire (Van Orden, et al., 2010). If constant, one will perceive their interpersonal levels of burden and thwarted belonging to be permanent and unwavering, creating continuous hopelessness, an active form of suicidal desire (Van Orden, et al., 2010). When continuous hopelessness is achieved, suffering individuals do not usually see a possibility of change, contributing towards active desire and engagement in suicidal intent (Van Orden, et al., 2010).

Suicidal intent is the third hypothesis, involves all three constructs, but focuses on one's acquired capability for suicide (Van Orden, et al., 2010). Suicidal intent is the conceptualized idea of suicidal desire that is translated into behavior (Van Orden, et al., 2010). At this point in time, individuals have suicidal desire and have or begun to habituate the fear and pain associated with suicide into an imaginable plan, and/or have decided to engage in suicidal actions (Van Orden, et al., 2010). When this occurs simultaneously, we begin to see how suicidal intent creates the most lethal form of suicidality (Van Orden, et al., 2010).

Near-lethal and lethal suicidal attempts in combination with the aforementioned constructs make up the fourth and final hypothesis of the Interpersonal Theory of Suicide (Van Orden, et al., 2010). As previously described, lethal suicidal attempts are methods of suicide where the fatality rate is high, such as utilizing a firearm or jumping from the top of a tall building (Suicide Prevention Resource Center, n.d.). Whereas, near-lethal suicidal attempts are

those that would have been fatal had it not been for chance, swift and efficient emergency care, or medication (Levi-Belz & Beautrais, 2016). Prediction of lethal suicidal behavior is usually low as individual risk factors do not always cause both a desire and capability for suicide, but if risk factors are co-morbid, such as having a mental disorder like MDD or GAD and prevalence of previous adverse childhood experiences, then the indirect risk for suicidal behavior is possible; this may then indicate the presence of all three theory constructs: thwarted belongingness, perceived burdensomeness, and acquired capability (Van Orden, et al., 2010).

The Interpersonal Theory of Suicide provides good evidence and explanation on the proximal risks for suicidal behavior that when in combination will provide an individual with the necessary means to complete suicide (Van Orden, et al., 2010). And while this theory goes on to show how each of these constructs on their own are influential to one's inter- and intra-personal feelings, they do not contribute to suicidal attempts or completions independently (Van Orden, et al., 2010). The prevalence of suicidal behavior among the general population is rare, making each of these hypotheses rare, but the rate of suicidal behavior among LGB youth continues to rise in the United States (Van Orden, et al., 2010).

2.4 The Minority Stress Model

Teens who identify as lesbian, gay, bisexual, or questioning their sexual orientation are at an increased risk for mental distress and disorders (Meyer, 2003; Hill & Pettit, 2012). This is most likely due to the increased social stress a teen may feel in coming out, their socioeconomic status, fear of discrimination and prejudice, and their overall mental health status (Meyer, 2003). It has been previously theorized in the minority stress model that LGB people have a higher prevalence of mental disorders due to the increased discrimination, victimization, and violence that is often paired with being an openly lesbian, gay, or bisexual individual (Meyer, 2003).

More specifically, LGB youth have experienced more anti-gay prejudiced events, suffered from the negative psychological consequences of these events, and are at a higher risk for being threatened, assaulted, missing school, and feeling unsafe while at school compared to their heterosexual counterparts (Meyer, 2003, Murphy, 1999). The stigmas experienced by sexual minority youth have the ability to cause habitually long-lasting stress that may negatively impact a teen's mental and physical health (Annor, et al., 2018).

In previous research, about 57% of LGB youth who previously attempted suicide said they did so in some part due to their sexual orientation and 21% said the relationship between their suicide attempt and sexual orientation was highly related (D'Augelli, Hershberger, & Pilkington, 2001; Hill & Pettit, 2012). Males have also been more likely to report that their sexual orientation was a factor in their suicide attempt compared to girls (D'Augelli, Hershberger, & Pilkington, 2001; D;Augelli, Grossman, Salter, Vasey, Starks, & Sinclair, 2005). And about 28% of males stated they attempted suicide because of their sexual orientation compared to only 12% of females (D'Augelli, Hershberger, & Pilkington, 2001). There has also been previous data to show that 12% of youth have attempted suicide because they could not accept their own sexual orientation and 15% have attempted because their life was unbearable due to their sexual orientation (D'Augelli, Hershberger, & Pilkington, 2001).

Nystedt, Rosval, & Lindstrom (2019) found that males and females who identified as bisexual were 3.90 and 5.50 times more likely to have experienced suicidal ideation, respectively. While bisexual males were 4.21 and females were 5.34 times more likely to experience increases in suicide attempts compared to their hetero- and homosexual counterparts (Nystedt, Rosval, & Lindstrom, 2019). Not surprisingly, homosexual males have a greater risk for suicidal ideation and attempt compared to homosexual females, which may be in part due to

the fact that more males die by suicide than females (America's Health Rankings, 2020; Nystedt, Rosval, & Lindstrom, 2019). Reasons for the increase in suicidal ideation and attempts among non-heterosexual oriented individuals may be due to increased stigma and associated depression that is often accompanied with victimization and violence, as outlined by the minority stress model (Nystedt, Rosval, & Lindstrom, 2019; Meyer, 2003).

The negative impacts felt by youth who experience bullying, stigma, and discrimination due to their non-heterosexual orientation can be identified through depression and other mental and physical illnesses (Annor, et al., 2018). In a 2016-17 survey conducted by the Human Rights Campaign Foundation (HRC Foundation) after the 2016 Presidential election, about 28% of LGB youth stated they felt depressed most or all of the time within a one-month time span compared to 12% of non-LGB youth (HRC Foundation, 2017). Additionally, 42% of the respondent LGB youth reported feeling hopeless, 34% worthless, and 59% nervous during a one-month time span post-election (HRC Foundation, 2017). An adolescent's feelings of depression, worthlessness, hopelessness, and nervousness is most likely due to a slew of other risk factors for suicide, such as social isolation, lack of family support, loneliness, and previous suicide attempts (American Academy of Child & Adolescent Psychiatry, 2018; Van Orden, et al., 2010). When these thoughts and feelings are experienced together, they may provide further understanding for both the interpersonal theory of suicide and the minority stress theory.

Until recently, there had been no formal research done on the intersection of the Interpersonal Theory of Suicide and the minority stress theory. Fulginiti, et al. (2020) discovered through the integration of both theories that sexual minority stress is significantly associated with perceived burdensomeness and thwarted belongingness. They also discovered that sexual minority stress has an indirect effect on suicidal ideation and attempt, as well as a direct effect on

suicide attempt (Fulginiti, et al., 2020). Prior research stated that stressors and risk factors related to identifying as a sexual minority also moderates the relationship between general risk factors for suicide and perceived burdensomeness and thwarted belongingness (Velkhoff, Forrest, Dodd, & Smith, 2016). It has also been shown that perceived burdensomeness mediates the relationship between sexual orientation victimization, suicidal ideation, and level of rejection from family and friends, which is further supported by the integration of the interpersonal theory of suicide and the minority stress theory (Baams, Grossman, & Russell, 2015; Fulginiti, et al., 2020).

2.5 Suicide prevention programs

With the continuous increase in rates of suicide among adolescents in the United States, specifically among LGB adolescents, an increase in prevention programs to help teens in crisis is necessary. Effective suicide prevention is achieved through a variety of individual, family and friend relationships and various community and social factors across all intersections of life (Stone, Holland, Bartholow, Crosby, Davis, & Wilkins, 2017; U.S. Office of the Surgeon General, 2012; WHO, 2014). Teens spend a significant amount of their life in school where teachers and administrators may interact with them more than their parents during the school year making it important for them to recognize the signs of suicide risk behaviors (AFSP: K-12, 2020). Prevention efforts that not only educate teachers and administrators to recognize the signs and symptoms of mental health conditions and risk for suicide, but also the students, empowers them to take their own health into their hands and reach out for assistance when necessary (AFSP: K-12, 2020). However, teenage students may not always be able to do that.

Suicide prevention programs that highlight the importance of protective environments, social connectedness, coping and problem-solving methods, and identification of those at risk are all strategies to include in universal school-based suicide prevention programs (Stone, Holland,

Bartholow, Crosby, Davis, & Wilkins, 2017). As outlined in the American Foundation for Suicide Prevention (AFSP) Model School District Policy on suicide prevention, school teachers and administrators are to be trained to support and identify at-risk LGB youth utilizing sensitivity, cultural competency, and affirming practices that do not lead to assumptions about the student's sexual orientation or identity (AFSP, American School Counselor Association, National Association of School Psychologists, & Trevor Project, 2019).

In a previous study, LGB-adolescents who experienced bullying because of their sexual orientation were more likely to attempt suicide, but not at a significant enough rate compared to their heterosexual counterparts (Barnett, Molock, Nieves-Lugo, & Zea, 2019). About 21% of LGBQ teens experienced bullying at school because of their sexual orientation and about 15% were fearful of going to school because of violence, compared to 7% of their heterosexual counterparts (Barnett, Molock, Nieves-Lugo, & Zea, 2019). Goldbach, Rhoades, Green, Fulginiti, & Marshal (2019) offered LGBT-specific services for youth in crisis and found a significant increase in call rates to this service as they were LGBT-affirming and offered services specific to this population. LGB youth who have experienced stigma and discrimination due to their sexual orientation are more likely to engage and share their experiences with providers in LGBT-specific organizations rather than unspecific or supporting organizations (Goldbach, Rhoades, Green, Fulginiti, & Marshal, 2019).

Successful school-based programs that bring awareness and prevention to suicide include the Good Behavior Game, Signs of Suicide (SOS) prevention program, and the Signs Matter: Early Detection program created by the AFSP (Kellam, et al., 2011; Aseltine & DeMartino, 2004; AFSP: Signs Matter, 2016). The Good Behavior Game is a tool used by teachers to help manage classroom disruptions without having to address the individual one on one and teach

children how to interact with each other, self-regulate their emotions, and maintain self-control in the first and second grades (Kellam, et al., 2011). The Good Behavior Game produced a significant decrease in the percentage of young adults who participated in risky behaviors after participating in this classroom, with 9% of females and 11% of males experiencing suicidal thoughts, compared to 19% of females and 24% of males who were in a standard classroom (Kellam, et al., 2011).

The SOS prevention program incorporates an education component featuring curriculum that raises awareness of suicide among high school students, and a self-screening component for mental health disorders, such as depression and suicidal ideation (Aseltine & DeMartino, 2004). The SOS program highlights how suicide is often times directly related to depression, is not a normal reaction to stressors, and how to recognize signs of depression and risk for suicide in themselves and their peers (Aseltine & DeMartino, 2004). The Signs Matter: Early Detection program created by the AFSP is an online program for teachers and administrators to learn the signs and symptoms associated with risk for suicide and other mental health disorders in kindergarteners to 12th graders (AFSP: Signs Matter, 2016). The signs and symptoms explained to educators during this course are tailored to the school environment and outlines the necessary steps needed to take if a student is near or at a mental health-related crisis (AFSP: Signs Matter, 2016). The aforementioned strategies and programs have all been beneficial in bringing awareness and education to suicide among adolescents. Future research may want to focus on creating protective environments, social connectedness, self, peer, and educator awareness, and LGB-affirming services for adolescents in a school-based setting.

2.6 Purpose

In line with the ideas of the Interpersonal Theory of Suicide and the Minority Stress Theory, it is important to understand the associations and interactions, together and independently, of adolescent sexual orientation and behavioral risk factors of suicide.

III. Methods

The Youth Risk Behavior Surveillance Survey (YRBSS) is a survey used to assess the leading causes of death, disability, and social issues among United States youth (CDC: What is the youth risk behavior surveillance survey, 2018). Developed in 1990, this survey asks adolescents questions regarding their social, risk-taking, dietary, and sexual behaviors (CDC: What, 2018). Through asking youth these questions at the national level, a representative sample of ninth through twelfth graders across the U.S. is required every two years in order to determine the health and safety of America's youth (CDC: What, 2018). YRBSS questions focus on six priority health areas, which include behaviors attributing to unintentional injury and violence, tobacco, alcohol, and other drug usage, sexual, dietary and physical activity behaviors (Frieden, Jaffe, Cono, Richards & Iademarco, 2016). Through the administration of this survey, public health professionals, educators, researchers, and policy makers can all describe and assess adolescent health behaviors in order to provide improvements to policies and programs over time (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013).

3.1 Data Source

For the purposes of this study, data was used from both the 2015 and 2017 national YRBSS surveys. The 2015 national YRBSS is the first of its kind to include questions asking about an adolescent's sexual identity and sex of sexual contacts (CDC: How, 2016). Both surveys were distributed to ninth through twelfth grade students in public, Catholic, and other

private high schools in all 50 states and the District of Columbia (CDC: 2015, 2016; CDC: 2017, 2018). Puerto Rico, the Virgin Islands, and trust territories were excluded from the national survey sampling frame for both survey years (CDC: 2015, 2016; CDC: 2017, 2018).

3.2 Sample Design

A three-stage cluster sample design was utilized to obtain a nationally representative sample of U.S. ninth through twelfth grade adolescents in both public and private schools (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). First-stage sampling involved primary sampling units (PSUs) of large counties or groups of small, adjacent counties (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). PSUs are chosen from 16 strata which are categorized according to metropolitan statistical area (MSA) status and the percentage of black and Hispanic adolescents in each PSU (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). Schools in each PSU are sorted by size with proportional probability to school enrollment size, and if large enough, PSUs can be divided into sub-PSU units and classified as either urban, if they are in one of the 54 largest MSAs, or otherwise rural (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013).

Using the Market Data Retrieval database, which includes information on student enrollment for both public and private high schools, the second stage of sampling begins by choosing schools from the selected PSUs. Additionally, the most recent data from the Common Core of Data from the National Center for Education Statistics is analyzed for inclusion when choosing schools (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). Schools can be classified as ‘whole schools’ if the house all four secondary grade levels, ‘fragment schools’ if other grade levels are also present, or as ‘cluster schools,’ which are a combination of ‘fragment schools’ (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). If a high school’s estimated enrollment is

greater than or equal to 25 students per grade, it is considered large, if it is less than 25 students per grade it is considered small (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). About a quarter of the PSUs are chosen because of their small schools, each small school is chosen with a probability proportional to its size, while three large schools are selected from all other PSUs with probability proportional to school enrollment size (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). To oversample for minority groups, such as black and Hispanic students, CDC created a separate analysis which involves larger sampling rates for PSUs with an increased stratum of both black and Hispanic students (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). This modified measure of size increases the probability of selecting a school with a greater minority enrollment (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013).

The third stage of sampling includes the random selection of one or two entire classes from each grade level in the chosen schools (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). An example of classes that can be chosen includes homerooms or required subject area classes for each grade level, and all students in the sample class are eligible to participate (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). Variable weights are added to each record to control for non-response and oversampling of black and Hispanic students. Weights are based on a student's sex, race/ethnicity, and grade level (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013). Final weights are equal to the total number of students sampled and weighted proportions for students in each grade are matched to the national projections generate for each survey year (Frieden, Jaffe, Stephens, Cardo, & Zaza, 2013).

3.3 Data collection

The 2015 YRBSS sampled 180 high schools with a 69% school response rate, while the 2017 sampled 192 high schools and had a 75% school response rate (CDC: 2016, 2018).

Depending on the school district, surveys were administered to students in classes of a required subject or all classes during a particular meeting period of the day. Figure 1 diagrams the possible associations and interactions between sexual orientation and suicide attempts with the behavioral risk factors analyzed for this study.

3.4 Description of variables

3.4.1 Dependent

The main outcome variable for this study was whether or not an adolescent actually attempted suicide in the past 12 months (CDC: YRBSS, 2015, 2017). The survey question in both the 2015 and 2017 YRBSS read, "*During the past 12 months, how many times did you actually attempt suicide?"* which gave the following choices, "*0 times, 1 time, 2 or 3 times, 4 or 5 time, 6 or more times*" (CDC: YRBSS, 2015, 2017). For this study, the binary form of the outcome was used to determine the percentage of students who attempted suicide one or more times during the 12 months before the survey. Other outcome variables from both the 2015 and 2017 YRBSS assessed in this study, but did not provide main effects, included adolescents who seriously considered suicide, made a plan about how they would attempt suicide, how many times did any suicide attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse in the past 12 months before the survey (CDC: YRBSS, 2015, 2017).

3.4.2 Independent

The independent variables for this study were grouped into demographic, mental health, social interaction, and at-risk behavior categories. Demographic variables included age (12 years or younger, 13, 14, 15, 16 ,17 or 18 years or older), sex (female or male), grade level (9^{th}, 10^{th}, 11^{th}, 12^{th}, or ungraded or other grade), Hispanic or Latino, race/ethnicity (American Indian/Alaskan Native, Asian, Black or African American, Native Hawaiian or other Pacific

Islander, White, Hispanic/Latino, Multiple – Hispanic/Latino, or Multiple – Non-Hispanic/Latino), sexual orientation (heterosexual, gay or lesbian, bisexual, or not sure), and sex of sexual contacts (I have never had sexual contact, females, males, or females and males) (CDC: YRBSS, 2015, 2017). The binary form of the mental health variable assessed adolescent depression asking "*During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities*?" (CDC: YRBSS, 2015, 2017). Social interaction variables were also used in their binary form assessing if an adolescent had ever been bullied on school property or cyberbullied in the past 12 months before the survey (CDC: YRBSS, 2015, 2017).

At-risk behavior survey questions included questions on an adolescent's smoking, vaping, alcohol, and illegal drug usage. Teens were asked if they ever tried cigarette smoking, including one or two puffs (yes or no), their age when they tried cigarette smoking, the number of days in the past month before the survey they smoked cigarettes (i.e. currently smokes), and the number of cigarettes smoked per day (CDC: YRBSS, 2015, 2017). Their vaping status was assessed by asking if they ever tried an electronic vapor product (yes or no) and the number of times they used a vaping product in the last month (i.e. currently vape) (CDC: YRBSS, 2015, 2017). The use of smokeless tobacco and cigars was also assessed for the month prior to the surveys (CDC: YRBSS, 2015, 2017). For adolescents who did use tobacco and vape products, their ability to quit these products was assessed over the last year prior to the surveys. (CDC: YRBSS, 2015, 2017)

Adolescents were asked about their lifetime alcohol usage, how many days have they had at least one drink and their age at their first drink (CDC: YRBSS, 2015, 2017). They were also asked about their alcohol usage in the last month, how many days did they have at least one

drink of alcohol, their source of alcohol (i.e. obtain it from someone else), how often they participated in binge drinking, and the largest number of alcoholic drinks they had in a row (CDC: YRBSS, 2015, 2017). Teens were asked how many times they ever tried marijuana in their life, their age the first time they used marijuana, and how many times they used marijuana in the last month (CDC: YRBSS, 2015, 2017). Adolescents were also asked about their lifetime, cocaine, inhalant, heroin, methamphetamines (METH), ecstasy (MDMA), synthetic marijuana, usage of steroids without a doctor's prescription, usage of prescription pain medication without a doctor's prescription, illegal injection drug use, and if they were ever offered, sold, or given an illegal drug on school property (CDC: YRBSS, 2015, 2017).

3.5 Data Analysis

Data were analyzed using statistical analysis software (SAS) University Edition for iOS, Mac. Descriptive statistics were used to describe the relationship between sexual orientation, the outcome variable, suicide attempt, and the demographic variables: age, sex, grade level, and race/ethnicity. Bivariate logistic regressions were completed to assess the interactions between sexual orientation, current smoking, vaping, and alcohol drinking statuses on the outcome variable. Multivariable logistic analyses were done for sexual orientation, social interaction, and at-risk behaviors on suicide attempts in the 12 months prior to the survey. Statistical significance was assessed when alpha = .05.

IV. Results

4.1 Study characteristics

A total of 15,624 and 14,765 adolescents from the 2015 and 2017 Youth Risk Behavior Surveillance Survey (YRBSS), respectively, were surveyed at various school locations across the United States (Table 1). The average adolescent who participated in both the 2015 and 2017

YRBSS were female, white/Caucasian, 16 years of age, and in tenth grade, regardless of their sexual orientation.

Adolescents identifying as heterosexual made up the majority of the survey respondents (Table 1). Between 2015 and 2017, there was a slight increase in the number of adolescent sexual minority respondents, with the greatest increase among those who identified as bisexual, who had a two-percentage point increase (Table 1).

4.2 Prevalence of suicide by sexual minority adolescents and behavioral risk factors

Comparing the number of suicide attempts among adolescents who participated in the most significant risk factors, those who currently smoke cigarettes, vape, drink alcohol, have seriously considered suicide, creased a plan for how they will attempt suicide, and/or attempted suicide that resulted in injury, poisoning, or overdose that required medical care, there was an overall decrease in the number of adolescent suicide attempts across all sexual orientations regardless of their behavioral risk factors (Table 2). Overall, LGBQ adolescents had an 11.67 and 4.99 times greater odds of feeling sad or hopeless every days for two or more weeks and attempted suicide in the year prior to the 2017 YRBSS compared to their heterosexual peers (Table 3).

4.3 Bivariate logistic regression results for suicide attempt

Tables 5 and 6 shows the association between sexual orientation and suicide attempts in the last year for both the 2015 and 2017 YRBSS. The odds of attempting suicide in the past year was statistically significant for all sexual minority identifying adolescents for both the 2015 and 2017 YRBSS, $p < .0001$ (Tables 5 and 6). Bisexual adolescents had a 6.07 greater odds of attempting suicide in 2015, and a slightly lower odds at 5.11 in 2017 (Tables 5 and 6).

4.4 Multivariable logistic regression result for suicide attempt

Comparing adolescent's current smoking, vaping, and alcohol drinking behaviors and their sexual orientation as predictors for suicide attempt between 2017 and 2015, there was a significant interaction between adolescents questioning their sexual orientation and those who currently smoke, $p = .0398$, vape, $p = .0090$, or drink alcohol one or more days in the past month, $p = .0023$, as they were at an overall greater odds of attempting suicide one or more times in the 12 months prior to the 2017 survey (Table 4). For adolescents of the 2015 YRBSS, there was only a significant interaction among adolescents who were questioning their sexual orientation and had at least one drink of alcohol one or more days in the last month who also attempted suicide in the last year, $p = .0154$ (Table 4).

The odds of suicide attempts for the 2017 YRBSS, regardless of their sexual orientation, was statistically significant for those who felt sad or hopeless for at least two weeks in the last year and stopped their daily activities (OR = 9.99, CI: 7.66-13.0, $p < .0001$), were bullied on school property (OR = 1.62, CI: 1.27-2.06, $p = < .0001$), cyberbullied (OR = 1.84, CI: 1.43-2.37, $p < .0001$), used marijuana one or more times in the past month (OR = 1.76, CI: 1.34-2.33, $p < .0001$), ever used inhalants (OR = 1.56, CI: 1.13-2.15, $p = .0063$), synthetic marijuana (OR = 1.46, CI: 1.03-2.07, $p = .0317$), prescription drugs without a doctor's prescription (OR = 1.70, CI: 1.32-2.20, $p < .0001$), or injected an illegal drug in their lifetime (OR = 3.96, CI: 1.59-9.84, $p = .0030$) (Table 8). While not statistically significant, the crude odds of suicide attempt was high among adolescents who smoked a cigarette one or more times in the past month, ever used methamphetamines, or steroids without a doctor's prescription in their lifetime, or were ever offered, sold, or given an illegal drug on school property.

Like the 2017 YRBSS, statistically significant behavioral risk factors of the 2015 YRBSS included: those who felt sad or hopeless (OR = 12.3, CI: 9.94-15.2, p <.0001), were bullied at school (OR = 1.76, CI: 1.46-2.13, p <.0001), cyberbullied (OR = 1.86, CI: 1.53-2.26, p <.0001), used marijuana (OR = 1.35, CI: 01.09-1.67, p = .005), ever used inhalants (OR = 1.99, CI: 1.56-2.55, p <.0001), or took prescription drugs without a doctor's prescription in their lifetime (OR = 1.36, CI: 1.11-1.67, p = .0028) (Table 7). Other statistically significant behavioral risk factors for the 2015 YRBSS adolescents included those smoked a cigarette (OR = 1.42, CI: 1.12-1.79, p = .0034), or had one or more alcoholic drinks one or more days in the past month (OR = 1.26, CI: 1.04-1.53, p = .0162) (Table 7).

Adolescent respondents of the 2017 YRBSS who identified as bisexual (OR = 2.61, CI: 2.02-3.36, p <.0001) or gay or lesbian (OR = 2.10, CI: 1.33-3.33, p = .0016) had higher crude odds estimates for suicide attempts in the past year than those who did not (Table 10). Behavioral risk factors that were also statistically significant include: those who felt sad or hopeless (OR = 8.84, CI: 6.73-11.6, p <.0001), were bullied at school (OR = 1.58, CI: 1.24-2.03, p = .0003), cyberbullied (OR = 1.79, CI: 1.39-2.32, p <.0001), used marijuana one or more times in the past month (OR = 1.66, CI: 1.25-2.21, p = .0004), ever used inhalants (OR = 1.58, CI: 1.14-2.20, p = .0060), synthetic marijuana (OR = 1.48, CI: 1.04-2.11, p = .0303), prescription drugs without a doctor's prescription (OR = 1.60, CI: 1.23-2.07, p = .0004), or injected an illegal drug in their lifetime (OR = 4.47, CI: 1.69-11.7, p = .0024) (Table 10). Other high crude estimates among sexual minority adolescents who attempted suicide in the past 12 months before the survey, but were not statistically significant, were those who smoked one or more cigarette one or more times in the past month, ever used ecstasy, or steroids without a doctor's prescription in their lifetime, or were offered, sold, or given an illegal drug on school property.

Similarly to 2017, sexual minority adolescents who responded to the 2015 YRBS and attempted suicide in the last year, there was statistical significance for those who identified as bisexual (OR = 2.65, CI: 2.11-3.33, p <.0001), felt sad or hopelessness (OR = 11.8, CI: 9.44-14.8, p <.0001), were bullied on school property (OR = 1.67, CI: 1.37-2.04, p <.0001), cyberbullied (OR = 1.83, CI: 1.49-2.23, p <.0001), used marijuana one or more times in the past month (OR = 1.34, CI: 1.08-1.67, p = .0085), ever used inhalants (OR = 1.86, CI: 1.44-2.41, p <.0001), or prescription drugs without a doctor's prescription (OR = 1.31, CI: 1.06-1.61, p = .0124) (Table 9). Unlike 2017, there was statistical significance among sexual minority adolescents who attempted suicide and smoked a cigarette one or more times (OR = 1.38, CI: 1.09-1.76, p =.0084), vaped one or more times (OR = 1.23, CI: 1.01-1.51, p = .0432), or drank alcohol one or more days in the past month (OR = 1.24, CI: 1.02-1.52, p = .0320) (Table 9).

V. Discussion and conclusion

The purpose of this study was to determine the relationship between adolescent sexual minority orientation and suicide attempts, and the interactions between sexual orientation and at-risk behaviors to find out if there are associated increases in suicide attempts. Based on the results of this study, some of the behavioral risk factors are strongly associated with non-heterosexual orientation among adolescents who have attempted suicide one or more times in the last year.

Previous research has shown that LGBQ teens are at an increased risk for depression and suicide attempts. When controlling for heterosexual orientated adolescents in this study, the findings were consistent with Meyer (2003) and Hill & Pettit (2012) as it is not possible to rule out that LGBQ teens may be depressed and attempt suicide more often than their heterosexual peers due to social stressors and discrimination associated with being open about their sexuality.

LGBQ teens who are suffering from depression, bullying at school, and cyberbullying may also suffer from the negative psychological consequences that are associated with both the minority stress model and the Interpersonal Theory of Suicide (Meyer, 2003; Murphy, 1999; Van Orden, et al., 2010). These consequences include feeling like they do not belong, lacking social connectedness, perceiving themselves to be a burden, and the associated stress, stigma, and discrimination that often follows one who identifies as non-heterosexual (Meyer, 2003; Van Orden, et al., 2010).

The overall findings of this study concluded that bisexual adolescents were more likely to seriously consider attempting suicide, make a plan about how they would attempt suicide, actually attempt suicide, and attempt suicide that resulted in an injury, poisoning, or overdose that required medical attention in the last year, which is in agreement with the literature. Nysdet, Rosval, & Lindstrom (2019) found that regardless of gender, bisexual identifying individuals were more likely to experience suicidal ideation than their heterosexual or lesbian, gay, or questioning peers. Another study found that bisexual adolescents are at an increased odds for current substance abuse risk factors, like an adolescent's current smoking status, that may lead to suicide attempts (Suominen, Isometsa, Haukka, & Lonnqvist, 2004).

Additionally, there was a significant interaction among adolescents questioning their sexual orientation who currently smoke cigarettes, vape, or drink alcohol who attempted suicide in the last 12 months. Adolescents questioning their sexual orientation were also more likely to use illegal drugs. Substance abuse among both bisexual and questioning adolescents may be a coping strategy for their increased feelings of depression, stress, thwarted belongingness, and perceived burdensomeness, further allowing them to acquire capability for suicide (Meyer, 2003; Van Orden, et al., 2010).

5.1 Strengths and Limitations

By analyzing both the 2015 and 2017 YRBSS, the findings of this study are generalizable to the U.S. adolescent population as a whole. With more longitudinal research in this field perhaps as the years progress, we may begin to see more acceptance in non-heterosexual orientation among adolescents than there has been in previous years. However, since this study relied on adolescent self-report data in high schools, it is impossible to rule out response bias from this study. Even though the survey was anonymous, there is still no way to prevent an adolescent from responding in a socially desirable manner.

5.2 Public Health Practice Implications

Future research in this field may focus on chronic substance abuse developing during adolescence among those who identify as non-heterosexual in order to provide more evidence for both the minority stress model and the Interpersonal Theory of Suicide in order to gain a better understanding of adolescent and sustained suicide over the course of an LGBQ-identifying individual's lifetime. As well as future studies on the intersection of Joiner's Interpersonal Theory of Suicide and Meyer's minority stress model for further understanding between the relationship of stress and feeling like a burden or no belonging among sexual minority identifying adolescents.

Additionally, prevention programs that are in and outside of schools that focus of social connectedness, provide protective environments, coping and problem-solving skills, and identify at-risk teens may provide assistance to teens near or in crisis. The continued use of school-based prevention programs like the Good Behavior Game and the Signs of Suicide in all grade levels may better assist students, teachers, and administrators to understand and identify warning signs

of suicide, but also take better attention to adolescents identifying as LGBQ who are at greater risk for suicide than the general adolescent population.

5.3 Conclusion

In conclusion, while there was an overall decline in the number of suicide attempts in 2017 from 2015, LGBQ identifying adolescents are at a greater risk for depression and suicide attempts than their heterosexual peers. Additionally, bisexual and teens unsure of their sexual orientation with current behavioral risk factors have attempted suicide more often than their heterosexual or gay/lesbian peers. This may be due to being open about their sexual minority identification leading them to perceived burdensomeness, thwarted belongingness, increased stress, and an acquired capability for suicide, as outlined in both Joiner's and Meyer's theories.

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Table 1. Comparison of frequency distribution among demographic characteristics of 2015 and 2017 YRBS

Participant Characteristics	2015 YRBSS	2017 YRBSS
	N (%)	N (%)
Age, years		
12 or younger	43 (0.2)	59 (0.34)
13	17 (0.06)	22 (0.10)
14	1,684 (10.0)	1,922 (11.6)
15	3,817 (26.1)	3,586 (25.0)
16	4,033 (25.1)	3,688 (25.4)
17	3,833 (23.7)	3,611 (24.2)
18 or older	2,131 (14.8)	1,796 (13.4)
Gender		
Female	7,577 (48.7)	7,526 (50.7)
Male	7,749 (51.3)	7,112 (49.3)
Grade level		
9th	4,003 (27.2)	3,921 (27.3)
10th	3,938 (25.7)	3,715 (25.6)
11th	3,930 (24.0)	3,602 (24.0)
12th	3,601 (23.1)	3,383 (23.0)
Ungraded/other	35 (0.16)	30 (0.15)
Race/Ethnicity		
NH White/Caucasian*	6,849 (54.5)	6,261 (53.5)
Multiple – Hispanic	2,756 (12.3)	2,104 (13.1)
Hispanic/Latino	2,365 (9.9)	1,543 (9.8)
NH Black/African American*	1,667 (13.6)	2,796 (13.4)
Multiple – Non-Hispanic	739 (4.6)	823 (5.5)
Asian/Pacific Islander	727 (4.5)	764 (4.3)
American Indian/Alaskan Native	163 (0.61)	137 (0.47)
Sexual Orientation		
Heterosexual (straight)	12,954 (88.8)	12,012 (85.4)
Gay or lesbian	324 (2.0)	357 (2.4)
Bisexual	922 (6.0)	1,137 (8.0)
Not sure	503 (3.2)	602 (4.2)
Total	100.0	100.0

Note. 2015 YRBSS, *N* = 15,624; 2017 YRBSS, *N* = 14,765. *NH = Non-Hispanic

Table 2. Comparison of the number of suicide attempts by adolescent risk behaviors stratified by sexual orientation between 2017 and 2015

Sexual orientation	Attempted suicide	
	Yes 2017 YRBSS	Yes 2015 YRBSS
Felt sad or hopeless		
Heterosexual (straight)	392	602
Gay or lesbian	35	217
Bisexual	181	40
Not sure	49	57
Considered suicide		
Heterosexual (straight)	431	664
Gay or lesbian	39	36
Bisexual	186	226
Not sure	49	60
Created a suicide plan		
Heterosexual (straight)	368	563
Gay or lesbian	37	34
Bisexual	169	208
Not sure	48	49
Suicide attempt resulted in an injury		
Heterosexual (straight)	161	244
Gay or lesbian	21	13
Bisexual	62	86
Not sure	23	21
Currently smokes		
Heterosexual (straight)	96	174
Gay or lesbian	16	11
Bisexual	40	72
Not sure	19	18
Currently vapes		
Heterosexual (straight)	103	324
Gay or lesbian	10	19
Bisexual	41	109
Not sure	16	28
Currently drinks alcohol		
Heterosexual (straight)	182	343
Gay or lesbian	20	20
Bisexual	97	130
Not sure	27	37

Note. Between the two years, there was a decrease in the total number of suicide attempts among adolescents with behavioral risk factors from 2015 to 2017, regardless of their sexual orientation.

Table 3. Comparison of sexual minority adolescents who felt sad or hopeless and attempted suicide between 2015 and 2017 YRBSS

	Sexual orientation				Odds ratio	95% Confidence interval
	Heterosexual (%)	Gay or lesbian (%)	Bisexual (%)	Not sure (%)		
2015 YRBSS						
Felt sad or hopeless	20.5	33.1	42.7	31.2	12.95	11.1 – 15.1
Attempted suicide	4.6	12.8	22.4	7.5	8.31	2.2 – 32.0
2017 YRBSS						
Felt sad or hopeless	27.6	34.7	64.1	48.7	11.67	9.7 – 14.0
Attempted suicide	5.7	19.0	23.5	15.7	4.99	1.6 – 15.5

Note. Felt sad or hopeless is defined as feeling this way every day for two or more weeks in the last year that an adolescent stopped doing their usual activities. Attempted suicide is defined as the number of times an adolescent attempted suicide in the 12 months prior to the survey.

Table 4. Comparison of adolescent's current smoking, vaping, and alcohol drinking behaviors as predictors for suicide attempt between 2017 and 2015 YRBSS

	Attempted suicide		
	2017 Yes (%)	**2015 Yes (%)**	**Percent change (%)**
Currently smoke			
Yes			
Heterosexual (straight)	14.9	18.3	-3.4
Gay or lesbian	44.4	36.7	7.7
Bisexual	35.4	50.7	-15.3
Not sure	47.5	34.6	12.9
Currently vape			
Yes			
Heterosexual (straight)	12.1	13.3	-1.2
Gay or lesbian	33.3	29.7	3.6
Bisexual	38.0	43.4	-5.4
Not sure	47.1	28.3	18.8
Currently drink alcohol			
Yes			
Heterosexual (straight)	8.0	11.3	-3.3
Gay or lesbian	24.7	28.2	-3.5
Bisexual	34.5	42.2	-7.7
Not sure	32.1	32.2	-0.1

Note. Between 2015 and 2017, there was an overall decrease in the number of bisexual adolescents who attempted suicide and participated in at-risk behaviors. There is a significant interaction among adolescents who were questioning their sexual orientation and had at least one drink of alcohol one or more days in the last month who also attempted suicide in the last year.

Table 5. Adolescent sexual orientation associated with suicide attempts in the last year, 2015 YRBSS

	Odds ratio	95% Confidence Interval	p-value
Sexual orientation			
Heterosexual (straight)	1.00+	-	-
Gay or lesbian	3.16	2.28 – 4.38	<.0001**
Bisexual	6.07	5.13 – 7.19	<.0001**
Not sure	2.85	2.17 – 3.73	<.0001**

Note. **statistical significance at alpha =.05; +denotes referent group

Table 6. Adolescent sexual orientation associated with suicide attempts in the last year, 2017 YRBSS

	Odds ratio	95% Confidence Interval	p-value
Sexual orientation			
Heterosexual (straight)	1.00+	-	-
Gay or lesbian	3.91	2.79 – 5.45	<.0001**
Bisexual	5.11	4.26 – 6.13	<.0001**
Not sure	3.09	2.34 – 4.09	<.0001**

Note. **statistical significance at alpha =.05; +denotes referent group

Table 7. Behavioral risk factors associated with adolescent suicide attempts in the last year, 2015 YRBSS

Characteristics	Crude Estimates		
	Odds ratio	95% Confidence Interval	p-value
Felt sad or hopeless			
No	1.00+	-	-
Yes	12.3	9.94 – 15.2	<.0001**
Currently smoke cigarettes			
No	1.00+	-	-
Yes	1.42	1.12 – 1.79	.0034**
Currently drinks alcohol			
No	1.00+	-	-
Yes	1.26	1.04 – 1.53	.0162**
Uses marijuana			
No	1.00+	-	-
Yes	1.35	1.09 – 1.67	.0050**
Bullied on school property			
No	1.00+	-	
Yes	1.76	1.46 – 2.13	<.0001**
Cyberbullied			
No	1.00+	-	
Yes	1.86	1.53 – 2.26	<.0001**
Ever used inhalants			
No	1.00+	-	-
Yes	1.99	1.56 – 2.55	<.0001**
Ever used prescription drugs without a prescription			
No	1.00+	-	-
Yes	1.36	1.11 – 1.67	.0028**

Note. **statistical significance at alpha =.05; +denotes referent group

Table 8. Behavioral risk factors associated with adolescent suicide attempts in the last year, 2017 YRBSS

Characteristics	Crude Estimates		
	Odds ratio	**95% Confidence Interval**	**p-value**
Felt sad or hopeless			
No	1.00+	-	-
Yes	9.99	7.66 – 13.0	<.0001**
Uses marijuana			
No	1.00+	-	-
Yes	1.76	1.34 – 2.33	<.0001**
Bullied on school property			
No	1.00+	-	-
Yes	1.62	1.27 – 2.06	<.0001**
Cyberbullied			
No	1.00+	-	-
Yes	1.84	1.43 – 2.37	<.0001**
Ever used inhalants			
No	1.00+	-	-
Yes	1.56	1.13 – 2.15	.0063**
Ever used synthetic marijuana			
No	1.00+	-	-
Yes	1.46	1.03 – 2.07	.0317**
Ever used prescription drugs without a prescription			
No	1.00+	-	-
Yes	1.70	1.32 – 2.20	<.0001**
Ever injected any illegal drug			
No	1.00+	-	-
Yes	3.96	1.59 – 9.84	.0030**

Note. **statistical significance at alpha =.05; +denotes referent group

Table 9. Sexual orientation and behavioral risk factors associated with adolescent suicide attempts in the last year, 2015 YRBSS

Characteristics	Crude Estimates		
	Odds ratio	95% Confidence Interval	p-value
Sexual orientation			
Heterosexual (straight)	1.00+	-	-
Gay or lesbian	1.52	0.93 – 2.49	.0915
Bisexual	2.65	2.11 – 3.33	<.0001**
Not sure	1.32	0.88 – 1.98	.1715
Felt sad or hopeless			
No	1.00+	-	-
Yes	11.8	9.44 – 14.8	<.0001**
Currently smoke cigarettes			
No	1.00+	-	-
Yes	1.38	1.09 – 1.76	.0084**
Currently vapes			
Yes	1.00+	-	-
No	1.23	1.01 – 1.51	.0432**
Currently drinks alcohol			
No	1.00+	-	-
Yes	1.24	1.02 – 1.52	.0320**
Uses marijuana			
No	1.00+	-	-
Yes	1.34	1.08 – 1.67	.0085**
Bullied on school property			
No	1.00+	-	-
Yes	1.67	1.37 – 2.04	<.0001**
Cyberbullied			
No	1.00+	-	-
Yes	1.83	1.49 – 2.23	<.0001**
Ever used inhalants			
No	1.00+	-	-
Yes	1.86	1.44 – 2.41	<.0001**
Ever used prescription drugs without a prescription			
No	1.00+	-	-
Yes	1.31	1.06 – 1.61	.0124**

Note. **statistical significance at alpha =.05; +denotes referent group

Table 10. Sexual orientation and behavioral risk factors associated with adolescent suicide attempts in the last year, 2017 YRBSS

Characteristics	Crude Estimates		
	Odds ratio	95% Confidence Interval	p-value
Sexual orientation			
Heterosexual (straight)	1.00+	-	-
Gay or lesbian	2.10	1.33 – 3.33	.0016**
Bisexual	2.61	2.02 – 3.36	<.0001**
Not sure	1.23	0.78 – 1.92	0.3732
Felt sad or hopeless			
No	1.00+	-	-
Yes	8.84	6.73 – 11.6	<.0001**
Uses marijuana			
No	1.00+	-	-
Yes	1.66	1.25 – 2.21	.0004**
Bullied on school property			
No	1.00+	-	-
Yes	1.58	1.24 – 2.03	.0003**
Cyberbullied			
No	1.00+	-	-
Yes	1.79	1.39 – 2.32	<.0001**
Ever used inhalants			
No	1.00+	-	-
Yes	1.58	1.14 – 2.20	.0060**
Ever used synthetic marijuana			
No	1.00+	-	-
Yes	1.48	1.04 – 2.11	.0303**
Ever used prescription drugs without a prescription			
No	1.00+	-	-
Yes	1.60	1.23 – 2.07	.0004**
Ever injected any illegal drug			
No	1.00+	-	-
Yes	4.47	1.69 – 11.7	.0024**

Note. **statistical significance at alpha =.05; +denotes referent group

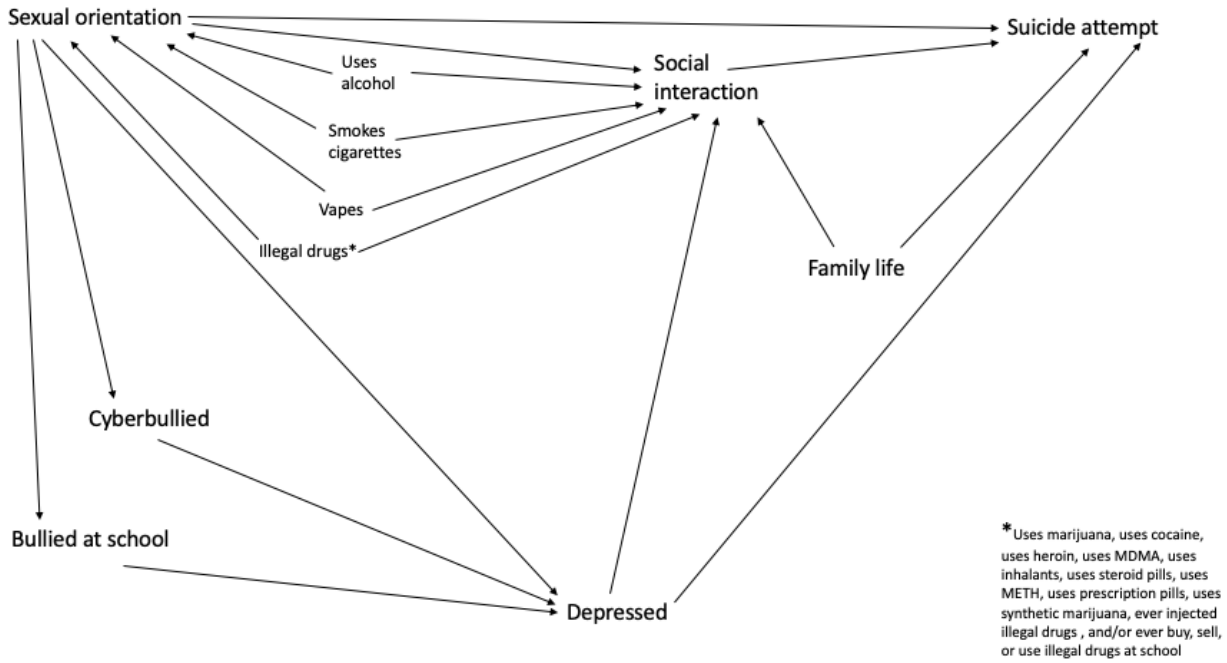

Figure 1. Directed acyclic graph: possible pathways of how adolescent non-heterosexual orientation interacts with attempted suicides