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A SOCIAL-ECOLOGICAL MODEL OF BLACK ADOLESCENT SUICIDE MORBIDITY

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DEDICATION

I dedicate this dissertation to my late father, Edminston Alexander Montgomery Phillip.

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It always seems impossible until it is done!- Nelson Mandela. Thank you, God, for giving me the wisdom, strength, and support to complete my doctoral degree. I embarked on my doctoral journey because one important mentor, Dr. Simon B. Jones-Hendrickson, believed in my abilities to complete this degree. I am very grateful to you, Dr. Jones-Hendrickson, for your leadership and encouragement. As you predicted, it is done; I did it!

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ABSTRACT OF THE DISSERTATION

A SOCIAL-ECOLOGICAL MODEL OF BLACK ADOLESCENT SUICIDE MORBIDITY

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Black adolescent suicide is on the rise and is a public health problem that requires effective, comprehensive strategies to mitigate the issue. Suicide is a multifaceted problem that requires a social-ecological approach to identifying the risk of suicidality among adolescents to ameliorate the issue (Centers for Disease Control and Prevention, 2020). Several surveillance systems identify trends of black suicide morbidity, and several research studies identified predictors of suicidality among black adolescents. However, the body of evidence lacks a comprehensive examination of the interplay between adolescents' individual-level factors and the factors of their environment on suicide-related behaviors. The gap in research disallows black adolescents' family members, practitioners, community organizations, and policymakers to address the issue effectively.

This dissertation adds to the body of black adolescent suicide literature by developing and evaluating a social-ecological model of suicide morbidity for black adolescents in the US. To configure the model, this study used black adolescents' risk behavior data from the high school Youth Risk Behavior Survey administered in 2015

and the racial equity index data from the National Equity Atlas database. The direct effects of individual, relational, communal, and societal-level risk factors on suicidality were analyzed through structural equation modeling techniques. The model yielded an acceptable level of fit to the data. Black adolescents who self-identified as sexual minorities, experienced sadness and hopelessness, experienced interpersonal violence, engaged in substance use, and experienced bullying were at-risk for increased suicidality. A multi-group analysis was conducted to test whether age and gender moderated the black adolescent risk model of suicidality. The model was moderated by both age and gender and was tested over time, consistently yielding acceptable goodness-of-fit for survey years 2015, 2017, and 2019 data. Future research into black adolescents' suicidality should assess more expansive models that include more societal, community, and protective factors of black adolescent suicidality to guide the culturally appropriate social work response to black adolescent suicidality.

Keywords: black adolescents, suicide, suicide attempt, a suicide plan, suicide attempt

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Chapter 1: Introduction

"I don't wanna live no more; I'm just tired, my life pointless, I don't want to do this anymore" (Miller & Burch, 2017). These words were among the final words of Naika Venant, a fourteen-year-old African American girl who died by suicide in the United States (US) in 2017. Globally, adolescent suicide is a public health problem (Abraham & Sher, 2017), and for black adolescents in the US, it is the third leading cause of death. Suicide rates of black adolescents have been lower than Whites and all ethnicities in the US. However, researchers found that black children ages 5-12 commit suicide three times the rates of their white counterparts (Bridge, Horowitz, Fontanella, Sheftall, Greenhouse, et al., 2018), and suicide among adolescents has increased at a faster pace than Whites in the past seven years (Centers for Disease Control and Prevention, 2020).

Why would Nakia Venant or any other black adolescent attempt to take their own life? Studies have identified factors that impact suicide ideation and suicide attempts among black adolescents to explain how or why black adolescents (ages 10 through 19) die by suicide and to provide some direction on effective suicide prevention strategies (Davidson, Wingate, Slish, & Rasmussen, 2010; Assari, 2017; Reed, 2020; Quinn, Beer, Boyd, Tirmazi, Nebbitt, & Joe, 2021). However, the evidence from the existing research that addresses the risk and protective factors related to suicide prevention among black adolescents is sparse (Joe, 2018; Reed, 2019). Thus, limiting the advancement of literature in the field and its ability to provide elucidated explanations of the predictors, correlates, and causes of suicidality among black adolescents. The scant evidence also limits insights into the development of strategies and tools needed to predict future

suicide ideation and suicide attempts and support the advent of culturally appropriate interventions to alleviate suicide attempts and completions among black adolescents.

Statement of the Problem

Ideally, black adolescent suicide rates should trend downward. Black families, communities, and their society would be equipped with culturally guided suicide risk instruments assessments and prevention strategies to mitigate black adolescents' suicide. However, the rate of increase in suicide ideation and suicide attempts among black children and adolescents ages 10 to 19 is trending upward and continues to be a growing public health concern (Joe, 2006, Molock, Barksdale, Matlin, Puri, et al., 2007; Fontanella, Sheftall, Greenhouse, et al., 2018et al.; Joe, 2018; Lindsey, Sheftall, Xiao, & Joe, 2019). The number of suicide-related death among black adolescents increased to an alarming 50% from 2015 to 2020, which is at a significantly faster rate than their white peers (Centers for Disease Control and Prevention, 2020).

Suicide is a multifaceted problem that requires a culturally competent social-ecological perspective that will provide a comprehensive solution to mitigate its occurrence (Centers for Disease Control and Prevention, 2020), particularly for black adolescents (Dahlberg & Krug, 2002; Reed, 2020). While there is documented evidence of individual, relational, and community-level factors associated with black adolescent suicidality, research examining societal-level factors related to suicide ideation and suicide attempts in black adolescents is scant to the author’s knowledge. Moreover, research that examines how each layer of a black adolescent’s environment interacts with one another is nonexistent.

Thus, research in black adolescent suicidality should examine how factors of an adolescent's individual, relational, community, and societal environments interact and interplay; and describe and measure the multi-level pathways to suicide-related behaviors to develop efficacious strategies that prevent suicide ideation and suicide attempts among black adolescents. Two of the world's leading organizations that support the need for the continued advancement of suicide prevention research (the World Health Organization and the Centers for Diseases Control and Prevention) have called for the development of a theoretical multi-level model of suicide prevention to attain a deeper understanding of adolescent suicidality through an intersectionality lens to combat this public health problem (Centers for Disease Control and Prevention, 2020; Dahlberg & Krug, 2002). While researchers have responded to the calls to direct their focus on a multi-level approach to examining suicide ideation and suicide attempt among black adolescents and have developed a multi-level framework for suicide ideation and suicide-related behaviors in black children and adolescents through a review of the literature (Opara et al., 2020; Reed & Adams, 2020; Clayton et al., 2021), no research to date has assessed a social-ecological model of adolescent suicidality that included individual, relational, communal, and societal and its ability to predict suicide morbidity for black adolescent in particular. The lack of empirical testing of a multi-level model of suicide risk for black adolescents provides the impetus for the current study to develop and examine a multi-level model of risk for black adolescent suicide morbidity undergirded by the social-ecological theory.

Purpose

This study aims to develop and assess a social-ecological model of suicide

ideation and suicide attempts for black adolescents ages 10-19. Using nationally represented data from the Youth Risk Behavior Survey (YRBS) and the National Equity Index, a four-level (individual, relationship, community, and societal) social-ecological model will be assessed over time and revised for its ability to predict suicidality in black adolescents.

The YRBS data includes questions related to the following: a) participant's individual-level factors such as age, gender, access to firearms, sexual identity, and drug and alcohol use; b) participant's relationship factors such as engagement in physical fights, intimate partner violence, and experience of bullying; c) community-level data such as participants' perception of community safety and participants' district. The National Equity Atlas and the YRBS databases provide the societal-level data of the model. The societal level of the model consists of the participants' racial and economic equity scores for each participant based on the city where the participants live.

The hypothesized model of the present study was developed and assessed through a quantitative research design utilizing structural equation modeling analyses. Structural equation modeling (SEM) is a significant methodology in testing multi-level models, mainly because of its capacity to control measurement error within a statistical model (Little et al., 2002).

Study Aims and Research Questions

The current study's initial research questions and aims are:

Aim 1: Identify and test empirically informed indicators of individual, relationship, community, and societal-level risk factors of the social-ecological model that predicts

suicidality (*suicide ideation, suicide plan, suicide attempt, and suicide attempt with injuries)* among black adolescents.

- Research Question 1: Do the identified indicators of individual, relationship, community, and societal factors satisfactorily measure each construct?

Aim 2: Evaluate a social-ecological model of black adolescent suicidality.

- Research Question 2. How do individual-level, relationship-level, community-level, and societal-level factors impact suicidality?

Aim 3: Determine whether age and gender moderate the social-ecological model of suicidality among black adolescents.

- Research Question 3: Is the effect of individual, relationship, community, and societal-related factors on suicidality among black adolescents moderated by age or participant's gender?

Aim 4: Examine whether the model's performance remains stable over time.

- Research Question 4: Does the observed social-ecological model of black adolescent suicide perform similarly in the survey years 2015, 2017, and 2019?

Significance of the Study

Adolescent suicide negatively affects the individual by terminating life prematurely. In cases where death did not occur after a suicide attempt, the individual may experience significant harmful physical, emotional, and psychological effects. In addition, the loss of life to suicide impacts the individual, family, community, and society unfavorably (Cross, Taylor, & Chatters, 2018).

The loss of a person by suicide can arouse feelings of grief in the relatives and close friends of those who have committed suicide more than survivors experience when the death of a loved one is from natural causes (DeLeo, Bertolote, & Lester, 2002). Suicide grief or bereavement is experiencing and adjusting to the loss (Pitman, Osborn, King, & Erlangsen, 2014). The research found that suicide bereavement may lead to negative mental health issues such as depression and suicide ideation and attempts (Spillane, Larkin, Corcoran, Matvieno-Sikar, & Arensmand, 2017). In black communities, survivors of suicide are less likely to seek professional help as there is a significant stigma surrounding seeking mental health, particularly adolescent suicide (Cauce et al., 2002; NAMI, 2018; Ward, Wiltshire, Detry, & Brown, 2013).

Black adolescent suicide-related deaths also have significant economic consequences. In the US, suicide and suicide attempts cost over fifty-eight billion dollars in 2013, which continues to increase (Shepard, Gurewich, Lwin, Reed, & Silverman, 2015). According to the Centers for Disease Control and Prevention, in 2010, there were 4,874 suicide-related deaths among Blacks ages 4-24. When the direct medical cost and work loss cost are combined, the economic impact in the year 2010 was $8.9 billion (Centers for Disease Control and Prevention, 2014). The total financial cost for suicide attempts that resulted in hospitalization that same year was $2.9 billion (Centers for Disease Control and Prevention, 2014).

Detecting risks or predictors of black adolescent suicide can lead to culturally informed prevention strategies, mitigating suicidality among black adolescents and alleviating its negative impact. This study explains how individual, relational, community, and societal-level risks interact with black adolescent suicide ideation and

suicide attempts. The results will provide some insights to guide comprehensive culturally informed strategies and efforts of researchers, social workers, other practitioners, school officials, community organizations, families, and individuals to eliminate the occurrence of suicide by early detection and intervention to save young lives.

Definitions of Key Terms

Suicide and its related behaviors are often categorized using suicide, suicide attempts, and suicide ideation. According to the American Psychiatric Association (APA), suicide is a "self-inflicted death with evidence that the person intended to die" (2003, p. 9). A suicide attempt is defined as "self-injurious behavior with a nonfatal outcome accompanied by evidence that the person intended to die" (APA, 2003, p. 9). Suicide ideation is the "thoughts of serving as the agent of one's death, which may vary due to the specificity of the suicidal plan and the degree of suicidal intent" (APA, 2003, p. 9). Suicide mortality refers to completed suicides, and suicide morbidity refers to any other suicide-related behaviors that did not result in death. The term "suicidality" was used when referring to more than one suicide-related behavior, such as suicide, a suicide plan, suicide attempts, or suicide ideation.

Following recommendations from the World Health Organization (2022), adolescents are defined as anyone between the ages of 10 and 19. This dissertation focuses on adolescents born in or residing in the United States of America (US). "Blacks" and "African American" are terms that are often used to describe persons having origins in any of the black racial groups of Africa (Office of Management and Budget, 1997); this includes B"lack Caribbean." The Black Caribbean are Blacks of West Indian or

Caribbean descent (Thornton, Taylor, Chatters, & Forsythe-Brown, 2017). Herein, the terminology "Blacks" encompasses Blacks, African Americans, Caribbean Blacks, and Black Americans.

Overview of the Chapters

The first chapter of this dissertation provides an introduction and a statement of the problem related to black adolescent suicidality in the US. The second chapter provides the definitions of suicidality and the population of interest to frame the discussion. Chapter 2 also reviews the empirical evidence of the epidemiological, theoretical, and risk and protective factors related to suicide morbidity among black adolescents, the purpose of the study, and the specific research questions and hypotheses of the current study. The methodology of the present study is provided in the third chapter, followed by the analysis results in the fourth chapter. Finally, the findings are discussed in the fifth chapter of this dissertation.

Chapter 2: Literature Review

This section reviews the relevant literature to identify gaps in available data on black suicidality to substantiate the justification of the study. The first section of the literature review focuses on describing the social-ecological theory and explaining the interplay between the theory's systems. The social-ecological theory of suicide is the theoretical underpinning for this dissertation. Subsequently, a social-ecological perspective of black adolescent development is presented. Then an extant body of knowledge related to the epidemiological and empirical outlook of black adolescent suicidality was reviewed to identify the prevalence, risk, and protective factors of suicidality among black adolescents. The latest data related to black adolescent suicide reflects the data year 2020, which indicates that no data postdates the global pandemic of Covid 19. Finally, a summary of the literature that includes the conceptualized model and the gap in evidence extant from the literature completes the literature review and chapter 2 of this dissertation.

Theoretical Model

Social-Ecological Theory of Suicide

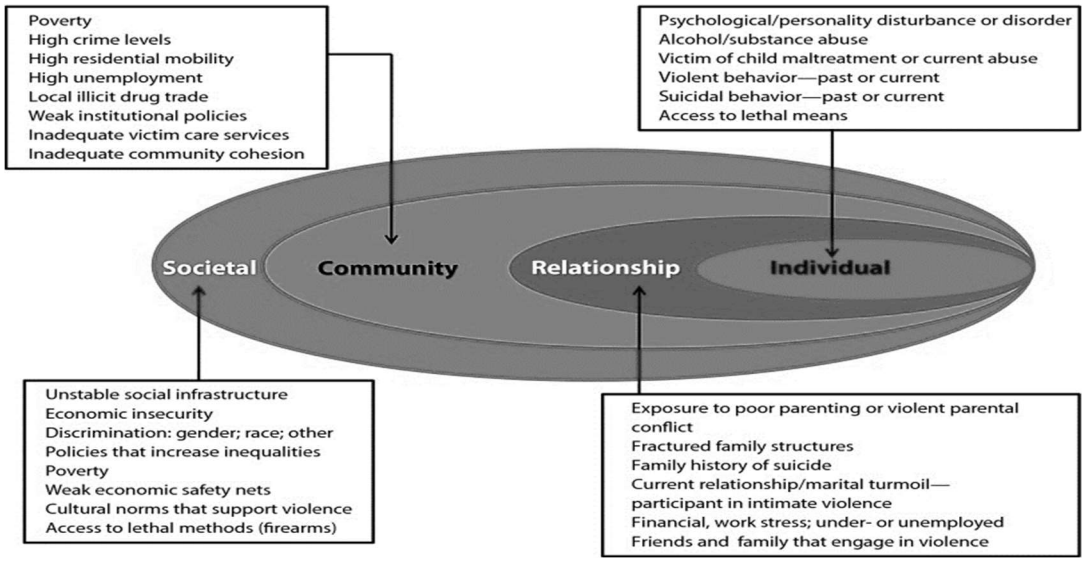
The Social-Ecological Model is a theoretical framework first introduced by Urie Bronfenbrenner, which considered the interrelatedness of an individual and their environment in human development (Bronfenbrenner, 2005). The Social-Ecological Model was adopted by the World Health Organization (WHO) and the CDC as a viable suicide prevention framework to advance the field in understanding and preventing suicide (Cramer & Kapusta, 2017). Violence, such as suicide attempts and suicide completion, are multifaceted phenomena that require a careful and simultaneous

examination of factors related to the individual, their relationships, and environmental factors that influence behaviors (Centers for Disease Control and Prevention, 2020).

The Social-Ecological Model addresses four levels (or domains) of factors (Centers for Disease Control and Prevention, 2020); 1) the individual strata that include factors such as the biological, psychological, attitudes, and behaviors of the individual such as age, education, social-economic status, or substance abuse; 2) the relationship strata that have factors related to the individual relationships with family members and peers such as exposure to parental abuse, intimate partner violence, or estrange family relationships; 3) the community strata explore the individual's environment such as schools, workplaces, and neighborhoods such as poverty level, bullying, or crime level; and 4) the societal strata where factors such as discrimination, policies, cultural factors, religious beliefs, and inequalities between groups in society.

The social-ecological model that the CDC posited provides a guide to violence prevention that conceptualizes the risk and protective factors of suicidality among black adolescents within this study. The CDC's social-ecological model framework for violence prevention (see Figure 1) was adopted to guide the current study's indexing of factors that emerge from the literature review to inform the development of the multi-level framework of black adolescents' suicide morbidity depicted in the later part of chapter 2 (see Figure 2).

Figure 1.
Social-Ecological Model: Framework for Violence Prevention CDC (2020)



Note. Model adapted from Butchart et al. (2004).

Black Adolescent to Adulthood Development: A Social-Ecological Perspective

The healthy development of adolescents is affected by the social-ecological systems they interact with, as an individual biological, physical, and mental health are interrelated to their historical, cultural, familial, and communal experiences (Brittian, 2012). Black adolescent's overall enculturation, development, and transitions from childhood to young adulthood are often negatively impacted by many adverse experiences, such as health disparities, economic suppression, discrimination, community or family violence, and poverty (Brittian, 2012; Choe, Stoddard, & Zimmerman, 2014; Woo, Fan, Tran, & Takeuchi, 2019), all of which provide an outlook on the black adolescents lived experiences and its impact on black adolescents' development to identify possible pathways to suicide ideation and suicide attempts in black adolescents.

Societal Outlook

Black people in America were initially brought to the United States of America from West Africa by way of the transatlantic slave trade in the late 1600s (Farrington, Powell, Graham, Day, & Anyanwu, 2019). From the initial involuntary migration, children and adolescents of black people in America have witnessed their parents and have directly been subjected to severe traumatic experiences, oppression, and institutional marginalization that created and fostered political, educational, health, and economic inequities for people of African lineages (Farrington, Powell, Graham, Day, & Anyanwu, 2019). In the twenty-first century, several hundred years later, slavery was abolished, and laws and policies were established to protect black people as any other race. However, black people continue to witness and experience systemic marginalization and racial, educational, and economic inequities in the current American society (Farrington, Powell, Graham, Day, & Anyanwu, 2019).

In a democratic republic like the United States, representation of black people in the political arena is necessary to establish new or improve existing legislative and congressional laws to address economic and social challenges that impact the black community adversely (Stout, Tate, & Wilson, 2021). The initial onset of black people in the political realm dates to the late 1960s through the Voting Rights Act, where provisions were made for black people to vote in the legislature and for black people to participate in politics (US Government Printing Office, 2008). One noteworthy progress in the representation of black people in American politics was demonstrated when the United States House of Representatives developed the Congressional Black Caucus (CBC) in 1970, which consisted of 13 black members of Congress (2021). Today, the

CBC consists of 56 members. Its agenda is to ensure black people are treated equitably under the law, promote economic development, reduce discrimination, and improve disparities and inequities that impact black communities (CBC, 2021). The representation of black people in American politics has increased by 330% by 2021; the first black president was elected in 2008 for two electoral terms. However, according to the Pew Research Center, 87% of all United States House of Representatives and Senate members are White (2021). Blacks continue to experience disparities and inequities that impact their economic, physical, and mental health despite their foreign status.

Today there are over 38 million black people in America, which is thirteen percent of the total population (United States Census Bureau, 2021). Of that number, 4.6 million are immigrants, mainly from Africa and the Caribbean (Tamir, 2022). The economic gap in the average annual household income and poverty levels of black people compared to non-Hispanic white people is vast. In 2019, the average non-Hispanic black household earned a yearly income of $43,771 compared to $71,664 for non-Hispanic white households (United States Census Bureau, 2021). Twenty-one percent of black people were in poverty compared to nine percent of white people (Semega et al., 2020). Also, over 60% of black adolescents live in low-income families, lower than their peers (US Department of Housing and Urban Development, 2017).

Black people continue to be disproportionately represented in criminal arrests due to the crime and drug policies on Black Americans (Tonry & Melewski, 2008). In 2019, of all adult criminal offense arrests made by law enforcement, 26% were black. In youth criminal offense arrests made, 33% were black nationally, and black adolescents are more likely to experience the use of force and have an overall police contact rate of 1 in 10

(Hockenberry & Puzzanchera, 2020). Taken together, racial inequities experienced by black Americans in the political, economic, and justice system strengthen the foundation of structural racism within society that continues to shape the disadvantageous disposition of black communities, families, and individuals (The Annie Casey Foundation, 2015).

Communal Outlook

The health and economy of a community are pivotal to the positive development of the child to young adult development (Youngblade et al., 2007). In the economic and racial inequities black people experience, black communities lack sufficient resources to mitigate the existing challenges and foster positive child development in black adolescents. The US Department of Housing and Urban Development (HUD) reported that neighborhoods and communities with concentration levels of poverty and racial inequality have limited resources, economic opportunities, and local and federal support to mitigate community safety problems such as high crime rates (US Department of Housing and Urban Development, 2016). The National Neighborhood Crime Study (NNCS), a study that examines neighborhood crime data in America, reported that the average rates of violent crime where neighborhoods where more than 70% of black people live, resulted in five times more violent crime than in white communities (US Department of Housing and Urban Development, 2016). Neighborhoods, where most of their residents are black, are also plagued with environmental pollutants (Hajat Hsi & O'Neill, 2015).

The historical, societal, and communal inequities black people experience have led to black people's mistrust and stigma about formal support within the community,

mainly where mental health is a concern (Ward, Wiltshire, Detry, & Brown, 2013; NAMI, 2017). The severe mental health of black people has increased from 2008 to 2018 (SAMHSA, 2018), yet in some black communities, the public discussion of health and psychological matters and help-seeking behaviors to address such issues are unmentionable (NAMI, 2018; Ward, Wiltshire, Detry, & Brown, 2013). Blacks viewed mental health illnesses as a phenomenon that can be explained by religion or moral character (Ward, Wiltshire, Detry, & Brown, 2013) and are not likely to access formal means of care for physical or mental health problems. Researchers have found that while some stigma around mental health in the black community decreases, African Americans prefer to engage in informal support from their churches than available professional mental health services (Cross, Taylor, & Chatters, 2018).

Relational and Familial Outlook

The dispositions of the black children and adolescents previously discussed are often nurtured by the environmental factors that are nested in their relationships with peers and families. Generally, 65% of black adolescents in America live in single-parent households (The Annie Casey Foundation, 2015). While most black adolescents are members of single-parent households, the family support network encompasses extended family and community members who provide informal support to foster positive biological, psychological, and societal well-being in black adolescents (Nguyen, Chatters, Taylor, & Mouzon, 2016), which strengthens the youth overall resiliency and support black adolescents' development.

Despite the additional support, black adolescents born into families that experience socioeconomic disparities experience higher levels of maltreatment that have

deleterious effects on their overall development (Cheng, Johnson, & Goodman, E. 2016). According to the US Department of Health and Human Services (HHS), children born into poverty and racial inequities are victims of child neglect and physical and sexual abuse at an alarming rate of 14.3 per 100,000 (HHS, 2020). In 2018, African American children had the highest rate of child fatalities at 3.92 per 100,000 due to the maltreatment they experienced (HHS, 2020). Many black children in foster care did not share reunification with their families nor connected with another family member and exited foster care at age eighteen (HHS, 2020).

Individual Outlook

The societal, communal, and familial experiences of black children and adolescents in America significantly impact the youth's overall development. Early education is a solid foundation for overall educational success and significant economic advantages for individuals. The educational outlook of black children and adolescents seems promising during early childhood. However, as black adolescents advance through the educational systems, their academic success decreases, providing a poor educational outlook for black students compared to their peers. From 2015 to 2019, sixty-two percent of black children ages 3 and 4 participated in early childhood education, more than any other race in America (The Annie Casey Foundation, 2021). However, in 2019, eighty-two percent of black children were not proficient in reading, and eighty-seven percent were not proficient in math, higher than their peers from other races or ethnicities (The Annie Casey Foundation, 2021). Also, in the academic year 2018 through 2019, twenty percent of black high school students did not graduate on time (The Annie Casey Foundation, 2021).

An individual's overall physical and mental well-being is also pertinent for adolescents' optimal social and economic development (The Annie Casey Foundation, 2021; CDC, 2020). Black children and adolescents experience health disparities in low-birthweight, obesity, sexually transmitted diseases, and mental health and substance use diagnoses, and such inequalities are detrimental and deleterious effects on the healthy development of children and adolescents (Hack, Klein, & Taylor, 1995; Fiscella, Franks, Gold, & Clancy, 2008). In 2019, almost fourteen percent of infants born with low birth weight were black, which was twice the rate of their non-Hispanic white peers; and forty percent of children and adolescents ages 10 to 17 were overweight or obese, which was also higher than their peers (The Annie Casey Foundation, 2021).

Black children and adolescents are affected by other challenges. Black adolescents, particularly those who self-identify as a sexual minority, contracted the human immunodeficiency virus more than their peers. In 2018, twenty-one percent of all new HIV diagnoses in America were youths, for 7,891 cases (Centers for Disease Control and Prevention 2021). Of that number, forty-two percent (3,334) were black males who contracted the virus through male and male sexual contact (Centers for Disease Control and Prevention, 2021). Black children and adolescents were diagnosed with post-traumatic disorders (PTSD), schizophrenia, and depression at higher rates than their non-Hispanic white children and adolescents (Carter, 2007). The widespread use of alcohol, marijuana, and methamphetamine in black adolescents ages 12-17 increased in 2018 from the previous year (Substance Abuse and Mental Health Services Administration, 2020), and black adolescents die by accidents, homicides, and suicide at a higher rate than their peers from any other race or ethnicities (Centers for Disease Control and Prevention,

2017; The Annie Casey Foundation, 2021). Black adolescents are victims of violent crime at significantly higher rates than their white peers, three times more likely to be victims of reported child abuse or neglect, three times more likely to be victims of robbery, and five times more likely to be victims of homicide (The Annie Casey Foundation, 2021).

Finally, like the trend observed in black adults, black adolescents do not access formal healthcare services (Jacobs, Rolle, Ferrans, Whitaker, & Warnecke, 2006; Substance Abuse Mental Health Services Administration, 2020). According to the National Survey on Drug Use and Health: African American Report (2018), of the total African American youth who have a substance use disorder, 88.7% did not receive treatment, and of the number of youth ages 12-17 who experienced a major depressive episode for longer than two weeks, 65.4% did not receive treatment (SAMHSA, 2020).

Considering that a healthy transition from youth to adulthood and the development of identity is associated with better psychological functioning (Chen, Lay, Wu, Yao, 2007), the review of the physical, psychological, and societal challenges that black adolescents endure during the identity formation stage of development provides a total view of risk factors that may cause deleterious effects on black adolescents' mental health, mainly where suicidality is of concern.

Epidemiology of Black Suicide Mortality and Morbidity

This section reviews the national databases that provide data on suicide mortality and morbidity among black adolescents and discusses national trends and statistics related to suicidal behaviors of black adolescents in the US. The data from the identified databases were analyzed to examine the prevalence of suicidality among black

adolescents by reviewing the leading cause of death and comparing the suicide rankings for two data points over five years (2015 and 2020). Also, the suicide, suicide ideation, and suicide attempt trends were pooled and reviewed. The critical patterns in suicidal behaviors were analyzed across gender, two developmental phases in adolescents (early adolescents ages 10 through 14 versus older adolescents ages 15 through 19), the precipitating circumstances that led to suicidality among black adolescents, and the geographic location of black adolescents in the US.

Mortality Data

This section details national databases that capture data related to black adolescent suicide. A review of the trends and prevalence of Black adolescent suicide is also presented. Finally, the leading cause, geographical distribution, precipitating circumstance, and mechanisms of black adolescent suicide are presented herein.

National Vital Statistics System/National Death Index. The National Vital Statistics System (NVSS) was created in the 1950s and is one of the first forms of data sharing in collecting and disseminating the nation's official birth and death data (National Center for Health Statistics, 2017). The data collected and shared in the NVSS is financially supported by the Center for Disease Control and Prevention National Center for Health Statistics (NCHS) and the Health Department and Vital Statistics offices within local areas nationwide (National Center for Health Statistics, 2014).

There are several programs under the NVSS, including the National Death Index. The National Death Index (NDI) is a centralized death record database on file in the state's vital statistics offices (National Center for Health Statistics, 2017). NDI contains about 95 million records from 1979 through 2016 from 50 states, the District of

Columbia, New York City, Puerto Rico, and the US Virgin Islands (National Center for Health Statistics, 2017). As of 2017, Guam, American Samoa, and the Northern Marianas are also included (National Center for Health Statistics, 2017).

The NDI captures information related to suicide as a cause of death. The Vital Statistics medical coders enter the cause of death codes. The data source for the codes is the death certificate obtained by a coroner (National Center for Health Statistics, 2017). Also, there are instances where the initial cause of death code "unspecified external cause of death" reported in the NDI was changed to "suicide," which indicates that there are instances where the reporting of the suicide may be inaccurate. In 2014, 125 records that were initially reported as an "unspecified" cause of death were changed to suicide or homicide, which is an indication that the suicide-related statistics provided by the NDI may be lower than the actual count of suicide rates (National Center for Health Statistics, 2013).

The NDI documents suicide-related data for Blacks and African Americans ages zero to 80 and older. The ten leading causes of death and their related rates were analyzed for black adolescent males and females ages 10 through 19 for two reporting years and are presented in Tables 1 and 2. Data for the leading cause of death in 2015 was compared to 2020. The total rate of suicide ranked third for both data points when the entire population was reviewed. In 2020, the total number of deaths caused by suicide increased by 66.5% from 2015. In 2015, the total number of suicide occurrences was 257. Of that number, black males ages 15 through 19 accounted for 161 suicide occurrences, three times the number of suicide incidents of females in the same age category. They accounted for 63% of the total number of suicide incidents. These data are fundamental

to highlight as it demonstrates that in 2015, black males ages 15-19 were most at risk for suicide.

When the same analysis was conducted for the same year for early black adolescents ages 10-14, the rate of male suicide incidents was also three times that of the females in the same demographics. While there was no change in the suicide rank among black adolescents ages 15 to 19 when the reporting year 2015 was compared to that of 2020, the ranking of the early adolescent group worsened over five years, particularly for the females in this category. In 2015, suicide was ranked top seven for black females ages 10-14 and five for males. By the reporting year 2020, suicide rose to the third leading cause of death for early black adolescents for both the male and female populations.

The escalation rate for suicide rankings among the leading cause of death in early adolescents from 2015 to 2020 is of grave concern, particularly for females ages 10-14. This increase in suicide among teenage black females may be a direct result of the global Coronavirus Disease 2019 (Covid-19) pandemic that resulted in lockdown that imposed physical distancing, restricted teenagers' connectedness to school, their community, and provided barriers to mental health treatment and other formal support which are all risk factors for suicide (Manzar, Albougami, Usman, & Mamun, 2021; Yard, Radhakrishnan, Ballesteros, et al., 2021).

Table 1

10 Leading Causes of Death, US, 2015, Black Adolescents

Rank	10-14		15-19		Total
	M	**F**	**M**	**F**	
1	Unintentional Injuries 88	Unintentional Injuries 62	Homicide 910	Unintentional Injuries 157	Homicide 1,090
2	Homicide 61	Malignant Neoplasm 32	Unintentional Injuries 422	Homicide 99	Unintentional Injuries 729
3	Malignant Neoplasm 36	Chronic low-respiratory diseases 20	Suicide 161	Suicide 51	Suicide 257
4	Chronic low-respiratory diseases 34	Homicide 20	Heart Disease 56	Malignant Neoplasm 41	Malignant Neoplasm 159
5	Suicide 33	Congenital Malformations 13	Malignant Neoplasm 50	Heart Disease 30	Heart Disease 116
6	Congenital Malformations 17	Heart Disease 13	Congenital Malformations 24	Congenital Malformations 18	Chronic low-respiratory diseases 86
7	Heart Disease 17	Suicide 12	Chronic low-respiratory diseases 20	Pregnancy Childbirth 17	Congenital Malformations 72
8	Cerebrovascular Diseases 8	Cerebrovascular Diseases 4	Diabetes 14	Anemia 16	Anemia 28
9	Diabetes 6	Complications of medical and surgical care 4	Legal Interventions 10	Chronic low-respiratory diseases 12	Diabetes 27
10	Influenza and Pneumonia 5	Influenza and Pneumonia 3	Anemia 8	Septicemia 7	Cerebrovascular Diseases 22

Note: Color indicates the suicide rank among black adolescents' causes of death.
Centers for Disease Control and Prevention, National Center for Health Statistics. CDC WONDER Online Database released in 2021.

Table 2

10 Leading Causes of Death, US, 2020, Black Adolescents

Rank	10-14		15-19		Total
	M	F	M	F	
1	Unintentional Injuries 126	Unintentional Injuries 50	Homicide 1,479	Unintentional Injuries 244	Homicide 1,787
2	Homicide 109	Malignant Neoplasm 37	Unintentional Injuries 583	Homicide 168	Unintentional Injuries 1,003
3	Suicide 65	Suicide 34	Suicide 209	Suicide 78	Suicide 386
4	Malignant Neoplasm 39	Homicide 31	Heart Disease 62	Malignant Neoplasm 43	Malignant Neoplasm 176
5	Chronic low-respiratory diseases 37	Chronic low-respiratory diseases 22	Malignant Neoplasm 57	Heart Disease 26	Heart Disease 119
6	Congenital Malformations 17	Congenital Malformations 15	Chronic low-respiratory diseases 22	Chronic low-respiratory diseases 21	Chronic low-respiratory diseases 102
7	Heart Disease 17	Heart Disease 14	Legal Intervention 22	Pregnancy Childbirth 19	Congenital Malformations 69
8	Diabetes 8	Diabetes 11	Congenital Malformations 21	Congenital Malformations 16	Diabetes 47
9	Covid-19 6	Influenza and Pneumonia 6	Covid-19 18	Covid-19 12	Covid-19 39
10	Anemia 4	Cerebrovascular Diseases 4	Diabetes 17	Diabetes 11	Legal Intervention 28

Note: Color indicates the suicide rank among black adolescents' causes of death.
Centers for Disease Control and Prevention, National Center for Health Statistics. CDC WONDER Online Database released in 2020.

National Violent Death Reporting System (NVDRS) and Web-based Injury Statistics Query and Reporting System (WISQARS). The National Violent Death Reporting System (NVDRS) is a centralized database managed by the National Center for Injury Prevention and Control Division of Violence Prevention that tracks violent death data. The surveillance system aims to monitor violent deaths and support planning and evaluation for prevention. The data captured within the NVDRS is obtained from several sources, such as death certificates, coroner or medical examiner reports, and law enforcement reports.

The secondary source for the data captured within the system are reports from a Child Fatality Review (CFR) team, Intimate Partner Violence (IPV) Review team data, crime lab data, and hospital data (Centers for Disease Control and Prevention, 2018). The NDVRS combines the data to answer who, what, when, where, and why related to suicide or homicide. The system encompasses suicide ideation and suicide attempts and data about the circumstances of suicide, such as depression and significant life stressors like relationships or financial problems (Centers for Disease Control and Prevention, 2018).

The data in the NVDRS are easily accessible. They are available to the public through an online reporting system known as the Web-based Injury Statistics Query and Reporting System (WISQARS) (Centers for Disease Control and Prevention, 2018). WISQARS is an interactive database system that tracks and houses injury-related data on mortality and morbidity, particularly suicide-related data. The WISQARS database utilizes data from several sources, including the National Vital Statistics Surveillance System and the National Violent Death Reporting System.

The mortality data were first analyzed to capture the prevalence of suicide death among black adolescents ages 10-19 from 2015-2019 in the US. The data for reporting the year 2020 was unavailable at the time of the current analyses and, therefore, not included in the subsequent analyses. Among black adolescents, there were 1,507 suicides reported, which yielded a national suicide rate of 4.39 (Centers for Disease Control and Prevention, 2020). Of the number of suicide incidents, 73% were males, and the rate of black adolescent male suicide (6.3) was three times that of the black adolescent female suicide rate (2.3). Of the total number of suicides among black adolescents, 79% were in the late adolescent (ages 15 through 19) category.

Geographical Distribution of Black Adolescent Suicide. Research has documented the importance of examining geography in identifying the prevalence of suicide to identify the barriers to access to care and distinctive geographic and cultural risk factors that are unique to a specific state and county, particularly in the context of examining suicide through a social-ecological framework (Holley, 1998; Hirsch, & Cukrowicz, K. C. 2014). The mortality data were further analyzed to capture the geographical prevalence of black adolescent suicide deaths at state and county levels. Several states emerged as having relatively higher suicide rates than the black adolescent national suicide rates. The states were New Mexico, Colorado, Kansas, Oklahoma, Iowa, Missouri, Oregon, Washington, Michigan, Indiana, Ohio, Wisconsin, Arizona, Minnesota, and Nevada (Centers for Disease Control and Prevention, 2020). When the data were analyzed by county, many counties within the states mentioned above emerged with high black adolescent suicide rates. However, several counties in Georgia (Clayton, Fulton, Dekalb, and Gwinnett) and others such as Davidson, Tennessee, Tarrant, Texas,

Mecklenburg, North Carolina, and the District of Columbia emerged with relatively high suicide rates among their black adolescent population.

Precipitating Circumstances of Black Adolescent Suicide. The precipitating circumstance data were extracted from the WISQARS database. Taken together, early black adolescents who commit suicide tend to experience stressors related to school problems (42%), current or previous mental health problems (35%), and depressed moods (26%). They also tend to experience a crisis within two weeks of suicide, have a history of suicide ideation or plan, experience family relational problems, are under mental health treatment at the time of the suicide, and tend to leave a suicide note (see Table 3). Black adolescents aged 15 through 19 tend to experience current mental health problems (51.5%), were treated for a mental health problem in the past (41%), and had a history of suicidal thoughts or plans (41%). The late adolescent group also tends to leave a suicide note, experience treatment for a mental health problem at the time of suicide, experience a crisis two weeks preceding the suicide and have a history of suicide attempts (see Table 4).

It is essential to highlight that school and family problems emerged as higher precipitating risk factors for both early and late adolescents. Current and past mental health problems and a history of suicidal thoughts or plans emerged as higher precipitating risk factors for late adolescents. Also, a distinctive difference between groups is that black adolescents ages 10 through 14 often do not disclose their intent to commit suicide, but adolescents ages 15 through 19 do. Disclosure of one's intent to commit suicide is crucial in clinicians' and practitioners' ability to assess suicide risk in

adolescents and provide treatment or support to elucidate suicide-related behaviors, which would be problematic when working with early adolescents.

Table 3

2019 Precipitating Circumstances of Black Adolescent 10-14 Suicide

Circumstance	Death Counts	Percentage
Total number of victims	236	100
All victims with known circumstances	208	88.14
All victims with unknown circumstances	28	11.86
Current mental health problem	100	48.08
Ever treated for a mental health problem	81	38.94
History of suicidal thoughts or plans *	76	36.54
Person left a suicide note	59	28.37
Current treatment for mental illness	56	26.92
Current depressed mood	53	25.48
Crisis in preceding or upcoming 2 weeks	53	25.48
School problem	48	23.08
History of suicide attempts	46	22.12
Disclosed intent to commit suicide	44	21.15
Family relationship problem ***	41	19.71
Argument or conflict	39	18.75
Other suicide circumstance	37	17.79
Intimate partner problem	31	14.9
Recent criminal legal problem	18	8.65
Other substance abuse problem	16	7.69
Other relationship problems (besides family)	12	5.77
Other death of a friend or family member	12	5.77
The victim had history of abuse/neglect as a child	6	2.88
Eviction or loss of home	5	2.4

Source: CDC, 2020. National Center for Injury Prevention and Control. Web-Based Injury Statistics Query and Reporting System (WISQARS) [Accessed 01/21/2022]

Table 4

2019 Precipitating Circumstances of Black Adolescent 15-19 Suicide

Circumstance	Death Counts	Percentage
Total number of victims	184	100
All victims with known circumstances	163	88.59
All victims with unknown circumstances	21	11.41
Current mental health problem	84	51.53
Ever treated for mental health problem	67	41.1
History of suicidal thoughts or plans *	67	41.1
Person left a suicide note	49	30.06
Current treatment for mental illness	48	29.45
Disclosed intent to commit suicide	42	25.77
Crisis in preceding or upcoming 2 weeks	42	25.77
Current depressed mood	41	25.15
History of suicide attempts	40	24.54
Family relationship problem ***	32	19.63
Argument or conflict	31	19.02
Other suicide circumstance	30	18.4
Intimate partner problem	29	17.79
School problem	29	17.79
Recent criminal legal problem	18	11.04
Other substance abuse problem	16	9.82
Other relationship problems (besides family) ***	9	5.52
Alcohol dependence	8	4.91
Other death of a friend or family member	7	4.29
Suicide of a friend or family member in the past 5 years	6	3.68
Victim had history of abuse/neglect as a child **	6	3.68
Eviction or loss of home **	4	2.45

Source: CDC, 2020. National Center for Injury Prevention and Control. Web-Based Injury Statistics Query and Reporting System (WISQARS) [Accessed 01/21/2022]

Mechanisms of Black Adolescent Suicide. It is essential to further identify the prevalence of risk by examining the means of black adolescent suicide. Understanding the mechanisms of suicide among black adolescents would provide families, communities, healthcare practitioners, and lawmakers with the information necessary to create strategies to reduce adolescents' access to lethal means of suicide. The leading mechanisms of suicide for black adolescents were suffocation (44%) and firearm (41%) (Centers for Disease Control and Prevention, 2020). Drug poisoning was the third common mechanism for suicide among black adolescents ages 10-19 (see Table 5). When mechanisms of black adolescent suicide data were analyzed across gender and age, suffocation (66%) was the leading mechanism of suicide, followed by firearm (29.8%) for black males ages 10 through 14.

Table 5

Mechanism of Suicide Death of Blacks Ages 10-19, 2019

Mechanism	Number	Percentage
Cut / Pierce	58	0%
Drowning	174	10%
Fall	252	20%
Fire/flame	40	0%
Firearm	4,549	28%
Transport, Other Land	35	0%
Suffocation	3,177	19%
Other specified and classifiable	179	10%
Other specified / NEC	44	0%
Unspecified	23	0%
Drug Poisoning	367	20%
Non-Drug Poisoning	119	10%

Source: Center for Disease Control and Prevention, National Center for Injury Prevention and Control, (2020)

The mechanisms of suicide were the same for black males ages 15 through 19. However, the order in which they appeared was reversed. The leading means for black males ages 15 through 19 were suicide firearms (53.2%) and suffocation (39.2%). The mechanism of suicide for black adolescent females ages 10 through 14 was suffocation

(66%) and firearm (17.7%), followed by drug poisoning (12.5%). For black females, ages 10 through 14, the leading mechanisms of suicide were suffocation (66.7%), firearm (17.7%), and drug poisoning (12.5%), and similarly, for black females aged 15 through 19, the mechanism of suicide was suffocation (54%), firearm (21%), and drug poisoning (12%).

Finally, the black adolescents' mechanisms for suicide data were also examined through a geographical perspective to identify better where the means of suffocation, firearms, and drug poisoning are most utilized in black adolescent suicides. As stated earlier, suffocation is the leading means of suicide for black adolescents ages 10-19, except for males 15 through 1,9, where a firearm was the top mechanism of suicide. The states with the highest suffocation-related suicides for black adolescents were Washington, Colorado, Oklahoma, Missouri, Wisconsin, and Minnesota, followed by Michigan, Ohio, Pennsylvania, Indiana, and Massachusetts. When similar data were analyzed for firearm-related suicide among black adolescents, Washington, Colorado, Oklahoma, and Missouri yielded the highest levels. Black adolescents in Indiana, Georgia, Alabama, Tennessee, and Texas, are more likely to use a firearm for suicide than any other means.

Morbidity Data

WISQARS and National Electronic Injury Surveillance System. The WISQARS database also tracks and monitors non-fatal injuries such as suicide attempts. The WISQARS data on suicide attempts draw from the data from the National Electronic Injury Surveillance System (NEISS) (Centers for Disease Control and Prevention, 2018). The NEISS captures data on all US injury-related hospitals and emergency department

visits. It is essential to highlight that since black people are not likely to access formal healthcare (uJacobs, Rolle, Ferrans, Whitaker, & Warnecke, 2006), mental health issues such as suicide are stigmatized in black families and communities, and adolescent suicide-related behaviors are usually subtle (Mitchell, Garand, Dean, Panzak, & Taylor, 2005). Thus, suicide morbidity incidents requiring emergency departments or hospital treatment will likely be under-reported for black adolescents. Nonetheless, the non-fatal injury data captured in WISQARS provide vital information on a sub-population of high-risk black adolescents who suffer from suicide morbidity. The prevalence of suicide attempts among black adolescents was reviewed from 2015 to 2019.

According to the suicide attempt data generated from WISQARS, the number of suicide attempts among black children and adolescents ages 10 through 19 was 70,787 (Centers for Disease Control and Prevention, 2020). Eighty percent of all suicide attempts were experienced by females, nearly four times more than the suicide attempt rate of black adolescent males (Centers for Disease Control and Prevention, 2020). When the data were examined across age categories, 65% were late adolescents ages 15 through 19, and black early adolescent females experienced suicide attempts 5.6 times more than males in the same age category (Centers for Disease Control and Prevention, 2020). Finally, black early adolescent males experience suicide attempts more than any other minority.

Youth Risk Behavioral Surveillance System. Another source of suicide morbidity data available for examination is the Youth Risk Behavior Surveillance System (YRBSS) which was collected, tracked, and monitored by the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2020). The YRBSS

was established in 1991 to identify and monitor health-risk behaviors contributing to the leading causes of death, disability, and social problems, including suicide attempts and and ideations, among 9th to 12th-grade students in the United States (Centers for Disease Control and Prevention, 2018). The CDC funds the YRBSS and monitors youth behaviors contributing to unintentional injuries and violence, sexual conduct related to pregnancy and sexually transmitted diseases, drug, alcohol, tobacco use, dietary behaviors, and physical activity. The database spans from 1991 to 2019 and has collected data from over 4 million students in the United States. One limitation of the YRBSS is that the data is self-reported, and there may be over-reporting and under-reporting data related to suicide. Although studies have demonstrated that the data are of acceptable quality, the data apply only to attend who attend school and, therefore, are not representative of all persons in this age group (Centers for Disease Control and Prevention, 2020).

The suicide ideation and suicide attempt trends among black high school students from 2015 through 2019 from the YRBSS survey. Suicide ideation was measured by one variable identified as students who "seriously considered suicide twelve months before the survey." Suicide plan was measured by "made a plan about how I would commit suicide during the last 12 months", suicide attempt was measured by "attempted suicide one or more times during the last 12 months," and suicide attempt injury was measured by "suicide attempt resulted in an injury, poisoning, or overdose that had to be treated by a doctor or nurse during the last 12 months". The trends related to black adolescent suicide intent, plan, and suicide attempts increased over time. However, suicide attempts

that resulted in injury trends decreased by one percent from 2015 to 2017 and did not increase or decrease in 2019 (Centers for Disease Control and Prevention, 2020).

The national surveillance systems discussed herein provided an in-depth outlook on suicide-related data among black adolescents, ranging from cross-sectional to longitudinal in the data collection design. The suicide-related indicators and outcomes gathered from the review of surveillance systems provide an outlook on suicide ideation and suicide attempts among black adolescents, accessible to researchers and policymakers to assist in identifying trends related to back youth suicidality. Trends identified by the surveillance systems appear to be relatively consistent. That is, black female adolescents are more likely to have higher rates of suicide ideation and make a suicide plan and have higher rates of suicide attempts than black males (Centers for Disease Control and Prevention, 2020; YRBS, 2017). However, no matter the age category, black males tend to have higher rates of suicide (Centers for Disease Control and Prevention, 2018).

Risk and Protective Factors of Black Adolescent Suicide Ideation and Attempts

This section of Chapter 2 reviews the relevant literature that identifies social-ecological factors associated with black adolescent suicide ideation and suicide attempts. The studies that were included for the empirical review of studies were peer-reviewed articles that: a) identified one or more factors and described its association (or correlation) to an outcome variable within the study; b) were written in the English language; c) were conducted in the US to inform on suicide-related predictors for black adolescents and young adults who reside in the US; d) consisted of a dependent variable or outcome variable of suicidality (self-harm suicide intent, suicide plan, suicide attempt,

or suicide); e) included a sample consisting of 51% or higher Black; f) the study included a mean age of adolescents from 10 and 19; g) published between 2007 to 2021. The risk and protective factors from the literature review were conceptualized and presented through a social-ecological model framework.

Individual Factors of Black Adolescent Suicidality

Age and Gender. Research has demonstrated the importance of demographic factors such as age and gender when investigating suicidality among adolescents (Centers for Disease Control and Prevention, 2015; Joe et al., 2006). A total of four articles (Hooper et al., 2017; Hooper et al., 2015; Tomek et al., 2015, and Tomek et al., 2018) measured the impact of age and gender on black adolescents' suicidality were reviewed. They were all longitudinal studies that analyzed data related to age and gender from the Mobile Youth Survey (MYS). MYS was a 14-year study of adolescents living in low-income neighborhoods in the southern region of the United States. The Hooper et al. (2015) study consisted of 977 between the ages of 11 and 18. The sample consisted of 59% of females. Hooper et al. (2015) conducted an unconditional growth model analysis and found that a significantly more considerable proportion of girls, 32% reported multiple suicide ideations than boys, 20%. As it related to the factor of age, Hooper et al. (2015) found that younger *adolescents (11-14)* are more likely to report suicidal thoughts than older adolescents. The probability of reporting suicide ideations decreased as the age of the adolescents increased.

Hooper et al. 2017, analyzed the effects of environmental stress, baseline stress, age, and gender on suicide ideation and suicide attempts over time. This article measured the construct of environmental stress by seven items adapted from the Global Appraisal

of Individual Needs (Hooper et al., 2017). Examples of the items were "I have bad dreams about the bad things that have happened to a family member or friend"; "I have gotten very upset when I found out that a friend or family member had something very bad happen to them"; and "When bad things happen to a family member or friend, it feels like they are happening to me." Participants selected their responses from three options that best reflect the impact of environmental events: 0 (almost never), 1 (sometimes), and 2 (very often) (Hooper et al., 2017). A logistic growth model analysis revealed that perceived environmental stress, for both males and females, decreased over time Y=-0.24, $t(456) = -7.39$, $p<.001$. However, for females, environmental stress decreased at a much slower pace than for males. While the Hooper et al. 2017 study presented a rigorous methodology in its analysis, the researchers could not determine if the participants conducted another suicide attempt after the first time, nor if any participant completed suicide as the data counted them as attrition. This data would provide more in-depth environmental stress, baseline stress, age, and gender on suicide ideation and suicide attempts over time.

Depression, Hopelessness, Burdensomeness, Thwarted Belonging, and Suicide. Depression and depressive symptoms were factors that were included in many studies within the literature review. Matlin et al. (2011) conducted a cross-sectional study that examined suicidality and depression in a sample of adolescents from the African American community. The sample from this study consisted of 212 Blacks whose ages ranged from 13 to 19 years old, and 62% were females. A multivariate regression analysis was conducted, and the results found that depression was significantly positively associated with suicidal ideation, $(1, N = 181) = 23.40$, $p < .001$, $B = 2.18$ ($SE = .45$), OR

= 8.84, and depression were also significantly related to suicide attempts, (1, N = 183) = 19.59, p < .001, B = 2.87 (SE = .65), OR = 17.65 (Matlin et al., 2011). The Matlin et al., 2011 study sample was middle-income youth recruited from three suburban public high schools. Thus, the results cannot be generalized to African American students from low-income families living in inner-city or rural areas.

A cross-sectional study (Bennet & Joe, 2015) reviewed data from 1,116 African American and 1,500 Hispanic students who participated in the CDC Youth Violence Survey. The data were examined for risk and protective factors related to suicide ideation and attempt among adolescents. The results for the suicide-risk structural equation model of black adolescents were reviewed to identify the risk and protection factors of black suicidality. The black adolescent sample consisted of students in the 7th through 12th grades. The mean age was 14.95, and 52% were female. Depressive symptoms and substance abuse, which were individual-level factors, were included in the structural equation model along with parental support and peer support, which were relational factors, and exposure to community violence, a community-level factor. The depressive symptoms of the Bennet & Joe, 2015 study were measured using the Modified Depression Scale (Orpinas, 1993), which consisted of items such as "Did you feel hopeless about the future?" and yielded a Cronbach alpha of .84. Depressive symptoms were significantly associated with black adolescent suicidality. The effects of depressive symptoms on the model posited in the Bennet & Joe (2015) study are presented in this section, while the interaction effects of the other factors included in the previously mentioned study will be discussed in later sections of the literature review to adhere to the social-ecological framework structure of the literature review.

Belongingness, burdensomeness, and acquired capability to commit suicide are the pillars of the interpersonal psychological theory of suicide (Joiner, 2005). There is evidence that suggests that all three factors are predictors of Black adolescents' suicidality. In one study by Hollingsworth, Cole, O'Keefe, Tucker, Story, & Wingate (2017), cross-intersectionality factors related to micro-aggressions that African Americans may experience were examined as risk factors for suicide ideation. The study participants were college students between 18 and 27 and yielded a mean age of 19. There were 135 participants included in the sample, and fifty-six percent were females, which indicates that the gender distribution was balanced within the study. The study measured six dimensions of microaggression which include invisibility (feeling devalued or ignored), criminality (stereotyped as a criminal or threatening), low-achieving/undesirable culture (viewed as incompetent, dysfunctional, success is due to unfair advantage), sexualization (oversexualized or eroticized), foreigner/not belonging (viewed as an immigrant or not a "true" American), and environmental invalidations (negative environmental messages about an individual's race) (Hollingsworth et al., 2017).

The model posited by Hollingsworth et al. (2017) examined perceived burdensomeness and thwarted belongingness and their relationship with suicide ideation. The study conducted six separate mediation analyses with the two mediators, each microaggression variable and suicide ideation. The results indicated that perceived burdensomeness, but not thwarted belongingness, mediated the relationship between invisibility, low achievement, undesirable culture, environmental invalidations, and suicide ideation. The study also reported that for African American college students

experiencing perceived invisibility, low achievement, undesirable culture, and outward invalidations, higher perceived burdensomeness levels were present, increasing suicide ideation. The Hollingsworth et al. (2017) study utilized rigorous analyses to identify risk factors of suicide ideation of African Americans. However, caution should be used when attempting to generalize using the results. The African American population was students attending predominantly white institutions where the experience of microaggressions may be higher than that of students studying at a predominantly African American educational institution or institutions with increased African American or Blacks enrolled.

Alcohol Use and Substance Abuse. Tomek et al. (2015) examined the effects of alcohol on suicide ideations and suicide attempts and determined whether the results differed by gender and age over time. This study was longitudinal. The sample included in the survey was black adolescents living in low-income communities. A total of 977 respondents, ages 11-19, were included in the analysis of suicide ideation. Also, 457 respondents aged 11-19 were included in the suicide attempt sub-sample. Suicidal ideation was measured as a single item, "In the past year, did you seriously think about killing yourself?" a one-item question also measured suicide attempt, "Have you tried to kill yourself?" and recent or frequent alcohol use was measured by three questions "(a) "Have you ever drunk alcohol?"; (b) "During the past month (30 days), did you drink alcohol?"; and (c) "During the past week (7 days), did you drink alcohol?" Tomek et al., 2015, conducted a logistic growth model regression analysis to analyze the use of alcohol on suicide ideation and found that the adolescent with more frequent alcohol use was significantly more likely to experience suicide ideation, $\gamma = 0.25$, $\boldsymbol{t}(3158) = 6.65$, $\boldsymbol{p} <$

.001. Similarly, regular use of alcohol increased the probability that the adolescent attempted suicide, $\gamma = 0.69$, $t(1567) = 3.25$, $p = .001$.

The results from the Tomek et al. (2015) study also demonstrated that there was a sizeable number of participants (26% of the 457 participants who attempted suicide) who experienced suicide ideation before committing suicide attempts, and more females experienced suicide ideation than their male peers over time. This study presented evidence that alcohol use is a critical factor in suicide ideation and attempt that should be investigated. While Tomek et al. (2015) had a rigorous research design and analysis, the results were based on self-reports of suicide ideation and suicide attempts. The study would benefit from including other sources of data, such as teachers' or parents' observations of the participants' suicide-related behaviors,

As stated previously, Bennet & Joe (2015) examined substance abuse of African American students in a multi-level suicide risk model. Substance abuse was measured by five items from the Youth Risk Behavior Survey (YRBS). The measure included questions such as "During the past 12 months, how many days did you have at least one drink of alcohol?" and "During the past 12 months, how many days did you use inhalants or illegal drugs such as marijuana, cocaine, or heroin?", which yielded a Cronbach alpha of .79. Substance abuse was also positively related to black suicidality.

Fitzpatrick, Piko, & Miller (2008) examined individual, familial, and school-related risk and protective factors utilizing a cross-sectional research study design. The study consisted of a sample of 1,526 African American youth of grades 5th through 12th; 40% were from 5th through 6th grades, 26% were from middle school 7th through 8th grades, and 34% were from high school grades 9th through 12th. The study's sample

consisted of 50% females. Of the number of participants, 13% of all the male participants and 20% of the females reported varying levels of suicide ideation. The risk factors analyzed for the individual domain were the participants' risky behaviors, such as whether the adolescent fought in school or carried a weapon. The participants' depression was measured by the Center for Epidemiological Studies for Depression Scale, and participants' experiences of sexual trauma were also measured on the respective domain. The results indicated that the students with higher odds of thinking about suicide reported more depressive symptomology (OR 95%CI = 1.04, $p < .01$, experienced sexual victimization (OR 95%CI = 2.02, $p < .01$), and were more likely to be taking risks (OR, 95%CI = 1.11, $p < .01$). The results also indicated that self-esteem (OR 95%CI = .89, $p < .01$) was a protective factor that was inversely related to suicide ideation that emerged from the study.

Relational and Familial Factors of Black Suicidality

Family-Related Factors. Fitzpatrick, Piko, & Miller (2008) also examined familial and school-related risk and protective factors utilizing a cross-sectional research study design. The family-related factor was measured by a single question that asked students how often they had been slapped, punched, kicked, or beaten by a family member. School-related factors were measured by whether the participants were a victim of bullying. Family-related protective factors include whether the participants eat dinner with family, whether the parents set a curfew, and how often the participant talks to their parents about problems. School bonding was the school-related protective factor included in the study's posited model. The results indicated that the students with higher odds of

thinking about suicide experienced more violence in their families (OR, 95%CI = 1.93, p < .01) and more bullying at school (OR, 95%CI = 1.52, p < .05).

Additional family relational factors that emerged from the literature review are parental support and social support. Bennet & Joe (2015) measured parental support by nine items that described the frequency of their parents' practices of rewarding good behavior with some form of praise as well as the importance of their parents knowing their whereabouts, friends, and activities, which yielded a Cronbach alpha of .79. Parental support was positively associated with African American suicidality, but the relationship was not statistically significant.

Social Support. Social support was measured by four items that asked participants questions such as "how much they agreed or disagreed with a series of statements such as "At school, there are adults I can talk to, who care about my feelings and what happens to me" and "There are people in my family I can talk to, who give good suggestions and advice about my problems" Bennet & Joe (2015). The social support factor of the study garnered a Cronbach alpha score of .80. Contrary to parental support, social support yielded a negative relationship with suicidality for African Americans, and the relationship was not statistically significant.

Community-Related Factors of Black Suicidality

Community Violence. Exposure to community violence is a factor that emerged in several studies included in the literature review as a factor related to suicidality among black adolescents. Lambert et al. (2008) was a longitudinal study utilizing path analyses to obtain the results. The study consisted of the youngest sample's mean age (11.77 years), which was included in the dissertation's literature review. This study examined

the associations between community violence exposure, suicide ideation, and suicide attempt. The longitudinal study examined the effects of depressive symptomology and aggression as intervening variables through path analysis. The study sample participants were assessed multiple times in the 6th, 7th, and 8th grades. The sample consisted of 46.5% females and 53.5% males. Aggression and depressive symptomology observed in the 7th and 8th grades had no intervening effect on suicide ideation or attempts. There was a positive correlation between 6th-grade community violence exposure and suicide attempt, which was significantly stronger for females than males ($\chi 2(1) = 4.\ 80$, $p < .05$).

However, in Bennet & Joe (2015), exposure to community violence yielded a different result. Exposure to violence on the community level was measured by the Children's Exposure to Community Violence Scale (Richters & Martinez, 1993), which contained items such as "I have seen somebody get shot or stabbed" or "I have heard a gun being shot." The exposure to community violence garnered a Cronbach alpha of .87. Through a structural equation modeling analysis, exposure to community violence was not associated with suicidality among black adolescents.

Societal/Cultural Factors

Perceived Discrimination, Racism, Acculturation, and Suicide. A sociocultural factor to consider in examining risk factors related to suicide ideation among black adolescents is perceived discrimination. Arshanapally, Werner, Sartor, and Bucholz (2017) studied racial discrimination and suicidality among a community sample of African American adolescents. The Experience of Discrimination Scale measured racial discrimination, and a one-item question measured suicide ideation, "Have you seriously thought about killing yourself?"

The study also included covariates such as sociodemographic factors, familial risk status, and offspring psychosocial risk factors. The community sample included in the study consisted of 806 youth between the ages of 13 and 23, with a mean age of 17.9 years, 50% were females, and 50% were males. The study indicated that the odds of experiencing suicidality were 2.24 times greater in black adolescents and young adults who reported racial discrimination (95% CI: 1.47–3.41) than in those who did not. After accounting for offspring risk factors entered in this stage, racial discrimination remained significantly associated with suicidality (OR = 1.76,95% CI = 1.10–2.76). Elevation in risk for suicidality was also associated with offspring MDD (OR = 3.64, 95% CI: 1.89–7.00), offspring CSA (OR = 2.57, 95% CI = 1.45–4.57), offspring CPA (OR = 2.73, 95% CI = 1.71–4.38), and offspring substance use (OR = 2.42, 95% CI = 1.41–4.14,). No interactions with gender were observed. However, the mother's racial discrimination report was associated with offspring suicidality in males (OR = 3.19, 95% CI = 1.30–7.84) but not in females (OR = 1.41, 95% CI = 0.72–2.78, p = 0.316). The study's sample consisted of black families that were at elevated risk for Alcohol Use Disorder, and results may differ for a sample that was not pre-disposed to Alcohol Use Disorder.

Societal Response to Black Adolescent Suicide in the US

There is an apparent need to focus efforts to build upon existing knowledge around black adolescents' suicidality to guide clinical practices and interventions by carefully examining the problem (Joe, 2018). In the US, national and state committees and political figureheads have called for the planning, implementation, and monitoring of effective strategies to prevent suicide among black adolescents. Despite the efforts addressed previously, the challenges related to mitigating trends in black adolescents'

suicidality still exist and are exacerbated by the lack of evidence (Joe, 2018). The surge in suicide trends among black adolescents, particularly children and adolescents ages 5-12, depicted in a study of racial disparity in suicide rates among US youths between 2001 and 2015 (Bridge, Horowitz, Fontanella, et al. 2018), gained national attention and sparked the creation of the Congressional Black Caucus Emergency Taskforce on Youth Suicide and Mental Health on April 30, 2019. The task force's primary goal is to battle suicidality among black adolescents.

The task force of nation-leading researchers and community leaders in black adolescent suicidality has convened and published a 38-page report entitled Ring the Alarm: The Crisis of Black Youth Suicide in America (Congressional Black Caucus, 2019). The report indicated that "few research dollars have been allocated by the National Institutes of Health (NIH), National Institute of Mental Health (NIMH) and the Substance Abuse and Mental Health Services Administration (SAMHSA) to investigate into the trends and effective interventions to reduce the occurrence of suicide among black adolescent in America" (Congressional Black Caucus, 2019, p.6), and has urged such organizations to reconsider its current practices.

The report has also provided recommendations on how the nation should move forward in unison to address suicide among black adolescents and develop programs to reduce suicidality among black adolescents and young adults. The overarching directives were to; a) increase the amount of research into topics relating to black adolescents' mental health and suicide through the National Institutes of Health (NIH) and National Institute of Mental Health (NIMH) funding, b) demonstrate and promote evidence-based interventions and best practices for clinicians, school personnel, teachers, parents, and

others who interact with black, and c) amplify the work of the task force and its working Group through strategic collaboration, outreach, and technical assistance to state and local governments, as well as through public-private partnerships (Congressional Black Caucus, 2019).

It is important to note that creating a comprehensive strategic plan to battle suicidality among black adolescents requires in-depth knowledge of trends, risks, and protective factors related to suicide ideation and suicide attempt that explore the intersectionality of black adolescents' suicide by gender, age, and geographical location, which were presented in the previous section of this dissertation. The construction of preventive suicide interventions fitting for black adolescents will also require further examinations of the demographic and psychosocial (Joe, 2006), as well as relational, community, and societal suicidal risk and protective factors. The following section reviews the empirical evidence of risk and protective factors related to black adolescent suicide ideation and suicide attempts through a social-ecological perspective.

Summary of Literature Review

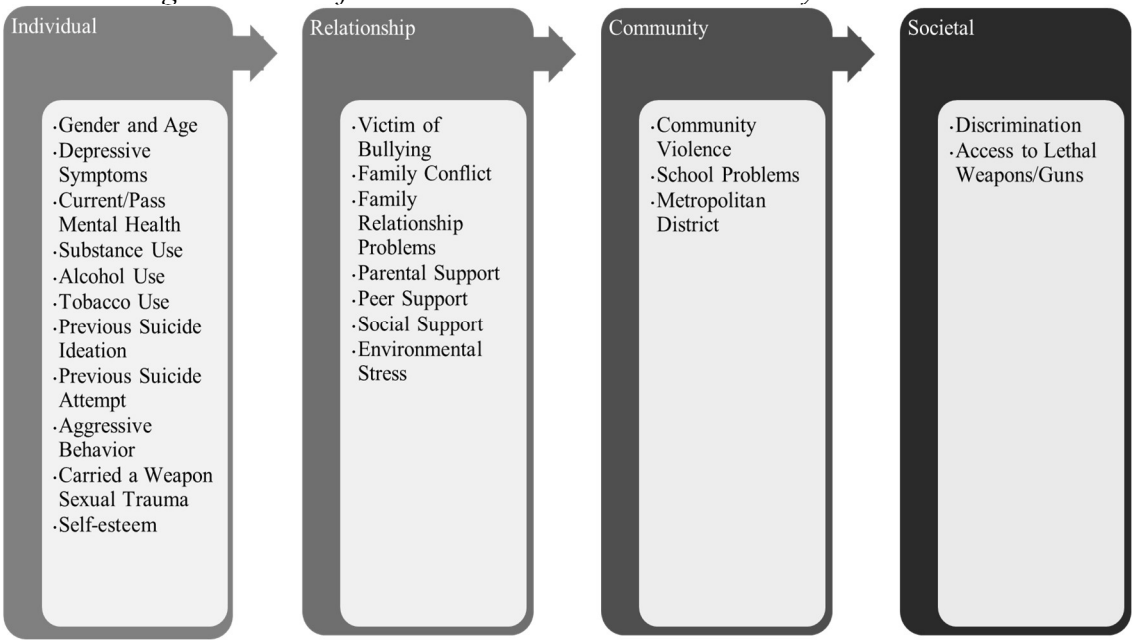
Conceptual Model

Through the literature search, the risk factors of suicide ideation, suicide intent, and suicide attempt were conceptualized in a social-ecological model to formulate the Social-Ecological Model of Black Adolescent's Suicide Morbidity (Figure 2). This model adds to the existing knowledge about suicidality among black adolescents. It frames black adolescent suicidality's protective and risk factors as an individual, relationship (family & friends), community, and societal. The current trends related to black suicidality and the factors that influence suicide ideation, suicide attempts and suicide

completions among black adolescents were reviewed in this chapter of the dissertation. Factors impacting black adolescent suicide ideation and suicide attempts are affected by individual, relationship, community, and societal elements. Figure 2 depicts the empirical research studies and the epidemiological monitoring of suicidality among black adolescents, which consisted of many more factors mapped on the individual domain than other domains of the social-ecological framework. There is a prevalence of suicide ideation and attempts among black adolescent females, whereas the pervasiveness of suicide completions is among black males. However, within the last few years (2015-2019), black female suicide rates were increasing and narrowed with the suicide rates of black males. Younger black adolescents' suicidality is significantly less than older adolescents, indicating that the risk of suicide mortality and morbidity increases with age. However, the rate of growth of suicidality among younger adolescents (10-14) increased from 2015 to 2019 as well. Finally, black adolescents who live in the Midwest states of the US and Washington and Oregon tend to have elevated levels of suicide mortality.

Figure 2.

Social-Ecological Model of Black Adolescent Suicide Morbidity



Note. The factors in the figure emerged from the literature review and were indexed using the CDC Social-Ecological Model Framework (2020).

The adolescents' individual-level factors identified as increased risk for suicidality were depression or depressive symptoms, current or history of mental health, and history of suicide ideations or plans. Black adolescents with depression or depressive symptoms have a higher risk of suicidality. Peer support was identified as a protective factor for black adolescent suicidality. However, an adolescent who does not have adequate support from their peers may not be able to benefit from the protection peer support offers. Also, parental support had a positive relationship with black adolescent suicidality.

Although this evidence was not supported by statistical significance, it presents a paradox that requires additional investigation. One explanation that might support the positive relationship between parental support and suicidality is that parental support in black households consists of strict disciplinary practices (Bennett & Joe, 2015; Reed, 2020), which may adversely impact black adolescents and make it more difficult for

adolescents to address issues related to suicidality with their parents. Community-related and societal factors of black adolescents emerged from the empirical review. However, the databases that monitor the epidemiological factors related to black adolescents' suicidality and the extant literature of empirical studies of black adolescents continue to demonstrate a scarcity of community and societal perspectives when examining the factors of suicidality among black adolescents.

Gaps in the Literature

The Social-Ecological Model of Black Adolescent Suicide Morbidity in Figure 2 emerged from the literature and provided a solid foundation to build on. Based on the literature presented, it is essential to emphasize that while some research studies identify risk factors of adolescent suicide ideation related to black adolescents, there is a paucity of research examining risk factors related to suicide attempts. In addition, many factors that emerged from the literature reviewed were associated with the individual strata of the Social-Ecological Model of Black Adolescents' Suicide Morbidity, and the factors of the other stratum (family, community, and societal) were sparse (Figure 2).

Black adolescents' transition from childhood to young adulthood is adversely impacted by factors such as poverty and racial inequity, yet aside from one study (Arshanapally et al., 2017) that examined the effects of discrimination on black adolescents, no other research emerged from this review that closely examined the relationship among racial, inequity and suicidality among black adolescents.

The scarcity of research conducted to identify risk factors for suicide attempts and other familial, community-related, and societal factors among black adolescents ages 10-19 may be attributed to the challenge researchers face when conducting mental health

research with children, which includes informed consent of a third party or adult (Glantz, 1996), particularly black children. As mentioned, the challenges can also be compounded when the perception of mental health and the stigma that holds firm in the black community is considered.

Finally, one study (Bennett & Joe, 2015) examined a multi-level risk factor of black adolescent suicidality. However, it did not include societal-level elements in its structural equation model of adolescent suicidality. The relationship between individual-level and relational factors and black adolescent suicidality has been researched. However, fewer studies have examined the interaction effect of individual, relationship, community, and societal factors on black adolescents' suicidality. The current study is the first to address the discussed gaps in the literature by assessing a social-ecological model of suicide suicidality in a national sample of black adolescents.

Chapter 3: Methodology

This chapter discusses the current study's research design, statistical procedures and tests, and materials to address the study's questions and hypotheses. This study used quantitative methodologies that assessed the reliability and validity of the current study's independent variables and how those constructs affect black suicidality through structural equation modeling (SEM). This approach supports the present study's aims to develop and evaluate the hypothesized multi-level model of black adolescent suicide risk using data from the Youth Risk Behavior Survey and the National Equity Atlas records. The hypothesized model consisted of complex relations among different levels of the social-ecological framework and moderating constructs of age and gender. The research design was undergirded by the social-ecological framework, which considers the interplay of biological and psychological factors within and across the participants' relational, community, and societal environment to predict black adolescents' suicidality. This theoretical framework will provide valuable insights into the predictive pathways of black adolescent suicidality and guide the development of prevention strategies to mitigate suicidal behaviors. Herein, the study's design, sample, hypotheses, operationalization of variables, instrumentation, data collection procedures, data analysis, and summary are discussed in detail.

Research Design

This study used a quantitative non-experimental research design. The quantitative approach to the current study is the appropriate design to assess objective theories by examining the relations among variables (Jhangiani, Chiang, Cuttler & Leighton, 2019; Creswell & Creswell, 2019; Hancock & Mueller, 2013) as the study's purpose is to

identify factors that predict black adolescent suicidality. The non-experimental approach was also appropriate for this study as this study's methodology did not manipulate the study variables by assigning the study's sample to a specific condition or intervention (Creswell & Creswell, 2019). The study used SEM to develop the measurement model and evaluated the significance of the model's performance in predicting suicidality among black adolescents. SEM estimates a hypothesized model informed by the literature or empirical testing (Byrnes, 2010).

The current study used SEM and employed both CFA and EFA on three different samples (from survey years 2015, 2017, and 2019) to identify and assess a social-ecological model of black adolescent suicidality. CFA was initially executed as the literature search in Chapter 2 empirically informed the hypothesized model. In the next phase of the analyses, an EFA was conducted to inform EFA to empirically identify factors or constructs to inform the model configuration of a modified model of black adolescent suicidality. Finally, another CFA ensued to estimate the modified model structure and assess the goodness of fit to the data through a series of fit indices to support the discovery of the final model of suicidality for black adolescents (Byrnes, 2010). Additional details about the SEM conducted in the current study are described in the analyses section of this chapter.

The SEM statistical approach was advantageous to accomplish the current study's objectives as each observed and latent factor and outcome variable included in the black adolescent's social-ecological model of adolescent suicide morbidity was investigated. The patterns identified among the predictors provided insights into the predictive pathways of the model simultaneously (Hancock & Mueller, 2013).

Research Questions and Hypotheses

The current research hypotheses were structured according to the study's aims and focus: to develop and evaluate a social-ecological model of black adolescent suicidality, determine whether the model was moderated by age and sex, and examine whether the model remains stable over time. The initial research hypotheses are presented below:

Research Question 1: Do the identified indicators of individual, relationship, community, and societal factors satisfactorily measure each construct?

- H1a: The variables sexual minority, hopelessness, current cigarette use, current cigar use, current marijuana use, smoke >10 cigarettes, and current alcohol use will satisfactorily load onto the individual risk factor.
- H1b: The variables physical fight bullying at school, electronic bullying, interpersonal violence (sexual), and interpersonal violence (physical) will satisfactorily load onto the latent relationship risk factor
- H1c: The variables perception of community safety, the experience of being threatened with a weapon on school property, and residential location will satisfactorily load onto the community risk factor.
- H1d: The variables racial equity index (REI) score of the adolescent residential location and adolescent access to a weapon will satisfactorily load onto the community risk factor.

Research Question 2. How do individual-level, relationship-level, community-level, and societal-level factors impact suicidality?

- H2: Each of the four latent factors, individual, relationship, community, and societal factors, will have a significant positive association with suicidality.

Research Question 3: Is the effect of individual, relationship, community, and societal factors on suicidality among black adolescents moderated by age or the participant's gender?

- H3a: There is a difference in the effect of each factor of the final model between early adolescents (ages 10-14) and late adolescents (ages15-18) and late adolescents.
- H3b: There is a difference in the effect of each factor of the final model between males and females (ages 15-18).

Research Question 4: Does the observed social-ecological model of black adolescent suicide perform similarly in the survey years 2015, 2017, and 2019?

Participants

Considering the current study's purpose and aim to assess a final model for black adolescent suicidality, the population of interest was black adolescents ages 10-19 who live in the US. The participants for this study were drawn from the Centers for Disease Control and Prevention's (Centers for Disease Control and Prevention) Youth Risk Behavior Survey (YRBS). The individual, relationship, community, and societal level risk behaviors-related data were also drawn from the YRBS. Because there was no other societal level indicator in the YRBS except for geographical location, the racial equity index scores (REI) data were drawn from the National Equity Atlas database. Details of both data sources are included below.

High School Youth Risk Behavior Survey

As stated in Chapter 2 of the current study, the YRBS is a nationally representative cross-sectional biennial study conducted by the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2020). The YRBS measures six areas of adolescents' individual, relational, and community-level health-related behaviors and experiences: a) unintentional injuries and violence, b) sexual behaviors, c) alcohol and other drugs, d) tobacco use, e) unhealthy dietary behaviors, and physical activity (Centers for Disease Control and Prevention, 2013). The current study will only draw from the YRBS high school district-level data. The YRBS school district-level data included the participant's city district, which was necessary to map the current study's participants' REI scores and regional geographical location.

The high school YRBS is a self-report survey administered to students in 9-12 grades attending US public, charter, and private schools. Since its development, the YRBS has conducted over fifteen cohorts of data collection from 1991 to 2019. The parent study is the most comprehensive national surveillance system that monitors adolescents' health behaviors and experiences in the US. Schools with less than 40 students enrolled, considered alternative schools, vocational schools operated by the Department of Defense, and special education schools were excluded from the YRBS (Centers for Disease Control and Prevention, 2020). The YRBSS uses stratified random sampling to include participating schools within the survey. The stratification was completed demographically and geographically to ensure that each cohort of adolescents is representative of the adolescent population in the nation. The sample of schools is from several districts within the 50 US states and the District of Columbia. The district-level

participation history was reviewed to identify the districts included in the YRBS in the most recent years (see Table 7). Participants from each district that engaged in the YRBS survey years of 2015, 2017, and 2019 were included in the study only if the district asked relevant questions to the current research. A total of 17 districts participated consecutively in the YRBS survey years mentioned above. However, the final number of districts included in the present study was reduced to seven as each district has the autonomy to exclude specific questions from their respective questionnaires, and the districts that did not ask questions relevant to the current study's focus were removed from the present study's sample for each survey year. The seven districts included in the current study were Broward County, Florida; Palm Beach County, Florida; Fort Worth, Texas; Los Angeles, California; Oakland, California; Orange County, Florida; and Philadelphia, Pennsylvania.

The decision was made to exclude the number of districts that did not ask questions relevant to the current study after seeking recommendations from the Youth Risk Behavior Surveillance System data administrators and statisticians. The exclusion of said districts also ensured an acceptable level of missingness among the variables of interest, which will be discussed in detail later in the methodology of the current study.

The YRBS, through its three-stage cluster sampling method, accounts for a significant increase in sampling variances to ensure the weighted count of students is representative of the adolescents in their respective middle or high school grade level. The YRBS also includes an oversampling of black students, which is ideal for the current study as the population of interest is black adolescents in the US. The 2015 survey yielded 10,265 black participants; however, when the seven districts were selected based

on the district inclusion criteria, the final count of 2015 participants included in the current study was reduced to 2,448. The 2017 survey yielded 12,395 black participants, of which 3,106 were included in the present study, and the 2019 survey year yielded 12,364 black adolescent participants, of which 2,389 were included in the current study. All participants for each survey year were unique and did not participate in two or more of the survey years. The total number of black adolescent participants in the current study was 7,943.

The CDC's Institutional Review Board approved the protocols of the YRBS study (the parent study). The data collection and reporting procedures incorporated protocols to protect the students' privacy by allowing anonymous and voluntary participation (Centers for Disease Control and Prevention, 2013). Parental consent and students' assent were garnered before the survey administration. The YRBS-trained data collectors traveled to each participating school to administer the questionnaires to students (Centers for Disease Control and Prevention, 2013). The data collectors then record data about the school, student grade level, and sample size to consider when computing weighted data and ensure a 60% response rate for each district (Centers for Disease Control and Prevention, 2013). The completed questionnaires were provided to local CDC contractors who scanned the results and generated the electronic data set (Centers for Disease Control and Prevention, 2013). Once the districts completed their data collection process, the datasets were sent to the CDC for cleaning and processing. Then the weighted data were computed to ensure the count of participants was equivalent to the number of high school students in the area (Centers for Disease Control and Prevention, 2013).

While the adolescent risk data were garnered from the YRBS, the REI data were drawn from the National Equity Atlas database. The National Equity Atlas database was developed through a collaborative partnership between PolicyLink and the University of Southern California Equity Research Institute (National Equity Atlas, 2022). The atlas contains data on demographic, racial, and economic equities for over 100 cities and all the states of the US. The atlas aims to assess the condition of equity in communities and compare such equity levels to that of other states in the US. The National Equity Atlas calculates a "racial equity index" (REI) for communities to identify areas where racial inequities exist to guide community organizations and policymakers with the tool necessary to close racial and economic equity gaps. The REI consists of nine different indicators from 3 distinct categories.

The categories are a) economic vitality, which consists of the median wage, unemployment rates, and poverty rates for a specific geological area; b) readiness, which comprises educational attainment, disconnected youth, and school poverty; and c) connectedness, which comprises air pollution, commute time, and rent burden rates for a specific geographical area. There are REI scores for a total of 150 large cities in the US. The REI is operationalized as an average of each city, region, or state's inclusion and prosperity scores, ranging from 1 to 100 (National Equity Atlas, 2022).

The Florida International University's Institutional Review Board approved the current study's protocols (see Appendix). The present study complied with the ethical standards for research designated by the National Social Work Association and the standards set forth by Florida International University.

Measures

The standard YRBS questionnaire consists of 89 questions. However, annual reviews and revisions are made by the CDC YRBS coordinators. All measures utilized in the present study were operationalized equally across all three survey years using the YRBS combined data set. The combined data set has several limitations: 1) each local district has the autonomy to exclude various questions from the standard questionnaire; 2) the survey questions are mapped according to the questions asked in the YRBS 2019 standard questionnaires, and if the districts did not ask the question or release the data related to specific questions, then the data were missing from the data set (Centers for Disease Control and Prevention, 2020). While the YRBS consists of an extensive list of risk factors and is widely used for its comprehensive data structure, the data missingness becomes prevalent when the questionnaire items are compared across time.

The inclusion criteria for variables relevant to the study were that the variables must be an item asked by each survey site and survey year included in the study. Some variables included in the YRBS, such as opioid use, cocaine, and meth use, were considered for inclusion as indicators of the substance use factor of the model. However, the prospective variables were only included in some survey years; and the variable number of alcoholic drinks an adolescent drank in one day was scarce when compared across sites within the survey year 2019 and were missing from survey years 2017 and 2015. Thus, they were not included in the current study. Also, factors cited by the literature as predictors of adolescent suicide of other races than Blacks and were included in the YRBS were not included in this study. One variable, adolescents' daily hours of sleep, has been linked to adolescent suicidality (Goldstein & Franzen, 2020) but not to

black adolescent suicidality, to the author's knowledge. As stated previously, the primary aim of the current research is to develop and evaluate a final model of black adolescent suicidality, which requires the model development to be guided and informed by the literature on black adolescent suicide (Byrnes, 2010). Since the factor of sleep did not emerge as a variable from the current study's literature, this variable was not included in the current study.

Many researchers suggest that employing a relatively small number of suitable variables in a final model is better than many poor variables (Morrison et al., 2017). The current study used the YRBS to identify risk factors from the literature on black adolescent suicidality to develop and evaluate the social-ecological model of suicidality among black adolescents. Finally, the YRBS did not include some risk and protective factors that emerged from the literature, such as adolescents' past mental health, family conflict, family relationship problems, parental support, peer support, and belonging to a spiritual community. These variables were not included in the study, thus limiting the social-ecological model identified in the current study. Chapter 5 of the current research further discusses this limitation's implication. The questions from the YRBS survey relevant to the present study, their instrumental definitions, interrater reliability for the current study risk measures of interest, and operational definitions for the current study are presented below. All measures included in the current study garnered a moderate (41%) or greater Cohen kappa statistic indicating acceptable levels of item-related interrater reliability with a confidence interval of 95% (Brener et al., 2002 and Raghupathy & Hahn-Smith, 2011).

Age

The YRBS measured *age* with one closed-ended item: "how old are you?" The variable was instrumentally defined as "12 years old or younger, 13 years old, 14 years old, 15 years old, 16 years old, 17 years old, 18 years old, and older". In the current study, age was categorized as "1" for ages 12 years or younger to 14 years old (early adolescents) and "2" for 15 years old through 18 years old (late adolescents).

Gender

Gender was measured by a closed-ended question: "what is your sex?" The responses were either "female or male." In the current study, the variable gender was categorized as "0," indicating female gender, and "1," indicating male gender.

Individual Suicidality Risk Factor Indicators

The indicators for the individual latent factor were all drawn from the YRBS. The indicators are as follows:

a) *Sexual minority* was measured with one closed-ended item: "which of the following best describes you?" The item response options were "heterosexual (straight), gay or lesbian, bisexual, and not sure." In the current study, sexual minority was categorized as "0" for respondents who self-identified as "heterosexual" and "1" for respondents who self-identified as "sexual minority" or "unsure."

b) *Hopelessness* was instrumentally defined as "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?" The reliability of this questionnaire item garnered an interrater kappa statistic of 56.4% (Brener et al., 2002). This item response was rated as "1" for "yes" or "2" for "no." In the current study, hopelessness was reverse-

scored and categorized as “0” for responses that were “no” and “1” for responses that were “yes.”

c) *Current tobacco use* was instrumentally defined as: “the number of days the adolescent smoked cigarettes in the past 30 days”. Current tobacco use response options were “1” for 0 days, “1” for 1-2 days, “2” for 3 to 5 days, “3” for 6 to 9 days, “4” for 10 to 19 days, “5” for 20 to 29 days, or “7” all 30 days”. The reliability of this questionnaire item garnered an interrater reliability item kappa statistic of 81.9% (Brener et al., 2002). The current study also categorized current tobacco use as previously mentioned.

d) *Daily tobacco use* was instrumentally defined as: “during the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?” The response options were “1” for “I did not smoke cigarettes during the past 30 days”, “2” for “less than one cigarette per day,” 3 for “1 cigarette per day”, “4” for “2 to 5 cigarettes per day”, “5” for 6 to 10 cigarettes per day, “6” for 11 to 20 cigarettes per day, or “7” for “more than 20 cigarettes per day”. The reliability of the previous questionnaire item garnered an inter-rater kappa statistic of 83.5% (Brener et al., 2002). In the current study, daily tobacco use was categorized as previously mentioned for all responses.

e) *Current cigar* was instrumentally defined as: “during the past 30 days, on how many days did you smoke cigars, cigarillos, or little cigars”. This item response options were “1” for “0 days”, “2” for “1-2 days”, “3” for “3 to 5 days”, “4” for “6 to 9 days”, “5” for “10 to 19 days”, “6” for “20 to 29 days”, or “7” for “all 30 days”. The reliability of this questionnaire item garnered an interrater kappa statistic of 59.7% (Brener et al., 2002). In the current study, the variable current cigar was categorized as previously mentioned for all responses in the present study.

f) *Current alcohol use* was instrumentally defined as: “during the past 30 days, on how many days did you have at least one drink of alcohol?” The response options were “1” for “0 days”, “2” for “1-2 days”, “3” for “3 to 5 days”, “4” for “6 to 9 days”, “5” for “10 to 19 days”, “6” for “20 to 29 days”, or “7” for “all 30 days”. The reliability of this questionnaire item garnered a kappa statistic of 70.9% (Brener et al., 2002). In the current study, alcohol use was categorized as previously mentioned for all responses.

g) *Current binge drinking* was instrumentally defined as: “during the past 30 days, on how many days did you have five or more drinks of alcohol in a row, that is, within a couple of hours?” This item response options were “1” for “0 days”, “2” for “1-2 days”, “3” for “3 to 5 days”, “4” for “6 to 9 days”, “5” for “10 to 19 days”, “6” for “20 or more days”. The reliability of the abovementioned questionnaire item garnered a kappa statistic of 67.6% (Brener et al., 2002). The current study categorized current binge drinking as previously mentioned for all responses.

h) *Current marijuana use* was instrumentally defined as: “during the past 30 days, how many times did you use marijuana?” This item’s response options were “1” for “0 times”, “2” for “1 or 2 times”, “3” for “3 to 9 times”, “4” for “10 to 19 times”, “5” for “20 to 39 times”, or “6” for “40 or more times”. The reliability of this questionnaire item garnered a kappa statistic of 76% (Brener et al., 2002). In the current study, the current marijuana use variable was operationalized, as previously mentioned, for all responses.

Relationship Suicidality Risk Factor Indicators

The indicators for the relationship latent factor were all drawn from the YRBS. The indicators are as follows:

a) Adolescents' engagement in a *physical fight* was instrumentally defined as: "during the past 12 months, how many times were you in a physical fight?" The item response options were rated as "1" for "0 times", "2" for "1 time", "3" for "2 or 3 times", "4" for "4 or 5 times", "5" for "6 or 7 times", "6" for "8 or 9 times", "7" for "10 or 11 times", or "8" for "12 or more times". The reliability of this questionnaire item garnered a kappa statistic of 67.8% (Brener et al., 2002). The current study categorized the variable physical fight similarly for all responses.

b) Adolescents' *physical interpersonal violence* was instrumentally defined as: "during the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose? (Count such things as being hit, slammed into something, or injured with an object or weapon.)." This item's response options were "1" for "I did not date or go out with anyone during the past 12 months", "2" for "0 times", "3" for "1 or more times", "4" for "2 or 3 times", "5" for "4 or 5 times", or "6" for "6 or more times". The reliability of the physical interpersonal violence item of the questionnaire garnered a kappa statistic of 53.6% (Brener et al., 2002). The current study categorized physical interpersonal violence as previously mentioned for all responses.

c) Adolescents' *sexual interpersonal violence* was instrumentally defined as: "during the past 12 months, how many times did someone you were dating or going out with forcing you to do sexual things that you did not want to do? (Count such things as kissing, touching, or being physically forced to have sexual intercourse.)." This item's response options were "1" for "I did not date or go out with anyone during the past 12 months", "2" for "0 times", "3" for "1 or more times", "4" for "2 or 3 times", "5" for "4 or 5 times", or "6" for "6 or more times." The reliability of this questionnaire item garnered

a kappa statistic of 65.8% (Brener et al., 2002). In the current study, Sexual interpersonal violence was categorized as previously mentioned for all responses.

d) Adolescents' experience of *school bullying* was instrumentally defined as: "during the past 12 months, have you ever been bullied on school property?" The item was rated as "1" for "yes" or "2" for "no." The inter-rater reliability of this questionnaire item garnered a kappa statistic of 46.5% (Raghupathy & Hahn-Smith, 2011). In the current study, school bullying was reverse-scored and categorized as "0" for "no" and "1" for "yes."

e) Adolescents' experience of *electronic bullying*: was instrumentally defined as "during the past 12 months, have you ever been electronically bullied?" The response options for this item were "1" for "yes" or "2" for "no." The inter-rater reliability of this questionnaire item was not available at the time of the current study. In the current study, electronic bullying was reverse-scored and categorized as "0" for "no" or "1" for "yes."

Community Suicidality Risk Factor Indicators

The indicators for the latent community factor were all drawn from the YRBS. The indicators are as follows:

a) Adolescents' perception of *school and community safety* was instrumentally measured as: "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?" This item's response options were rated as "1" for "0 days", "2" for "1 day", "3" for "2 or 3 days", "4" for "4 or 5 days", "5" for "6 or 7 days". The inter-rater reliability of this questionnaire item was a 31.5% kappa statistic. The current study similarly categorized the variable adolescent's perception of school and community safety.

b) Adolescents' experience of being *threatened with a weapon on school property* was instrumentally defined as: "during the past 12 months, how many times has someone threatened or injured you with a weapon such as a gun, knife, or club on school property?" The response options for this item were "1" for "0 days", "2" for "1 day", "3" for "2 or 3 days", "4" for "4 or 5 days", "5" for "6 or 7 days". The reliability of this questionnaire item garnered a kappa statistic of 42.0% (Brener et al., 2002). The current study operationalized the adolescent's experience of being threatened at school, as previously mentioned.

c) The districts instrumentally defined adolescents' geographic location as the variable *location*. Location was measured in the current study as "1" for districts in the northeast regions of the US, "2" for districts in the southeastern region, "3" for the western region of the US, and "4" for the southwestern part of the US.

Societal Level Suicidality Risk Factor Indicators

The items loaded onto the latent measure of societal risk were adolescents' access to weapons such as guns and the participants' district REI score. The adolescents' *access to weapons* data was drawn from the YRBS. This item was instrumentally defined as: "during the past 30 days, on how many days did you carry a gun?" The response options for this item were "0 times, 1 time, 2 or 3 times, 4 or 5 times, 6 or 7 times". The reliability of this questionnaire item garnered a Cronbach alpha of 65.7% (Brener et al., 2002). This measure was also categorized in the current study, similar to the parent study.

The participants' racial equity index (REI) score was the other societal-level latent variable indicator. The REI score of the participants' district was the second indicator of the societal level construct. A score of 1 indicates "needs improvement," while 100

means the most racially inclusive and overall population well-being within a given geographic location. In the current study, the REI remained a continuous variable and was operationalized as its raw score.

Dependent Variables/ Suicidality Outcome Measure

In the current study, the factor of *suicidality* was measured by suicide ideation, a suicide plan, suicide attempt, and suicide attempt. Each outcome measure consisted of one item drawn from the YRBS data set. *Suicide ideation* was instrumentally defined as: "during the past 12 months, did you ever seriously consider attempting suicide?" The response options for this item were "1" for any responses that were "yes" and "2" for any answers that were "no." The reliability of this questionnaire item garnered a kappa statistic of 74.3% (Brener et al., 2002). Within the current study, suicide ideation was reverse-scored and categorized as "0" for "no" or "1" for "yes."

Suicide plan was instrumentally defined as: "during the past 12 months, make a plan about how you would attempt suicide?" The response options for this item were "1" for "yes" and "2" for "no." The reliability of this questionnaire item garnered a kappa statistic of 66.6% (Brener et al., 2002). Within the current study, the variable suicide plan was reverse-scored and categorized as "0" for "no" or "1" for "yes."

The variable suicide attempt was instrumentally defined as: "during the past 12 months, how many times did you attempt suicide?" The response options for this item were "1" for "0 days", "2" for "1 day", "3" for "2 or 3 days", "4" for "4 or 5 days", "5" for "6 or 7 days". In the current study, suicide attempts were categorized as depicted above.

Suicide attempt with injuries was instrumentally defined as: "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?" The response options for this item were "1" for "yes" and "2" for "no." In the current study, the item suicide attempts with injuries were reverse-scored and categorized as "0" for "no" or "1" for "yes."

Initial Hypothesized Model

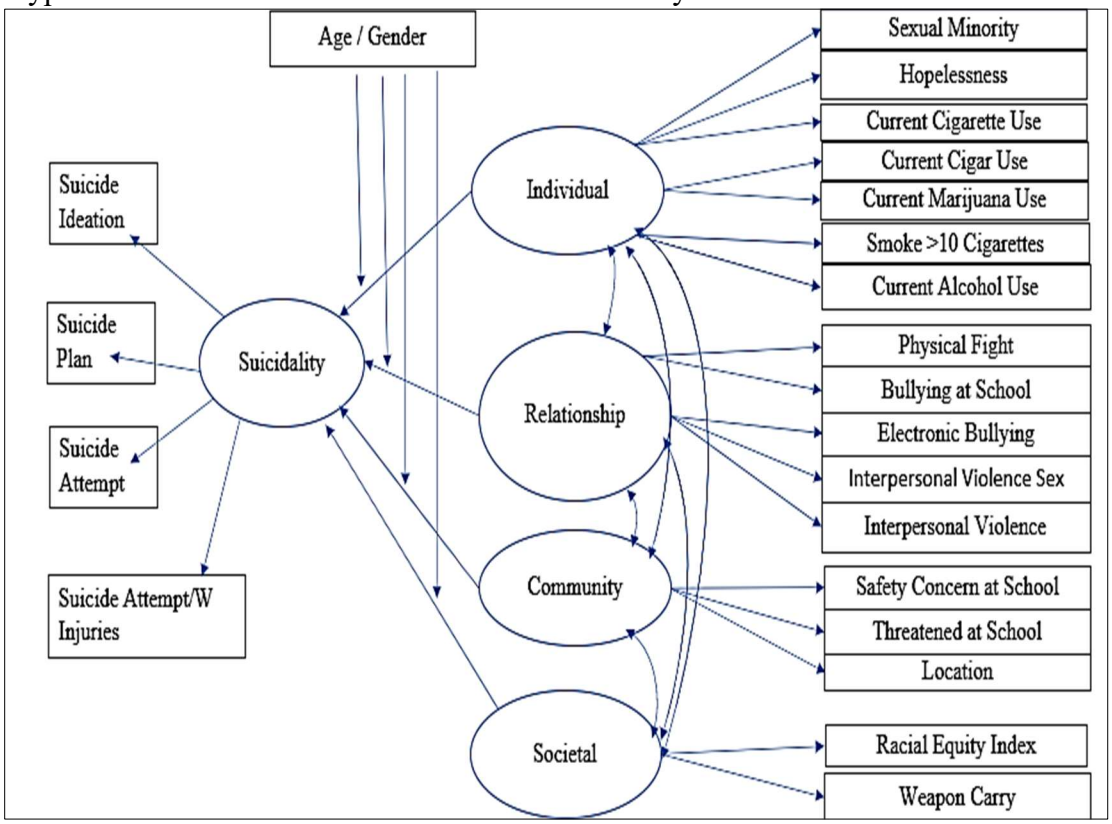
The hypothesized conceptual model for the current study is depicted in Figure 3. This model was analyzed using latent variable SEM, which "plays a vital role in analyses of interaction effects in which all independent variables are latent constructs" (Hancock & Mueller, 2013, p. 273). SEM allowed concurrent confirmatory factor analyses and identified the direct and indirect effects of the constructs on the dependent variables. The constructs evaluated in the initial hypothesized model were labeled individual, relationship, community, and societal risks. The risk factors were depicted as latent variables, hypothetical constructs that purport to explain covariation in behaviors (Hancock & Mueller, 2013). The latent factors in the structure have two or more variables that strengthen each latent factor structure while controlling for measurement error (Hancock & Mueller, 2013).

In the hypothesized model, the observed or measured variables are represented by rectangles, and oval shapes represent the latent constructs. The relationships of the variables or factors in the model were presented by unidirectional arrows for path designation and bi-directional arrows for the correlational association. The latent variables in the SEM models have residuals for each observed variable, which is the measurement that accounts for a possible variance for each observed variable not included in the model, including reliability and validity (Hancock & Mueller, 2013). Disturbances were also measured in SEM for all other influences of the variables in the

model (Hancock & Mueller, 2013). Residuals and disturbances were calculated and represented in the structural model. Additional details about the measurement used in SEM were discussed in the analysis part of the methodology.

Figure 3

Hypothesized Model of Black Adolescent Suicidality



Data Cleaning

The YRBS district data for survey years 2015, 2017, and 2019 were downloaded from the CDC website. Data cleaning and descriptive analyses were conducted utilizing the IBM Statistical Package for Social Sciences (SPSS) 23.0 data editor. The data were examined for unengaged respondents by ascertaining a low standard deviation in the responders' scores. The REI data were added to the data after that. Frequency analyses were executed to identify any missing or erroneous data. All variables included in the

model garnered a missingness percentage of less than 3%, which is well below the acceptable standard of 10% (Madley-Dowd et al., 2019). Considering the categorical nature of the missing data, all missing data were imputed using the mode of the variable (Madley-Dowd et al., 2019). The binary variables in the data sets were transformed using reverse scoring. This method of coding ensured that the values of the variables were aligned with the label's context of each indicator, simplifying the interpretation of the variables of interest in this study (Byrne, 2010). Finally, the data's normality was also assessed using histograms, skewness, and kurtosis values ascertained through frequency analysis.

Data Analysis

As discussed, the current study used EFA and CFA to assess a social-ecological model of black adolescent suicidality. The process consisted of first evaluating the hypothesized model through a CFA, which resulted in a misfit of the model to the data. An EFA was then employed to inform the modified model's re-configuration and specifications, followed by a CFA to estimate the modified model goodness of fit of the data from survey years 2015, 2017, and 2017. Details of the current study's analysis process are depicted below.

Structural Equation Modeling (SEM)

The current research focused on testing and evaluating a multivariate model as hypothesized, providing the rationale for using structural equation modeling as a data analysis technique. SEM was used as the primary method of analysis in this study.

As stated earlier, the current study engaged in SEM. Two models were analyzed: measurement and structural models (Byrnes, 2010). Both types of models were

configured and estimated at each phase of the SEM analyses, and the phases of the steps were: 1) CFA of the initial hypothesized model, 2) EFA to identify a modified model, and 3) a CFA to confirm the modified model and present a final model. Each phase began with the setting of the measurement model. The measurement model is part of the model that refers to the independent variables or constructs at each phase of the analysis (Byrnes, 2010). The results of the EFA informed the configuration of the modified measurement model. The EFA conducted in this study was focused on discovery or generating (Brown, 2010; Byrnes, 2010; and Little, 2002), where all items of interest were empirically evaluated by their commonality, and factors emerged as a result (Pearson & Mundform, 2010). The structural part of the hypothesized model and the modified models' latent variables' direct path or relationship to the outcome variables and the latent factors' correlational associations were evaluated. Acceptable factor loadings and the overall performance of the measurement and structural models were assessed using the global level of fit indices the model yielded (Byrnes, 2010).

Goodness of Fit Indices. The following criteria are generally used to measure model fit to reduce the probability of Type I and Type II errors in the examination of structural models (Hancock & Mueller, 2013): The chi-square ($\chi 2$) likelihood ratio statistic, the goodness-of-fit indices (GFI), the standardized root means square residuals, (SRMR) Index, the comparative fit index (CFI), and the root mean square error of estimation (RMSEA). The chi-square ($\chi 2$) likelihood ratio statistics is an absolute fit index that examines the discrepancy between the theoretical and empirical models (Hancock & Mueller, 2013). A significant $\chi 2$ indicates that the theoretical model does not fit the empirical data, while a nonsignificant $\chi 2$ (p-value > 0.05) indicates a good fit. The

GFI is the proportion of variance accounted for by the population measure of the directional relationship between two random variables (Hancock & Mueller, 2013). Any value equal to or greater than .90 indicates a good model fit. The SRMR analyzes the difference between the observed correlations and the model-implied correlations about variables of the model (Byrnes, 2010). The target value for the SRMR is <.05 (Byrnes, 2010). The CFI analyzes the differences between the empirical data and the theoretical model. A value of .90 indicates a good fit. The model's overall goodness of fit was measured using Root Mean Squared Error of Approximation (RMSEA), which measures the model's fit with the sample in the current study. Hu and Bentler (1999) reported that the RMSEA index smaller than 0.06 would be a criterion that suffices as a good model fit.

Power. The current EFA required a minimum sample size of 180 participants (Pearson & Mundform, 2010). The sample included in the EFA consisted of 2448 respondents from the survey year 2015, rendering the sample size adequate to conduct the EFA. The desired statistical power for the CFA estimation of the models is 0.8 (Hancock & Mueller, 2013). The model's post hoc sample size was calculated using an online calculator (Soper, 2022). The calculator was set at an anticipated effect size of 0.1, for a model with four latent variables and 24 observed variables, at a probability level of 0.05, which determined that a minimum sample size of 1,454 participants is needed to yield the desired metrics. Therefore, the sample size in the current study, 2,248 for the survey year 2015, 3,106 for the survey year 2017, and 2,389 for the survey year 2019, was sufficient to execute the SEM analyses.

Phase I Specification of Hypothesized Model. The hypothesized model, depicted in Figure 3, was configured in IBM AMOS 27 SEM software with the initial constructs of 1) individual factor, 2) relational factor, 3) community factor, and 4) societal factor. The configuration was informed by the literature and evaluated through CFA. According to Byrnes (2010), a CFA is an appropriate approach to initiate an SEM if the model is undergirded by existing literature. All indicators were included in the hypothesized model specifications with corresponding error variances. The model was adjusted using modification index values to adjust the model to achieve acceptable fit indices. Modification index values in AMOS provide suggestions to respecify or reconfigure the model by adding correlational arrows to the error terms of the indicators based on an approximated decrease in the chi-square of the overall model, thus increasing the quality of the model fit statistics (Byrnes, 2010). Although the modification index values approach guides the researcher during the specification portion of the CFA, modification index values should be used cautiously and be theoretically sound. The reasons a researcher can correlate the item's error terms to improve the model's chi-square and thus its overall performance are in cases where there is evidence of response bias where the respondents agreed with statements without regard to the item's content if the items were reversed or worded similarly, or if there were factors that impeded the respondents reading abilities or abilities to answer the questionnaires truthfully (Brown, 2006; and Byrnes, 2010).

In the current study, the factor indicators' error terms were adjusted if the modification indices recommended the adjustments, the item's error terms were reversed or similarly worded, and the items' error terms were loaded on the same latent structures.

All modification indices with a value of 10 were examined and implemented to yield an acceptable fit rating of the measurement model. The attempt to specify a measurement model according to the hypothesized four-factor configuration resulted in a poorly fitted model.

According to Byrnes (2010), a measurement model may not garner appropriate fit indices during CFA if one or more indicators have cross-loadings on several factors in the model, which requires further investigation (Byrnes, 2010). In structural equation modeling, EFA is commonly used with CFA when a researcher seeks to generate a model by identifying possible factors from observed variables and validating the factors via CFA (Byrnes, 2010). When a researcher abandons a CFA technique and transitions to EFA followed by another CFA due to a model's theoretical complexities or underfitting, which occurs quite often in SEM studies, one must do so with caution as the re-estimated model that derives from the EFA may have fundamental differences from said researcher study's original focus and theoretical underpinning (Byrnes, 2010). To identify and evaluate an ecological model of black adolescent suicide, it was necessary, at this phase of the analysis of the current study, to transition from a confirmatory factor analysis process to an exploratory factor analysis approach.

Phase II Exploratory Factor Analysis. Exploratory factor analysis (EFA) is a technique that identifies structure dimensionality by measuring observed variables' commonalities and discovering underlying constructs (Pearson & Mundform, 2010). The current study's exploratory factor analysis (EFA) was conducted using IBM SPSS version 27. To discover the factorial structure of the independent variables of interest in the study, eighteen observed variables of the hypothesized model were subjected to an

exploratory factor analysis with orthogonal rotation (varimax). A rule of thumb for the sample size to conduct a successful EFA is that for every variable being assessed, there must be 10 participants.

As stated earlier in this chapter, all the eighteen items included in the EFA yielded acceptable interrater reliability in the parent study. Thus, another item-level interrater reliability was not conducted through the current study's EFA. A correlational analysis of all items was conducted. Items that yielded consistently low (< +/-.20) Pearson Product correlations or high (>.80) inter-item correlations were deleted, as the fundamental purpose of conducting an EFA is to identify items that are inter-correlated (Pearson & Mundform, 2010).

The current study conducted a Kaiser-Meyer-Olkin measure to evaluate how suited the data was for the sample included in the EFA to verify assumptions prior to rotating the items on the factors. The KMO measure verified the sampling adequacy for the analysis, and a KMO score above .50 at a Bartletts' test of sphericity at a significant p-value of <.05 indicates the factor structure may be helpful for structure detection (Pearson & Mundform, 2010). The cut-off score for the factor loading coefficient was .3, and the Kaiser's criterion of eigenvalues greater than one was examined via scree plot as the minimum factor loading score of (+/-) .3 is needed to ensure the interpretability of the model (Pearson & Mundform, 2010). Each factor derived from the EFA by meeting all the criteria previously specified was examined through the varimax rotated matrix and renamed to form the current study modified constructs.

The constructs were renamed by examining each item that loaded on a factor contextually. Following the cautionary advice of Byrnes, 2010, two variables were

removed from the factor they loaded on as items were not similar in context to those that loaded on the factor. Keeping them was not theoretically plausible. Thus, the factors were removed from the latent factors and included in the complete structural model of the SEM as observed variables to ensure the modified model was aligned with the social-ecological theory.

Phase III Confirmatory Factor Analysis of the Modified Model. After the EFA was conducted, a CFA was initiated in the IBM AMOS version 27 to validate the modified model derived from the EFA. Each factor and its corresponding independent variables were created using Amos' graphical user interface (GUI). The model was adjusted using modification index values to adjust the model to achieve acceptable fit indices where it was acceptable to do so. As stated previously, modification index values in AMOS provide suggestions to respecify or reconfigure the model by adding correlational arrows to the error terms of indicators. After the adjustment, the CFA was executed using generalized least squares for parameter estimates. The current study employed generalized least squares estimation, considered robust when estimating models robust to violations of normality assumption (Byrnes, 2010). The measurement model of each factor yielded an acceptable level of goodness of fit indices.

The composite reliability (CR) and average variance extracted (AVE) statistics of the measurement models were calculated to garner the models' validity and reliability. The factors were then placed in the structural model, which included five latent factors and two observed variables. The parameter estimates and the goodness of fit indices were measured. Adjustments were also made to the structural model based on the modification index specified during the structural model's analyses to garner the best model that fits

the data. Once the best-fit model was identified, the outcome latent variable suicidality was added to assess the performance of the entire structural model.

Standardized loading estimates were garnered for each construct to ascertain a convergent validity measured by the average variance extracted score of .5 or higher to suggest adequate convergent validity, a composite reliability score of .7 or higher to indicate adequate convergence for internal consistency, and discriminant validity measured by maximum shared variance score that is less than the average variance extracted score (Hancock & Mueller, 2013). Indicators were adjusted until desired factor loading scores were achieved for each construct. Any factor that did not meet the recommended validity and reliability levels was retained, given that the factor was essential to the overall model. However, all issues with validity and reliability were presented in the limitation of the interpretation of the overall results.

Phase IV Structural Model. The structural model of the current study was developed by covarying the latent variables and the observed variables and establishing paths from said variables to the latent outcome variable of suicidality. The two observed variables in the structural model with paths leading to the outcome factor were binary categorical data, which were nonnormal (Byers, 2010). Modification indices were evaluated for theoretically reasonable adjustments. The model fit indices were assessed, and parameter estimates were analyzed to identify which factor(s) predicts suicidality. Nonsignificant factors were pruned, revealing a final structural model, which emerged as the current study model of black adolescent suicidality.

Moderation Analyses. Once the final model was estimated, the impact of the moderator variables, gender, and age was estimated. Multi-group confirmatory factor

analyses and path analyses were conducted in Amos version 27 to examine whether the effect of gender or age moderated the coefficient paths to the outcome variable in the final model. The gender-related groups were female and male; the age-related groups were early adolescents (respondents ages 11-14) and late adolescents (respondents ages 15-18). A test of configural factorial invariance was conducted to ensure the responses to the item in the model were equivalent across groups for both moderators. The fit indices for the unconstrained model were analyzed; if the indices reveal a good model fit, then the results indicate that the model performed equally across groups. The chi-square difference significance level for the constrained and unconstrained models was assessed. In that case, the chi-square test yielded a statistically significant difference ($p<.05$); the moderator was deemed effective in strengthening the paths from the latent factor or independent variable to the outcome variable (Byrnes, 2010). If the moderator significantly impacted the final model, each path was further analyzed through equality constraints to identify which path was statistically significant among the groups.

Model's Performance Over Time. The current study model's predictive power was assessed by using data from survey years 2015, 2017, and 2019. These analyses provided the current study with cross-validation that the predictors included in the structural model were valid in predicting suicidality (Byers, 2010). The fit indices of the final model for survey years 2015, 2017, and 2019 were compared and evaluated qualitatively.

Summary

This chapter explains the current study's methodology for developing and accessing a social-ecological model of suicide morbidity for black adolescents. A detailed

account of the phases of the analyses undertaken was discussed. Descriptive results of the current study's sample and study of interest, along with the CFA and EFA executed to identify a social-ecological model of suicidality, were included in Chapter 4 of this dissertation.

Chapter 4: Results

This chapter presents the research findings of the analyses conducted in the current study, which utilized secondary data from the Youth Risk Behavior Survey. The analyses were conducted to develop and assess a social-ecological model of black youth suicidality. The findings of the hypotheses are also discussed herein.

Preliminary Analyses

Data Preparation

The skewness and kurtosis were calculated and analyzed for REI, which is the only continuous variable in the model from survey years 2015, 2017, and 2019. When the skewness and kurtosis of the data were assessed for the racial equity index, the variable yielded a skew of -.68 (2015), -.14 (2017), and -.118(2019). REI also yielded a kurtosis score of -1.68 (2015), -1.563(2017), and -1.73(2019), indicating all skew and kurtosis scores were acceptable (< 3 for skew and < 10 for kurtosis) (Byrnes, 2010). All other variables included in the current study were categorical and exempt from skewness and kurtosis assessment (Byrnes, 2010; Hancock & Mueller, 2013).

Descriptive Statistics

Sample. In Table 4.1, the sociodemographic rates of the participants were calculated for all survey years. Overall, there were a total of 7,493 participants included in the current study. Of the total number, 54% were females, 88% were early adolescents, 84% self-identified as heterosexual, and 46% of the participants were from districts located in the southeastern region of the United States; no students who reside in rural communities were included in the current study. The YRBS data included sampling weights for the participants. However, sampling weights were not used in this study as

the study focused on developing a final model of suicidality for a subset of the adolescent population (Black or African American). The sample used in the study was all English-speaking only. It is assumed that in the US, Black Americans are primarily French or Spanish-speaker and thus not represented in this study.

Table 4.1

Sociodemographic Characteristics of Participants by Survey Year

Characteristics	Survey Year 2015		Survey Year 2017		Survey Year 2019		Total	
	N	%	*n*	%	*N*	%	*N*	%
Gender								
Female	1,313	53.6	1,652	53.1	1,337	56	4,302	54.1
Male	1,135	46.4	1,454	46.8	1,052	44	3,641	45.9
Age								
Early Adolescent	288	11.8	310	10	299	12.5	897	11.3
Late Adolescent	2,160	88.2	2,796	90	2,090	87.5	7,046	88.7
Sexual Minority								
Heterosexual	2,069	84.5	2,654	85.4	1,971	82.5	6,694	84.2
Homosexual/ Unsure	379	15.5	452	14.6	418	17.5	1,249	15.8
Geolocation								
Northeast	520	21.2	674	21.7	497	20.8	1,691	21.3
Southeast	1,115	45.5	1,260	40.6	1,311	54.9	3,686	46.5
Southwest	425	17.4	546	17.6	274	11.5	1,245	15.6
West	388	15.8	626	20.2	307	12.9	1,321	16.6
Suicide Ideation	367	15.2	389	16.3	414	13.3	1,170	15.6
Suicide Plan	318	13.1	395	13.3	353	15.3	1,066	14.2
Suicide Attempt	269	11	254	8	247	11	770	10.2
Suicide Attempt W/Injuries	96	3	92	3	73	3	261	3.4

Note. $N = 7{,}493$ There were an average of 2,647 participants per survey year.

Suicidality Prevalence. The participants' rates of suicide ideation, plans, attempts, and attempts with injuries were calculated. In the current study participants, 15.6% of participants reported they had considered suicide within the past 12 months,

14.2% reported they had planned on how to commit suicide in the previous 12 months, 10% reported suicide attempts within the previous 12 months, and 3.4% reported they had attempted suicide that had to be treated by a doctor. In the survey year 2017, the rates decreased slightly, then increased slightly in the survey year 2019 for suicide ideation, plan, and attempt. The rates of suicide attempts with injuries among the current study participants had no change over the three survey years.

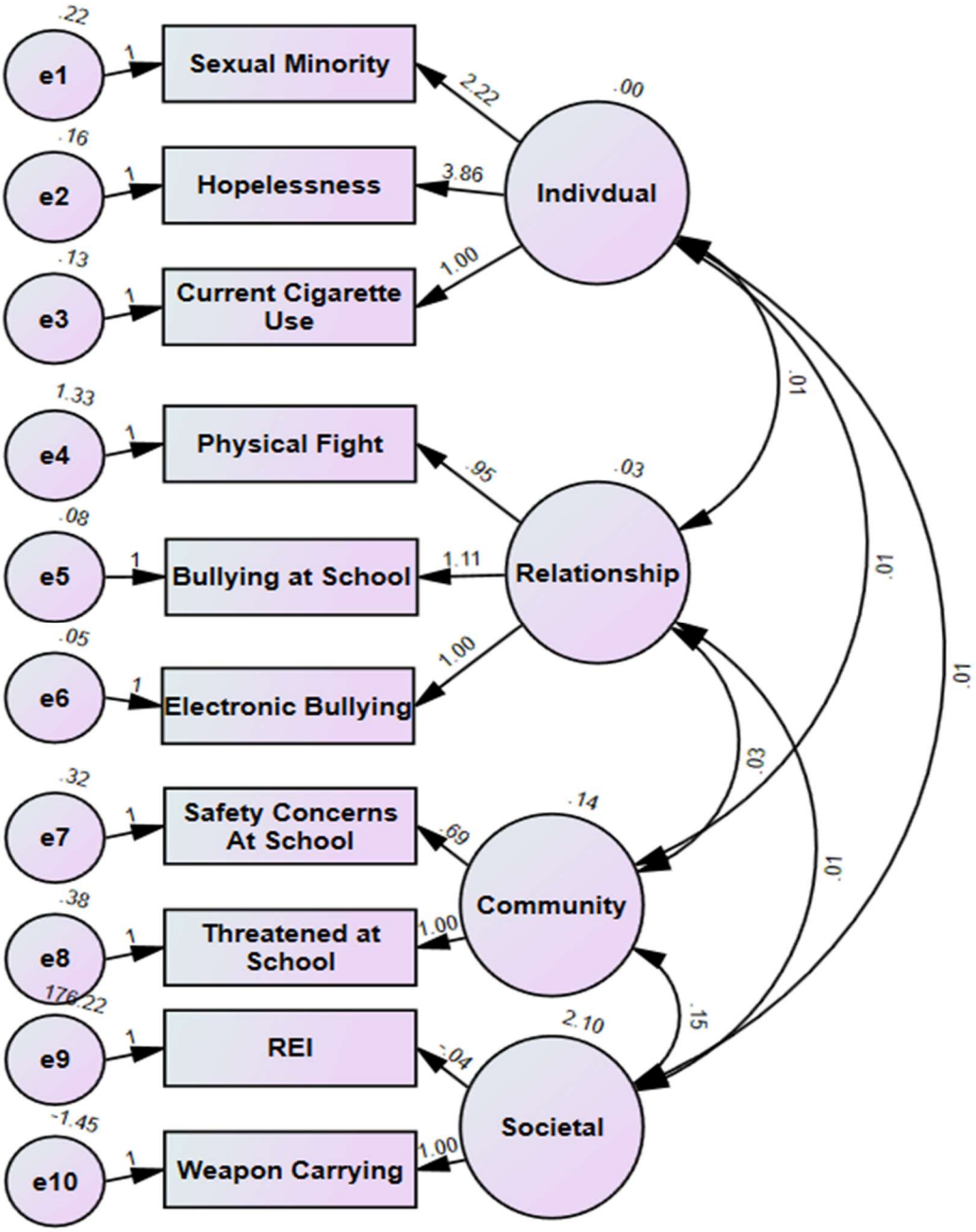
Hypothesized Model Estimation

The hypothesized model was estimated using generalized least squares estimator, a robust model estimation technique employed when data are complete and nonnormal (Olsson et al., 2000). The measurement aspects of the hypothesized model were assessed using confirmatory factor analysis, and the data used for the CFA phase were drawn from the survey year 2015. The initial hypothesized measurement model (HMM1) was unidentified and required modifications and adjustments. Due to the low factor loading of current marijuana use and the unexpected direction of the current cigar use, the variables were pruned to achieve model identification, and parameter estimates were re-calculated. The process of pruning variables with low factor loading required several rounds of re-estimation, and with each round different parameter coefficient estimates emerged.

The pruning process of HMM1 resulted in an identifiable and estimated model, hypothesized measurement model 2, depicted in Figure 4.1. The overall performance improved. However, several issues were observed. The first critical issue observed is that several indicators yielded unacceptable factor loadings or parameter estimates. While the variables physical fight and safety concerns at school garnered acceptable factor loadings

on their respective constructs, all other indicators yielded unacceptable parameter estimates (Byrnes, 2010; Little, 2002).

Figure 4.1
Schematics of Hypothesized Measurement Model 2 (HMM2)



Byrnes (2010) states that "parameter estimates should exhibit the correct sign and size and be consistent with the underlying theory. Any estimates falling outside the acceptable range (less than 1 and greater than .30) signal a clear indication that either the model is wrong, or the input matrix lacks sufficient information" (P.67). As a method to address the issue of low and high factor loadings, the respective indicator can be eliminated from the factor. However, removing REI from the societal factor would make the model unidentifiable. Each latent factor requires a minimum of two indicators to calculate coefficient estimates and ascertain the overall model indices (Byrnes, 2010). In addition, when current cigarette use paths to the individual factor or physical fight to the relationship factor were pruned, the model reverted to an unidentifiable status where estimates were not generated.

At this time of the initial CFA, the composite reliability (CR) and average variance extracted (AVE) statistics of the latent variable of the hypothesized measurement model were calculated to garner the latent variables' validity and reliability score. The factors individual factors yielded a CR value of .27 and AVE of .16; the relational factor yielded a CR of .42 and AVE of .28; the community factor yielded a CR of .38 and AVE of .24; the societal factor yielded a CR of .20 and AVE of .18. The CR and AVE of the hypothesized measurement model did not yield acceptable levels reliability and validity.

Finally, the HMM2 model's performance was estimated using survey years 2015, 2017, and 2019. However, the HMM2 did not yield acceptable levels of model fit indices compared to the recommended cutoff scores for either survey year (Survey Year 2015= CMIN/DF = 16.29 (< 3), CFI = .703 (.90), GFI (Not calculated), RMR (Not calculated),

RMSEA = .08 (<.05), and AIC = 544; Survey Year 2017 = CMIN/DF = 19.494 (< 3), CFI = .76 (.90), GFI (Not calculated), RMR (Not calculated), RMSEA = .07 (< .05), and AIC = 637; Survey Year 2019 = CMIN/DF = 14.85, CFI = .73 (.90), GFI (Not calculated), RMR (Not calculated), RMSEA = .07 (< .05), and AIC = 502). After many iterations of model configurations of the hypothesized models were unsuccessful, the hypothesized model was abandoned, and the exploratory factor analysis phase of the current study's analyses commenced.

Exploratory Factor Analysis

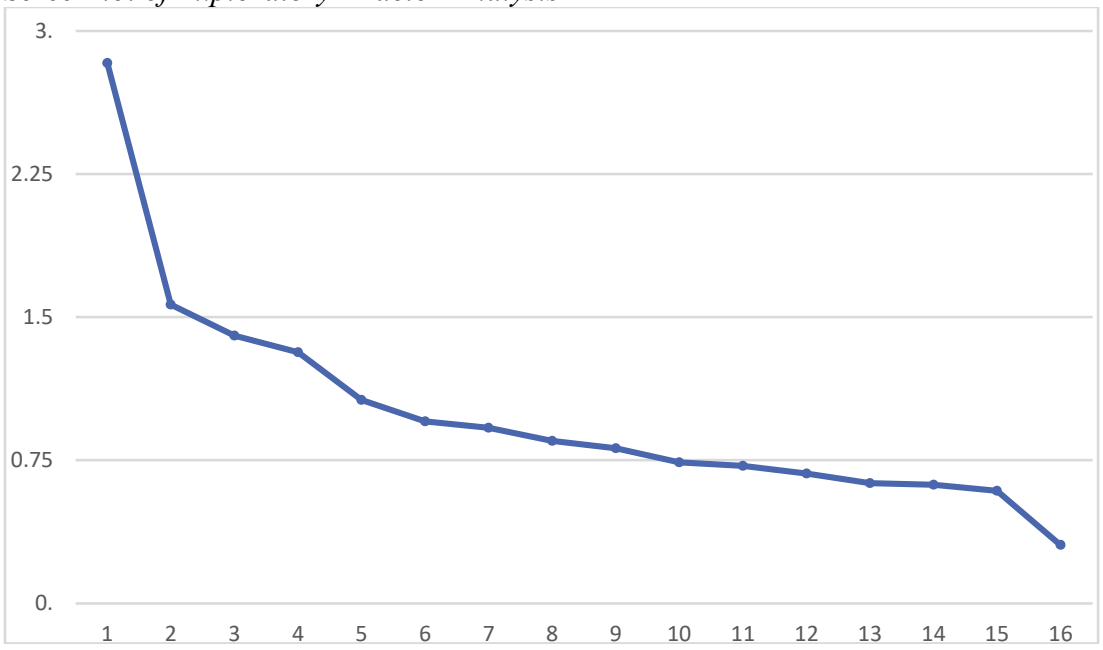
To generate a viable social-ecological model of black adolescent suicidality, exploratory factor analysis was conducted with all the current study's indicators and variables of interest. To yield a successful EFA, a minimum of 180 participants were needed. The EFA was conducted with the participants of the survey year 2015. As stated earlier, the number of participants included in the current study from the survey year 2015 was 2,448 respondents, rendering the sample size adequate to conduct the EFA. The Kaiser-Meyer-Olkin (KMO) measure was conducted to assess the data's suitability for the sample. The current study's exploratory factor analysis yielded an acceptable sample adequacy score of KMO =.70 and Bartlett's test of sphericity v2(91) =7122.09, p<.000, indicating that correlation structure is adequate for factor analysis. To identify any redundancy in the correlations between variables that yielded a correlation of greater than .80 was removed from the analyses, as any such correlation may be doubling the variables' contribution to the variance (Pearson & Mundform, 2010). The variable current cigarette uses and smoked >10 cigarettes per day yielded a Pearson correlation of .86, p=.001. The variable "current cigarette use" was kept in the exploratory analysis. In

contrast, smoke > 10 cigarettes were removed as the variable current cigarette uses were measured on the same scale as other indicators in the EFA and would reduce the likelihood of the EFA producing spurious factors (Watkins, 2018).

The exploratory factor analysis was conducted via maximum likelihood estimation with a cutoff point of .30 and the Kaiser's criterion of eigenvalues greater than 1. Any variables that did not meet the previously recommended values were suppressed and not included in the model. A scree plot review of the EFA results revealed a five-factor solution as the best fit for the data, accounting for 53% of the variance (see Figure 4.2).

Figure 4.2

Scree Plot of Exploratory2 Factor Analysis



The rotation of each factor was reviewed through the varimax-rotated matrix. The cross-loadings of indicators were analyzed. All indicators loaded on a unique factor except for the variable “safety concerns at school,” which loaded on factors 2 and 4. The “safety concerns at school” indicator yielded the highest factor loading (.43) for factor 2

and thus was removed from factor 4 in the configuration of the measurement model. The factor loadings were also reviewed for communality according to theoretical context. According to Marley Watkins (2018), while an indicator may be identified to have commonality with other variables and thus load on the same factor during the EFA, "measured variables should adequately represent the factor contextually and not include other variables from other factors" (p.222).

A review of the current study factor-related items revealed that all indicators loaded on their respective factor represented the factor contextually except for factor 4. In the case of factor 4, "sexual minority" (factor loadings of .33), which refers to the participant's sexual preference, and sad or hopeless, which refers to whether the participants were sad or felt hopeless two weeks consecutively (factor loadings of .58), loaded on the same factor as the experience of bullying at school (factor loading of .73) and electronically (factor loading of .72). While the experience of one of the previously mentioned variables may cause the other or be associated with each other, sadness and hopelessness, sexual minority, bullying at school, or electronic bullying do not define one specific domain contextually. Thus, the bullying at school and the electronic bullying indicators remained the indicators for factor 4 as they were contextually similar. Their factor loading values were also similar in ratings, indicating that both variables empirically measure the same domain. Sexual minorities and the sad and hopeless variables were removed from factor 4. Since the later variables did not load on any other factor but were essential to the focus of the current study, they were included in the model as observed variables which is discussed in detail later in this chapter.

Consequently, four indicators loaded onto factor 1, which was renamed "substance use," four indicators loaded onto factor 2, which was renamed "safety, lethal means, and violence," two indicators loaded on factor 3, which was renamed "interpersonal violence," two indicators remained in factor 4 which was renamed "bullying," and two indicators loaded on factor 5 which was renamed "community and society." The factor reliability scores for each factor were reviewed, and the factor "interpersonal violence" yielded an acceptable Cronbach Alpha level of >.80 (Watkins, 2018), while all other factors yielded less than optimal reliability ratings. Although factor reliability scores were less than optimal for the remaining factors, the constructs that emerged from the EFA remained in the model configuration and were included in the CFA phase of the analyses because of their importance to the current study. The inclusion of said factors will be discussed as a limitation in the succeeding chapter of this study. The above factors generated the current study's modified measurement model used in the confirmatory factor analysis.

Table 4.*2*

Exploratory Factor Analysis Factor Loadings with Factor Cronbach Alpha Scores

Model Items	Factor Loadings					
	1	2	3	4	5	Cronbach Alpha
Community/Society*						
Racial Equity Index Score					.794	
Location					.782	.10
Safety, Lethal Means, Violence*						
Safety concerns at school (a)		.434		.327		
Threatened at school		.679				
Physical fighting		.657				
Weapon carrying		.710				.50

Interpersonal Violence*						
Sexual dating violence			.904			
Physical dating violence			.894			.82
Bullying*						
Bullying at school (R)				.734		
Electronic bullying (R)				.720		.56
Substance Use*						
Current cigarette use	.600					
Current cigar use	.711					
Current alcohol use	.653					
Current marijuana use	.626					.57

Note. N = 2448. The extraction method was principal axis factoring with an orthogonal (Varimax with Kaiser Normalization) rotation. Reverse-scored items are denoted with an (R). *Denotes renaming of constructs. (a) Denotes variables or indicators loaded on two factors.

Confirmatory Factor Analysis of Modified Model

Measurement Model. The CFA was conducted with the data from the participant in the survey year 2015. As presented earlier in this chapter, through the process of the EFA, one variable (smoked >20 cigarettes per day) was dropped and not included in the CFA phase of the current study, while two variables (sexual minority and sad and hopelessness) were removed from the factor they loaded on and was included as the only observed variables. The new constructs or factors that emerged from the exploratory factor analysis using the original variables of interest of the current study were "substance use," "safety, lethal means, and violence," "interpersonal violence," "bullying," and "community and societal" (see Figure 4.3). The factor loadings, chi-square ($\chi 2$), and degree of freedom (df, N-1) were estimated in SPSS Amos version 27.

For the initial model estimation of the Modified Measurement Model 1 (MMM1), modification indices and the model's overall fit were reviewed. The overall fit indices of MMM1 resulted in a good fit (Table 4.3). The modification indices were then reviewed,

which recommend covarying the error terms of current cigarette use and current cigar use, as well as current cigarette use with current marijuana use, which reduced the chi-square of the overall model by 21.25 and 26.18, respectively, to configure the Modified Measurement Model Version 2(MMMV2). The change in the measurement model from MMM1 to MMMV2 yielded a decrease in chi-square form $\chi 2 = 254.4$, df = 67 to $\chi 2 = 199.8$, df=65. The model MMM1 and MMMV2 yielded indicator loadings greater than .30, which was expected considering the loadings were initially calculated using the EFA. At this stage, both models yielded a generally good fit (see Table 4.3).

The observed variables were then added to the measurement model (MMMV3). Figure 4.4 represents the Modified Measurement Model Version 3 (MMMV3), where the observed and latent variables were analyzed. At this stage, no theoretically plausible modification indices were observed, as all the modification indices were smaller than ten or were not theoretically sound. The correlation between the latent variables and the observed variables was analyzed. The correlation between bullying and hopelessness yielded a minimally acceptable significant positive correlational score of .31, which indicated that any increase in bullying significantly increases the participants' feelings of hopelessness. Interpersonal violence yielded a statistically significant positive correlation with substance use (.30), which indicated that their use of substances increased as the participants experienced interpersonal violence. The participants' experience of interpersonal violence increases, so do the participants' perception of concern for school safety, the experience of threats at school, access to a lethal weapon, or engagement in fights within the past 12 months, and the positive association was statistically significant (.36). Finally, the participants' perception of concern for school safety, the experience of

threats at school, access to a lethal weapon or engaged in fights within the past 12 months latent variable was positively associated with their substance use (.64), which yielded the most significant statistical correlational score within the MMMV3.

Table 4.3 below depicts the overall model fit for MMMV3, which yielded a chi-square of 245.2 and degrees of freedom of 83, and a good overall fit rating of (CMIN (χ2 /df) = 2.9 (<5), GFI=.98 (>.90), CFI= .92 (>.90), RMSEA = .02 (<.05). All factors in the MMMV3 yielded statistically significant estimates, except societal and community. The "community and societal" factor was retained for further analyses while estimating the complete structural model phase.

Table 4.3

Measurement models fit statistics.

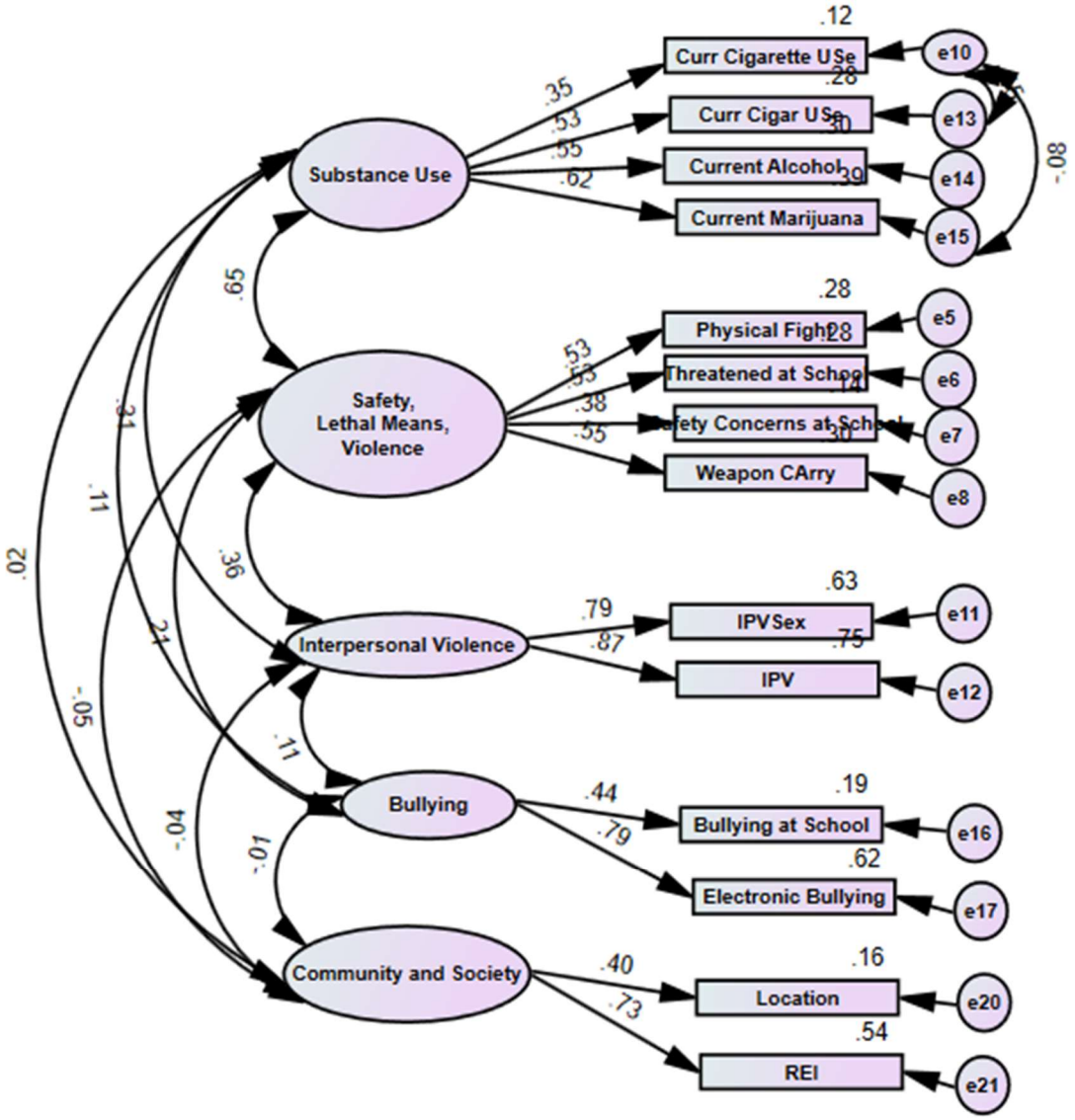
Model	χ2/df	AIC	BIC	SRMR	RMSEA	GFI	CFI
MMM1 (Latent only)	3.79 P = .000	330	550	.321	.03	.98	.92
MMMV2 (Latent with Covariances)	3.07 P = .000	351	638	.322	.02	.98	.93
MMMV3 (Latent, Observed Variables, and Covariances)	2.90 P = .000	279	511	.284	.02	.98	.92

Note: Acceptable levels of fit are χ2 /df <5, AIC/BIC the lower, the better, SRMR <.05, RMSEA <.05, GFI >.9, CFI >.9

During this phase of the CFA for the modified model, the composite reliability (CR) and average variance extracted (AVE) statistics of the latent variable of the modified measurement model were calculated to garner the latent variables' validity and reliability scores. The factors of interpersonal violence yielded a CR of .81 and AVE of .69; Substance use CR .61 and AVE of .28; the bullying factor yielded a CR of .56 and

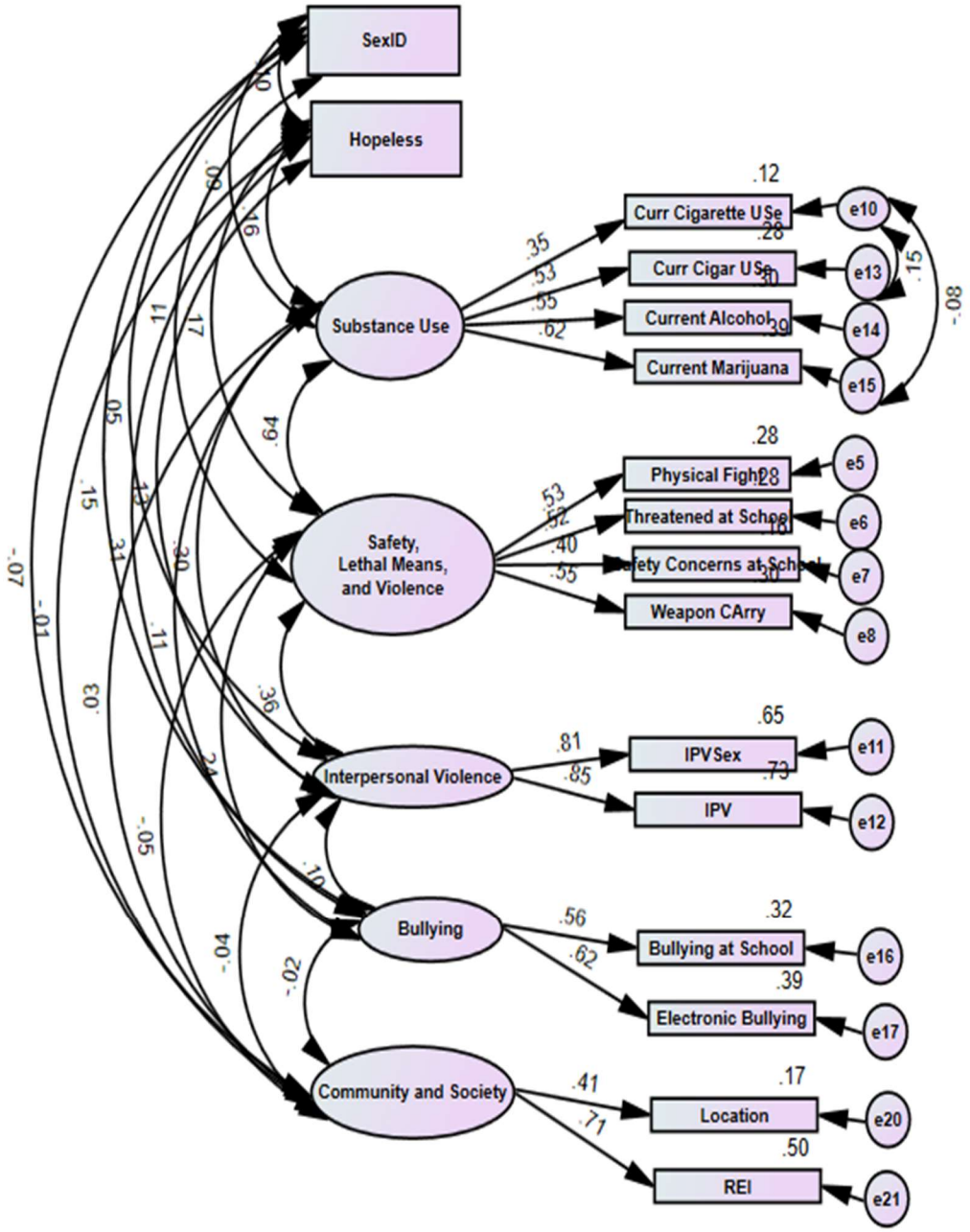
AVE of .40; the safety, threat, and violence factor yielded a CR of .57 and AVE of .25, and the community and societal factor yielded a CR value of .50 and AVE of .40. The CR and AVE values for the modified measurement model yielded ranged from good to poor levels of reliability and validity.

Figure 4.3
Modified Measurement Model Version 2 (MMMV2) (Latent Variables Only)



Note. Fit Indices: CMIN(χ2 /df) = 3 (<5), GFI=.98 (>.90), CFI= .92 (>.90), RMSEA = .02 <.05)

Figure 4.4
Modified Measurement Model 3 (MMMV3) (Latent and Observed Variables).

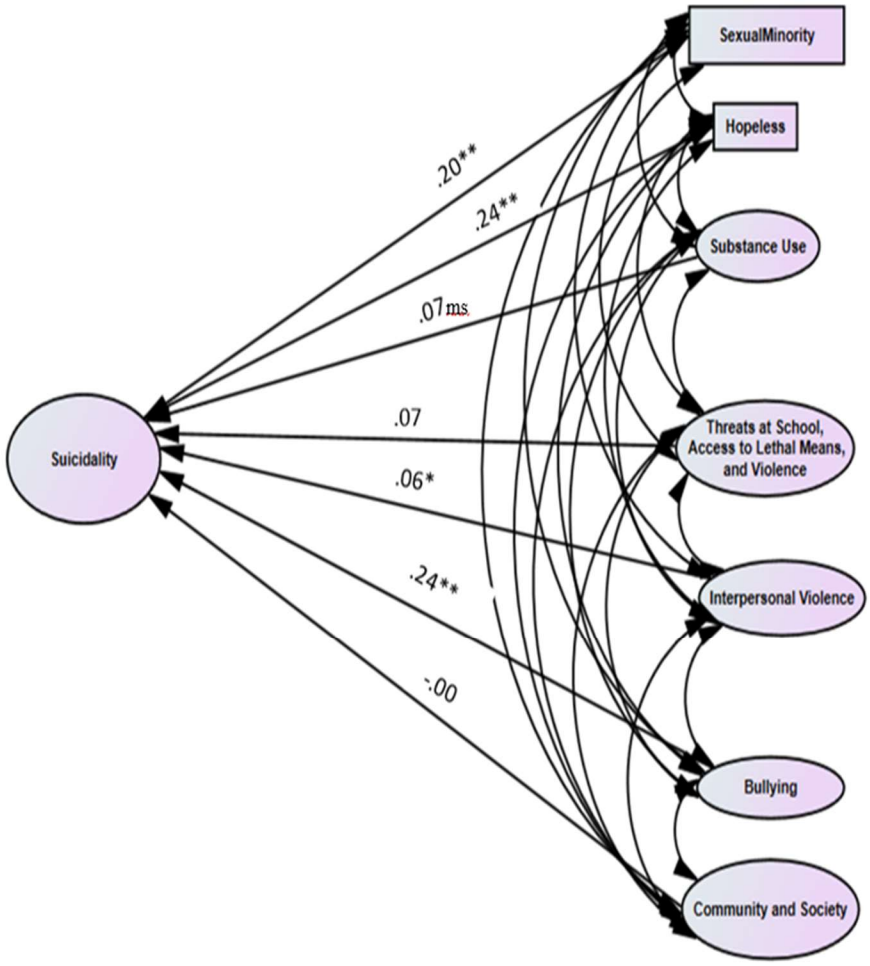


Note. MMMV3 Fit Indices: CMIN ($\chi 2$ /df) = 2.9 (<5), GFI=.98 (>.90), CFI= .92 (>.90), RMSEA = .02 (<.05)

Structural Modified Model. In this phase of the CFA, the dependent construct "suicidality" was added to configure and measure the entire structure of the modified model. Suicidality consists of four measures, suicide ideation, suicide attempt, a suicide plan, and suicide attempt with injuries. A Cronbach alpha of reliability test was conducted on the suicidality construct and yielded an a = .72, which is an adequate score indicating that the suicidality construct as defined in the current study is reliable. Figure 4.5 depicts Structural Model 1 (SM1) was estimated using data from the participants of the survey year 2015. The model was estimated in SPSS Amos version 27.

The SM1 model resulted in two modification indices which recommended the error terms of suicide ideation and suicide plan to be correlated, which yielded a modification index score of 20.2 decreases in chi-square and suicide attempt with injuries, which yielded another decrease in the model's overall chi-square of 67.7. Correlational relationships were implemented as it is theoretically plausible that suicide ideation and suicide plan are similar contextually, and suicide attempts and suicide attempts with injuries are similar. The covarying of the previously mentioned error terms formed the Structural Model Version 2 (SMV2). The parameter estimates SMV2 were estimated once more to generate the model's fit indices, which yielded overall fit statistics that were good.

Figure 4.5
Structural Model Version 3 (SMV3)



Note: The model depicts the structural part of the model only.
** Denotes p<.001, *denotes p <.05, and *ms* denotes marginally significant.

The analysis of fit indices of the SMV2 model indicated that the model fit statistics yielded an overall good fit (Table 4.4). The fit statistics were like that of the measurement model. The good fit indicated that the model fit the data and that the parameter estimates of paths to suicidality were ready for further investigation.

Table 4.4
Structural models fit statistics.

Model	$\chi 2$ /df	AIC	BIC	SRMR	RMSEA	GFI	CFI
SM1	5.0 (P = .000)	858	1252	.236	.04	.97	.81
SMV2 (With Covariances)	3.6 (P = .000)	648	1054	.235	.03	.98	.88
*SMV3- (Dropped Comm/Society, Substance use, and Safety, Threats, and Violence)	4.5 (P=.000)	173	348	.00	.03	.99	.95

Note: Acceptable levels of fit is $\chi 2$/df <5, AIC/BIC the lower, better, SRMR <.05, RMSEA <.05, GFI >.9, CFI >.9. * Denotes final model.

Standardized and unstandardized regression weights, standard errors, and p-levels of each path are included in Table 4.5. One crucial detail is that while one path was being analyzed, all other paths were constrained or held constant. The factors "substance use" was marginally statistically significant, while "community and society" and "safety, threats, and violence" were not statistically significant in predicting black suicidality; all other factors included in the model (SMV2) yielded a statistically significant factor loading. Although substance use was marginally significant, it was included in the final model of suicidality as it is theoretically plausible that the effect of substance use on suicidality may be different with the absence of other non-significant factors. The factors that did not yield a significant effect on suicidality were removed to present the best model to predict black suicide morbidity to generate the Structural Model Version 3 (SMV3) (see Figure 4.6).

Table 4.5

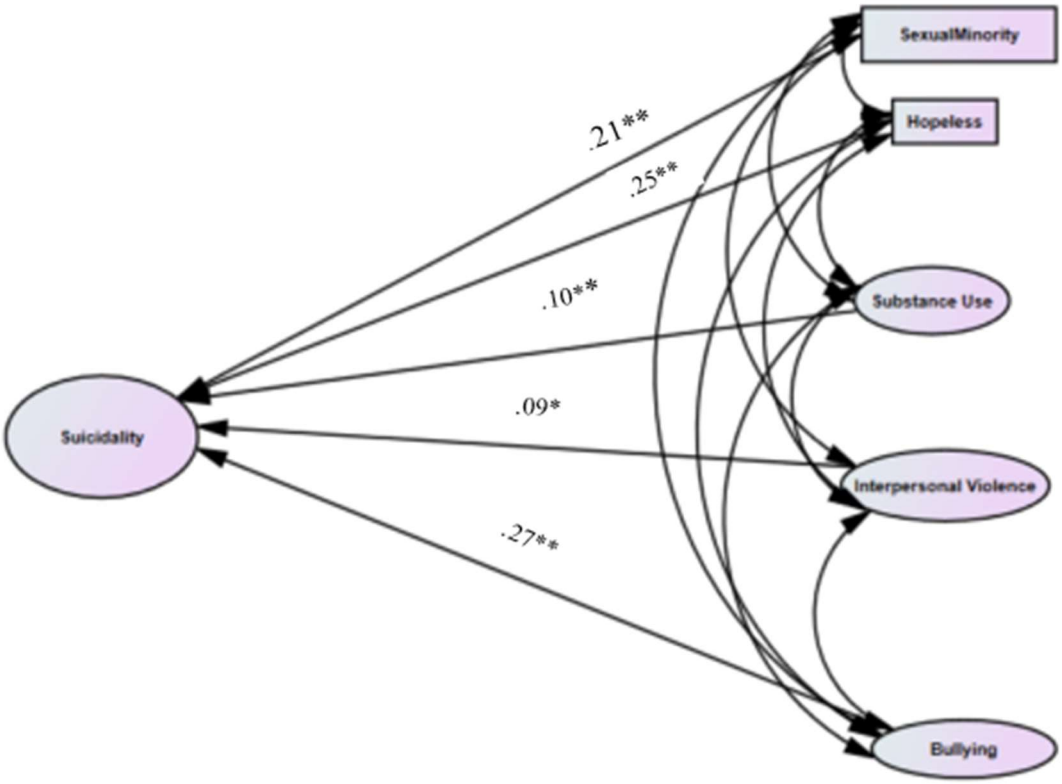
Structural Model's (SMV2) *Standardized Estimates and Standard Errors,*

Latent or measured variable	Standardized Regression	Unstandardized Regression	Standard Errors	P-Level
Sexual Minority	.20	.04	.005	<.001**
Hopeless	.24	.04	.005	<.001**
Substance Use	.07	.01	.009	.084(ms)
Threats at School, Access to Lethal Means, & Violence	.07	.00	.005	.144
Interpersonal Violence	.06	.00	.003	.031*
Bullying	.24	.097	.016	<.001**
Community and Society	-.002	.000	.005	.938

Note: ** Denotes (p.<.001), * denotes (p.<.05), and (ms) denotes marginally acceptable

The SMV3 (final model) resulted in the best fit of the models measured in the current study (see Table 4.4). The correlation statistics of the final structural model (SMV3) were compared to that of the correlations of the final measurement model (MMV3) with the dependent variable excluded). The positive correlational association of bullying and hopelessness increased slightly, from .31 (in MMMV3) to .34 (in SMV3), and the positive association of bullying and hopelessness decreased slightly, from .30 (in MMMV3) compared to .27 (in SMV3). There were no other statistically significant correlations between any other latent or observed independent variable in the final model (SMV3) as safety, threat, and violence (all of which were statistically significant with interpersonal violence and substance use in MMMV3) were removed in SMV3 due to their nonsignificance in predicting suicidality.

Figure 4.6
Structural Model Version 3 (SMV3)



Note. Final Model depicts the structural part of the model.
Fit Indices: CMIN $\chi 2$ /df) = 4.3 (<5), GFI=.98 (>.90), CFI= .92 (>.90), RMSEA = .04 (<.05)

The final model's (SMV3) variables standardized estimates were also evaluated in predicting suicidality for black adolescents. Once the non-significant factors were removed, substance use and bullying effect increased slightly while all other significant factors yielded a similar effect size on their ability to predict suicide for black adolescents. All factors of the final model (SMV3) yielded a statistically significant effect in predicting suicidality (see Table 4.6), which was expected as the removal of the non-significant factor of the model results in the improvement of the model's overall performance (Byrnes, 2010). The standardized scores and the p-level of the effects of

each variable on suicidality are further interpreted in the "Test of Research Questions" section of this chapter.

Table 4.6
Final Model (SMV3) *Standardized Estimates and Standard Errors*

Latent or measured variable	Standardized Regression	Unstandardized Regression	Standard Errors	P-Level
Sexual Minority	.21	.04	.005	<.001
Hopeless	.25	.04	.005	<.001
Substance Use	.10	.02	.005	<.001
Interpersonal Violence	.09	.10	.003	.016
Bullying	.27	.11	.015	<.001

The next step of the analyses conducted in this dissertation was testing the model's performance over time. This segment of the analysis included estimating the final model's fit statistics and qualitatively comparing the values of the survey year 2015 to 2017 and 2019. The final model yielded good fit statistics for each year, demonstrating that the model was stable over time.

Table 4.7
Final Model (SMV3) *Goodness-of-Fit by Survey Years*

Years	CMIN (<5)	GFI (>.90)	CFI (>.90)	SRMR	RMSEA (<.05)
2015	4.12	.99	.93	.00	.030
2017	4.30	.99	.94	.01	.033
2019	4.21	.99	.93	.01	.037

Moderating Analysis

Gender. The next stage of the analysis included assessing the moderating effects of gender on the final model of black suicidality. The moderating impact of gender (coded 0=Female and 1=Male) on suicidality was investigated through a multi-group analysis in Amos version 27. The first step in the multi-group analysis was essential to

conduct a configural invariance test to assess whether the model performed similarly for the males as it did for the females of the survey year 2015. A configural invariance test examines the factors and their loadings in a model to ensure a model is the same for both groups in SEM (Byrnes, 2010). In the configural invariance test, once the groups have been identified in Amos and estimates for each group were compared, the fit statistics of the test must result in an acceptable level of goodness of fit, which indicates that the model fits the data for both groups. The analyses for the model configural invariance test across gender resulted in the following fit indices CMIN= 3.3 (<5), GFI=.97 (>.90), CFI= .89 (>.90), RMSEA = .03 (<.05) across groups, indicating that the factors within the final model best represent the data for male and females alike.

The multi-group analysis's next step was determining whether gender moderates the structural model. This analysis examined the chi-square difference of the final model (full structural model) chi-square value for the male group compared to that of the final model chi-square value for the female group. The comparative model chi-square difference test for males and females yielded a chi-square difference of 41.21, which was statistically significant (see Table 4.7). This result indicates that gender moderates the final model (SMV3) as the model for the males did not yield equal chi-square values as the model for females.

The last step in the multi-group analysis was determining which path differed when moderated by gender. To determine the path-by-path difference in predicting suicidality across both groups, each path was constrained while the other paths were freed, resulting in an estimated decrease in chi-square for the constrained path. All the paths in the model were moderated by gender at a statistically significant level, except for

the bullying to suicidality path. While the bullying to suicidality path yielded a difference in factor loading for males versus females (Figure 4.7), the difference was not statistically significant.

Table 4.8

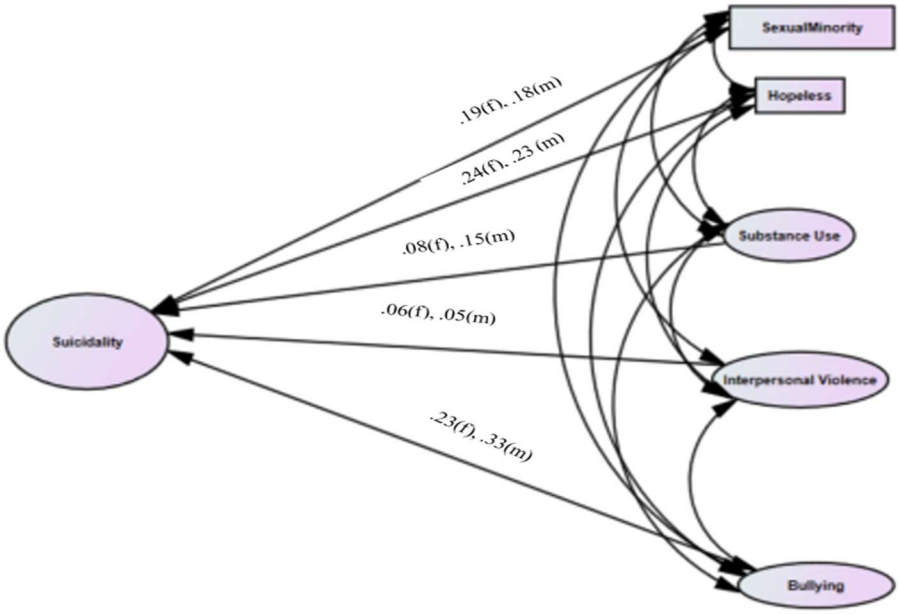
Final Model (SMV3) Moderated by Gender Survey Year 2015

Model	DF	CMIN	P-Level
Full Structural Model	13	41.210	.000
Sexual Minority to Suicidality	1	105.098	.000
Hopelessness to Suicidality	1	115.360	.000
Substance Use to Suicidality	1	103.288	.000
Interpersonal Violence to Suicidality	1	109.412	.000
Bullying to Suicidality	1	.126	.723

Note: DF= Degree of Freedom, CMIN= $\chi 2/df$, p= Probability significance level

Figure 4.

Structural Model Version 3 (SMV3) Moderated by Gender.



Note. (f) denotes female factor loading, and (m) denotes male factor loading

Age. The next stage of the current study analyses of 2015 data included assessing the moderating effects of age on the final model of black suicidality. The moderating impact of gender-coded (0=early adolescent and 1=late adolescent) on suicidality was investigated through a multi-group analysis in Amos version 27. As stated earlier, the first step in the multi-group analysis was essential to conduct a configural invariance test to assess whether the model performed similarly for the early adolescents as it did for the late adolescent group of the survey year 2015. A configural invariance test examines the factors and their loadings in a model to ensure the model is the same for both groups in SEM. In the configural invariance test, the adolescent groups were identified in Amos and estimated. The analyses for the model configural invariance test across age resulted in the following fit indices CMIN= 2.9 (<5), GFI=.97 (>.90), CFI= .91 (>.90), RMSEA = .02 (<.05) across groups, indicating that the factors within the final model best represent the data for early and late adolescents alike.

The multi-group analysis's next step was determining whether age moderates the structural model. This analysis examined the chi-square difference of the final model (full structural model) chi-square value for the early adolescent group compared to that of the final model chi-square value for the late adolescent group. The chi-square difference test of the full structural model yielded a score of 52.52, which was statistically significant (see Table 4.8).

The last step in the multi-group analysis was determining which path differed when moderated by age. To determine the path-by-path difference in predicting suicidality across both groups, each path was constrained while the other paths were freed, resulting in an estimated decrease in chi-square for the constrained path. Sexual

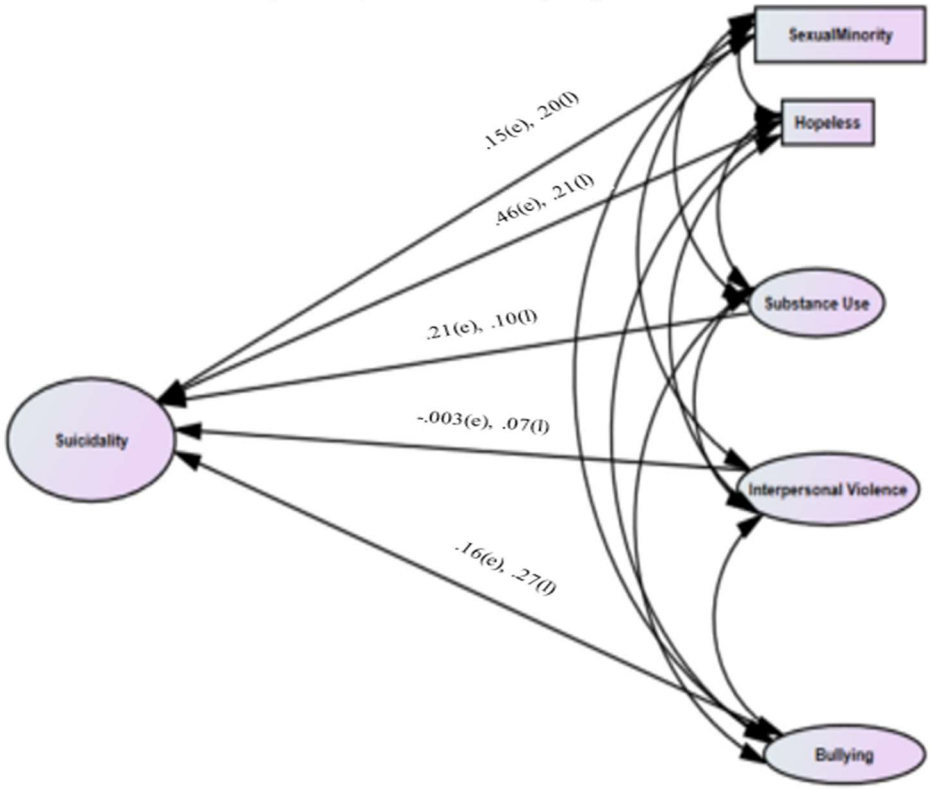
minority to suicidality and bullying to suicidality paths yielded a statistically significant difference in chi-square when moderated by age (see Table 4.); all other paths were not significantly different when moderated by age.

Table 4.8
Final Model (SMV3) Moderated by Age

Model	DF	CMIN	P
Full Structural Model	13	52.529	.000
Sexual Minority	5	13.176	.022
Hopelessness	1	1.970	.160
Substance Use	1	.106	.744
Interpersonal Violence	1	1.829	.176
Bullying	1	4.299	.038

Note: DF= Degree of Freedom, CMIN= $\chi 2/df$, p = Probability significance level

Figure 4.8
Structural Model Version 3 (SMV3) Moderated by Age.



Note. (e) denotes early adolescent group factor loading, and (l) denotes late adolescent group factor loading.

Tests of Research Questions

The research questions and hypotheses listed below were modified to reflect the changes to the initial hypothesized model that emerged from the analyses. Through the exploratory factor analysis, the latent variables were renamed and are reflected in the modified hypotheses. The hypothesized model's initial factors were individual, relationship, community, and societal factors. The factors and observed variables that emerged were sexual minorities, hopelessness, substance use, safety, threat, and violence, bullying, community, and societal and interpersonal violence.

Research Question 1*:* Do the identified indicators of individual, relationship, community, and societal factors satisfactorily measure each construct?

Results: It was hypothesized that the variables of adolescent's sexual minority, hopelessness, the number of days the adolescent smoked cigarettes in the past 30 days, the number of cigarettes smoked per day, the number of days the adolescent smoked cigars in the past 30 days, the number of days the adolescent drank alcohol, and the number of days the adolescent smoked marijuana in the past 30 days were communally define the construct individual factors. This hypothesis was unsupported as the individual factor, as most of the variables yielded a factor loading score of less than .3, indicating that taken together as configured in the hypothesized model, they did not define the individual factor as configured in the hypothesized model. Consequently, several of the variables of the individual factor were removed from the factor yielding a final factor that included sexual minorities, hopelessness, and current cigarette use. The final composite of the individual factor did not yield an acceptable level of reliability or validity. Finally, when the individual factor measured in the hypothesized model was evaluated (in HMM1

or HMM2), the hypothesized measurement model did not yield an acceptable fit and the HMM2.

It was also hypothesized that the variables of adolescent engagement in a physical fight, physical interpersonal violence, sexual interpersonal violence, the experience of bullying at school, and experience of electronic bullying would measure the construct relationship factor of the hypothesized model. This hypothesis was also unsupported for several reasons. The variables from this construct were also pruned due to low factor loadings. The relationship factor resulted in engagement in a physical fight, the experience of bullying at school, and the experience of electronic bullying. Also, the relationship factor yielded an unacceptable level of reliability and validity. Finally, when the relationship factor measured in the hypothesized model was assessed (in HMM1 or HMM2), the hypothesized measurement model did not yield an acceptable fit and the HMM2.

It was also hypothesized that the variables of adolescents' perception of community safety, the experience of being threatened with a weapon on school property, and residential location would directly measure the latent community risk factor. The residential location variable was removed from the community factor to improve the overall composite of the community risk factor. However, as configured in the final model, the community factor did not yield acceptable reliability or validity. The pruning of the variable left the construct with two remaining indicators, which may have contributed to the low reliability and validity levels. When the community factor as measured in the hypothesized model was assessed (in HMM1 or HMM2), the hypothesized measurement model did not yield an acceptable fit and the HMM2.

Finally, for research question one, it was hypothesized that the racial equity index (REI) score of the adolescents' residential location and the adolescent access to a weapon would measure the societal factor of the measurement model. This hypothesis was not supported. This factor also did not yield an acceptable reliability and validity score, and when configured in the hypothesized model, the model did not yield an acceptable goodness-of-fit level.

Through the initial CFA process, the hypothesized measurement model, which included the four factors (individual, relationship, community, and societal), did not yield an acceptable fit to the data and was abandoned. The next step of the methodology was focused on generating an identifiable modified model. This process was undertaken via an exploratory factor analysis; a combination of two observed variables (sexual minority and hopelessness) and five latent constructs (substance use, safety, threats, access to weapons, interpersonal violence, bullying, and community and societal) emerged.

Modified Research Questions. The remaining research questions and hypotheses were modified to reflect the renamed constructs from the exploratory analysis. The focus and aim to evaluate and measure the social-ecological model (individual-level, relationship-level, community-level, and societal-level factors) of black adolescent suicidality were maintained while the remaining research questions and hypotheses were modified to reflect the renaming of the constructs.

Research Question 2: What are the effects of individual, relationship, community, and societal-related factors on suicidality?

Results: It was hypothesized that each of the variables and factors, except the community and societal factors, would have a significant positive association with black

adolescent suicidality. This hypothesis was partially supported. The sexual minority and hopelessness observed variables and the latent constructs of substance use, interpersonal violence, and bullying yielded a statistically significant direct effect. However, safety, threats, access to weapons, and community and societal constructs did not yield a statistically significant direct effect on black adolescent suicidality. Further details about these relationships are provided in the results of the research questions.

Research Question 3*:* Is the final model of black adolescent suicidality moderated by age or the participant's gender?

Results: It was hypothesized that there would be a difference in the effect of each observed variable and factor on suicidality among the age (early and late adolescents) and gender (male and female) groups. The effects of each variable and latent factor included in the final model of black adolescent suicidality were moderated by age for the survey year 2015. This hypothesis was supported as when the model for an early adolescent was compared to that of the late adolescent, the multi-group equality test of chi-square difference resulted in a statistically significant difference. This result indicates that age moderates the final model (SMV3), as the model for the early adolescents did not yield equal chi-square values as the late adolescents.

It was hypothesized that the effects of each of the observed variables and latent factors included in the final model of black adolescent suicidality (SMV3) are moderated by gender. This hypothesis was supported as the model for males was compared to that of females in a multi-group equality test of chi-square difference, which resulted in a statistically significant difference. This result indicates that gender moderates the model

(SMV3) as the model for the early adolescents did not yield equal chi-square values as the model for late adolescents.

Research Question 4: Does the observed social-ecological model of black adolescent suicide morbidity perform the same in the survey years 2015, 2017, and 2019?

Results. The final model of adolescent black suicide morbidity was assessed over time. The model was evaluated qualitatively by comparing the overall fit for each survey year. The findings indicate that the model performed each year, similarly, garnering a good overall fit over time.

Chapter 5: Discussion

This study aimed to develop and assess a social-ecological model of suicidality using the data derived from the Youth Risk Behavior Survey, a widely used national survey completed on an ongoing basis. Suicidality is a multifaceted problem influenced by factors of multiple levels of a person's biological, psychological, social, and environmental dispositions in life. The current study applied a structural equation modeling through the confirmatory factor analysis of the hypothesized model (consisting of individual, relational, community, and societal factors), which yielded unacceptable fit indices due to the hypothesized model configuration—an exploratory factor analysis that resulted in a modified model of black adolescent suicide and reconfigured constructs.

The modified model was estimated using a second confirmatory factor analysis to identify the association between the effects of the sexual minority factor, sad or hopelessness factor, the concern for safety, lethal means, physical violence factor, interpersonal violence factor, bullying factor, and substance use factor. The hypothesized and modified model maintained its overarching focus of assessing biological, psychological, interpersonal, community, and societal variables to identify a social-ecological model of suicidality for black adolescents. The current study evaluated the models in a sample of 7,493 black adolescents over three survey years (2015, 2017, 2019) in four different geographic regions in the US. To the author's knowledge, this is the first study to assess a social-ecological model of suicidality for a significant geographically represented sample of black adolescents, validated over several succeeding years.

One vital result of this study is the identification of the final model of suicide morbidity for black adolescents. Black adolescents who self-identifies as sexual minorities, experience feelings of sadness or hopelessness, use substances, experience interpersonal violence victimization, and experience being a victim of bullying are more likely to experience suicidality (suicide ideation, suicide plan, suicide attempt, and suicide attempt with injuries). The literature supports the positive associations of the above factors.

However, safety concern, access to lethal weapons, or experience of a physical fight (as measured and evaluated in the current study) did not have a significant impact on black adolescent suicidality, which is contrary to the reviewed literature related to black adolescent suicidality. In the following sections, these and other key findings from the final model will be discussed, and the study's limitations and suggestions for future research and practice will be presented.

The Social-Ecological Model of Black Adolescent Suicidality

The original aim of the current study was to identify and assess empirically informed indicators of individual, relationship, community, and societal risk factors guided by a social-ecological model that predicts suicidality among black adolescents. The hypothesized model was configured by loading all the biological, psychological, and sociodemographic variables (current alcohol use, smoking more than twenty cigarettes in one day, current cigar use, current marijuana use, hopelessness, and sexual minority) on one factor called individual. All the variables related to interpersonal relationships and experience of violence with close friends or family (physical interpersonal violence, sexual interpersonal violence, physical fight, bullying at school, and bullying

electronically) were loaded onto the relationship factor. Finally, the exposure to community violence (concern for safety at school or on the way to school and regional location) was loaded onto the community factor. Finally, the racial equity index and access to weapons were loaded onto the societal factor (Figure 3). As mentioned before, during the first CFA phase of this study, the hypothesized model was abandoned in search of an identifiable social-ecological model of black adolescent suicidality.

All the above variables were used to conduct an EFA followed by a CFA where a social-ecological model of black adolescent suicidality emerged (SMV3). The aim was to identify and assess a social-ecological model of suicidality. While this aim was underscored at every phase of the current study, the final model resulted in a two-level risk model. The final model consisted of the observed variables, sexual minority and hopelessness, and the substance use factor, which are all factors of the individual risk level of the social-ecological model of suicide prevention. The current study's final model also consisted of the interpersonal violence factor and bullying, which are relationship risk level factors of the social-ecological model of suicide prevention. All community risk level factors or societal risk level factors (threats at school, access to lethal means, and physical violence factor or the community and societal factor) were nonsignificant predictors of suicidality for black adolescents.

The Effect of Sexual Minority

As postulated through the modified hypothesis of the current study, sexual minority (the participant self-identifies as heterosexual or homosexual) had a positive and significant effect on back adolescent suicidality, indicating that when a black adolescent identifies as a homosexual or is unsure of their sexual identity, they are likely to

experience suicidality (.21, p<.001) than a black adolescent who self-identifies as a sexual minority. This finding is consistent with prior research on black adolescents indicating that sexual minority status is positively associated with suicidality (Opara, 2020, Human Rights Center, 2019, Stone et al., 2014). The variable age (early or late adolescent) and gender (female or male) moderated the path from sexual minority to suicidality. The path of the sexual minority to suicidality of black adolescents was moderated by gender, and the effects of sexual minority on suicidality were significantly different for males than when participants identified as females.

When the participants' sexual minority status was combined with identifying as a female, the path to suicidality strengthened. The path of self-identifying as a sexual minority to suicidality of black adolescents was also moderated by age. The effects of identifying as a sexual minority on suicidality were significantly different for early adolescents than for late adolescents. When the participants' sexual minority status was combined with being a late adolescent (ages 15-19), the path to suicidality strengthened. To date, this study joins the body of knowledge in emphasizing the critical role of sexual minority status when conceptualizing suicidality among black adolescents. However, the moderating effects of gender and age on the path of sexual minorities and its effects on black adolescent suicidality add value to the existing literature.

The Effect of Hopelessness

Another finding was the statistically significant effect of hopelessness on predicting suicidality in black adolescents. Black adolescents who report they experience feelings of sadness or hopelessness almost every day for two weeks or more in the past year are more likely to experience suicidality (.25, p<.001). This finding is consistent

with the literature that indicates higher levels of hopelessness contribute to higher suicide ideation and suicide attempts (Bennet & Joe, 2015; Matlin et al., 2011; CDC, 2020; Pinderhughes, 2015; Opara, 2020). The variable age (early or late adolescence) did not moderate the path from hopelessness to suicidality; however, gender (females or males) did. When the path of hopelessness to black adolescent suicidality was moderated by gender, the effects of hopelessness on suicidality were significantly different from males; when participants identified as female, the path from hopelessness to suicidality strengthened. As it pertains to the role of hopelessness in predicting suicidality, this study joins the existing literature underscoring hopelessness as a significant factor in predicting black adolescent suicidality.

The Effect of Substance Use

The effect of substance use (current cigarette use, current cigar use, current marijuana use, and current alcohol use) were statistically significant on black adolescent suicidality. In this study, the positive effect of current substance use (within the past 30 days) and suicidality among black adolescents was observed and is aligned with the review of the results of other studies (Tomek et al., 2015; Bennet & Joe, 2015). Substance use in the current study was measured similarly to that of Tomek et al. (2015) and the Bennet & Joe (2015) study supporting the notion that higher substance use led to increased suicidality among black adolescents. In the current study, black adolescents who use substances described herein are more likely to experience suicidality (.10, $p<.01$).

The variable age (early or late adolescence) did not moderate the path from substance use to suicidality; however, gender did. The path of substance use to black

adolescent suicidality was moderated by gender, and the effects of substance use on suicidality were significantly different for males than females. When participants identify as male, the path from substance use to suicidality strengthens. As it pertains to the role of substance use on the direct path to predict suicidality among black adolescents, this study joins the existing literature underscoring the importance of including substance use as a factor.

The Effect of Interpersonal Violence

Interpersonal violence in the current study was measured as the experience of physical and sexual dating violence among black adolescents in the past 12 months. Alhusen et al. (2015), found a significant positive relationship between IPV and black suicidality among women. The current study also found equivalent results. In this study, the experience of interpersonal violence increases the likelihood of suicidality among black adolescents by 1.09 times. When the path of IPV to suicidality was evaluated through the lens of gender and age, the path was significantly different for males and females but not for early adolescents versus late adolescents. When the experience of IPV within the past twelve months is combined with self-identifying as a female, the path from IPV to suicidality strengthens. As it pertains to the role of IPV on the direct path to predicting suicidality among black adolescents, this study joins the existing literature underscoring the importance of including substance use in addressing suicidality. To the author's knowledge, the observation of gender moderating the path of IPV to suicidality of black adolescents was observed in the current study and is a novel finding that also contributes to the existing body of knowledge.

The Effect of Bullying

In the current study, bullying yielded the highest factor loading indicating the largest significant association with black adolescent suicidality. Consistent with other research (Fitzpatrick, Piko, & Miller, 2008; Opara, 2020), being a victim of bullying was positively associated with black adolescent suicidality indicating that as the experience of bullying increases, the likelihood of suicidality increases by 1.31 times. When this path was analyzed through the lens of gender and age, the path was moderated by both variables.

When bullying experiences at the school or electronically are combined with identifying as male, the path to suicidality strengthens. The path of bullying to suicidality of black adolescents was also moderated by age, and the effects of bullying on suicidality were significantly different for early adolescents than for late adolescents. The path to suicidality strengthens when the participants experience bullying victimization and late adolescents (ages 15-19). To date, this study joins the body of knowledge in emphasizing the critical role of sexual minority status when conceptualizing suicidality among black adolescents.

The Nonsignificant Effects of Threat, Safety, and Violence and the Community and Societal Factors

The experience of receiving threats at school, concerns for safety at or on the way to school, access to weapons, and experience of physical fighting within the past twelve months were positively associated with black adolescent suicidality. The direction of the relationship was expected and is consistent with the literature regarding precipitating events of black adolescents' suicidality (Centers for Disease Control and Prevention,

2020). Lambert (2008) analyzed the intervening impact of aggressive behaviors (measured by physical fights) among depressive symptoms and suicidality. In that study, the association did not mediate the impact of depressive symptoms on suicidality in black adolescents. In this current framework, the physical fight was communally associated with other violence-related measures, such as access to weapons and experiencing threats within the past twelve months. Nevertheless, the emerging threat, safety, and violence did not significantly impact suicidality in black adolescents. This study joins the literature demonstrating that experience of aggressive encounters or non-interpersonal violence does not predict black adolescent suicidality or when the previously mentioned variables were integrated and correlated in a multi-level framework.

The association of the community and societal-related factors on suicidality as measured in the current study (racial equity score index and geolocation) was in the right direction but nonsignificant. Community and societal factors were negatively associated. The negative association indicates that suicidality decreases when the community and societal factor increases. The observed association was not statistically significant.

These findings do not align with the literature, which may be explained by the differing level of measurement when discrimination in the current study is compared to another study that emerged from the literature. One research study reported that when black adolescents experience racial discrimination, the likelihood of suicidality rose 2.4 times, and the association was statistically significant (Arshanapally, Werner, Sartor, and Bucholz, 2017). Under the current study's framework, discrimination was measured on the societal level, not the individual level. In the current study, the higher the racial equity index scores (the discrimination measure), the lesser the racial discrimination. In the

Arshanapally et al. (2017) study, the higher the score garnered from the discrimination scale, the higher the presence of discrimination. The difference in the values related to the discrimination measure and the difference in experience level (individual or societal) are possible explanations for the contradictory direction of association with racial discrimination on suicidality in this study versus the current literature.

The final model that emerged from testing a four-risk level social-ecological model in the current study has offered insights into the varying pathways to suicidality for black adolescents. The model of black suicidality was successfully fitted to the data within this study, and its performance remained stable when estimated with three samples of black adolescents from different survey years. These findings speak to the predictive power of the final model and build on the existing body of knowledge, which provides some insights and directions for future research and practice. However, due to the limitations of the model, the data sources, and the measures used in the model of black adolescent suicidality, the findings herein should be interpreted with caution.

Limitations

One of the limitations of the current study is the use of secondary data. While the national representation and the size of the samples included in the current research were significant advantages, the measures included in this study were limited to the variables available in the datasets. Other variables (burdensomeness, sense of belonging, family relationships and conflict, and the role of religion) have been identified as a risk or protective factors of black adolescent suicidality through the literature but were not available in the YRBS data set. Also, the definitions or attributes of variables in the data set were limited. For example, gender in the data set was defined as male or female.

However, the definition of gender includes categories such as male, female, transgender, and nonbinary. The exclusion of a broader gender-related classification limits the data to two groups. It limits the possible insight one would have garnered by evaluating the intersectionality of self-identifying as transgender or non-binary and its effect on the black adolescent final model of suicidality.

Another limitation of the current study is that it utilized cross-sectional data where the temporal link of the independent and dependent factors cannot be empirically measured. For instance, while hopelessness and bullying were two of the strongest predictors of black suicidality, this was observed for participants of each survey year during the time of survey response of each year, respectively. Thus, the responses are one-time snapshots of the participants' perceptions, experiences, or feelings. One-time measurement of such variables makes identifying actual cause and effect difficult. A longitudinal research design would resolve this limitation and allow researchers to identify changes in the data over time.

The final model of the current study was cross validated by three separate sample data sets, yielding stable performances across all survey years (2015, 2017, 2019). While the factor of suicidality and interpersonal violence yielded good validity and reliability scores, the reliability and validity scores of all other factors were minimally acceptable or poor. The minimal or inadequate level of reliability may have reduced the identification of different statistically significant predictive pathways of black adolescent suicidality and the overall predictive performance of the model. Many of the factors were measured using two or three indicators, and while developing a construct using two or more measures is acceptable (Morrison et al., 2017), additional measures of each factor may

assist in improving factor-related validity and reliability, thus improving the model's predictive power and possibly the identification of other significant predictive pathways.

Finally, the sample used in the current study was non-clinical English-speaking persons who attended schools with a population greater than 40 students. The study did not include black adolescents who speak Spanish, French, and other languages nationally. Some adolescents may be in correctional facilities who were not included in the current study, and adolescents who attend schools with low enrollment or in rural communities of the US. The exclusion of non-English speakers, adolescents who are not students, and adolescents from rural communities limit the generalizability of the results from the current study of the categories mentioned above of adolescents. The current study's limitations and the model present causal assumptions (not causal conclusions) of the predictive pathways that emerged in the current study's final model. The causal inferences are relative to the observed and unobserved variables included in the current study.

Despite the previously discussed limitations, the value added by the identification and rigorous estimation of the identified predictive pathways of the model of black adolescent suicidality that emerged in the current study is crucial in the ongoing battle to mitigate suicidality among black adolescents. In this study, the hypothesized model was assessed, an alternative model was assessed, and the final model was confirmed and validated by three different samples rendering the conclusions garnered in this research relevant to future research and practice related to black adolescent suicidality.

Implications for Research

Suicidality in black adolescents continues to prove itself to be a multifaceted problem, which requires additional research designs that integrates multi-level models that are measured by multi-level factors of the biological, psychological, social, community, and societal systems of a person. Further research may build on the current study by identifying additional measures to define each factor included in the current study, particularly those deemed insignificant or statistically significant in predicting suicidality but yielded minimally acceptable reliability and validity factor scores. For instance, hopelessness is a symptomology of depression. However, a scaled factor of depression measured by a robust psychometric instrument such as the Modified Depression Scale (Orpinas, 1993) may increase the existing model's predictive ability. In the literature, parental support was positively associated with black adolescent suicidality Bennet & Joe (2015). The positive association between parental support and suicidality is unique to black adolescents, as parental support is a protective factor in suicidality for their peers (Bennet & Joe, 2015) and warrants further investigation. Future research should consider parental support and other risk factors that did not emerge from the literature search but have been theoretically linked to suicidality among adolescents of different ethnic backgrounds, such as sleep (Goldstein & Franzen, 2020). Such investigations may advance the extant knowledge and reveal insights into novel risk factors impacting black adolescents' suicidality.

Also, future research should include strength-based predictors of suicidality to examine the role of personal values such as religion or spirituality, positive family relationships, peer support, community support, and other societal factors as they affect

black adolescent suicidality. Including the previously mentioned factors mediated by sociodemographic factors of black adolescents may provide additional insights into reducing black adolescent suicidality and identify sub-groups of black adolescents impacted by suicidality. Future research also should consider examining multi-level protective factors of black adolescent suicidality. Determining strength-based factors (peer support, family support, and community support) may offer valuable insight into the factors that mitigate suicide by fortifying suicidality assessment and treatment of black adolescents. Such research can help inform therapeutic interventions and prevention programs that incorporate protective factors to reduce the risk of suicidality.

Future research should leverage or develop and assess screening tools for black adolescent suicidality that effectively measures sexual minorities, hopelessness, interpersonal violence, and bullying. Developing and evaluating such a screening tool would help identify black adolescents at risk of suicide-related behaviors.

Finally, longitudinal research to assess and estimate the effects of factors in predicting suicide over time is needed. The utilization of longitudinal research with the same that spans early adolescence to young adulthood may provide novel information about how the effect of the predictors of black suicidality changes across distinct phases of black adolescents' development.

Implications for Practice

The primary purpose of identifying a social-ecological model of black adolescent suicidality is to guide individual, relational, community, and societal responses to mitigate the problem. There is a need to prevent the suicidality of black adolescents, particularly the individual and relational systems. Since the experience of bullying

(electronic or in person), self-identification of homosexuality, feelings of hopelessness, and substance use were significant predictors of suicidality, interventionists, and practitioners who collaborate with individuals, families, and within schools could be equipped with the knowledge and resources necessary to address the issue.

Individuals

Black adolescents are less likely to engage in therapeutic services (Cross, Taylor, & Chatters, 2018), yet individual clinical interventions are needed to treat feelings of hopelessness and substance use. While working with black adolescents, clinicians, counselors, and practitioners must educate the black adolescents' possible risk factors of suicidality and the resources available to help them navigate feelings or thoughts of suicide and empower the black adolescent to access help. Cognitive behavioral therapy has been demonstrated to effectively reduce depressive symptoms like sadness and hopelessness and its impact on suicidality among adolescents from diverse backgrounds (Dirks, 2017; Stanley et al., 2009; Macgowan, 2004; Iyengar,2018).

Finally, adolescent substance prevention programs that treat black adolescents should include an effective screening of adolescent suicidality during intake and admissions. Also, substance use programs should consist of modules on navigating, mitigating feelings of hopelessness, and building healthy romantic relationships. While a biopsychosocial assessment is standard in substance abuse outpatient and inpatient programs, it is recommended that a black adolescent suicide screening includes questions related to sadness and hopelessness, the experience of bullying, sexual identity, and experience of interpersonal violence. This screening will help identify black adolescents at risk for suicidality, where the appropriate response can follow.

Family

Black adolescents, particularly those who are of sexual minority status, require family support to mitigate the challenges that lie in suicide ideation and suicide attempts. Black adolescents who identify as sexual minorities are often ostracized by their parents and other family members, which leads to suicide-related behaviors (Human Rights Center, 2019). While the current study did not measure the direct effect of family relationships on black adolescent suicidality, parents of black adolescents, particularly those who self-identifies as homosexuals, should be educated about factors that contribute to suicidality and how to recognize symptoms of suicidality in black adolescents.

Interventionists should use Attachment-Based Family Therapy (ABFT) or Attachment-Based Family Therapy for Lesbian, Gay, and Bisexual (ABFT-LGB) has emerged as a viable therapeutic family-based intervention in reducing suicide ideation and depressive symptoms in black adolescents and black adolescents who self-identifies as homosexuals (Diamond, G. M., Diamond, G. S., Levy, S., Closs, C., Ladipo, T., Siqueland, L. 2011)

Schools

Adolescents spend most of their waking moments at school or educational institutions. Interventionists who are in schools that serve black adolescents should use measures that identify sexual minority (particularly for females), sad and hopelessness (particularly for females), substance use (particularly for males), the experience of interpersonal violence, and experience of bullying to identify black adolescents who are at-risk for suicidality. The school administration should collaborate with trained school

interventionists to develop clear policies and protocols for identifying and responding to identifying students at risk of suicidality. School administration should create policies that genuinely address bullying in schools or electronically. Finally, schools that serve black adolescents should develop prevention programs and groups that address the impact of interpersonal violence, substance use, and the risk of suicidality.

Summary

Suicidality among black adolescents is a significant problem in the US. This study assessed and measured a final model of suicidality using the Centers for Disease Control and Prevention's social-ecological framework for addressing suicidality. Consistent with other research, this study reported that black adolescents who self-identify as a sexual minority experience hopelessness, experience interpersonal violence, engage in substance use, and experience bullying and are at risk for increased suicidality. Unique to this study, the model's performance was consistently assessed over time.

Future research in black adolescents should assess similar models that focus on identifying and testing community-level and societal-level predictors of black adolescent suicidality and include protective factors. The current study underscores the importance of collaborating with individuals, families, and schools to address black adolescent suicidality comprehensively.

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Appendix

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Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To: Dr. Mark Macgowan
CC: Scherrayn Phillip-Garcia

From: Maria Melendez-Vargas, MIBA, IRB Coordinator

Date: March 31, 2022

Protocol Title: "Social-Ecological Model of Suicide Risk for Black Adolescents"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-22-0122 **IRB Exemption Date:** 03/30/22
TOPAZ Reference #: 111497

As a requirement of IRB Exemption you are required to:

1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at http://research.fiu.edu/irb.

MMV/em

VITA

SCHERRAYN PHILLIP-GARCIA

EDUCATIONAL BACKGROUND:

1997-2002 B.S., Psychology
Florida Memorial University
Miami, Florida

2005-2007 MSW, Social Work
Barry University, Miami, FL

2017-2023 PhD., Social Welfare,
Florida International University, Miami, FL

RESEARCH EXPERIENCE:

2011-2014 University of the Virgin Islands, St. Croix, USVI
College of Liberal Arts and Social Sciences
Supervisor Dr. Simon B. Hendrickson
Research Assistant
Performed times series analyses of the impact of crime on the economy of the United States Virgin Islands.

2014-2016 Florida International University, Miami, FL
College of Nursing and Health Sciences,
Supervisor Dr. Ora Strickland
Research Assistant
Performed participatory action research to identify healthcare needs of underserved communities to guide the development of school-based services. Conducted interviews with students, parents, and school personnel, and focus groups with community members. Conducted qualitative and quantitative analyses.

2018-2022 Florida International University, Miami, FL
College of Public Health and Social Sciences
Supervisor Dr. Mark Macgowan
Doctoral Student
Performed cross-sectional research to identify trends and prevalence of suicidality among adolescents in the US (United States) and identified predictors of black adolescent suicidality using large data sets. Conducted linear
regression, structural equation modeling, and joinpoint regression analyses.

2022-2022 Centers for Disease Control and Prevention, Atlanta, GA
Rhode Island Department of Health (RIDOH)
Supervisor Sarah Bowman
Data Analyst
Developed and managed databases of SARS-CoV-2 variants SARS-

CoV-2 and variant classifications. Performed trends analysis of genomic data and epidemiological analyses.

PUBLICATIONS AND PRESENTATIONS:

Garcia, S., & Macgowan, M. (2019). *"Ten-Year Suicide Trends Among Black Adolescents in the United States From 2007-2017"*, American Public Health Association (APHA) Annual Conference, PA

Garcia, S. (2018). *"Culturally Sensitive Approach to Assessing Suicide Risk in Black Youth,"* Florida National Association of Social Workers (FL-NASW) Annual Conference, FL

Garcia, S. (2018). *"A Collaborative Approach to Advancing Social Work Practices of School-Based Mental Health Service Delivery System."* Barry University Doctoral Student Symposium, FL

Frayer, L., Garcia, S., Huffman T., Framil, C., Strickland, O. (2016) *"The Health Effect, 27th international Nursing Research Congress,"* Sigma Theta Tau International, Cape Town South Africa

Garcia, S. & Strickland, O. (2016*). "Community Needs Assessment: A Collaborative Approach to Advancing Healthcare Practices of a School-Base Primary Comprehensive Health Care Center within an Inner-City Community."* National Black Nurses Association, TN Oct. 2016