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Prevalence Trends of Victimization among High School Students by Race, Ethnicity, and Gender – YRBSS 2009-2017

Carlos Avalos

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PREVALENCE TRENDS OF VICTIMIZATION AMONG HIGH SCHOOL STUDENTS BY
RACE, ETHNICITY, AND GENDER – YRBSS 2009-2017

by

Carlos Avalos

Bachelor of Science
University of Central Florida, 2015

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University of South Carolina

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Accepted by:

Myriam Torres, Director of Thesis

James Hussey, Reader

Kellee White, Reader

Cheryl L. Addy, Vice Provost and Dean of the Graduate School

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ABSTRACT

Introduction: Students who are victimized at school are more likely to report mental health, behavioral, and academic problems. Bullying and electronic bullying are types of victimization that are prevalent in US schools, with prevalence varying by race and ethnicity, gender, and age. Additionally, due to increases in bias-based harassment (such as being targeted due to race, ethnicity, or religious beliefs) in the country over the last few years, it is of interest to see how victimization behaviors in schools may have changed from 2015 to 2017.

Objective: To analyze trends of overall bullying, school bullying, electronic bullying, and other forms of victimization such as being threatened at school or missing school due to safety concerns from 2009 to 2017 by race and ethnicity, gender, and among gender-stratified race/ethnic categories. Additionally, to better understand how the prevalence of all types of victimization changed from 2015 to 2017 among these groups.

Methods: Data came from the Youth Risk Behavior Surveillance System's (YRBSS) national school-based survey from 2009-2015 (n=73,975). Our outcomes of interest consisted of reporting school bullying, electronic bullying, missing school due to safety concerns, and being threatened at school. Our independent variable of interest was time (odd years from 2009 to 2017). Covariates were age, gender, and race/ethnicity. Analyses were performed using multivariable logistic regression models using SAS 9.4.

Results: Most of our sample were 15 to 17 years of age, and non-Hispanic White. The proportions of those reporting overall bullying was highest in 2011 (27.5%) and lowest in 2017 (24.1%) ($p=.0460$). School bullying and electronic bullying did not vary by year. Reporting missing school due to safety concerns was highest in 2013 (7.04%) and lowest in 2009 (4.90%) ($p=.0051$) and reporting being threatened or injured at school was highest in 2009 (7.53%) and lowest in 2017 (5.83%) ($p<.0001$). Younger students had higher proportions of reporting all types of victimization, female students had higher proportions of reporting all forms of victimization compared to male students except being threatened or injured at school. Non-Hispanic Other students had higher proportions of reporting all forms of victimization except missing school due to safety concerns, which was highest among Hispanic students. Our total sample of students and male students saw decreasing trends of overall bullying. We saw decreasing trends of school bullying among male students and decreasing trends in electronic bullying among female students. We saw increasing trends of missing school due to safety concerns in the female group while we saw decreasing trends of being threatened in the total sample, the female groups, and the male groups. Comparisons between 2015 and 2017 showed continuations of trends except among non-Hispanic Black students, who were more likely to report electronic bullying in 2017 than in 2015, although their prevalence seemed to decrease from 2011-2015.

Conclusions: The results of our analyses show that female students had higher proportions of all types of bullying compared to male students, and their proportions of bullying are not decreasing. Although national anti-bullying campaigns emphasize prevention among racial, and ethnic minorities, it appears that more needs to be done to

decrease bullying prevalence among females. We saw an increase in odds of victimization from 2015 to 2017 only among male non-Hispanic Black students, whereas the prevalence of being threatened at school seemed to plateau for some groups. This warrants future research to continue monitoring long-term trends of victimization among US high school students.

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CHAPTER 1

INTRODUCTION

Being victimized at school is defined as the action of being singled out as a target of aggressive actions by peers when there is minimal supervision.^{1,2} Bullying, a form of victimization, is defined by repeated aggressions causing physical or emotional harm, and is mainly driven by an imbalance of power.³ Bullying can be perpetrated not only in person, but can also occur as electronic bullying, or repeated aggression through online interactions. Bullying and electronic bullying are not uncommon nor mutually exclusive in US high schools; as of 2017, as many as 19% of high school students reported being bullied at school in the past year and as many as 14.9% of high school students reported being bullied electronically in the past year.⁴ Bullying and electronic bullying prevalence has been shown to vary by race and ethnicity, gender, and age, with the highest proportions of being bullied among non-Hispanic white students, among females, and among those in lower school grades.⁴

Although, over the last 10 years, the prevalence of physical fighting at school has decreased in the US, the number of students who do not go to school because of safety concerns has increased.⁴⁻⁶ Additionally, an increasingly polarized political climate across the country has the potential to negatively affect the every-day lives of high school students at home, at school, or on the way to school. FBI reports have shown that bias-based aggressions, or being targeted for harassment due to race, ethnicity, or religious

beliefs, rose 17% in 2017, marking a three-year increase in such crimes.⁷⁻⁹ These increases in bias-based harassment over the last few years were also reported in US schools, as instances of these types of behaviors increased from 8.3% in 2015, to 9.9% in 2016, and 10.5% in 2017.⁷⁻⁹ These increases in bias-based harassment in US schools highlight the importance to better understand trends of bullying and other forms of victimization happening at school or on the way to school among different race and ethnic groups over time.

There is extensive literature on the adverse psychological and behavioral effects that victimization has on adolescents. Students who report more instances of victimization are more likely to also report mental health problems (increased anxiety, depression, substance use), report behavioral problems (poor interpersonal functioning, violence involvement), experience poor physical health (headaches, stomachaches), and tend to have academic problems.^{2,3,10-14} These adverse outcomes can have a lasting effect on students, and can be especially harmful during their high school years, as their success during this time period is crucial for their success later on in life.^{10,15} Despite the growing literature on victimization's effect on behavior, development, and mental health, studies among ethnically diverse populations were lacking until recently. Additionally, physical or psychological abuse, such as being victimized, are considered Adverse Childhood Experiences (ACEs), and these have been shown to be implicated in diseases such as depression and substance use into adulthood.¹⁶⁻¹⁹

Adolescent's health can be shaped by their interactions with their environments, and previous research has shown that bullying victimization can be closely related to some of the leading causes of morbidity and mortality among adolescents. Mental

illnesses, such as depression and anxiety disorders, which are the leading causes of disability among older children and adolescents, pose a large threat to their healthy development.²⁰⁻²² Several cross-sectional and longitudinal studies over the last two decades have shown that being bullied is associated with depression, anxiety, and substance use during adolescence, and that being bullied can predict the onset of depression and anxiety in adulthood.^{3,13-15,23} Mental illnesses, such as depression and anxiety, that arise as a result of physical or psychological abuse, such as bullying, can affect adolescent's healthy development, and significantly impact their lives.^{21,24} Alarming, bullying has also been shown to be associated with a higher risk of suicidality among adolescents, posing a more direct threat to their lives.^{25,26}

Given that bullying victimization can have serious short and long term adverse effects on the health of adolescents, the Office of Disease Prevention and Health Promotion designated bullying as one of the emerging issues in injury and violence prevention under the Healthy People 2020 goals, and specified a need to better understand trends of bullying among youths, including adolescents.²⁷ Furthermore, observed increases in bias-based harassment in US schools since 2015 warrant a better understanding of changes in victimization over the last few years. Therefore, the purpose of this study is to evaluate changes in overall bullying, school bullying, electronic bullying, being threatened or injured at school, or missing school due to safety concerns from 2009 to 2017 by race and ethnicity and gender, but also to better understand how the prevalence of these types of victimization changed from 2015 to 2017.

CHAPTER 2

LITERATURE REVIEW

1. US Adolescents

From 2014 to 2017, adolescents made up 13% of the US population as approximately 42 million individuals were between the ages of 10 and 19.^{28,29} Furthermore, the number of adolescents in the US is expected to grow to 45 million by the year 2050.³⁰ Approximately 16.3 million of adolescents, or individuals who are from 10 to 19 years of age, were enrolled in high school in 2017.²⁹ The health of adolescents is crucial, as adolescence is a key dynamic period in which the way they interact with their environment has the potential to shape their physical health, emotional wellbeing and social skills that become the foundation for their future.^{21,24,31}

2. Adolescent Mortality

Worldwide, road traffic injuries are the leading cause of death among adolescents; followed by suicide, interpersonal violence, HIV/AIDS, and deaths caused by infectious diseases.³² US adolescents have higher all-cause mortality and different causes of mortality compared to adolescents living in other developed countries.³³ The major causes of mortality affecting adolescents in the US are unintentional injuries, homicides or violent crime, and suicide.³³⁻³⁶

Deaths from unintentional injuries are the leading cause of death among US adolescents, and most are due to motor vehicle accidents.^{33,34} However, the proportion of

unintentional deaths from motor vehicle accidents have steadily decreased. In the late 1970s through early 1990s, approximately 78% of all deaths from unintentional injuries among US adolescents were due to motor vehicle accidents; this proportion decreased to 73% in the later 1990s and early 2000s.^{34,36} One possible factor explaining this decrease could be the advances in automobile safety over the last few decades.

Adolescent deaths from homicides and crimes were increasing in the late 1970s and peaked in the early 1990s, becoming one of the largest public health problems among adolescents and young adults in the US at the time.³⁷ However, homicide deaths have decreased from the late 1990s to 2015.^{33,34,37} The possible reasons for this decline are without a doubt complex, and are likely a result of collaborative efforts involving law enforcement, community leaders, legislation, school-based interventions, and the growing economy.^{21,38}

Suicide has consistently been in the top three leading causes of death among adolescents in the US. Although adolescent deaths from unintentional injuries and from homicides or violent crimes have decreased over time, suicide deaths among adolescents have increased from 11% of adolescent deaths in 2009-2006 to 17% of adolescent deaths in 2016, surpassing homicides to become the second leading cause of death among adolescents in the US.^{35,36} These increases in suicide have been observed in several races or ethnicity groups, as suicide rates have increased for Hispanic/Latino, non-Hispanic white, and non-Hispanic black adolescents from 1999 to 2002.^{33,39} Higher access to firearms and drug use are some factors that have been associated with suicides among US adolescents as some suicide deaths can be tied to firearms and drug poisonings.^{33,34} Mental illnesses such as depression, dysthymia, or bipolar disorder have also been

observed to be major factors of suicide ideation among adolescents and young adults.²⁴ Other possible reasons for the observed increase in adolescent deaths from suicide could be tied to how an adolescents' social contexts, such as interpersonal violence, bullying, or abuse, impact their lives at home and at school.^{20,24,40,41}

Overall, some of the major causes of mortality among adolescents have declined since the 1990s.³³ However, suicide deaths have increased, becoming the second leading cause of death in this age group. Despite decreases in adolescent mortality over the last few decades, the leading causes of adolescent death are still predominantly tied to modifiable risk factors.^{36,42}

3. Adolescent Morbidity

Adolescents experience some of the same causes of morbidity as older individuals; among these causes are obesity, reproductive health problems, mental illnesses, and injuries.^{24,40} However, the leading causes of disease and disability among older children and adolescents are mental illnesses such as depression and anxiety disorders.²⁰⁻²² The burden of mental illness among adolescents has gathered more attention as this period is the usual onset of many of these illnesses which can often persist into adult life.^{24,40} Furthermore, adolescent's mental health can be closely related to other major causes of adolescent morbidity and mortality such as self-harm or suicide.²⁴ Although, mental illnesses are the leading cause of morbidity among adolescents, this group's health is also burdened by unintentional injuries and violence.

3.1 Injury

Injuries among adolescents are common due to the risk-taking behaviors that are in a way a part of adolescent's life, such as driving or playing contact sports, while others can be a result from stressors such as interpersonal violence, abuse, or neglect. Although unintentional injuries and death from these injuries have decreased over the last two decades, injuries from suicide attempts have increased.³⁹ More can be done to further prevent these injuries through evidence-based practices, policy changes, structural changes, and behavioral changes.^{26,39,43,44}

Unintentional injuries are not only the leading cause of mortality among adolescents and young adults, but they are also one of the leading causes of morbidity; most of these injuries are a result of motor vehicle accidents.⁴³ However, unintentional injuries among adolescents can also occur in many other different settings. Schools are a common place where injuries could occur, and most injuries that occur in school property are caused by playing sports.⁴³ Injuries among adolescents can also occur at home, during recreational activities, or at work.^{43,45} Unintentional injuries from drug poisonings among adolescents from prescription drug use have gathered increasing attention over the last few years.⁴⁶

Although the rates of motor vehicle injuries have decreased in the last two decades, possibly due to advances in technology and evidence-based prevention strategies, these types of injuries are still the leading cause of death among adolescents.^{34-36,43} Injuries among adolescents from motor vehicle related accidents are not confined to adolescents driving; the majority of adolescent bicycle related injuries and pedestrian serious injuries can also be attributable to collisions with a motor vehicle.⁴³ Many injuries

from motor vehicle collisions are a result of modifiable risk factors such as inexperience, emotional or peer pressure, or risk behaviors such as speeding or driving under the influence of drugs or alcohol.

Injuries among adolescents can also arise from peer aggressions such as physical, emotional, or sexual abuse, and these experiences can sometimes play an important role in the progression from suicide ideation to attempt among individuals at risk.^{26,39}

Although most injuries at school are unintentional and sports related, serious injuries that occur at school are often due to violence.^{43,47,48} Adolescents who are at higher risk of being targeted and threatened or injured at school, or have higher odds of being bullied at school, also have higher odds of attempting to harm themselves.^{39,49} Although physical, emotional, or sexual abuse can place certain individuals at higher risk of suicide, other health risk behaviors such as intravenous drug use and prescription drug use are also associated with a higher risk of suicide injuries or death.^{39,43} Furthermore, suicide ideation and serious injuries from suicide attempts have increased over the last decade.³⁹

Injuries, whether intentional or unintentional, continue to negatively impact the lives of adolescents in the US. Normal aspects of adolescent life, such as being involved in risk taking behaviors, can put adolescents at risk of harm from injuries. However, many of the injuries sustained by adolescents can be tied to modifiable risk factors at home, at school, and at work.

3.2 Violence

In the 1980s and 1990s, violence posed a large threat to the health of adolescents and young adults in the US and was considered one of the public health priorities at the time.^{37,41,50} Adolescent homicides have decreased since they peaked in the early 1990s.

However, the US still retains youth violence and homicide rates that are higher than other wealthy nations, and violence related acts are one of the leading causes of morbidity and mortality among US adolescents.^{33,34,37,51,52} Further, those affected by youth violence tend to be males and individuals from different minority groups.⁵³ Despite efforts to curb youth violence in the US, injuries from violence continue to be an important, preventable, health problem affecting the healthy development and wellbeing of US children and adolescents.^{14,51}

Schools are one of the settings where violence could affect the health and wellbeing of US children. The term “school violence” started being used in the early 1990s, and it comprised behaviors like criminal acts, aggressions, and violence victimization in the school setting.⁴¹ Males are mostly involved in school violence when compared to females, but females can also act in aggressive ways through verbal or emotional harassment.⁴¹ Adolescent school violence is also associated with higher access to firearms, taking part in other violent behavior, or experiencing abuse or neglect as a child.^{51,54} Gun violence, which often affects adolescents in densely populated areas, can sometimes also find its way into schools.^{41,53}

Bullying, or repeated verbal, physical, or psychological aggression, is an important aspect of school violence.³ In the late 1990s approximately one third of school children were involved in bullying either as a bully, a victim, or both, and bullying involvement has been observed to differ by grade, gender, and race/ethnic groups.³ Although bullying victimization can often happen in person, this type of victimization can also occur through online interactions as electronic bullying.¹⁴ Bullying has serious consequences on the mental health, behavioral development, and academic achievement

of those being bullied and those who bully.¹⁴ Being bullied can result in physical injuries, anxiety, depression, or academic problems during childhood that can have lasting negative effects into adulthood; similarly, being a bully is associated with aggressive and substance use behaviors in childhood, and criminal behavior into adulthood.^{3,14,51} Furthermore, suicidal thinking and attempts have been observed among students involved in bullying either as perpetrators, victims, or both.¹⁴ Due to the short- and long-term effects that bullying can have on the health and development of US children and adolescents, bullying remains to be an important aspect of school violence.

Aggressive and violent behaviors largely arise from modifiable risk factors such as access to firearms, parental neglect or abuse, and other health risk behaviors that compromise these individuals' ability to normally adapt to society, and are responsible for their violent and aggressive behavior.^{14,53} Violent and aggressive behaviors continue to be an important factor among the injuries sustained by adolescents, and have the potential to affect the mental health, behavioral development, and academic achievement of victims and perpetrators.^{53,55}

3.3 Mental Health

Adolescence is a key dynamic period in human physical, emotional, and mental development which plays a large role in the quality of life of these individuals.^{21,24,31,56} Adolescence is the usual onset of mental illnesses, such as depression and anxiety disorders, and they can have a long-lasting impact on the lives of adolescents.^{21,24} Some mental illnesses among adolescents can arise from how they interact with their social environments or through their exposure to modifiable risk factors (child abuse, neglect,

bullying), highlighting the importance to establish interventions against hostile environments in order to decrease the burden of mental illness among this population.^{20,40}

Many different mental health illnesses affect the health of US adolescents, such as attention deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), autism spectrum disorders (ASD), mood and anxiety disorders, and substance use disorders.⁵⁷ These mental health illnesses can potentially impair their social interactions, affect their academic achievements, or play a role in accidents, injury, substance use, or disability.⁵⁷⁻⁵⁹ Further, the prevalence of mental health illnesses among adolescents has been increasing since the mid-1990s.^{57,60} Although, some mental health illnesses, such as ASD, can arise early in life, other mental illnesses can arise from negative experiences throughout development such as from substance use, abuse, neglect, living in single-parent households, or having negative school experiences such as peer-violence or bullying.⁶¹

Mood and anxiety disorders, like depression and anxiety, can have a harmful impact on the lives and health of adolescents, and these can occur alongside other psychiatric comorbidities, disability, and suicidal tendencies.⁵⁸ For example, adolescents with major depressive disorder can experience long periods, up to a few months at a time, of impairment or disability, and almost one third report suicidal tendencies due to this condition.⁵⁸ Adolescents who experience severe major depressive disorder symptoms experience even worse impairment and up to 3 times the number of suicide attempts.⁵⁸ In just a half a decade, the prevalence of major depression has increased among the adolescent population, from 12.8% lifetime prevalence and 8.3% 12-month prevalence in 2011, to 18.1% lifetime prevalence and 12.9% 12-month prevalence in 2016.⁵⁹ However,

although the prevalence of major depression has increased over time, there has been little change in the treatment of depression among adolescents, resulting in a growing number of them living with untreated depressive symptoms.⁶¹

Mental health illnesses can play an impactful role in the health of adolescents due to their early onset and association with mental health illness in adulthood.^{56,57} Early onset of mental health disorders could increase the burden of disability, suicidal tendencies, or injury among adolescents.^{21,24,57-59} Identifying adolescents at highest risk of experiencing some of the factors associated with mental illnesses such as substance use, child abuse, or negative school experiences, and acting towards decreasing these risk factors, provides a unique opportunity to improve the present quality of the life of these individuals, and has the potential to prevent the onset of adult mental illnesses later on in their lives.

3.4 Aims, Research Questions, and Hypotheses

Aim 1: Analyze trends of overall bullying, physical bullying, and electronic bullying over time among the total sample of US high school students by race and ethnicity, gender, and among the gender-stratified race and ethnicity groups.

Research question 1: Since the addition of the physical bullying question in 2009 and electronic bullying question in 2011, have prevalence of overall bullying, physical bullying, and electronic bullying increased, decreased, or remained the same for each race/ethnic category, gender, and gender-stratified race/ethnic categories?

Hypothesis 1: The prevalence of overall bullying, physical bullying, and electronic bullying have decreased over time.

Aim 2: Analyze trends of missing school because of feeling unsafe at school or on the way to school and the prevalence of being threatened or injured at school among the total sample of US high school students by race and ethnicity, gender, and among the gender-stratified race and ethnicity groups.

Research question 2: Since the 2009 survey year, have the prevalence of missing school because of feeling unsafe and the prevalence of being threatened or injured in school increased, decreased, or remained the same for each race/ethnic category, gender, and gender-stratified race/ethnic categories?

Hypothesis 2: The prevalence of not going to school due to safety concerns has increased over time while the prevalence of being threatened or injured at school has decreased over time.

Aim 3: Analyze changes in the prevalence of overall bullying, electronic bullying, physical bullying, feeling unsafe at school or on the way to school, or being threatened or injured at school among the total sample by race and ethnicity, gender, and among the gender-stratified race and ethnicity groups comparing 2015 to 2017.

Research question 3: Comparing the 2017 survey year to the 2015 survey year, how have overall bullying, physical bullying, electronic bullying, missing school because of feeling unsafe at school and being threatened or injured in school changed for each race/ethnic category, gender, and gender-stratified race/ethnic categories?

Hypothesis 3: The odds of overall bullying, physical bullying, electronic bullying, not going to school due to safety concerns, and being threatened or injured at school will be higher in 2017 compared to 2015.

CHAPTER 3

METHODOLOGY

1. Dataset

Data came from the Youth Risk Behavior Surveillance System (YRBSS), a survey conducted by the Centers for Disease Control and Prevention (CDC)^{62,63}. More specific information on the history, methodology, sampling, and weighting of this survey has been published elsewhere^{62,63}. Briefly, this survey was established in 1991 and monitors health risk behaviors using a three-stage cluster sample of youth in 9th through 12th grade in public and private schools, including violence and victimization behaviors. YRBSS data is available in the form of a national survey conducted by the CDC, but it is also available in the form of state, territorial, tribal, and large urban school district-specific surveys conducted by education and health agencies.

The data used on this analysis came from the national school-based survey only, as we are interested in making inferences at the national level and not at the state, territorial, tribal, or large school district level. The national school-based surveys have been conducted biennially since the YRBSS's establishment in 1991 and provide representative samples of US students enrolled in 9th through 12th grade in public and private schools. The national YRBSS is conducted in the spring of odd-numbered years, and the last completed survey available for analysis was completed in the spring of 2017.

The national YRBSS uses a three-stage, cluster sample design to obtain a nationally representative sample of 9th through 12th grade students in the US. The target population of this survey is all public and private school students in 9th through 12th grade from all 50 states and the District of Columbia. Once the schools are selected based on this three-stage sampling design, one or two entire classes in each school and in each grade are randomly selected and all students in the selected classes are eligible to participate. Additionally, non-Hispanic black and Hispanic students are oversampled. Parental permission is obtained locally by the schools before the YRBSS is conducted. The YRBSS questionnaires are administered by trained data collectors or by teachers and are completed by hand by participating students.

2. Dependent variables

2.1 Bullying

The question “During the last 12 months have you been bullied on school property” was added in 2009. The question “During the past 12 months, have you ever been electronically bullied? (Count being bullied through texting, Instagram, Facebook or other social media.)” was added to the YRBSS in 2011. Both questions had a dichotomous response of “Yes” or “No”. The YRBSS survey begins this section on bullying with the following statement: “Bullying is when 1 or more students tease, threaten, spread rumors about, hit, shove, or hurt another student over and over again. It is not bullying when 2 students of about the same strength or power argue or fight or tease each other in a friendly way.” These variables were analyzed independently, and also combined and recoded into a single variable named “overall bullying”. Overall

bullying was coded as “Yes” if respondents answer “Yes” to the school bullying question or “Yes” to the electronic bullying question, and coded “No” if respondents answered “No” to both forms of bullying.

2.2 Other Violence-related behaviors

The survey years selected also included information on being a victim of other violence related behaviors like missing school because of safety or being threatened or injured with a weapon at school. The question “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?” had the responses “0 days”, “1 day”, “2 or 3 days”, “4 or 5 days”, and “6 or more days”. A new variable was created to dichotomize feeling unsafe as “Never” if respondents selected “0 days” or “At least once” if respondents selected any other option. The question “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?” had the responses “0 times”, “1 time”, “2 or 3 times”, “4 or 5 times”, “6 or 7 times”, “8 or 9 times”, “10 or 11 times”, and “12 or more times”. A new variable was created to dichotomize being threatened or injured as “Never” if respondents selected “0 times” or “At least once” if respondents selected any other option. These questions were analyzed from 2009 to 2017 to better understand the trends in prevalence in the last decade.

3. Independent variables

3.1 Gender

Respondents were asked “What is your sex?” and the possible answers were “Female” or “Male”. The YRBSS also asks about sexual behavior, including a question in which respondents can describe themselves as “Heterosexual”, “Gay or lesbian”, “Bisexual”, or “Not sure”, but this information was not included in our analyses.

3.2 Race and ethnicity

Respondents were asked the ethnicity question “Are you Hispanic or Latino?” to which they can answer “Yes” or “No”. They were also asked the race question “What is your race?” to which they can answer “American Indian or Alaska Native”, “Asian”, “Black or African American”, “Native Hawaiian or Other Pacific Islander”, or “White”. A new variable was created to combine race and ethnicity groups and categorize respondents as Hispanic or Latino, Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Asian, and Non-Hispanic Other. This last group consists of those who self-reported being American Indian or Alaska Native, or Native Hawaiian or Other Pacific Islander.

3.3 Age

Respondents were asked the question “How old are you?” to which they could answer “12 years old or younger”, “13 years old”, “14 years old”, “15 years old”, “16 years old”, “17 years old”, or “18 years old or older”.

3.4 Survey year

The sample variable for survey year with the categories “2009”, “2011”, “2013”, “2015”, and “2017” was used when performing statistical analyses and linear trend analyses. For the linear trend analyses, this time variable was treated as continuous and coded with orthogonal coefficients using PROC IML in SAS.⁶⁴

4. Data analysis

Datasets from the 2009 to 2017 YRBSS (5 survey years) were utilized for the analyses of this project (with electronic bullying available starting in 2011). When combining YRBSS survey data, it is important to consider the complex sampling and weighting of this data; however, when combining the national YRBSS data, there is no need to adjust the weights as the data are weighted to the sample size.⁶⁵

Descriptive analyses were performed using SAS 9.4, accounting for the sampling design and survey weights by using survey procedures. The SAS *proc surveyfreq* procedure was used to conduct bivariate analyses between our independent and dependent variables by survey year to obtain descriptive statistics of the high school students over the years included in our study.

To address our first aim, we used SAS *proc surveyfreq* to obtain proportions of overall bullying (from 2011 to 2017), physical bullying (from 2009 to 2017), and electronic bullying (from 2011 to 2017) by race/ethnicity and race/ethnicity by gender for each survey year. Then, following the guidance on how to conduct trend analyses using YRBSS data from the CDC’s Division of Adolescent and School Health (DASH), we

used SAS *proc surveylogistic* to test for linear trends over time while controlling for age, gender, and race/ethnicity.⁶⁴ When stratifying by gender, the model only included the year variable, age, and race/ethnicity. When stratifying by gender and race/ethnicity, the model only included the year variable and age. We tested for a linear trend by adding a linear time variable to our model.⁶⁴ We then used the p-value of our linear time variables to assess if there is evidence of a linear change in our dependent variable over time.

To address our second aim, we again used SAS *proc surveyfreq* to obtain proportions of feeling unsafe at school and being threatened or injured at school from 2009 to 2017 by race/ethnicity and race/ethnicity by gender for each survey year. We also conducted a trend analysis following the same guidance from DASH to test for a linear trend using a multivariable logistic regression model including the year variable, age, gender, and race/ethnicity among the total sample; the year variable, age and race/ethnicity among the gender-stratified groups; and only the year variable and age among the gender and race/ethnicity stratified groups.

Lastly, to address our third aim, we used SAS *proc surveylogistic* to compare the odds of overall bullying, physical bullying, electronic bullying, and feeling unsafe or being threatened at school between 2017 and 2015 for all race/ethnicity and gender groups. The logistic regression models included the year variable, age, gender, and race/ethnicity among the total sample of students; the year variable, age and race/ethnicity when stratifying by gender; and just the year variable and age when stratifying for gender and race/ethnicity.

CHAPTER 4

RESULTS

Demographic characteristics of our total sample and the proportion of students who reported overall bullying, school bullying, electronic bullying, or feeling unsafe at school or on the way to school are reported in **Table 4.1** by year, age, gender, and race/ethnicity. In our total sample ($n=73,975$), a large majority of students were between the ages of 15 and 17, slightly more of them were female, and a majority were non-Hispanic White. The proportions of high school students who reported overall bullying was highest in 2011 (27.5%) and lowest in 2017 (24.1%) ($p=.0460$). However, the proportions of those reporting school bullying and electronic bullying did not vary by year. The proportion of those reporting feeling unsafe was highest in 2013 (7.04%) and lowest in 2009 (4.90%) ($p=.0051$), and the proportion of those reporting being threatened was highest in 2009 (7.53%) and lowest in 2017 (5.83%) ($p<.0001$). Students who were 12 years old or younger had the highest proportions for all types of victimization, with more than half of them reporting overall bullying (51.7%) and being threatened at school (56.1%). Students who were 16 years or younger had higher proportions of all types of victimization than students who were 17 years or older. Between male and female US high school students, a larger proportion of female respondents reported overall bullying (34.8%) ($p<.0001$), school bullying (22.8%) ($p<.0001$), electronic bullying (21.1%) ($p<.0001$) and feeling unsafe at school (6.52%) ($p<.0001$). However, a larger proportion

of male students reported being threatened or injured on school property (8.27%) ($p < .0001$). Lastly, a higher proportion of non-Hispanic Other students reported overall bullying (33.7%) ($p < .0001$), school bullying (23.7%) ($p < .0001$), electronic bullying (18.1%) ($p < .0001$) and being threatened or injured at school (9.13%) ($p < .0001$). A larger proportion of Hispanic students reported missing school due to feeling unsafe (8.69%) ($p < .0001$).

Table 4.2 and **Figure 4.1** show the proportions of each type of victimization among our total sample and among the different race and ethnicity groups over the time periods included in our analysis. Table 4.2 also shows the linear trend over time and adjusted odds ratios comparing 2017 to 2015 for each category. Results from Table 4.2 show significant linear decreases in overall bullying ($p = .0055$) from 2011 to 2017 and in being threatened at school or on the way to school ($p < .0001$) from 2009 to 2017 among the total sample. Our results showed no significant linear changes in school bullying, electronic bullying, or feeling unsafe among our total sample. Analyses by race and ethnicity showed significant linear decreases in overall bullying among non-Hispanic White students ($p = .0436$), Hispanic students ($p = .0047$), and non-Hispanic Asian students ($p = .0276$) from 2011 to 2017. Analyses by race and ethnicity also showed significant linear decreases in being threatened at school among non-Hispanic White students ($p = .0077$), non-Hispanic Black students ($p = .0349$), and Hispanic students ($p < .0001$). In our sample, the prevalence of feeling unsafe increased from 2015 to 2017 for all race/ethnic groups except for the non-Hispanic Other group. However, the odds of feeling unsafe in 2017 were not significantly higher than the odds of feeling unsafe in 2015 after adjusting for age and gender for any of the race/ethnic groups. Lastly, non-Hispanic

White students, who had a significantly decreasing linear trend in overall bullying from 2011 to 2017, also had significantly lower odds of overall bullying in 2017 compared to 2015 after adjusting for age and gender.

Table 4.3 and **Figure 4.2** show the proportions of each type of victimization among female high school students in our sample as well as the linear changes over time and adjusted odds ratios comparing 2017 to 2015. Our results show that there was no significant linear change in overall bullying, school bullying, or electronic bullying among female high school students in the US. However, our results show a linear increase in feeling unsafe ($p=.0317$) and a linear decrease in being threatened at school ($p=.0134$) among female high school students. Stratified analyses by race and ethnicity among female students showed a significant linear decrease in electronic bullying among female non-Hispanic Asian students ($p=.0435$), a significant linear increase in feeling unsafe among female non-Hispanic White students ($p=.0431$), and a significant linear decrease in being threatened at school among female Hispanic students ($p=.0046$). Like the total sample, the prevalence of feeling unsafe among female high school students increased in 2017 from 2015 for all race/ethnic groups. However, the odds of feeling unsafe in 2017 were not significantly higher than the odds of feeling unsafe in 2015 after adjusting for age for any race/ethnic group. Table 4.3 also shows that female non-Hispanic White students had lower odds of both overall bullying ($p=.0259$) and school bullying ($p=.0398$) in 2017 compared to 2015, after adjusting for age.

Table 4.4 and **Figure 4.3** show the proportions of each type of victimization among male students in our sample as well as the linear changes over time and adjusted

odds ratios comparing 2017 to 2015. Our results show significant linear decreases in overall bullying ($p=.0008$), school bullying ($p=.0001$), and being threatened at school ($p<.0001$) among male high school students in the US. There was not a linear change detected in electronic bullying or feeling unsafe. Male non-Hispanic White students saw significant linear decreases in overall bullying ($p=.0438$), school bullying ($p=.0386$), and being threatened at school ($p=.0060$). Male Hispanic students saw linear decreases in overall bullying ($p=.0016$), school bullying ($p=.0001$), and being threatened at school ($p<.0001$). Male non-Hispanic Asian students saw a linear decrease in school bullying ($p=.0023$). Lastly, male non-Hispanic Other students saw a linear decrease in being threatened at school ($p=.0223$). We did not see a significant linear change among male non-Hispanic Black students for any form of victimization in our analyses. Similar to the total sample and the female sample, the prevalence of feeling unsafe at school or on the way to school increased from 2015 to 2017 for male students of all race/ethnic groups except for non-Hispanic Other. However, the odds of feeling unsafe in 2017 were not significantly different from the odds of feeling unsafe in 2015 for any race/ethnic group after adjusting for age. Male non-Hispanic Black students had significantly higher odds of electronic bullying in 2017 compared to 2015 after adjusting for age.

Table 4.1. Demographic characteristics of US high school students and proportions of US high school students who reported overall bullying, physical bullying, electronic bullying, safety concerns, and being threatened by year, age, gender, and race/ethnicity

| | Total Sample | Overall Bullying ^a | Chi-Square | School Bullying ^b | Chi-Square | Electronic Bullying ^c | Chi-Square | Safety Concerns ^d | Chi-Square | Threatened ^e | Chi-Square |
|-----------------------|--------------|-------------------------------|------------|------------------------------|------------|----------------------------------|------------|------------------------------|------------|-------------------------|------------|
| Unweighted n | 73975 | 16565 | | 13390 | | 8115 | | 4655 | | 5148 | |
| Weighted n | 74129 | 17585 | P-value | 14332 | P-value | 8709 | P-value | 4318 | P-value | 4933 | P-value |
| Survey year, % (n) | | | .0460* | | .7735 | | .3389 | | .0051* | | <.0001* |
| 2009 | 16072 | - | | 19.9 (2898) | | - | | 4.90 (922) | | 7.53 (1271) | |
| 2011 | 15083 | 27.5 (3499) | | 20.0 (2577) | | 16.2 (2016) | | 5.85 (978) | | 7.37 (1123) | |
| 2013 | 13251 | 25.3 (3169) | | 19.7 (2452) | | 14.8 (1837) | | 7.04 (1013) | | 6.91 (967) | |
| 2015 | 15194 | 25.8 (3674) | | 20.3 (2874) | | 15.6 (2207) | | 5.40 (933) | | 5.76 (913) | |
| 2017 | 14375 | 24.1 (3325) | | 19.0 (2589) | | 14.9 (2055) | | 6.54 (809) | | 5.83 (874) | |
| Age (years), % (n) | | | <.0001* | | <.0001* | | <.0001* | | <.0001* | | <.0001* |
| 12 years or younger | 170 | 51.7 (83) | | 40.6 (70) | | 40.9 (55) | | 49.1 (69) | | 56.1 (90) | |
| 13 years old | 90 | 34.1 (21) | | 20.4 (15) | | 22.1 (12) | | 13.9 (13) | | 17.7 (14) | |
| 14 years old | 7967 | 35.0 (2261) | | 24.8 (1907) | | 16.5 (1025) | | 6.02 (501) | | 7.03 (586) | |
| 15 years old | 17300 | 32.7 (4480) | | 23.0 (3771) | | 15.9 (2043) | | 6.16 (1132) | | 7.46 (1271) | |
| 16 years old | 18753 | 30.0 (4194) | | 20.5 (3417) | | 15.8 (2077) | | 6.02 (1197) | | 6.90 (1326) | |
| 17 years old | 18756 | 26.4 (3640) | | 16.8 (2821) | | 14.7 (1904) | | 5.11 (1040) | | 5.65 (1153) | |
| 18 years or older | 10939 | 23.4 (1886) | | 13.9 (1389) | | 13.8 (999) | | 5.83 (703) | | 5.81 (708) | |
| Gender, % (n) | | | <.0001* | | <.0001* | | <.0001* | | <.0001* | | <.0001* |
| Female | 37276 | 34.8 (9807) | | 22.8 (7682) | | 21.1 (5511) | | 6.52 (2545) | | 5.07 (1962) | |
| Male | 36699 | 22.3 (6758) | | 16.8 (5708) | | 9.75 (2604) | | 5.28 (2110) | | 8.27 (3186) | |
| Race/Ethnicity, % (n) | | | <.0001* | | <.0001* | | <.0001* | | <.0001* | | <.0001* |
| Non-Hispanic White | 31555 | 33.1 (8483) | | 22.2 (6955) | | 17.8 (4332) | | 4.43 (1464) | | 5.68 (1889) | |
| Non-Hispanic Black | 13012 | 20.6 (1980) | | 12.9 (1560) | | 9.24 (849) | | 7.14 (874) | | 8.47 (1060) | |
| Hispanic | 21479 | 25.2 (4184) | | 17.2 (3343) | | 12.7 (1979) | | 8.69 (1788) | | 7.81 (1608) | |
| Non-Hispanic Asian | 2988 | 24.5 (570) | | 16.2 (450) | | 12.8 (268) | | 5.16 (148) | | 5.09 (141) | |
| Non-Hispanic Other | 4941 | 33.7 (1348) | | 23.7 (1082) | | 18.1 (687) | | 7.38 (381) | | 9.13 (450) | |

Chi-square p-values were significant at an alpha level of .05

*Indicates statistically significant results

^aRespondent stated "Yes" to physical bullying or electronic bullying – Only available from 2009

^bDuring the last 12 months have you been bullied on school property

^cDuring the last 12 months, have you ever been electronically bullied? (Count being bullied through texting, Instagram, Facebook or other social media) – Only available from 2009

^dDuring the last 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on the way to school?

^eDuring the last 12 months, how many times has someone threatened or injured you with a weapon such as a gun, knife, or club on school property?

Table 4.2 Prevalence and trends of overall bullying, school bullying, and electronic bullying among high school student by race and ethnicity

| Victimization | Race/ Ethnicity | Year | | | | | Linear trend | | 2017 vs 2015 | |
|---------------------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------------|---------|------------------|---------|
| | | 2009 | 2011 | 2013 | 2015 | 2017 | t-value ^a | P-value | aOR ^b | P-value |
| Overall Bullying, % (95% CI) | Total | - | 27.5 (25.8, 29.2) | 25.3 (23.8, 26.9) | 25.8 (23.9, 27.7) | 24.1 (22.5, 25.6) | -2.81 | .0055* | 0.89 | .0572 |
| | NHW | - | 30.6 (28.8, 32.4) | 27.8 (25.6, 30.0) | 29.9 (27.9, 31.8) | 27.0 (24.9, 29.0) | -2.03 | .0436* | 0.85 | .0446* |
| | NHB | - | 17.4 (14.8, 20.1) | 17.2 (15.6, 18.8) | 16.8 (13.7, 20.0) | 18.4 (15.9, 20.9) | 0.36 | .7222 | 1.09 | .5530 |
| | Hispanic | - | 24.3 (21.7, 26.9) | 22.9 (20.6, 25.3) | 21.2 (18.4, 24.1) | 20.1 (18.9, 21.4) | -2.86 | .0047* | 0.93 | .4145 |
| | NHA | - | 24.2 (19.1, 29.3) | 24.9 (17.9, 32.0) | 20.7 (14.4, 26.9) | 17.5 (13.9, 21.1) | -2.22 | .0276* | 0.83 | .3865 |
| | NHO | - | 33.1 (29.2, 37.0) | 30.5 (26.9, 34.1) | 29.8 (24.7, 34.8) | 28.6 (25.0, 32.2) | -1.50 | .1360 | 0.92 | .5697 |
| School Bullying, % (95% CI) | Total | 19.9 (18.6, 21.2) | 20.0 (18.5, 21.5) | 19.7 (18.5, 20.9) | 20.3 (18.7, 21.8) | 19.0 (17.6, 20.4) | -0.78 | .4350 | 0.91 | .1001 |
| | NHW | 21.6 (19.9, 23.2) | 22.9 (21.3, 24.5) | 21.7 (20.0, 23.5) | 23.6 (21.8, 25.3) | 21.4 (19.6, 23.3) | -0.10 | .9208 | 0.87 | .0821 |
| | NHB | 13.7 (11.9, 15.5) | 11.7 (9.80, 13.6) | 12.7 (11.3, 14.0) | 13.1 (10.4, 15.7) | 13.2 (11.0, 15.4) | -0.05 | .9640 | 0.99 | .9569 |
| | Hispanic | 18.5 (16.7, 20.2) | 17.5 (15.4, 19.7) | 17.8 (16.2, 19.4) | 16.5 (14.1, 18.9) | 16.2 (14.9, 17.5) | -1.85 | .0652 | 0.97 | .7343 |
| | NHA | 17.5 (13.2, 21.8) | 15.7 (11.4, 20.1) | 21.7 (14.7, 28.7) | 14.8 (10.5, 19.1) | 12.7 (9.63, 15.8) | -1.67 | .0968 | 0.88 | .5637 |
| | NHO | 24.6 (20.9, 28.4) | 22.7 (19.5, 26.0) | 23.8 (20.9, 26.8) | 23.7 (19.6, 27.9) | 23.7 (20.8, 26.6) | 0.04 | .9691 | 0.97 | .8429 |
| Electronic Bullying, % (95% CI) | Total | - | 16.2 (15.2, 17.3) | 14.8 (13.7, 16.0) | 15.6 (14.3, 16.9) | 14.9 (13.7, 16.1) | -1.39 | .1654 | 0.93 | .2678 |
| | NHW | - | 18.6 (17.1, 20.1) | 16.9 (15.3, 18.6) | 18.4 (16.8, 19.9) | 17.3 (15.7, 19.0) | -0.95 | .3418 | 0.91 | .3228 |
| | NHB | - | 8.91 (7.64, 10.2) | 8.72 (7.27, 10.2) | 8.54 (6.76, 10.3) | 10.8 (8.92, 12.8) | 1.44 | .1527 | 1.36 | .1314 |
| | Hispanic | - | 13.6 (11.9, 15.2) | 12.8 (10.9, 14.7) | 12.4 (10.4, 14.4) | 12.2 (11.4, 13.1) | -1.41 | .1598 | 0.98 | .8164 |
| | NHA | - | 14.4 (9.82, 19.1) | 12.9 (9.28, 16.5) | 13.9 (9.18, 18.6) | 10.1 (7.12, 13.0) | -1.42 | .1586 | 0.67 | .1135 |
| | NHO | - | 20.1 (16.0, 24.1) | 18.3 (15.0, 21.7) | 19.0 (14.5, 23.5) | 15.7 (12.2, 19.1) | -1.48 | .1405 | 0.76 | .1725 |
| Safety Concerns, % (95% CI) | Total | 4.90 (4.23, 5.57) | 5.85 (4.92, 6.78) | 7.04 (5.97, 8.11) | 5.40 (4.60, 6.19) | 6.54 (5.53, 7.55) | 1.71 | .0888 | 1.21 | .0961 |
| | NHW | 3.53 (2.87, 4.19) | 4.37 (3.48, 5.27) | 5.57 (4.38, 6.75) | 4.13 (3.10, 5.15) | 4.84 (3.56, 6.12) | 1.36 | .1746 | 1.17 | .4390 |
| | NHB | 6.26 (4.83, 7.68) | 6.63 (5.14, 8.13) | 7.86 (5.98, 9.74) | 6.57 (4.80, 8.35) | 8.85 (6.78, 10.9) | 1.75 | .0815 | 1.35 | .1195 |
| | Hispanic | 8.10 (6.85, 9.35) | 8.95 (7.44, 10.5) | 9.76 (7.99, 11.5) | 7.47 (6.17, 8.78) | 9.33 (7.58, 11.1) | 0.32 | .7529 | 1.27 | .1055 |
| | NHA | 2.87 (1.35, 4.40) | 6.16 (4.19, 8.14) | 5.78 (2.75, 8.81) | 5.27 (2.35, 8.20) | 6.05 (3.14, 8.96) | 1.35 | .1789 | 1.15 | .7218 |
| | NHO | 6.57 (4.43, 8.72) | 7.48 (5.32, 9.64) | 9.85 (6.71, 13.0) | 6.68 (4.24, 9.12) | 6.59 (4.63, 8.55) | -0.22 | .8278 | 1.02 | .0526 |
| Threatened, % (95% CI) | Total | 7.53 (6.81, 8.25) | 7.37 (6.75, 7.98) | 6.91 (6.21, 7.61) | 5.76 (5.07, 6.46) | 5.84 (5.16, 6.51) | -5.15 | <.0001* | 1.00 | .9815 |
| | NHW | 6.45 (5.57, 7.32) | 6.13 (5.46, 6.81) | 5.81 (5.17, 6.45) | 4.84 (3.86, 5.82) | 5.03 (4.10, 5.98) | -2.69 | .0077* | 1.04 | .7923 |
| | NHB | 9.35 (7.84, 10.9) | 8.88 (7.62, 10.1) | 8.37 (6.78, 9.97) | 7.73 (5.69, 9.77) | 7.78 (6.39, 9.18) | -2.12 | .0349* | 0.98 | .9292 |
| | Hispanic | 9.15 (7.87, 10.4) | 9.13 (7.49, 10.8) | 8.46 (7.09, 9.83) | 6.56 (5.32, 7.81) | 6.10 (5.22, 6.98) | -4.88 | <.0001* | 0.90 | .4169 |
| | NHA | 5.49 (3.65, 7.32) | 6.97 (4.92, 9.02) | 5.31 (2.42, 8.21) | 3.62 (0.93, 6.31) | 4.35 (2.42, 6.28) | -1.58 | .1158 | 1.31 | .5576 |
| | NHO | 10.4 (7.73, 13.0) | 9.86 (7.40, 12.3) | 9.06 (5.24, 12.9) | 8.36 (5.32, 11.4) | 8.19 (6.26, 10.1) | -1.61 | .1088 | 1.04 | .8828 |

95% CI = 95% Confidence Interval

NHW = Non-Hispanic White

NHB = Non-Hispanic Black

NHA = Non-Hispanic Asian

NHO = Non-Hispanic Other

Results are unadjusted proportions and 95% confidence intervals from frequency tables

^at-value for the linear time component for the multivariable logistic regression model for each outcome (overall bullying, physical bullying, electronic bullying) stratified by race/ethnicity

^bAdjusted odds ratios of each outcome comparing 2017 to 2015 (adjusted for age, gender and race/ethnicity for Total rows and adjusted for age and gender for race/ethnicity rows)

Bold* = Statistically significant at an alpha of .05

Table 4.3 Prevalence and trends of overall bullying, school bullying, and electronic bullying among female high school student by race and ethnicity

| Victimization | Race/ Ethnicity | Year | | | | Linear trend | | 2017 vs 2015 | | | |
|---------------------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------------|--------------|------------------|---------|-------|
| | | 2009 | 2011 | t-value | P-value | 2017 | t-value ^a | P-value | aOR ^b | P-value | |
| Overall Bullying, % (95% CI) | Total | - | 31.8 (29.9, 33.8) | 31.7 (29.6, 33.8) | 32.3 (29.9, 34.6) | 28.9 (26.2, 31.7) | -1.47 | .1425 | 0.85 | .0480* | |
| | NHW | - | 35.6 (33.5, 37.8) | 36.1 (33.3, 39.0) | 37.5 (35.0, 39.9) | 32.0 (28.0, 35.9) | -1.28 | .2015 | 0.78 | .0259* | |
| | NHB | - | 19.3 (16.3, 22.3) | 20.2 (17.8, 22.5) | 20.2 (16.0, 24.5) | 21.6 (17.1, 26.1) | 0.76 | .4462 | 1.08 | .6840 | |
| | Hispanic | - | 28.2 (25.1, 31.2) | 27.7 (24.9, 30.4) | 26.2 (22.2, 30.2) | 25.7 (23.6, 27.9) | -1.25 | .2112 | 0.97 | .7847 | |
| | NHA | - | 27.7 (20.7, 34.6) | 27.7 (20.7, 34.6) | 22.8 (16.6, 28.9) | 24.2 (19.8, 28.6) | 18.8 (11.6, 26.0) | -1.64 | .1034 | 0.76 | .3361 |
| | NHO | - | 39.2 (32.9, 45.5) | 37.7 (32.1, 43.2) | 38.2 (31.0, 45.4) | 34.4 (28.5, 40.4) | -0.99 | .3249 | 0.84 | .4041 | |
| School Bullying, % (95% CI) | Total | 21.2 (19.6, 22.8) | 22.0 (20.4, 23.6) | 23.9 (22.2, 25.5) | 24.8 (22.7, 26.9) | 22.3 (20.0, 24.5) | 1.67 | .0969 | 0.86 | .0752 | |
| | NHW | 23.5 (21.3, 25.7) | 25.2 (23.5, 27.0) | 27.3 (25.0, 29.7) | 29.1 (26.6, 31.6) | 24.6 (21.2, 27.9) | 1.31 | .1934 | 0.79 | .0398* | |
| | NHB | 15.5 (13.1, 17.9) | 12.2 (9.72, 14.8) | 15.1 (12.8, 17.4) | 15.1 (11.6, 18.6) | 14.5 (10.9, 18.2) | 0.08 | .9328 | 0.95 | .8068 | |
| | Hispanic | 18.9 (16.8, 21.0) | 19.2 (16.6, 21.8) | 20.7 (18.5, 22.9) | 19.4 (15.7, 23.0) | 20.9 (18.9, 22.9) | 1.15 | .2497 | 1.08 | .5640 | |
| | NHA | 13.9 (7.77, 19.9) | 16.6 (10.0, 23.1) | 18.6 (12.7, 24.5) | 18.0 (14.3, 21.6) | 14.9 (8.56, 21.1) | 0.25 | .8030 | 0.85 | .5774 | |
| | NHO | 24.6 (19.7, 29.5) | 27.0 (21.3, 32.7) | 27.0 (22.2, 31.9) | 31.1 (24.8, 37.3) | 27.0 (22.4, 31.7) | 1.20 | .2307 | 0.81 | .2953 | |
| Electronic Bullying, % (95% CI) | Total | - | 22.2 (20.6, 23.7) | 21.0 (19.0, 22.9) | 21.8 (19.8, 23.7) | 19.7 (17.4, 22.1) | -1.39 | .1651 | 0.88 | .1597 | |
| | NHW | - | 25.9 (24.0, 27.8) | 25.2 (22.6, 27.9) | 26.0 (23.7, 28.3) | 23.0 (19.4, 26.6) | -1.20 | .2311 | 0.85 | .1710 | |
| | NHB | - | 11.0 (9.09, 12.9) | 10.4 (8.58, 12.3) | 11.9 (8.90, 14.9) | 13.3 (10.4, 16.2) | 1.45 | .1502 | 1.13 | .5220 | |
| | Hispanic | - | 17.9 (15.7, 20.2) | 17.1 (14.5, 19.7) | 16.8 (13.9, 19.6) | 17.1 (15.3, 18.9) | -0.52 | .6027 | 1.01 | .9281 | |
| | NHA | - | 18.3 (11.5, 25.2) | 13.5 (8.72, 18.3) | 15.5 (11.4, 19.5) | 9.75 (5.31, 14.2) | -2.03 | .0435* | 0.60 | .0879 | |
| | NHO | - | 27.8 (22.0, 33.6) | 24.7 (18.8, 30.6) | 26.4 (19.1, 33.7) | 20.1 (14.9, 25.3) | -1.80 | .0729 | 0.70 | .1401 | |
| Safety Concerns, % (95% CI) | Total | 5.23 (4.47, 5.99) | 5.91 (4.70, 7.13) | 8.70 (7.39, 10.0) | 5.98 (4.98, 6.98) | 7.06 (5.77, 8.34) | 2.16 | .0317* | 1.19 | .1766 | |
| | NHW | 3.85 (3.01, 4.69) | 4.75 (3.56, 5.94) | 7.39 (5.62, 9.16) | 5.39 (3.92, 6.86) | 5.69 (3.94, 7.44) | 2.04 | .0431* | 1.06 | .7894 | |
| | NHB | 6.57 (4.46, 8.68) | 5.23 (3.14, 7.32) | 7.98 (5.82, 10.1) | 6.37 (4.42, 8.33) | 9.46 (6.76, 12.2) | 1.84 | .0674 | 1.54 | .0630 | |
| | Hispanic | 8.35 (6.72, 9.98) | 9.43 (7.19, 11.7) | 12.6 (10.1, 15.0) | 7.29 (5.61, 8.97) | 9.29 (7.49, 11.1) | -0.14 | .8867 | 1.30 | .1126 | |
| | NHA | 3.41 (1.43, 5.38) | 4.34 (0.86, 7.83) | 6.43 (2.80, 10.1) | 4.19 (1.47, 6.90) | 5.99 (1.05, 10.9) | 0.84 | .4015 | 1.41 | .5400 | |
| | NHO | 6.22 (3.82, 8.63) | 7.64 (4.75, 10.5) | 9.93 (6.03, 13.8) | 6.82 (4.18, 9.47) | 7.04 (4.35, 9.73) | 0.15 | .8844 | 1.03 | .9142 | |
| Threatened, % (95% CI) | Total | 5.47 (4.70, 6.23) | 5.12 (4.37, 5.87) | 6.10 (5.33, 6.87) | 4.63 (3.83, 5.43) | 4.12 (3.23, 5.02) | -2.49 | .0134* | 0.87 | .3559 | |
| | NHW | 4.94 (4.00, 5.88) | 4.17 (3.23, 5.11) | 5.45 (4.42, 6.47) | 4.31 (3.32, 5.30) | 3.63 (2.40, 4.87) | -1.44 | .1513 | 0.83 | .4132 | |
| | NHB | 7.43 (5.66, 9.20) | 6.51 (4.85, 8.17) | 6.78 (4.92, 8.64) | 6.46 (4.53, 8.40) | 5.55 (3.85, 7.24) | -1.30 | .1944 | 0.85 | .4813 | |
| | Hispanic | 6.26 (4.96, 7.56) | 5.96 (4.65, 7.26) | 7.52 (6.05, 9.00) | 4.70 (3.17, 6.24) | 3.76 (2.62, 4.90) | -2.86 | .0046* | 0.76 | .2566 | |
| | NHA | 1.59 (0.41, 2.76) | 5.82 (1.81, 9.83) | 2.78 (0.59, 4.97) | 2.04 (0.00, 4.34) | 2.98 (0.13, 5.83) | -0.30 | .7629 | 1.60 | .5579 | |
| | NHO | 5.37 (2.81, 7.93) | 7.56 (4.77, 10.4) | 7.07 (3.91, 10.2) | 4.96 (1.73, 8.20) | 7.01 (4.16, 9.87) | 0.30 | .7673 | 1.44 | .3808 | |

95% CI = 95% Confidence Interval

NHW = Non-Hispanic White

NHB = Non-Hispanic Black

NHA = Non-Hispanic Asian

NHO = Non-Hispanic Other

Results are unadjusted proportions and 95% confidence intervals from frequency tables

^at-value for the linear time component for the multivariable logistic regression model for each outcome (overall bullying, physical bullying, electronic bullying) stratified by race/ethnicity^bAdjusted odds ratios of each outcome comparing 2017 to 2015 (adjusted for age and race/ethnicity for Total rows and adjusted for age only for race/ethnicity rows)

Bold* = Statistically significant at an alpha of .05

Table 4.4 Prevalence and trends of overall bullying, school bullying, and electronic bullying among male high school student by race and ethnicity

| Victimization | Race/ Ethnicity | Year | | | | Linear trend | | 2017 vs 2015 | | |
|---------------------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------------|--------------|------------------|---------|
| | | 2009 | 2011 | t-value | P-value | 2017 | t-value ^a | P-value | aOR ^b | P-value |
| Overall Bullying, % (95% CI) | Total | - | 23.4 (21.5, 25.3) | 18.9 (17.2, 20.6) | 19.7 (18.0, 21.3) | 19.0 (17.8, 20.3) | -3.41 | .0008* | 0.95 | .4396 |
| | NHW | - | 25.9 (23.5, 28.3) | 19.6 (17.1, 22.1) | 22.4 (20.4, 24.3) | 21.7 (19.8, 23.6) | -2.03 | .0438* | 0.96 | .5832 |
| | NHB | - | 15.6 (12.1, 19.1) | 14.0 (11.9, 16.2) | 13.8 (10.4, 17.2) | 15.2 (12.9, 17.5) | -0.37 | .7088 | 1.10 | .5844 |
| | Hispanic | - | 20.7 (17.5, 23.9) | 18.1 (14.7, 21.4) | 16.5 (13.9, 19.1) | 14.8 (12.7, 16.8) | -3.20 | .0016* | 0.87 | .2490 |
| | NHA | - | 21.3 (14.2, 28.3) | 27.3 (15.5, 39.0) | 17.9 (9.17, 26.7) | 16.1 (10.8, 21.4) | -1.54 | .1244 | 0.91 | .7866 |
| | NHO | - | 27.0 (21.2, 32.7) | 23.1 (18.8, 27.4) | 22.1 (16.1, 28.1) | 22.3 (17.8, 26.7) | -1.25 | .2148 | 1.02 | .9456 |
| School Bullying, % (95% CI) | Total | 18.7 (17.3, 20.1) | 18.2 (16.3, 20.0) | 15.6 (14.2, 16.9) | 15.9 (14.4, 17.4) | 15.6 (14.4, 16.8) | -3.88 | .0001* | 0.97 | .6241 |
| | NHW | 19.9 (18.0, 21.8) | 20.7 (18.4, 23.0) | 16.2 (14.2, 18.2) | 18.1 (16.2, 19.9) | 18.1 (16.3, 19.9) | -2.08 | .0386* | 0.99 | .8676 |
| | NHB | 11.9 (9.28, 14.4) | 11.1 (8.70, 13.6) | 10.2 (8.29, 12.1) | 11.2 (8.31, 14.2) | 11.8 (9.93, 13.7) | -0.16 | .8752 | 1.04 | .8067 |
| | Hispanic | 18.0 (15.3, 20.7) | 16.0 (13.1, 18.9) | 14.8 (12.0, 17.7) | 13.8 (11.5, 16.0) | 11.8 (10.0, 13.5) | -3.96 | .0001* | 0.83 | .1177 |
| | NHA | 21.0 (16.7, 25.4) | 15.0 (9.98, 20.0) | 25.0 (13.4, 36.6) | 12.4 (6.69, 18.0) | 10.4 (6.88, 13.9) | -3.08 | .0023* | 0.85 | .6203 |
| | NHO | 24.7 (19.6, 29.8) | 18.5 (14.1, 23.0) | 20.5 (16.1, 24.9) | 17.1 (12.3, 21.9) | 20.1 (16.3, 23.9) | -1.51 | .1315 | 1.21 | .3585 |
| Electronic Bullying, % (95% CI) | Total | - | 10.7 (9.44, 11.9) | 8.66 (7.76, 9.56) | 9.65 (8.34, 11.0) | 9.93 (9.19, 10.7) | -0.49 | .6216 | 1.03 | .7462 |
| | NHW | - | 11.8 (9.80, 13.7) | 8.72 (7.50, 9.94) | 10.8 (8.73, 12.9) | 11.2 (10.1, 12.4) | 0.01 | .9891 | 1.04 | .7444 |
| | NHB | - | 6.83 (4.71, 8.96) | 6.90 (5.17, 8.64) | 5.49 (3.62, 7.37) | 8.36 (6.21, 10.5) | 0.40 | .6909 | 1.50 | .0444* |
| | Hispanic | - | 9.55 (8.04, 11.0) | 8.35 (6.73, 9.97) | 8.15 (6.14, 10.2) | 7.62 (6.08, 9.15) | -1.69 | .0938 | 0.92 | .6021 |
| | NHA | - | 11.2 (6.32, 16.2) | 12.2 (6.43, 18.0) | 12.6 (6.40, 18.9) | 10.4 (5.99, 14.8) | -0.18 | .8551 | 0.80 | .5533 |
| | NHO | - | 12.3 (7.33, 17.2) | 11.7 (7.69, 15.7) | 12.3 (8.35, 16.2) | 10.8 (7.35, 14.3) | -0.41 | .6831 | 0.88 | .6330 |
| Safety Concerns, % (95% CI) | Total | 4.59 (3.76, 5.43) | 5.78 (4.89, 6.69) | 5.36 (4.29, 6.42) | 4.83 (3.93, 5.74) | 6.00 (5.01, 6.99) | 0.57 | .5683 | 1.23 | .1001 |
| | NHW | 3.25 (2.38, 4.12) | 4.02 (3.13, 4.91) | 3.77 (2.78, 4.76) | 2.87 (1.87, 3.87) | 3.92 (2.79, 5.05) | 0.02 | .9817 | 1.37 | .1956 |
| | NHB | 5.95 (4.44, 7.46) | 8.01 (6.27, 9.74) | 7.73 (5.40, 10.1) | 6.75 (3.90, 9.60) | 8.23 (5.17, 11.3) | 0.69 | .4891 | 1.18 | .5701 |
| | Hispanic | 7.86 (5.79, 9.93) | 8.50 (6.54, 10.5) | 6.85 (5.07, 8.63) | 7.65 (6.16, 9.14) | 9.37 (7.28, 11.5) | 0.60 | .5504 | 1.24 | .2030 |
| | NHA | 2.33 (0.51, 4.15) | 7.72 (4.57, 10.9) | 5.09 (0.00, 10.2) | 6.15 (2.19, 10.1) | 6.11 (2.56, 9.66) | 1.19 | .2339 | 0.94 | .8993 |
| | NHO | 6.94 (3.77, 10.1) | 7.32 (4.02, 10.6) | 9.77 (5.56, 14.0) | 6.55 (2.82, 10.3) | 6.10 (3.07, 9.12) | -0.46 | .6449 | 0.98 | .9589 |
| Threatened, % (95% CI) | Total | 9.42 (8.29, 10.6) | 9.49 (8.71, 10.3) | 7.73 (6.73, 8.73) | 6.85 (5.98, 7.72) | 7.61 (6.76, 8.46) | -5.12 | <.0001* | 1.09 | .3664 |
| | NHW | 7.75 (6.46, 9.04) | 7.97 (7.21, 8.72) | 6.16 (5.26, 7.06) | 5.36 (4.03, 6.70) | 6.53 (5.57, 7.49) | -2.78 | .0060* | 1.22 | .2095 |
| | NHB | 11.2 (8.94, 13.6) | 11.2 (8.61, 13.8) | 10.0 (7.89, 12.2) | 8.86 (6.23, 11.5) | 10.0 (7.46, 12.6) | -1.53 | .1266 | 1.09 | .7099 |
| | Hispanic | 12.0 (9.86, 14.1) | 12.1 (9.70, 14.6) | 9.43 (7.54, 11.3) | 8.37 (6.90, 9.84) | 8.33 (6.86, 9.80) | -4.07 | <.0001* | 0.97 | .8085 |
| | NHA | 9.45 (5.89, 13.0) | 7.96 (5.16, 10.7) | 8.00 (2.65, 13.4) | 4.88 (0.73, 9.03) | 5.85 (2.53, 9.18) | -1.68 | .0952 | 1.18 | .7763 |
| | NHO | 15.7 (11.5, 20.0) | 12.2 (7.89, 16.4) | 11.1 (5.77, 16.5) | 11.4 (6.20, 16.6) | 9.46 (6.48, 12.4) | -2.30 | .0223* | 0.84 | .5981 |

95% CI = 95% Confidence Interval

NHW = Non-Hispanic White

NHB = Non-Hispanic Black

NHA = Non-Hispanic Asian

NHO = Non-Hispanic Other

Results are unadjusted proportions and 95% confidence intervals from frequency tables

^at-value for the linear time component for the multivariable logistic regression model for each outcome (overall bullying, physical bullying, electronic bullying) stratified by race/ethnicity

^bAdjusted odds ratios of each outcome comparing 2017 to 2015 (adjusted for age and race/ethnicity for Total rows and adjusted for age only for race/ethnicity rows)

Bold* = Statistically significant at an alpha of .05

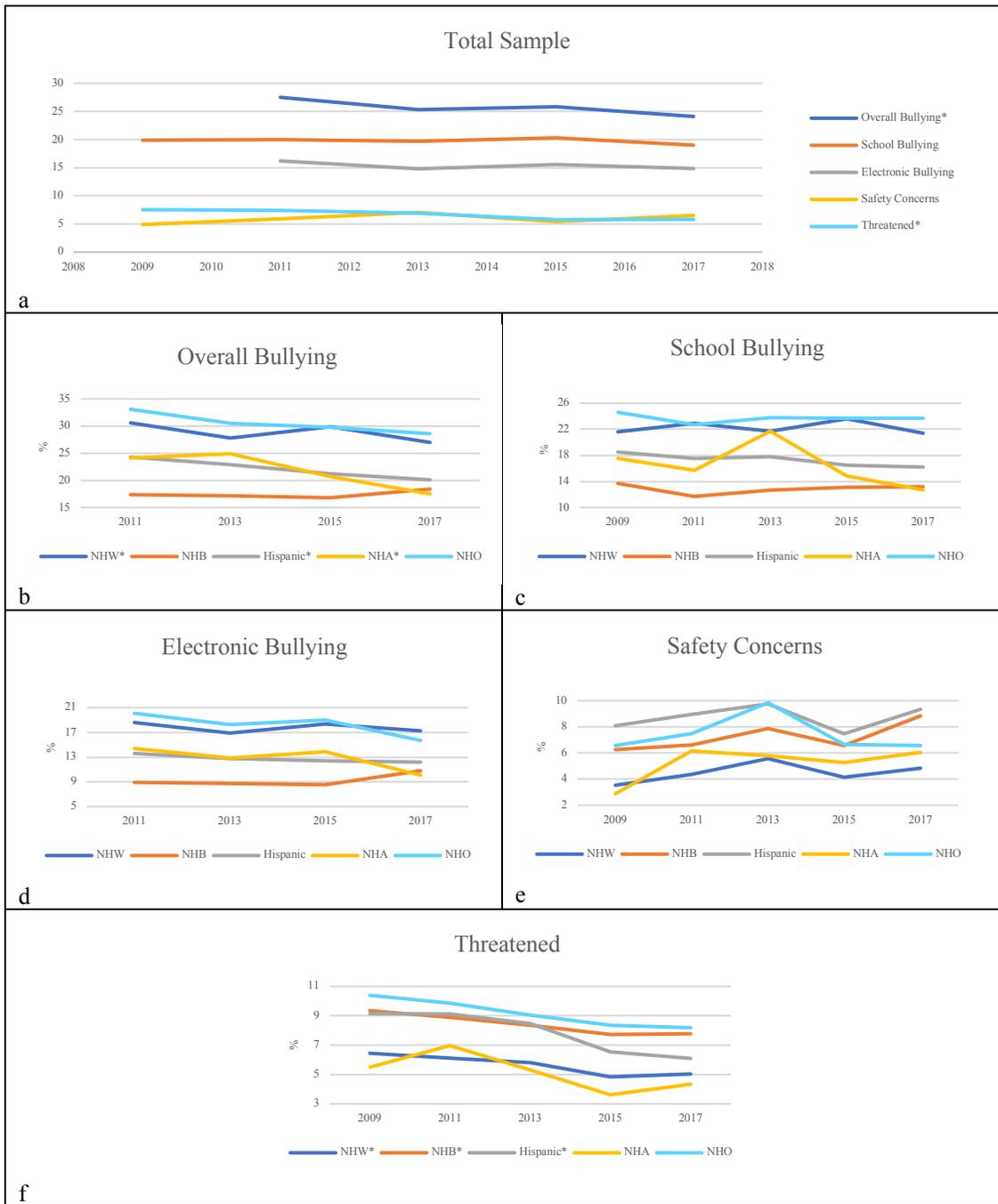


Figure 4.1. Trends of overall bullying, school bullying, electronic bullying, feeling unsafe at school, and being threatened or injured on school property by race and ethnicity (YRBSS 2009-2017)

*Statistically significant linear change at an alpha level of 0.05



Figure 4.2. Trends of overall bullying, school bullying, electronic bullying, feeling unsafe at school, and being threatened or injured on school property by race and ethnicity among female high school students (YRBSS 2009-2017)

*Statistically significant linear change at an alpha level of 0.05

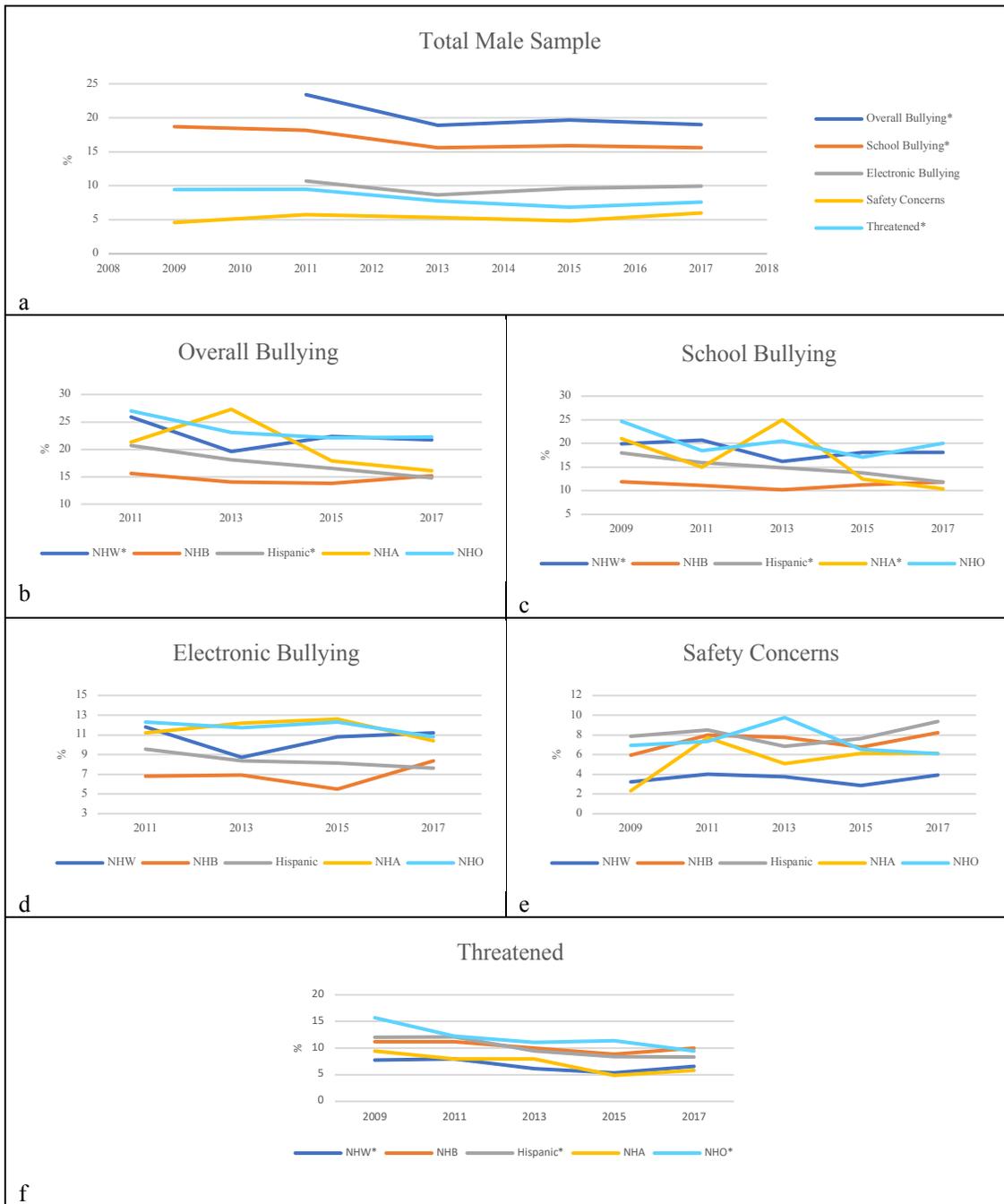


Figure 4.3. Trends of overall bullying, school bullying, electronic bullying, feeling unsafe at school, and being threatened or injured on school property by race and ethnicity among male high school students (YRBSS 2009-2017)
 *Statistically significant linear change at an alpha level of 0.05

CHAPTER 5

CONCLUSION

Using national data from the Youth Risk Behavior Surveillance System (YRBSS), this cross-sectional study analyzed the prevalence of being victimized among a national sample of high school students from 2009 to 2017. Unlike other studies, the present research aimed to not only study victimization that might occur at school, such as bullying, but other types of victimization that might occur in many other different settings. Although other studies have looked at the prevalence of bullying by gender and race and ethnicity, we hoped to incorporate the intersection between gender and race/ethnicity when analyzing the prevalence of bullying and other forms of victimization.

The results of our analyses provide some evidence to support our hypotheses. First, our results showed significant linear decreases in overall bullying among the total sample, and decreases in overall bullying among non-Hispanic White, non-Hispanic Asian, and Hispanic students in the total sample. However, this was not always the case for every race/ethnic and gender group. Female students had higher proportions of reporting any type of bullying victimization. Neither the total sample of females nor any of the race/ethnicity groups of female students saw any changes in the prevalence of any type of bullying. Alternatively, not only did the total sample of males see significant decreases in overall bullying and bullying at school, both male non-Hispanic White and

Hispanic students saw decreases in overall bullying and school bullying, while non-Hispanic Asian students saw a decrease in school bullying.

Our findings of higher prevalence of bullying among female students are consistent with previous research, and they provide further evidence that not only do female students have higher prevalence of bullying, but their proportions are not decreasing as they are among male students.^{25,66} One possible explanation for the observed decreases among males is the fact that national anti-bullying campaigns have been successful in decreasing the prevalence of more aggressive bullying, as male students have been shown to be more involved in more direct and physically aggressive forms of bullying than female students.^{3,14} On the other hand, female students have been shown to be involved in more covert types of bullying such as emotional or psychological bullying.^{3,14}

National campaigns, most of which already consider the role of factors like race and ethnicity or sexual orientation and their relationship to bullying, should also emphasize bullying prevention among female students due to their higher and unchanging proportions of any type of bullying. Additionally, non-Hispanic Black and non-Hispanic Other students in either the total sample or in both of the gender-stratified groups did not see decreases in any type of bullying, continuing to add additional stressors to these already vulnerable students. As being bullied has been associated with poor academic achievement, national campaigns should also continue to provide support to these minority groups to minimize the impact of bullying on their academic progress.^{3,10,13}

Our results do not provide evidence of significant increases in the prevalence of missing school due to feeling unsafe at school or on the way to school among the total sample of students, the race/ethnicity groups in the total sample, or for any of the genders or gender-specific race/ethnicity groups. However, our results do provide evidence of decreases in the prevalence of being threatened or injured at school among the total sample of high school students, the total sample of male students, and the total female students, providing further evidence that more violent victimizations have decreased over the last decade. Hispanic students saw decreases in the prevalence of being threatened regardless of gender as Hispanic students in the total sample, female Hispanic students, and male Hispanic students all saw decreases in the prevalence of being threatened. Non-Hispanic White students and male non-Hispanic White students in the total sample saw decreases in being threatened. Additionally, we observed decreases in being threatened for the total sample of non-Hispanic Black students and male non-Hispanic Other students.

Our results did not find evidence that all forms of victimization were higher in 2017 compared to the 2015 survey year, and actually show a continuation of decreasing trends for some groups. For example, the prevalence of overall bullying among the total sample of non-Hispanic White students showed a significant linear decrease from 2011 to 2017, and our analysis between 2015 and 2017 showed that the likelihood of overall bullying was lower in 2017. The likelihood of overall bullying in 2017 was also lower among the total sample of female students and among female non-Hispanic White students compared to 2015. Additionally, although the prevalence of school bullying seemed to increase from 2009 to 2015, female non-Hispanic White students were less

likely to be bullied at school in 2017 compared to 2015, signaling a potential change in the trend. Perhaps most alarming, was the finding that although the prevalence of electronic bullying among male non-Hispanic Black students seemed to decrease from 2011 to 2015, non-Hispanic Black students were more likely to be bullied electronically in 2017 than in 2015, signaling a potential change in the trend.

Although we did not see any other significant increase in odds of other forms of victimization when comparing 2015 to 2017, we did observe some interesting changes. Almost all race/ethnic groups among the total sample of high school students, female students, and male students showed higher sample proportions of missing school due to feeling unsafe in 2017 compared to 2015, although these findings were not statistically significant. Additionally, although we found that prevalence of being threatened at school was decreasing for the total sample of students and male students, if we look at the prevalence of being threatened by race and ethnicity, we can see that these proportions are beginning to plateau for all race and ethnicity groups. This observation warrants further investigation by future studies to better understand if the decreasing trend is reversing.

One strength of our study is that it uses multiple years of data to analyze long-term trends of victimization among high school students, including the most recent release of YRBSS data from 2017. Our study not only included relatively new data about electronic bullying, but also added to the growing body of research focusing on more diverse samples, while considering the intersection between race/ethnicity and gender. Additionally, our study analyzes forms of victimization that might occur not only at

school, but instead uses a more comprehensive approach to better understand all forms of victimization included in the YRBSS survey that could be affecting high school students. Lastly, this study uses data from the YRBSS survey, which has been named by the Office of Disease Prevention and Health Promotion to be the desired data source to study physical fighting and bullying among adolescents in the US.

Our study has some limitations. Although the YRBSS survey has undergone reliability testing, and survey administrators use standardized protocols that ensure data is of the highest quality possible, due to the self-reported nature of the YRBSS survey, our data is still vulnerable to recall bias from the participants. Additionally, since the survey does not have a 100% response rate, if the reason why the schools did not participate are linked to bullying rates, then this could be introducing bias to our results. A limitation of our analysis when comparing 2017 to 2015 is that we only found one significant increase in odds of being victimized out of thirty as seen among male non-Hispanic Black students; this result could potentially be due to chance. We are also limited in our conclusions, as data from the national YRBSS survey is only representative of US high school students and does not provide representative data on all high-school-aged children, the results from our study can only be interpreted as such.

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