2021

How Cyber Activity Influences Depression and Anxiety in Teenagers

Mary Fridah Gatwiri Muiruri
Walden University

Walden University

College of Health Professions

This is to certify that the doctoral dissertation by

Mary Fridah Gatwiri Muiruri

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Ji Shen, Committee Chairperson, Public Health Faculty
Dr. Howell Sasser, Committee Member, Public Health Faculty
Dr. Pelagia Melea, University Reviewer, Public Health Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2021

Abstract

How Cyber Activity Influences Depression and Anxiety in Teenagers

by

Mary Fridah Gatwiri Muiruri

MA, St James School of Medicine, 2011

BS, Walden University, 2012

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

May 2021

Abstract

Both depression and anxiety have been a focus of scholars since their rates have recently skyrocketed from 5.4 % in 2003 to 20 % currently among teenagers in the United States. Although numerous studies have assessed the association between playing video games and depression, few studies have examined how cyberbullying and screen time contribute to depressive symptoms in teenagers. The purpose of this study was to analyze cyberbullying and screen time on depression in teens. . The exploration of associations between the dependent variable, depression, and the independent variables, screen time, video gaming, and cyberbullying, were guided by Bandura's social cognitive theory to learn the psychological effects of the participants and Social economic model (SEM) to answer the research questions. Participants were teenagers aged 13 to 17. Retrospective secondary data from *the Centers for Disease Control and Prevention's 2019 Youth Risk Behavior Survey (YRBS*; *N*= 10,909) were analyzed using binomial logistic regression for multivariate analysis and chi-square for bivariate analysis Results revealed a significant positive association between video gaming, long screen time, and cyberbullying in relation to teenage depression. The social change implication of this study is a better understanding of the relationship between depression in teenagers as it relates to screen time, video gaming, and cyberbullying for caregivers, parents, teachers, public health professionals and teenagers themselves such that these stakeholders can better address and remove factors that increase anxiety and depression in teenagers. These findings could also reduce violence and suicidal cases that are linked to depression.

How Cyber Activity has Influenced Depression and Anxiety in Teenagers

by

Mary Fridah Gatwiri Muiruri

MA, St James School of Medicine, 2011

BS, Walden University, 2012

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

May 2021

Dedication

May I start by thanking and giving all the glory to the lord God almighty. This far I have reached I say he is Ebenezer. I could not have accomplished this if he was not on my side. To the most, high, God, be all the glory and honor. I would like to dedicate the completion of my dissertation to my husband Benson, daughter Grace, and son Nathan, for helping me finish the journey, with their social, economic and spiritual support. Thank you for believing in me. Your encouragement, prayers and financial backing helped me to come this far. I would also like to thank my parents for always asking me how I was doing in school wherever they called. This motivated me to work even harder. I would also like to thank our Lord and Savior Jesus Christ for guiding me along the way. To God be all the glory and honor. I will forever praise him and exalt his name. He has made everything beautiful in its time; bible new international version Ecclesiastes 3:11.For the vision waits for an appointed time; it speaks of the end and will not prove false. Though it lingers, wait for it; it will certainly come and will not delay bible new international version Habakkuk 2:3.

Acknowledgments

I would like to acknowledge the completion to several individuals who have helped me along the way. I would like to thank Dr. Ji Shen (chairperson). Thanks for agreeing to be my chair, your encouragement, commitment and constant instructions kept me going. Thanks for all the advice help and instructions along the way. Thank you, Dr. Howell Sasser (methods expert) for agreeing to be my committee member. I could not have made it this far without your guidance. Thank you, Dr. Pelagia Melea (University research reviewer) for guiding and helping me in this journey. Thank you all for helping me to present a quality

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Over the last five years, there have been high rates of both anxiety and depression among teenagers between the ages of 13-17 (CDC, 2016). Depression is a serious mental health problem that causes a persistent feeling of sadness and loss of interest in activities. Anxiety is nervous disorder characterized by a state of excessive uneasiness and apprehension, typically with compulsive behavior or panic attacks (NIMH, 2019). Computer-mediated communication (CMC), which is either synchronous communication where all parties are engaged in the communication simultaneously, as in video chats, or asynchronous where a sender does not receive an immediate response from the receiver, for example text messaging, is a common method of communication used by teenagers (Madden et al., 2015). Use of the Internet and cellular telephones for communication with friends and entertainment among this age group has been on the rise (Madden et al., 2015). Factors such as cyber bullying and video gaming (which are linked with CMC) are have been associated with high rates of depression in teenagers. In this study, I examined how the duration of adolescent CMC use (screen time), cyber bullying, and video gaming have contributed to depression in teenagers or both anxiety and depression when they occur at the same time. Studying the impact of the above factors when it comes to teenage depression and anxiety has several positive social change implications. First, adding to the research on how screen time, video gaming contributes to depression/anxiety among teenagers will provide contemporary perspectives not yet explored—specifically, duration of screen time and if some video games have more negative impact than others (for instance violent verse nonviolent). Second, parents and

guardians may be able to identify red flags from the teenagers that spend a lot of time on the screen or playing video games. Educators and healthcare providers may be able to address and educate the community on the impact video gaming, long screen time, and cyber bullying has on teenage depression and anxiety. This will lead to early detection, treatment, and eventually great outcome. In this chapter, I provide an overview and introduce the study by giving the background and purpose of the study, and describing the problem statement, research questions, and hypotheses. I also discuss the theoretical framework, nature, and significance of the study, as well as the assumptions, limitations, and scope of delimitations.

Background of the Study

According to CDC (2018), there have been high incidences of drug overdose and suicides among teenagers in the last 5 years due to a rise in depression and anxiety in this country. According to the CDC report, U.S. life expectancy has dropped amid the rise in overdoses and suicides; life expectancy, which averaged 78.6 years in 2017, was a decrease of 0.1 from the year before, and is attributed to the rise in deaths from overdose and suicide (CDC,2018). The same report also indicated that more than 70,000 people died of drug overdoses in 2017 (CDC, 2018). This number marks a nearly 10%increase from 2016 and the highest ever in the United States for a single year (CDC, 2018). This is a drastic increase bearing in mind that only about 17,000 people died of overdoses in 1999 (CDC, 2018). To be more specific, the number of deaths involving synthetic opioids, such as fentanyl, increased by 45%in the span of a single year, from 2016 to 2017 (CDC, 2018). According to the report by Howard, (2018), the total death rate for

10- to 19-year-olds in the United States declined by 33% between 1999 and 2013 but then suddenly soared by 12% between 2013 and 2016 (Howard, 2018). This rise in deaths is attributable to injury-related deaths, such as traffic accident fatalities, drug overdoses, homicides, and suicides, as opposed to illnesses. Most of the above factors (suicides, homicides, and drugs overdose), are commonly associated with mental health; mainly depression and anxiety (Howard, 2018). Sally et al. (2018) showed how the death rate increased in teenagers from 1999 to 2016. Most of these incidences were associated, connected or linked with either anxiety or depression (Sally et al., 2018). This rise in deaths among teenagers led me to assess factors that are associated with both anxiety and depression. In conducting this study, I was able to assess how anxiety and depression are correlated with CMC and what can be done to tackle this social problem.

Various factors such as long screen time, video gaming, and cyber bullying have been associated with high incidences of both anxiety and depression in teenagers in the last 5 years. According to Rachel et al. (2016), cyber bullying may have even more harmful outcomes to adolescents' mental health, including substance abuse, increased suicidal ideation, and suicide attempts. Rachel et al. (2016) study showed that the likelihood of suicide attempts is up to twice as high among victims and aggressors involved in cyberbullying, as compared to those who are not involved in cyberbullying. Studies, such as psychguides.com (2019), show that video gaming can lead to addiction and isolation that can eventually cause depression and anxiety. Those who isolate themselves from others in order to play video games may miss out on family events and outings with friends. If this continues to be a pattern for a long period of time, individuals

with an addition to videogames might find themselves without any friends at all. This may eventually lead to depression and anxiety (psychguides.com, 2019). Markham (2018) indicated that young people who spend 7 hours or more a day on screens are more than twice as likely to be diagnosed with depression or anxiety than those who use screens for an hour a day (Markham,2018). Finally, as per the Schrobsdorff, (2016) severe gender disparity is demonstrated when it comes to depression and anxiety. In the United States, 19.5% of girls experienced at least one major depressive episode while only 5.8% of boys did (Schrobsdorff, 2016). The pediatrics study researchers suggested that adolescent girls may be more exposed to risk factors such as cyberbullying and frequent use of cell phones (Schrobsdorff, 2016).

According to Merikangas et al. (2015), when it comes to mental health in teenagers and adults, anxiety disorders were the most common condition (31.9%), followed by behavior disorders (19.1%), mood disorders (14.3%), and substance use disorders (11.4%), with approximately 40% of participants with one class of disorder also meeting criteria for another class of lifetime disorder. To be more precise, the overall prevalence of disorders with severe impairment and/or distress was 22.2% (11.2% with mood disorders, 8.3% with anxiety disorders, and 9.6% behavior disorders; Merikangas et al., 2015). The median age of onset for disorder classes was earliest for anxiety (6 years), followed by 11 years for behavior, 13 years for mood, and 15 years for substance use disorders (Merikangas et al, 2015).

Merikangas et al. (2015) concluded that approximately one in every four to five youth in the United States meets criteria for a mental disorder with severe impairment

across their lifetime (Merikangas et al., 2015). The likelihood that common mental disorders in adults first emerge in childhood and adolescence highlights the need for a transition from the common focus on treatment of U.S. youth to that of prevention and early intervention (Merikangas et al., 2015). The study however does not address ways and methods of early prevention and detecting mental health especially anxiety and mental health. Therefore, a new study is required to provide this vital information.

Problem Statement

Depression is a serious mental health problem that causes a persistent feeling of sadness and loss of interest in activities. Anxiety is a nervous disorder characterized by a state of excessive uneasiness and apprehension, typically with compulsive behavior or panic attacks (National Institute of Mental Health [NIMH], 2019). Anxiety and depression both affect how a child thinks, feels, relates to other people, and behaves (NIMH, 2019). Depression can also cause emotional, functional, and physical problems (NIMH, 2019). According to the NIMH (2019), about 3.2 million, which is equivalent to 13% of the population between 12- to 17-year-olds, have had at least one major depressive episode within the past 12 months (NIMH, 2019). Depressed children often struggle with anxiety and substance abuse hence making early detection of mood disorder very difficult. Diagnosis with depression among children aged 13–17 years increased from 5.4% in 2003 to 8% in 2007 and to 8.4% in 2011–2012 (CDC, 2013). Per the National Survey on Drug Use and Health (NSDUH) in 2017, this rate has increased to 13% (NSDUH, 2017). Due to this increasing rate of depression within a very short duration, a continued study was required to investigate the factors associated with high

rate of depression among teenagers. Knowledge of contributing factors will assist various groups in early detection of mood disorders. This will help in detecting depression earlier, ideally improving the outcome of the depression. Some factors such as cyber,bullying, long screen time and video gaming have been associated with depression among teenagers (CDC, 2018). This new study has explored how these factors have contributed to high rate of depression in children. As I mentioned earlier, when these factors are proven to have an impact in causing mood disorder; assessment of these factors may aid in early detection and prevention of depression in teenagers. This could eventually lead to early treatment, better outcomes, and fewer cases. According to CDC (2018), 7.1% of children aged 13-17 years (approximately 4.4 million) have diagnosed anxiety while 3.2% of children aged 13-17 years (approximately 1.9 million) have been diagnosed with depression (CDC, 2018). Studies have shown that both anxiety and depression can occur concurrently (CDC, 2018). In other words, 3 in 4 children aged 13-17 years with depression also have anxiety (73.8%; CDC, 2018). My plan is to assess the effect of risk factors of depression. Anxiety will be included in the study, if there are participants with both conditions at the same time; in other words, only when they both occur in the same person. According to Anderson and Jiang (2018), 45% of teens say they use the internet almost constantly, a figure that has nearly doubled from a 2014-2015 survey; meanwhile, 44% of teenagers go online several times a day. According to Bottino et al. (2015), emotional responses of adolescents exposed to cyberbullying vary in intensity and quality. The emotional impact is harmful to most victims (Bottino et al., 2015). Children who reported experiences cyberbullying (which is commonly as a result

of screen time) particularly those who suffered frequent attacks (two or more times a month), had more severe depressive symptoms. The association between cyberbullying and depressive symptoms found in several studies suggests that these phenomena occur in a bidirectional way (i.e., they can be either the cause or the consequence of each other; Rachel et al., 2016). Hence, cyberbullying can occur as a result of screen time. Video gaming is another way that teenagers spend a lot of time on the screens (Anderson & Jiang, 2018). While a substantial majority of girls' report having access to a game console at home (75%) or playing video games in general (83%), those shares are even higher among boys. Roughly nine in 10 boys (92%) had or have access to a game console at home and 97% say they play video games in some form (Anderson & Jiang, 2018). Ottino et al. (2015) associated an increase in both depression and anxiety among teens with cyberbullying. Anderson & Jiang, (2018) suggested that the high rates in depression and anxiety is a result of video gaming and long screen time. Schrobsdorff, (2016) suggests that girls are more prone to both anxiety and depression as a result of cyberbullying and long screen time (Twenge et al., 2018). However, although all the above studies indicate some relationship between long screen time, cyber bullying, and video gaming in relation to anxiety and depression in teenagers, a new study is required to show how cyber bullying, long screen time and video gaming can lead to anxiety and depression in this age group. Although numerous studies have assessed the association between playing video games and depression, few studies have examined how cyber bulling, and screen time contribute to depressive symptoms in teenagers. Thus, I examined how cyberbulling and screen time contribute to depressive symptoms in

teenagers. Further, I also sought to understand contributing factors to the association for example, frequency and long screen time, and the gender of the affected individuals.

Purpose of the Study

The purpose of my quantitative study was to explore how factors such as hours of screen time and video gaming contribute to the higher rates of anxiety and depression conditions among children between the ages 13-17 years. Knowing the factors that have contributed to high rates of depression and anxiety in children will be a gateway to prevent both depression and anxiety among this age group (CDC, 2018). In this study, I tested the hypothesis that video gaming, screen time, and cyber bullying is associated statistically with a higher rate of depression and anxiety among children between the ages of 13-17 years.

Research Question(s) and Hypotheses

Research Question 1: Is there an association between screen time (amount of time spent on the screen) and depression/anxiety in teenagers between ages 13-17 in the United States?

$H_0$1: There is no statistically significant relationship between screen time and depression/anxiety conditions in teenagers between ages 13-17 in the USA.

H_a1: There is a statistically significant relationship between screen time and depression/anxiety between teenagers at the age of 13-17 in the USA.

Research Question 2: Is there an association between video gaming and depression/anxiety in teenagers between ages 13-17 in the USA?

$H_0$2: There is no statistically significant relationship between video gaming and depression/anxiety between teenagers at the age of 13-17 in the USA.

H_a2: There is statistically significant relationship between video gaming and depression/anxiety between teenagers at the age of 13-17 in the USA.

Research Question 3: Is there an association between cyberbullying and depression/anxiety in teenagers between ages 13-17 in the USA?

$H_0$3: There is no statistically significant relationship between cyberbullying and depression/anxiety between teenagers at the age of 13-17 in the USA.

H_a3: There is statistically significant relationship between cyberbullying and depression/anxiety between teenagers at the age of 13-17 in the USA.

Confounding factors that were included were the range of age, gender, race of the participants, and parental history of depression and anxiety.

Research Question 4: Is there a relationship between screen time, video games, cyberbullying and depression/anxiety in teenagers between ages 13-17 in the USA?

$H_0$4: There is no statistically significant relationship between cyber bullying, video games, and screen time and depression/anxiety between teenagers at the age of 13-17 in the USA.

H_a4: There is statistically significant relationship between screen time, video games, cyber bullying and depression/anxiety between teenagers at the age of 13-17 in the USA.

Theoretical Foundation

I used the social ecological model (SEM) theory to answer my research questions (McLeroy et al., 2012). I chose SEM because this framework will address each group in order to bridge the existing gap when it comes to mental health in teenagers and young adults between ages 13-17 years. When it comes to this age range, parents/patients should be educated on the signals for depression and anxiety factors (CDC, 2016). Knowledge of these signals may help diagnose mental health among the affected individuals before a situation becomes uncontrollable. Early detection and treatment are the main keys to keep depression and anxiety from progressing into a more chronic condition (CDC, 2016). In the relationship or social circle level (McLeroy et al., 2012), those detected with signs and symptoms of depression and anxiety should then be referred to the care givers who are able to take a detailed history, evaluate the patient, and treat depression and anxiety (CDC, 2016). Community knowledge of the warning signs of depression and anxiety can also lead to early detection; hence, early treatment will be possible (CDC, 2016; McLeroy et al., 2012). The government and private sectors should support and sponsor many free centers where teenagers and young adults are screened, treated, counseled on measures and precautions; complications and effects of mental health and how some of these predisposing factors can be avoided. The government should also control and come up with rules, regulations, orders, and laws that govern all states when it comes to educating and training health educators on how to counsel and follow up affected people (CDC, 2016).This can bring uniformity and at the same time ensures that teenagers suffering from depression and anxiety are not left out and are diagnosed and treated

(CDC, 2016).On societal level, there should be national standards that regulate screening, care and treatment of those that have mental health or signs and symptoms of depression and anxiety. There should also be national standards that regulate screening, care, and treatment of those that have mental health or signs and symptoms of depression and anxiety.

I also incorporated social cognitive theory (SCT) in this study because SCT helps explain the psychological condition of teenagers. For instance, teenagers who watches violent video games and observes rewards may want to repeat those same behaviors (Bandura, 1999, as cited in the "Social Cognitive Theory," 2010). In addition, teenagers may be frustrated with peers who cyberbully them, so the frustrated teenagers may seek adverse peer relationships such as joining a bullying group to bully those who bully them. This is the product of observed behaviors and false perceptions of belonging through the human-motivation effect (Bandura, 1999, as cited in the "Social Cognitive Theory," 2010). In this regard, I used the SCT to explain and analyze social and psychological determinants of the health of depressed teenagers as a result of quantitative factors such as video games and cyberbullying (Bandura, 1998). I used SCT to obtain and maintain behavior changes and what type of modifications can be made to these behavior changes. Thus, my study focused on the self-efficacy of teenagers between ages 12-17. Therefore, SCT was important to my study due to the relationship between obtaining learning skills and self-efficacy and their effect on behavioral changes. I used SCT to show how observation of bullying and violent video gaming may influence depression and anxiety among teenagers. Studies by Pew (2018), the CDC (2018), Brian et al. (2018), and

Landoll et al (2015) support this concept. Therefore, I applied this theory in the prevention of high incidences of both depression/anxiety in teenager's secondary to video gaming, long screen time and cyber bullying which I review in-depth in Chapter 2.

Nature of the Study

My study is quantitative and cross-sectional in nature because cross sectional analysis allowed me to look at the numerous characteristics such as age, sex, and cyber activities at the same time. This helped me to determine how exposure to cyber activities might correlate with anxiety and depression in teenagers. All four research questions above have variables that helped me to fill in the gap that is currently there concerning factors leading to depression and anxiety in teenagers and young adults. By using the quantitative method, I was able to do numerical analysis of my findings from survey of various peer reviewed articles from various researchers on the causes of both depression and anxiety in teenagers and how this has impacted lives of many in the USA. I was also able to use pre-existing statistical data using computational techniques, since quantitative research focuses on gathering numerical data and generalizing it across groups of people in order to explain a particular phenomenon. In this case, the phenomenon was the effects of mental health in teenagers and factors that are contributing to depression and anxiety.

Definitions

Adolescence: transitional phase of growth and development between childhood and adulthood (Brian et al., 2018).

Anxiety: Social anxiety occurs when an individual has a fear of social situations or interactions with other people that will make them feel self-conscious, inferior, or judged.

They may feel better when they are alone than when they are in social situations (Weeks et al., 2016).

Cyberbullying: Any physical threat or actual physical altercation intended to harm someone or a group of people (Gentile et al., 2015).

Depression: Depression occurs when individuals experience sadness mostly every day and lack interest in activities that previously brought them pleasure. Depression may be characterized by a lack of energy, feelings of worthlessness, and social isolation (DSM-IV-TR, 2000).

Gaming addiction: Video game addiction is referred to as video game overuse, pathological or compulsive/excessive use of computer games and/or video games (AAC, 2018).

Screen time: The time on spends viewing screen on any electronic device (Campaign for a Commercial-Free Childhood, Alliance for Childhood, & Teachers Resisting Unhealthy Children's Entertainment, 2012, p. 4).

Video games: Games that are played on game consoles, computers, hand-held devices, or cell phones (Gentile et al., 2015).

Assumptions

According to Cohen et al., (2015), a researcher is required to reveal underlying assumptions in order to bolster strength and relevance of the study. For this study, I assumed that all the participants were truthful in their survey responses. This assumption is essential in order to get information that would make the study results valuable (Cohen et. al., 2015). Second, since the results were generalized, replication was possible

(Mitchell & Jolley, 2015). Finally, I assumed that the instruments used were valid and measured the constructs important to this study, leading to accurate inferences from the collected data (Mitchell & Jolley, 2015).

Scope and Delimitations

The scope of this study involved the perspectives of teenagers between the age of 13-17 Black and White, as well as Hispanics and non-Hispanics in the United States. The data assessed the effects of screen time, cyberbullying, gender, and video game use in relation to depression and anxiety in teenagers. The reason that this age group was chosen is due to the high rate of both depression and anxiety among this age group. According to CDC, (2018), 7.1% of children aged 13-17 years (approximately 4.4 million) have diagnosed anxiety while 3.2% of children aged 13-17 years (approximately 1.9 million) have been diagnosed with depression (CDC, 2018). Studies have shown that both anxiety and depression occur concurrently (CDC, 2018). I chose this age group in order to help address this social problem of rising depression rates in teenagers.

Possible Types and Sources of Data

Since my study is quantitative in nature and my plan was to use retrospective secondary data analysis of existing data; I used G*power to determine sample population which is children between the age of 13-17, both Black and White, in the United States. I used retrospective secondary data from the CDC's National Center for Health Statistics (NCHC); specifically, 13,677 adolescents from the 2019 Youth Risk Behavior Survey (YRBS) because the data were publicly available and had detailed statistics, facts, and was up to date.

Analyzing secondary data helped in bridging the gaps that we have in various studies concerning mental health. This will also help in reducing the high incidences of anxiety and depression among teenagers and young adults. When it comes to the data collection method, because I used secondary database from CDC, I concentrated on the data that mostly addresses depression and anxiety in adolescence in relation to sex, video gaming, cyberbullying, and long screen time use. Statistical analysis included binomial logistic regression.

Limitations

The data on screen time, cyberbullying, and video gaming was self-reported and subject to some reporting bias, particularly underreporting. This is a major limitation in this study. Self-reported answers may be exaggerated; respondents may be too embarrassed to reveal private details; for instance, one may not feel free to open up when it comes to cyberbullying because the subject may be afraid of meeting further consequences for example more bullying as a result of participation. Second, social desirability bias (tendency of survey respondents to answer questions in a manner that will be viewed favorably by others) can take the form of over-reporting good behavior or under-reporting bad or undesirable behavior. In this particular study, teenagers may want to show that they spend less time on video games and study more. This may have affected the outcome of the study. There were also cases when respondents may have guessed the hypothesis of the study and provide biased responses that will confirm the researcher's conjecture or make them look good; or make them appear more distressed to receive promised services (Rosenman, et al., 2016) .Finally, subjects may forget pertinent

details. Self-report studies are inherently biased by the person's feelings at the time they filled out the questionnaire. If a person feels bad at the time, they fill out the questionnaire, for example, their answers will be more negative. If the person feels good at the time, then the answers will be more positive. To avoid the above limitations, I used data from a reliable source that had the most current information and also included teenagers, and both genders (males and females), the racial categories of White and Black, and included Hispanics and non-Hispanics in the United States.

Significance of the Study

This new study has contributed to solving the social problem that exists currently in this country, which is a high rate of depression and anxiety among children at the age of 13-17 (CDC, 2018). I assessed how screen time and video gaming influence depression in children, both White and Black, in the United States, between the ages of 13-17. The study has also added to the available information that might be able to reduce both mortality and morbidity rate associated with depression in teenagers. Less cases of depression and anxiety among teenagers means that more children will be able to perform well in schools; hence becoming reliable, confident and more productive members and leaders in the community. This will not only improve the economy of the society but will also promote good health and social life (CDC, 2019).

By studying the relationship between screen time, video games, race, and gender in relation to anxiety/depression among teenagers, I have created tools that address this social problem (anxiety and depression) as well as prevent other consequences that are related to depression/anxiety, for example, premature deaths secondary to suicide,

violence, drunken driving, addiction and alcoholism. My goal is to reduce both mortality and morbidity associated with depression in teens. The study has also helped in solving the research problem by looking closely at screen time, gender, video gaming, gender, and screen time which is associated with high rates of anxiety and depression among children and teenagers. At the end of the study, there are recommendations related to the outcome of the study. These recommendations seek to reduce depression/anxiety among teenagers in America. The study has also added vital information on how to tackle teenage depression and its complications on to the existing information. This contribution will help in teaching children, parents, a teachers, and communities on potential signals to diagnose depression and anxiety in teenagers early. Early diagnosis will help in commencing early treatment of these disorders (CDC, 2019). Early treatment has a better prognosis and is also cheaper than late treatment, hence making this an effective strategy when it comes to preventing and reducing depression and anxiety among teenagers (CDC, 2019).

Significance to Theory

According to CDC, (2018) there have been high incidences of drug overdose and suicides among teenagers in the last 5 years; following depression and anxiety in this country. According to the CDC report, U.S. life expectancy drops amid disturbing rise in overdoses and suicides; life expectancy, which averaged 78.6 years in 2017, a decrease of 0.1 from the year before, to the rise in deaths from overdose and suicide (CDC,2018). By studying the relationship between gender, screen time, cyberbullying, and video game use, in relation to anxiety/depression among teenagers and young adults, I identified ways

to address this social problem (anxiety and depression) as well as prevent other consequences that are related to depression/anxiety, for example premature deaths secondary to suicide, violence, drunken driving, addiction, and alcoholism.

Significance to Practice

The study was able to help in solving the research problem by looking closely at cyberbullying, video gaming, gender, and screen time which are associated with high rates of anxiety and depression among teenagers and young adults. In Chapter 5, I give recommendations on how to use the findings from this research to reduce depression/anxiety among teenagers. The new study has an original contribution to teaching children, parents, and teachers and, the communities on those identifiers that will help many to diagnose children with depression and anxiety.

Significance to Social Change

The above practice and theory significances will help in reducing the number of both depression and anxiety cases among teenagers. This may reduce the mortality and morbidity that occurs following depression related to suicide and drug overdose that may result from depression. This will also help in coming up with strategies that will reduce depression and anxiety among teenagers and in United States.

Summary and Transition

The prevalence of both depression and anxiety rates in teenagers has gone up (Centers for Disease Control and Prevention (CDC), 2013). Diagnosis with either anxiety or depression among children aged 12–17 years increased from 5.4% in 2003 to 8% in 2007 and to 8.4% in 2011–2012 (CDC, 2013). Various studies have been conducted to

determine the association of the type of depression/ anxiety and the quantitative factors such as age, gender, cyberbullying, screen time, and video game use here in the United States. However, studies conducted on a large scale to get a broader perspective of both mortality and morbidity and the increase of both depression /anxiety among teenagers' rates is lacking. This particular study has determined a broader perspective of the outcome of depression and anxiety in adolescence by combining the findings of various studies conducted on a small scale as well as looking at each of the above quantitative factors. It is important and necessary to determine the magnitude and severity of association between depression/anxiety and quantitative factors such as cyberbullying, screen time, and video gaming before developing appropriate interventions to deal with the rising problem of high incidences of both depression and anxiety among teenagers.

In this chapter, I discussed the background of the study, problem statement, and purpose of the study. I was also able to identify the research questions, the related hypotheses, and theoretical/ conceptual model for the study. A brief overview of the assumptions, scope and limitations was provided. Finally, I concluded with a brief discussion of the significance of the current study and implications for positive social change. Based on the empirical evidence already focused on cyberbullying, video gaming, and long screen time issues, a literature review will help in understanding the phenomenon of cyberbullying, long screen time and video gaming on teenage depression and anxiety. Such a review lays a strong foundation for the study at hand.

Chapter 2 includes a review of literature that establishes empirical evidence of how long screen time, cyberbullying and video games have contributed to teenage

depression and anxiety. In addition, the independent and dependent variables are explained fully in Chapter 2. Chapter 3 includes the methodology to be used in the study, as well as the background, survey design, and data analysis. In Chapter 4, the method, data-analysis planning, and results are analyzed. Chapter 4 includes results and provides analysis of the methodology used in the study. Chapter 5 concludes with a summary and interpretation of the findings, implications for social change, recommendations from findings, and recommendations for further study.

Chapter 2: Literature Review

Overview of the Chapter

In this review, I introduce depression/ anxiety among teenagers between the ages of 13-17 and consider how factors such as video games, cyberbullying, screen time, age and gender have contributed to high incidences of both anxiety and depression among teenagers in the United States in the last 5 years. I introduce what anxiety and depression are, types of anxiety and depression, and signs and symptoms of both conditions to better understand early diagnosis and treatment. In this review, I also orient the reader to different types of screen time usage (how teenagers spend time on the screen), video games, cyberbullying, and how age and gender has contributed to anxiety and depression among teenagers. Factors that tend to promote depression/anxiety will be examined next. Looking at the factors that lead to depression/anxiety in teenagers will be beneficial for the development of evidence so that interventions can be put in place to prevent these conditions as well as mortality related to depression and anxiety (CDC, 2016). Screen time has become increasingly popular with 71% of teens reporting use of online social media sites (Lenhart & Pew Research Center, 2015). Adolescents spend nearly 9 hours daily using some form of social media with 1 hour spent on websites such as Facebook and Instagram (Common Sense Media, Inc., 2015). Various studies have pointed out both negative and positive mental effects when it comes to screen time. A comprehensive review of research of teenage screen time, video gaming, cyberbullying, and its influence on teenage depression/ anxiety is highlighted. Current research focusing on outcomes of screen time, cyber bullying, and video gaming on adolescent depression and anxiety is

presented. Additionally, I present literature on anxiety and depression and how teenagers spend their time on screen plus other factors associated with the depression/anxiety-teenagers relationship. The literature review helped identify what is known as well as the gaps that exist in the literature. The identification of gaps is a prerequisite for the formulation of knowledge-based recommendations for other studies in the future. The purpose of this research was to investigate the relationship between video gaming, length of screen time, and cyberbullying with respect to anxiety and depression in teenagers. The analysis was contingent on the independent variables, bullying and long screen time, and video gaming, and the dependent variable, depression/anxiety. The results depended on the independent or dependent variables used in the studies.

Literature Search Strategy

The literature reviewed in this chapter supports the planned research, including relevant studies on the possible causes of factors leading to anxiety and depression in teenagers. I used the Walden University Library to access various academic databases and journals to locate relevant literature for this study. The multidisciplinary databases that I searched included Google Scholar, Academic Search Complete, ProQuest, EBSCOHost, SAGE Premier, and Science Direct. The subject databases that I searched included SocINDEX, PsycINFO, and PsycARTICLES. I searched for peer-reviewed articles published 20-15-2020 and input the following key words and key word combinations to obtain different results: *cyber bullying, cyber-bullying, cyber-aggression, cyber-victim, online bullying, online aggression, and theoretical theory*. The key word combinations inputted were "*cyber bullying* and *adolescents*," "*cyber bullying*

and *teens*," "*cyber bullying* and *adolescence*," "*cyber bullying* and *depression*," "*participants* and *video gaming*," "*cyber bullying* and *depression*," "*cyber bullying* and *theories*," "*video* and *teenage depression*," "*screen time* and *depression*," "*screen time* and *teenagers*," "*cell phones* and *teenagers*," and "*gender* and *phones*."

Similar searches were completed for the remaining variables using keywords *teenage depression in association to video gaming, effects of social media on teens, effects of video gaming on teens, effects of cyber bullying on teens, gender and teenage depression/anxiety, race and teenage depression, social background and depression in teenagers.* Data from published reports from reliable government websites such as the National Institute of Mental Health and Centers for Disease Control and Prevention, as well as health organization websites were also included. Focus was placed on research published within the last 5 years except for a few studies which are older but still very relevant; to ensure the most recent research in most areas of interest.

Theoretical Foundation

I used the social ecological model (SEM) theory to answer my research questions (McLeroy et al., 2012). I chose SEM because this framework addresses each group in order to bridge the existing gap when it comes to mental health in teenagers and young adults between ages 13-17 years. When it comes to individual/intrapersonal sphere, parents/patients should be educated on the signals for depression and anxiety factors (CDC, 2016).Learning how depression presents will help many to diagnose mental health among the affected individuals before a situation becomes uncontrollable. Early detection and treatment are the main keys to keep depression and anxiety in check or at bay in the

community (CDC, 2016). In relationship or social circle level (McLeroy et al., 2012), those detected with signs and symptoms of depression and anxiety should then be referred to the care givers who are able to take a detailed history, evaluate and treat depression and anxiety (CDC, 2016). When it comes to the community level (McLeroy et al., 2012) everyone should be a brother, or a sister's keeper. If you see, hear or detect something say something. By working as a group, early detection hence early treatment will be possible (CDC, 2016). The government and other private sectors should support and sponsor many free centers where teenagers and young adults are screened, treated, counseled on measures and precautions; complications and effects of mental health and how some of these predisposing factors can be avoided. The government should also control and come up with rules, regulations, orders, and laws that govern all states when it comes to educating and training health educators on how to counsel and follow up affected people (CDC, 2016). This will bring uniformity and at the same time ensures that no teenagers suffering from depression and anxiety are left out or not diagnosed and treated (CDC, 2016). Finally, on a societal level, there should be national standards that regulate screening, care and treatment of those that have mental health or signs and symptoms of depression and anxiety.

Social Cognitive Theory (SCT)

SCT is important in explaining the psychological condition of those teenagers that spend most of the time on social media.SEM above was used to answer the research questions while the SCT helped to analyze psychological effects of the participants. In this regard, the SCT can be used to explain and analyze psychological effects of the

teenagers between the age of 13-17 when it comes to video gaming, cyberbullying and screen time. Several surveys and studies have shown that those teenagers that have been subjected to the above quantitative factors have been physically and psychologically influenced by them. This concept has demonstrated the effect of teenager depression and anxiety as a result of these factors. Social cognitive theory is used to explain how individual acquires and maintains their behavior in the community and the how that behavior affects their daily living (Bandura, 1998). The SCT is used to address self-efficacy of individual participant. SCT helps to know how human influence such as what they do, what their characteristics are and the way they can respond to their environment can influence their life. Therefore, in this study, SCT was used in explaining interpersonal issues and how an individual's surroundings are related; for instance, when it comes to cyber bullying and video gaming with friends. Behavioral determinants are intrinsic factors which look at how an individual respond to environment. Thus, SCT helped us as researchers in this study when it come to explaining the modification of personal behaviors in teenagers that spend more time on screens and environmental factors such as cyber bullying (Glanz et al., 2018; Strecher, DeVellis, Becker, & Rosenstock, 1986). Self-efficacy, outcome expectancies as well as goals leads to behavioral changes in health of an individual; for instance, less screen time leads to less anxiety and therefore and individual adapts to less screen time (Bandura, 1998). The framework of this study consisted of validated surveys to assess the relationship between teenage depression/anxiety and quantitative factors such as screen time, cyber bulling, and video games.

Literature Review

Anxiety

Anxiety is when children do not outgrow the fears and worries that are typical in young children, or when there are so many fears and worries that they interfere with school, home, or play activities, the child may be diagnosed with an anxiety disorder (CDC, 2019). Based on diagnostic interview data from National Comorbidity Survey Adolescent Supplement (NCS-A), lifetime prevalence of any anxiety disorder among U.S. adolescents aged 13-17 indicates that,

- An estimated 31.9% of adolescents had any anxiety disorder.
- Among adolescents with any anxiety disorder, an estimated 8.3% had severe impairment. DSM-IV criteria were used to determine impairment.
- The prevalence of any anxiety disorder among adolescents was higher for females (38.0%) than for males (26.1%). (National Institute of Mental Health [NIMH], 2017).
- The prevalence of any anxiety disorder was similar across age groups.

Examples of different types of anxiety disorders include

- Being very afraid when away from parents (separation anxiety)
- Having extreme fear about a specific thing or situation, such as dogs, insects, or going to the doctor (phobias) (CDC,2019)
- Being very afraid of school and other places where there are people (social anxiety)

- Being very worried about the future and about bad things happening (general anxiety)
- Having repeated episodes of sudden, unexpected, intense fear that come with symptoms like heart pounding, having trouble breathing, or feeling dizzy, shaky, or sweaty (panic disorder) (CDC,2019)

According to CDC, (2019), anxiety may present as fear or worry, but can also make children irritable and angry. Anxiety symptoms can also include trouble sleeping, as well as physical symptoms like fatigue, headaches, or stomachaches. Some anxious children keep their worries to themselves and, thus, the symptoms can be missed (CDC, 2019).

As we have seen above social isolation is one of the red flags when it comes to social anxiety. Being very afraid other places where there are people is social anxiety (CDC, 2019). According to Lenhart, (2015), some teens especially girls spend time on phones in order to avoid social interaction. This study does not give a clear picture of what they do when they are not socially interacting. The study does not give details of how they feel about not social interacting. A new study is required to investigate how lack of social interaction affects teenagers. Probably this is one of the reasons why there is an increase in anxiety among teenagers.

According to Pew Lenhart, (2015), here are other factors that cause anxiety among teenagers. For instance, family income, type of friends that they have, their performance in school, and being targeted by law enforcement plays a great role when it comes to anxiety in teenagers (Lenhart, Ling, Campbell, & Purcell, 2015). A group of

teenagers were asked how often they have certain experiences or feelings, four-in-ten teens say they feel bored every day or almost every day, while about three-in-ten say they feel tense or nervous about their day (29%) or wish they had more good friends (29%) with the same frequency (Lenhart, et al., 2015). Roughly a quarter of teens say they get excited by something they study in school (26%), come across people who try to put them down (24%) or worry about their family having enough money for basic expenses (23%) every or almost every day (Lenhart, et al., 2015). Smaller shares say they regularly feel targeted by law enforcement (7%) or get in trouble at school (6%). In fact, 54% of teens say they never feel targeted by law enforcement, and 40% say they never get in trouble at school (Lenhart, et al., 2015). Concerns about their family having enough money for basic expenses differ greatly by income: 36% of teens in the lower-income group and 29% of those in the middle-income group say they worry about this daily or almost daily, whereas 13% of teens in higher-income households say the same (Lenhart, et al., 2015). These small but important factors need to be implemented in the new study when it comes to dealing with teenage anxiety. Additional studies should investigate causation between variables. The purpose of studying cyber bullying, video gaming among teenagers is to present issues that may affect them psychologically leading to anxiety and depression. Therefore, I examine cyber bullying, long screen time and video gaming in relationship to depression/anxiety to observe how they are all interrelated.

Types of Anxiety

Panic disorder (PD): This involves at least two panic attacks accompanied by the constant fear of future attacks. People with panic disorder may lose a job, refuse to travel

or leave their home, or completely avoid anything they believe will trigger an attack of anxiety (CDC, 2019).

Generalized anxiety disorder (GAD): This is a constant state of worry about a number of events or activities in the person's life.

Phobic disorder: This features an incapacitating and irrational fear of an object or situation, for example, a fear of snakes and heights.

Obsessive-compulsive disorder (OCD): This condition is marked by unwanted repeated thoughts (obsessions) and behaviors (compulsions) (CDC, 2019).

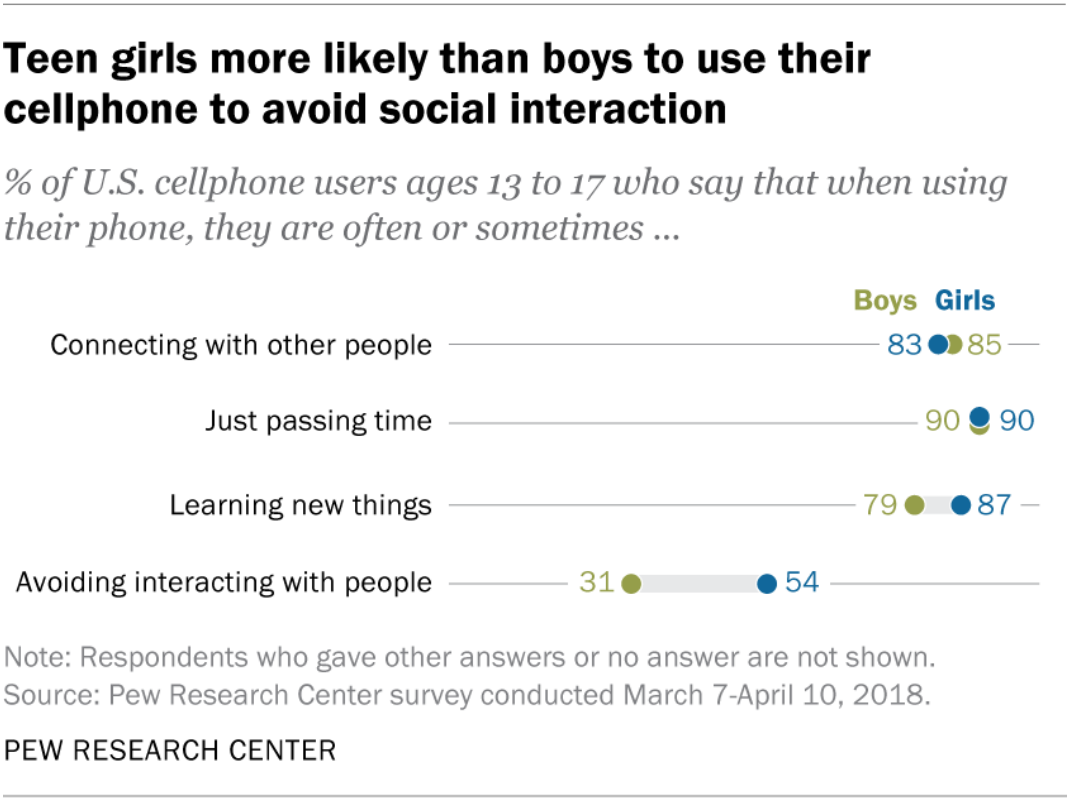
Complications of Anxiety

- depression
- an anxiety disorders
- Problems with the immune, digestive, sleep, and reproductive systems.
- frequent colds and infections
- heart disease
- high blood pressure
- diabetes (CDC,2019)

By first looking at the above causes and complications of both anxiety and depression in teenagers, we will be able to come up with the main reason why this has become so common among American teenagers in the last 5 years as well as a solution to this social problem (CDC, 2019).

Figure 1

Teen Girls More Likely Than Boys to use Their Cellphone to Avoid Social Interaction



Note: Adapted from "Pew Reseach Center Survey," (Retrieved from https://www.pewresearch.org/fact-tank/03/10/2018/a-growing-number-of-american-teenagers-particularly-girls-are-facing-depression/Copyright 2018 by Pew Research Center Survey. Reprinted with permission

Secondly, according to another study conducted by (Lenhart, 2018) teenagers between the ages of 13-17, do a lot of activities on their phones. Some of the activities that the teenagers are involved in online include reading and sending emails, surfing the web for fun, visiting entertainment sites, sending instant messages and searching information on

hobbies. The table below analyses most of the activities that they are involved in. Probably these are so many activities on top of the schoolwork and other extra curriculum activities. A new study will help to investigate how they feel about all these online activities. Probably this is another cause of anxiety. **Figure 2**.

What Teenagers do Online.

What teens have done online *The percentage of youth with Internet access aged 12 through 17 who have done the following activities online:*	
Send or read email	92%
Surf the Web for fun	84%
Visit an entertainment site	83%
Send an instant message	74%
Look for info on hobbies	69%
Get news	68%
Play or download a game	66%
Research a product or service before buying it	66%
Listen to music online	59%
Visit a chat room	55%
Download music files	53%
Check sports scores	47%
Visit a site for a club or team that they are a member of	39%
Go to a Web site where they can express opinions about something	38%
Buy something online	31%
Visit sites for trading or selling things	31%
Look for health-related information	26%
Create a Web page	24%
Look for info on a topic that is hard to talk about	18%

Source: Pew Internet & American Life Project Teens and Parents Survey, Nov.-Dec. 2000. Margin of error is ±4%.

Note .Adapted from "Lenhart, A. (2018)" (Retrieved from http://pewinternet.org /Reports/2018/Teens-and-smartphones.aspx /Copyright 2018 by pewinternet.org /Reports/2018. Copyright 2018 by Pew internet.org. Reprinted with permission

Depression

According to CDC (2019), depression is mostly characterized by occasionally being sad or a feeling hopeless most of the time. However, some children feel sad or uninterested in things that they used to enjoy or feel helpless or hopeless in situations where they could do something to address the situations (NIMH, 2017). When children feel persistent sadness and hopelessness, they may be diagnosed with depression (CDC, 2019).In 2017, an estimated 2.3 million adolescents aged 13 to 17 in the United States had at least one major depressive episode with severe impairment. This number represented 9.4% of the U.S. population aged 13 to 17. Of adolescents with major depressive episode, approximately 70.77% had severe impairment while 29 % had no severe impairment (NIMH, 2017).

Examples of behaviors often seen when children are depressed according to CDC, (2019) include -

- Feeling sad, hopeless, or irritable a lot of the time
- Not wanting to do or enjoy doing fun things
- Changes in eating patterns – eating a lot more or a lot less than usual
- Changes in sleep patterns – sleeping a lot more or a lot less than normal
- Changes in energy – being tired and sluggish or tense and restless a lot of the time
- Having a hard time paying attention
- Feeling worthless, useless, or guilty
- Self-injury and self-destructive behavior (CDC, 2019).

Complications of Depression

According to Levine, (2017), the following are the complications of depression in teenagers.

- Excessive weight gain or loss
- Physical pain or illness
- Alcohol or substance abuse
- Social anxiety, panic or phobias
- Conflicts with family or personal relationships
- Problems at work or school
- Social isolation
- Suicidal feelings or attempts
- Self-destructive behaviors, such as cutting oneself
- Premature death from other medical conditions
- Finally, depression is also linked to other health conditions such as cardiovascular disease. Heart disease patients, for example, are at risk for depression, and depression has been shown to worsen heart problems (Levine, 2017).

Suicide is the most devastating complication of depression and it is the 10th-leading cause of death in the U.S. and the second-leading cause of death for people ages 15 to 34, the APA reports (CDC, 2018). More than 40,000 people die by suicide and one million people attempt suicide every year (CDC, 2018).

Extreme depression can lead a child to think about suicide or plan for suicide. For youth ages 10-24 years, suicide is the leading form of death (CDC, 2019. Since suicide is

the leading cause of death in adolescence and it is also directly associated with depression, it's important to look at the signs and symptoms of suicidal thoughts since this may help in tacking this social problem. From the study Burstein B, Agostino H, Greenfield B et al., (2019), the number of children and teens in the United States who visited emergency rooms for suicidal thoughts and suicide attempts doubled between 2007 and 2015, according to a new analysis (Burstein B et al., 2019). The study also shows that diagnosis of either condition increased from 580,000 in 2007 to 1.12 million in 2015, as per this study, the average age of a child at the time of evaluation was 13 (Burstein B et al.,2019). According to National Institute of Mental Health [NIMH], (2017), Signs and symptoms of suicide are:

- Talking about feeling empty, hopeless, or having no reason to live
- Talking about wanting to die or wanting to kill themselves
- Making a plan or looking for a way to kill themselves, such as searching online, stockpiling pills, or buying a gun (NIMH, 2017).
- Talking about great guilt or shame
- Talking about feeling trapped or feeling that there are no solutions
- Feeling unbearable pain (emotional pain or physical pain)
- Talking about being a burden to others
- Using alcohol or drugs more often
- Acting anxious or agitated
- Withdrawing from family and friends
- Changing eating and/or sleeping habits

- Showing rage or talking about seeking revenge
- Taking great risks that could lead to death, such as driving extremely fast
- Talking or thinking about death often
- Displaying extreme mood swings, suddenly changing from very sad to very calm or happy
- Giving away important possessions
- Saying goodbye to friends and family
- Putting affairs in order, making a will (NIHM.2017).

Researchers in this study used the National Longitudinal Survey of Adolescent Health (Add Health) to investigate the relationship between electronic media exposure in 4142 adolescents who were not depressed at baseline and subsequent development of depression after 7 years of follow-up **(**Brian et al.,2018).Of the 4142 participants (47.5% female and 67.0% white) who were not depressed at baseline and who underwent follow-up assessment, 308 (7.4%) reported symptoms consistent with depression at follow-up. Controlling for all covariates including baseline Center for Epidemiologic Studies–Depression Scale score, those reporting more television use had significantly greater odds of developing depression (odds ratio 95% confidence interval), or each additional hour of daily television use **(**Brian et al., 2018). In addition, those reporting more total media exposure had significantly greater odds of developing depression for each additional hour of daily use. Compared with young men, young women were less likely to develop depression given the same total media exposure odds ratio for interaction term, 0.93 **(**Brian et al., 2018). From this study, conclusion was made that, total media exposure in

adolescence is associated with increased odds of depressive symptoms in young adulthood, especially in young men **(**Brian et al., 2018). Future studies should investigate why boys develop depression at a faster rate than girls when exposed to long screen time. Second limitation of the study was that social economic status (SES) of the participants was not evident in the study. This could create bias for family status, as it is unknown about how long screen time is affected by family environment in conjunction with the variable depression/anxiety relationships. I used this study to show how long screen time is associated with anxiety/ depression among teenagers between the ages of 13-17.

According to Lenhart, (2017) depression has become increasingly common among American teenagers – especially teen girls, who are now almost three times as likely as teen boys to have had recent experiences with depression. In 2017, 13% of U.S. teens ages 13 to 17 (or 3.2 million) said they had experienced at least one major depressive episode in the past year, up from 8% (or 2 million) in 2007, according to a Pew Research Center analysis of data from the Health. One-in-five teenage girls – or nearly 2.4 million – had experienced at least one major depressive episode (the proxy measure of depression used in this analysis) over the past year in 2017. By comparison, 7% of teenage boys (or 845,000) had at least one major depressive episode in the past 12 months. The limitations of the study were that race and social economic status (SES) were not evident in the study. This could create bias for race and family status, as it is unknown about how gender is affected by race and family environment in conjunction with teenage depression. A new study that will incorporate all these factors to know why one gender is more affected by depression is important. I used this study to show that

girls are more prone to depression than boys. Further research is required to know why this is the case among teenagers between the ages of 13-17.

Seven-in-ten U.S. teens said anxiety and depression is a major problem among people their age in the community where they live, according to a Pew Research Center survey of teenagers ages 13 to 17 conducted in fall 2018 (Pew Research Center,2017). An additional 26% cited anxiety and depression as a minor problem (Pew Research Center, 2017). About three-in-ten teens (29%) said they felt tense or nervous about their day each day or almost every day, and 45% said they felt tense or nervous sometimes. About a third of teen girls (36%) reported feeling this way every day or almost every day, compared with 23% of teen boys (Pew Research Center,2017). Academic and social pressures are among the reasons cited by experts who have studied teen depression. The Center's survey asked about some of those pressures teens face in their daily lives. About six-in-ten teens (61%) said they personally felt a lot of pressure to get good grades, while roughly three-in-ten reported a lot of pressure to look good and fit in socially (29% and 28%, respectively) (Pew Research Center, 2017). This study shows that academic and social pressure causes depression in teenager (Lenhart, 2017). The limitations of the study were that race, and Social economic status (SES) was not evident in the study. This could create bias for race and family status, as it is unknown about how academic and social pressures are affected by race and family environment in conjunction with teenage depression. A new study that will look at the participants' background, SES, and race is required since these factors can either positively or negatively affect someone's academic and social pressure. For instance, if a teen has a good support system and not have to

worry of school fees then such a person may have less stress. While a teen without support system ay worry about school fees, and this can eventually lead to stress. Therefore, a new study putting all the above factors into consideration is highly recommended here. I used this study to show that girls are more prone to depression than boys.

The total number of teenagers who recently experienced depression increased 59% between 2007 and 2017. The rate of growth was faster for teen girls (66%) than for boys (44%). The above study shows that girls are more prone to depression and, they seek treatment of depression more than boys. Therefore, this new study focusing on why boys are less likely to seek for treatment, when depressed should be enacted. This will help many boys to seek treatment hence improving their health and making them reliable members of the community.

I also wanted to point out that factors such as doing well in school and fitting in the community (social aspect) are other factors that contribute to depression among the teenagers. Therefore, this new study focusing on how striving to perform well in school and trying to fit in the community affects teenagers, is very important. This will not only reduce depression/anxiety cases among teenagers but will also help them fit in and also do better in school.

Factors Associated with Depression and Anxiety Among Teenagers in United States

Screen time

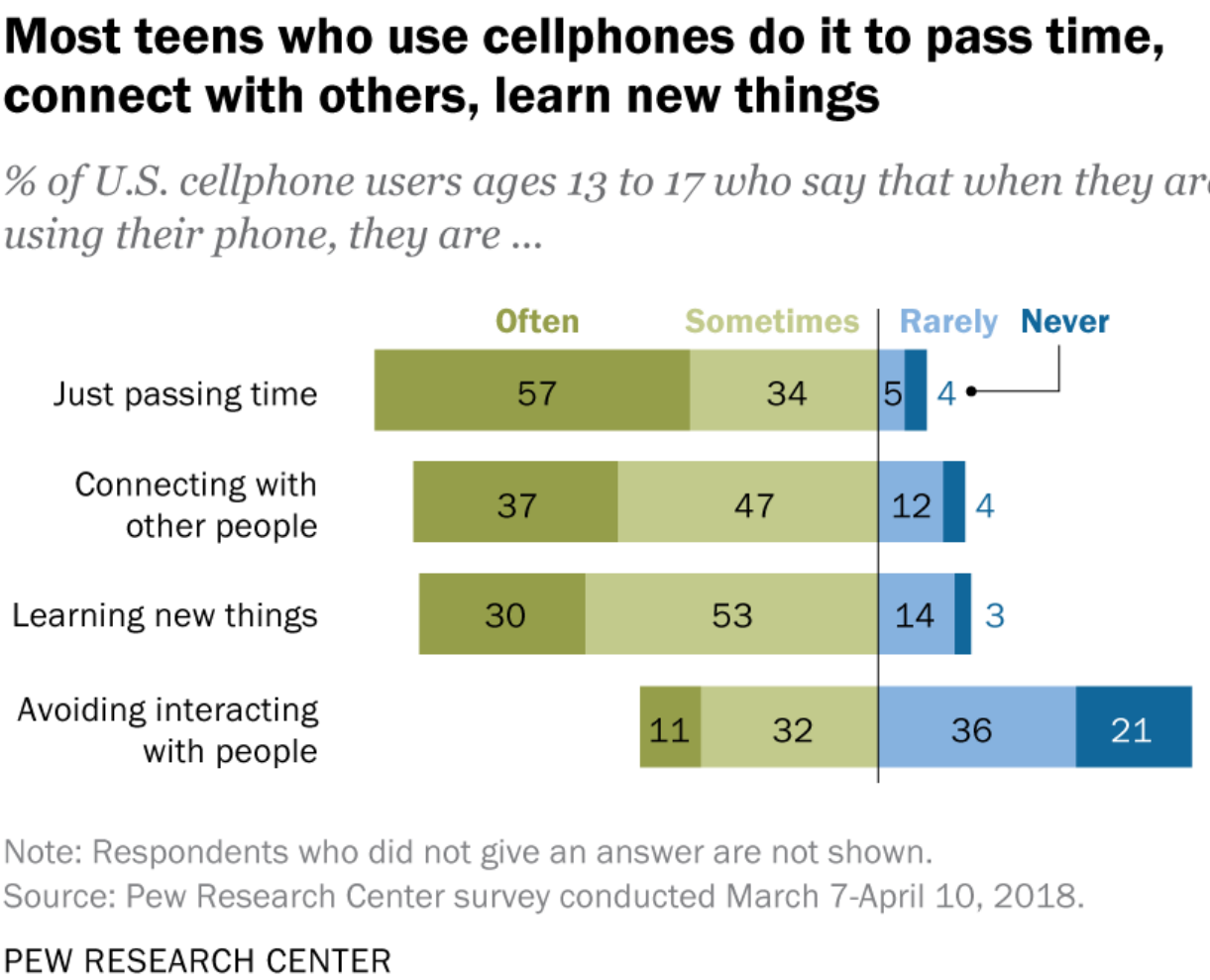
Long screen time is one of the factors that may positively or negatively affect teenagers (Anderson & Jiang, 2018). Anderson &Jiang (2018) indicated that 95% of

teens have access to cell phones that could take pictures and recorded video. Anderson and Jiang also stated that 45% of those teens frequently use their cell phones on social media sites. While 54% of American teenagers say they spend too much time on their cell phones, two-thirds of parents express concern over their teen's screen time (Anderson & Jiang, 2018). But parents face their own challenges of device-related distraction (Anderson & Jiang, 2018). In 2004, 45% of teens had cell phones, rising to 71% in 2008. During this same period, 2004 to 2008, adults owning cell phones increased from 65% to 77%, and of these adults, 88% were parents. The largest increase in use by teens occurred at age 14. In 2008, 52% of 12-13-year-old had cell phones, 72% had cell phones by age 14, and 84% of 17-year-olds reported having their own cell phone. (Lenhart, 2019) pointed out that personalized devices such as cell phones, mp3 players, and game-related devices are more likely to be thought of as owned by the children, whereas computers are owned by the parents (Lenhart, 2019). Pew found that in 2019, 95% of the teens owned cell phones, 77% owned a game console (e.g., Xbox, PlayStation), 74% owned an mp3 player, 60% owned a desktop or laptop computer, and 55% owned a portable gaming device. All these devices can be used for communication through wireless capabilities. Lenhart, (2019) provided statistical information about screen time and teenagers. According to Lenhart (2019), nearly all U.S. teens (95%) say they have access to a Smartphone – and 45% say they are “almost constantly” on the internet. That amount of screen time has raised concerns from parents, educators and policymakers across the country, and even many teens worry they use their phone too much. The main limitation about this study is generalization. Gender and race are not put into consideration. This

can lead to selection bias. Researchers do not say if all races were included. We are not told whether the ratio of boys to girls during selection was equal. Therefore, this new study that is inclusive, showing the gender and race of the participants is important. I used this study to show how many teenagers have cell phones and game console (e.g., Xbox, PlayStation) which are correlated to psychosocial behaviors such as depression and anxiety if used for long periods of time (Lenhart, 2019). This study clearly shows that nearly all U.S. teens (95%) say they have access to a Smartphone – and 45% say they are "almost constantly" on the internet (Lenhart, 2019).

Figure 3.

Why Teenagers Spend Much Time on Their Screens



Note. Adapted from "Lenhart, A. (2018)" . Teens, Smartphones & Texting. Pew Research Center (Vol. i). Retrieved from http://pewinternet.org/Reports/2018/Teens-and-smartphones.aspx. Copyright 2018 by Pew Research Center. Reprinted with permission

Nine in 10teens interviewed in this study said that they use cell phones to just pass time, with nine-in-ten saying they often or sometimes use it this way, according to a (Lenhart, 2018). Similarly, large shares of teen cell phone users say they at least sometimes use their phone to connect with other people 84% or learn new things 83% (Lenhart, 2018). Finally, 43% of teenagers use cell phones just to avoid interaction with people (Figure 2) above.

For the first time, more than half of all households in the U.S. contain a cell phone but not a landline telephone, according to a new survey from the Centers for Disease Control and Prevention (CDC, 2018). The growing prevalence of cell phones comes as the typical American household now contains a wide range of connected devices (CDC, 2018).

Some 84% of American households contain at least one smart phone, according to a Pew Research Center survey conducted in fall 2016. Desktop and laptop computers are nearly as common – 80% of households contain at least one of these devices. Tablet computer ownership is somewhat less widespread, with 68% of households containing at least one tablet. And 39% of households contain at least one streaming media device, such as an Apple TV, Roku or Google Chrome cast (Lenhart, 2016).

Many American households have multiple devices – especially smart phones. A third of American households have three or more smart phones, compared with 23% that have three or more desktops, 17% that have three or more tablets and only 7% that have three or more streaming media devices (Lenhart, 2016).

Taken together, 90% of U.S. households contain at least one of these devices (smartphone, desktop/laptop computer, tablet or streaming media device), (as shown in Figure 3 below) with the typical (median) American household containing five of them. And nearly one-in-five American households (18%) are "hyper-connected" – meaning they contain 10 or more of these devices (Lenhart, 2016). This study does not show if those people that are hyper connected are more affected psychologically that those with only one or two gargets. Teenagers are omitted. Instead, the study has concentrated on families, probably adults (as seen on figure 5 below). This study looked at how families are technologically hyper connected in general. The study does not specify if this was done in urban or rural areas. This can lead to selection bias. That is why we needed this new study showing specific demographic areas in order to make sure that all areas are included. This new study needs also looked at how technology hyper connection affects teenagers mentally.

According Heid, (2018) young people who spend seven hours or more a day on screens are more than twice as likely to be diagnosed with depression or anxiety than those who use screens for an hour a day (Heid, 2018). The data in this particular study came from more than 40,000 kids ages two to 17 and was collected as part of the Census Bureau's 2016 National Survey of Children's Health (Heid, 2018). While spending seven or more hours a day on screens was not typical among the younger kids in the study, roughly 20% of 13- to 17-year-olds spent this amount of time on screens each day (Heid, 2018). Along with the associations between screen time and diagnoses of depression and anxiety, the study found that young people who spent seven hours or more a day on

screens (not including schoolwork) were more easily distracted, less emotionally stable and had more problems finishing tasks and making friends compared to those who spent just an hour a day on screens (not including schoolwork) (Heid, 2018).Many of these same negative trends also turned up to a lesser degree among young people who used screens for four hours a day. Also, adolescents seemed to have more problems than younger kids as a result of heavy screen use (Heid, 2018). Limitation in this study is looking at teenagers in general. Gender is not put into consideration and therefore we don't know if both boys and girls are equally represented. That's why this new study showing equal representation of both boys and girls was recommended. I used this study to show that teenagers in general are involved in heavy screen time or long screen time which according to (CDC, 2019), may contribute to teenage depression and anxiety.

A similar study by Twenge, Joiner, Rogers, & Martin, (2018) also found that kids who spend more time on screens tend to be less happy than kids who engage in non-screen activities like playing sports, reading traditional printed media or spending time socializing with friends face-to-face (Twenge et al., 2018). Her work has contributed to growing concerns among some parents, teachers, guidance counselors and doctors that too much time spent on screens especially on smart phones, may be linked to recent increases in teen depression and suicide. Twenge says that her study shows a clear and strong association between more screen time and lower wellbeing (Twenge et al., 2018). This study also shows that increased media screen time may be involved in the recent increases from 35% to 41% in boys and from 37% to 43% in girls. In short, sleep among adolescents is affected by long screen time (Twenge et al., 2018). If this is the case,

public health interventions should consider electronic device use as a target of intervention to improve adolescent health especially sleep (Twenge et al., 2018). We also find the limitation of generalization in this study too. Therefore, this new study showing how many girls and boys that are in the study will prevent selection bias.

Gender

When it comes to gender, girls are more prone to both depression and anxiety since they are more exposed to risk factors such as cyber bullying and frequent use of phones hence longer screen time as compared to their male counterparts (Schrobsdorff, 2016). Twenge et al., 2018) also believed that brain changes in adolescence increase a teen's vulnerability to depression and anxiety and play a role in the severe gender disparity in these disorders. In the U.S., 19.5% of girls experienced at least one major depressive episode while only 5.8% of boys did (Schrobsdorff, 2016). The pediatrics study researchers suggested that adolescent girls may be more exposed to risk factors such as cyber-bullying and frequent use of cell phones (Schrobsdorff, 2016). Pew, (2018) also shows that teen boys and girls are about equally likely to say they often or sometimes use their devices to connect with other people (85% vs. 83%, respectively), just pass the time (both 90%) or learn new things (79% vs. 87%). This same survey found that around seven-in-ten teens (72%) say they often or sometimes check for messages or notifications as soon as they wake up. More than half of teens (56%) associate the absence of their phone with at least one of three emotions: loneliness, being upset or feeling anxious. Girls are more likely than boys to feel anxious or lonely without their phone (Lenhart, 2018). The only limitation is that race is omitted in the study. A study

showing different races is important to prevent selection bias. This will help in including all girls from different races hence giving more accurate results.

When it comes to gender, much research has been done into the association between depression and environmental factors such as exposures to acute stressful events and chronic adversity like bullying by peers (Wolke & Lereya, 2015). Nevertheless, such exposures do not always lead to the development of depression in adolescents, although those at high genetic risk seem to be especially susceptible to the effects of such stressors (Wolke & Lereya, 2015). Stressful life events seem more strongly associated with first onset rather than recurrence of depression, and risk is considerably greater in girls and in adolescents who have multiple negative life events than those exposed to one event.Chronic, severe stressors that affect relationships seem most important (Wolke & Lereya, 2015). According to this study, negative family relationships,peer victimization through bullying, and maltreatment are common risks for depression (Wolke & Lereya, 2015). I used this study to show how other stressful life events such as cyber bullying can contribute to teenage depression and anxiety.

However, factors that enhance resilience to depression vary considerably between different groups of children and across diverse risk contexts, which means that prevention strategies will probably need to be carefully tailored for maximum benefit (Wolke & Lereya, 2015). Also, studies have tended to focus on correlates of resilience, and underlying mechanisms remain poorly understood (Wolke & Lereya, 2015). The study also presented little data on ethnicity or socioeconomic status (SES), hindering the ability to determine whether depression among teenagers varied by ethnic group or if

unfavorable factors such as low economic factor played any role in depression. Future studies should include the relationship of how gender is influenced by stressful events such as cyber bullying, low economic status, and ethnicity when it comes to depression in teenagers between the ages of 13-17 years. This will also help to limit selection bias and should validate causation between gender and depression/anxiety. I use this study to show the relationship between gender and stressful environmental factors such as violent video gaming and cyber bullying in relationship to depression among teenagers at the age of 13-17 years.

According to Pew Internet & American Life Project, (2018), one in eight online teens (13%) reported that someone had sent them a threatening or aggressive email, instant message or text message. Older teens, particularly 15- to 17-year-old girls, are more like to report that they have received a threatening email or message. Overall, 9% of online teens ages 13-14 say they have been threatened via email, IM or text, while 16% of online teen's age 15-17 report similar harassment (Pew, 2018). Among older girls, 19% have received threatening or aggressive email, IMs or text messages. Social network users are more likely than those who do not use social networks to report that someone had sent them a threatening or aggressive email (16% vs. 8%) (Pew, 2018).A new study that is able to come up with format of prevention social network cyber bullying will help to reduce depressive disorders in teens. Gender differences are also apparent, particularly when it comes to experiences in school (Pew, 2018). Girls are more likely than boys to say they get excited every, or almost every day by something they study in school (33% vs. 21%), and they're less likely to get in trouble at school (Pew,

2018). About half of girls (48%) say they never get in trouble at school, compared with 33% of boys. In addition, higher shares of girls than boys say they feel tense or nervous about their day on a daily or almost daily basis (36% vs. 23%) (Pew, 2018). This new study was able to look at why many girls use their phones to avoid interacting with people. According to (CDC, 2018) avoiding interaction with people is one of the signs of depression. Therefore, this new study will shed more light in this area. This will help in early diagnosis of depression in teenagers; a great step towards reducing the rate of depression among this age group.

Cyber Bullying

According to CDC, (2018) cyber bullying that takes places over digital devices and can occur through email, text message, social media, and other digital applications. Majority of teens have experienced some form of cyber bullying. According to Anderson M. (2018), 59% of U.S. teens have been bullied or harassed online, and a similar share says it's a major problem for people their age (Anderson, 2018). At the same time, teens mostly think teachers, social media companies and politicians are failing at addressing this issue (Anderson, 2018). Nearly 1 in 5 students (21%) report being bullied during the school year, impacting over 5 million youth annually (National Center for Education Statistics [NCES], 2018). According to CDC, (2018), teenagers who are bullied are at increased risk for depression, anxiety, sleep difficulties, lower academic achievement, and dropping out of school. According to NCES, (2019), almost all forms of bullying peak in middle school**,** specifically6th grade students reported the highest percentage of bullying (29%). The new study was able to investigate why teenagers are prone to cyber

bullying. This will help in rectifying this social problem at this level. Hinduja & Patchin, (2015), study also reports that approximately 34% of students report experiencing cyber bullying during their lifetime; Over 60% of students who experience cyber bullying reported that it immensely impacted their ability to learn (Hinduja, 2018). According to Hinduja & Patchin, (2019), school bullying rates have increased by 35% from 2016 to 2019. Therefore, a new study is important to look at the factors that have contributed to this 35% increase rate in 3 years. Finally, Pew Research Center, (2018) shows that 59% of U.S. teens have been bullied or harassed online, and over 90% believe it's a major problem for people of their age. I used this study to show that cyber bulling is a major problem among teenagers between the ages of 13-17.

Researchers in this study looks at how peer victimization that occurs via electronic media, also termed as cyber bullying. It is a growing area of concern when it comes to depression and anxiety in teenagers (Landoll, La Greca, Lai, Chan, & Herge, 2015). The current study evaluated the short-term prospective relationship between cyber bullying and adolescents' symptoms of social anxiety and depression over a six-week period. Participants were 839 high-school aged adolescents (14–18 years; 58% female; 73% Hispanic White), who completed measures of traditional peer victimization, cyber bullying, depression, and social anxiety at two time points (Landoll et al, 2015). Findings supported the distinctiveness of cyber victimization as a unique form of peer victimization. Furthermore, only cyber victimization was associated with increased levels of depressive symptoms over time, and only relational victimization was associated with increased social anxiety over time, after controlling for the comorbidity of social anxiety

and depression among youth (Landoll et al, 2015). Cyber victimization appears to be a unique form of victimization that contributes to adolescents' depressive symptoms and may be important to target in clinical and preventive interventions for adolescent depression (Landoll et al, 2015).The only limitation in this study is that there is selection bias. Boys and African American girls were not included in this study. That's why a more inclusive new study that is not gender or race biased was recommended. I used this study to show that cyber victimization that is one of the factors that lead to teenage depression is prevalent among teenagers in the US. The public health concern is that this study or literature has shown that victims of bullying are more likely to feel depressed, lonely, and anxious more than their non-victimized counterparts.

Another good example that will help us understand why teenagers are cyber bullied is this focus groups study from (Lenhart, Madden, & Hitlin, 2015). Researchers in this study asked teens about online experiences they had with bullying and harassment. In some cases what they heard was that teenagers' cruelty had simply moved from the school yard, the locker room, the bathroom wall and the phone onto the internet (Lenhart et al., 2015). The simplicity of being able to replicate and quickly transmit digital content makes bullying quite easy (Lenhart et al., 2015). Some of the cyber bullying techniques used by teenagers are talking behind each other's back, sharing pictures and information about each other without permission (CDC, 2015). According to Lenhart et al., (2015), some teenagers manipulate digital materials or information that they receive from their friends and share with other. This can hurt the people involved and lead to stress (Lenhart et al., 2015). Some teens suggested that it is the mediated nature of the communication

that contributes to bullying, insulating teens from the consequences of their actions. One high school boy responded to the question whether he had heard of cyber bullying: Intolerance also sparks online bullying incidents, as a middle school girl related in a focus group. Some teenagers in this focus group also shared some cases where their gay friends' accounts have been hacked and have been bullied for who they are (Lenhart et al., 2015). This caused emotional disturbances to the people involved (Lenhart et al., 2015).

Bullying has entered the digital age. The impulses behind it are the same, but the effect is magnified. In the past, the materials of bullying would have been whispered, shouted or passed around. Now, with a few clicks, a photo, video or a conversation can be shared with hundreds via email or millions through a website, online profile or blog posting (Lenhart et al., 2015). The only limitation in this study is that the researchers interviewed girls. Another focus group is essential including both boys and girls. I used this study to show that cyber bullying is on the rise among teenagers and causing emotional disturbance such as anxiety, fear and depression.

Adverse effects of cyber bullying

Various studies have shown life threatening consequences of cyber bullying such as self-harm and suicide. Targets of cyber bullying are at a greater risk than others of both self-harm and suicidal behaviors (John *et al.*, 2018). Approximately 18% of youth report self-harming at least once, impacting 1 in 4 girls and 1 in 10 boys (Monto, McRee, & Deryck, 2018). About 6% of students have digitally self-harmed, or anonymously posted online or shared hurtful content about oneself (Patchin & Hinduja, 2018).

According to (Hinduja & Patchin, 2015), students who experienced cyber bullying are nearly 2 times more likely to attempt suicide. Current research suggests that suicide ideation and attempts among adolescents have nearly doubled since 2008 (Plemmons *et al.*, 2018), making suicide the 2nd leading cause of death among teenagers and young adults (CDC, 2017). Approximately 1 in 20 teenagers experience a suicide in single year (Andriessen, Dudley, Draper, & Mitchell, 2018). Self- harm and suicide are adverse effects of anxiety /depression leading to high mortality in this age group. Therefore, this new study that focuses on how to prevent suicide and self –harm as a result of depression /anxiety among teenagers is important. Other minor but noticeable effects of cyber bullying include, development of low self-esteem, depression, anxiety, family problems, academic difficulties, delinquency, and school violence (Hinduja, 2018). Approximately 1 in 5 children and youth in America experience serious mental health concerns associated with trauma, social isolation, and bullying, yet only 20% of them receive the help they need (CDC, 2019). The public health concern is the literature in the above studies has shown that victims of bullying are more likely to feel depressed, lonely, and anxious more than their non victimized counterparts (Hinduja & Patchin, 2018).

The main limitation in this study is that gender, race and sex were not put into consideration. Therefore, it is difficult to tell if both boys and girls are affected the same when it comes to cyber bullying. A new study putting the gender, race and sex into consideration is recommended. This will help to know how different individuals are affected hence coming up with a solution for diverse individuals. Researchers in this study show that there are many adverse effects of cyber bullying such as self- harm,

depression, anxiety, and suicide in teenagers among general. I used this study to point out the adverse effects of cyber bullying among teenagers between ages 13-17.

Researchers have found that about 90% of individuals who die by suicide experience mental illness, one of the greatest risk factors for suicide (National Alliance on Mental Illness [NAMI], 2015). This is the reason why, a study that can come up with red flags of depression and anxiety among teenagers is important. This will help in early diagnosis and treatment of these conditions hence reducing the complications associated with them such as self-harm and suicide. According to United States Department of Education [USDE], (2019), there are other minor factors that are associated with cyber bullying for instance, approximately, 135,200 teenagers had allegations of harassment or bullying based on sex, race, sexual orientation, disability, or religion during the 15-16 school year (Myers, & Cowie, 2019). National Center for Education Statistics [NCES], (2016) reported 17% of students experiencing one type of bias-based bullying as a result of their gender, race, and disability being the most common reasons for being targeted. They said that cyber bullying also increased the student's fear of being harmed, school avoidance, and negative effects on physical, psychological, and academic well-being (NCES, 2016). According to Jetelina*et al.*, (2018), study, there is a strong relationship between bullying behaviors in teenagers and violent injury over time; 6% of students had been threatened or injured with a weapon on school property. 1 or more times and about 4% of students ages 12–18 reported that they had been afraid of attack or harm at school during the school year (U.S. Department of Education & NCES, 2019). Therefore, a new study will look closely at the relationship between cyber bulling and violence in schools

in order to come up with ways to help reduce violence in school as a result of bullying. Some ways such as positive peer interaction have shown some positive changes as a strong protective factor against being a target of cyber bullying (Zycha, Farrington, &Ttofi, 2018). Secondly, developing a positive school climate is consistently associated with lower rates of bullying and cyber bullying behaviors (Hinduja & Patchin, 2016), and finally specific anti-bullying and anti-cyber bullying programs effectively reduce school-bullying behaviors by anywhere 10 – 20% (Gaffney, Ttofi, & Farrington, 2018; Gaffney, Farrington, Espelage, &Ttofi, 2018). Therefore, this new study that puts more emphasis on these programs was done. The new study also came up with more programs/suggestions that will help to reduce cyber bullying which is one of the causes of depression among teenagers.

Video Gaming

The new study (Serena, 2019) found that children who are more likely to become addicted to video games (which the researchers call "pathological" video gaming) are those who spend a lot of hours playing these games, have trouble fitting in with other kids and are more impulsive than children who aren't addicted (Serena, 2019). Once addicted to video games, children were more likely to become depressed, anxious or have other social phobias (Serena, 2019). Not surprisingly, children who were hooked on video games also saw their school performance suffer. In this study, kids with less than 19 hours a week didn't get involved in pathological gaming, so no more than two hours a day (Serena, 2019). According to American Addiction Centers [AAC], (2018) study; video gaming addiction looks similar to other addictions (AAC, 2018). According to

Serena, (2019) gaming might be a secondary problem. It might be that kids who are socially awkward, who aren't doing well in school, get depressed and then lose themselves into games (Serena, 2019). After further research, researchers further found out that in kids who started gaming pathologically, depression and anxiety got worse (Serena, 2019). And, when they stopped gaming, the depression lifted. It may be that these disorders co-exist, but games seem to make the problem worse (Serena, 2019).

The American Psychiatric Association recently included Internet gaming disorder (IGD) as a potential diagnosis (Gentile et al., 2017). The study recommended that further study be conducted to help illuminate this potential diagnosis more clearly (Gentile et al., 2017). This by using measures based on or similar to the IGD definition, we found that prevalence rates range between ∼1% and 9%, depending on age, country, and other sample characteristics. The etiology of IGD is not well-understood at this time, although it appears that impulsiveness and high amounts of time gaming may be risk factors (Gentile et al., 2017). Estimates for the length of time the disorder can last vary widely, but it is unclear why. Although the authors of several studies have demonstrated that IGD can be treated, no randomized controlled trials have yet been published, making any definitive statements about treatment impossible (Gentile et al., 2017). Therefore, IGD does, appear to be an area in which additional research is clearly needed. Problematic use can occur in both offline and online settings, although reports of video game "addiction" often involve online games such as Massively Multiplayer Online Role-Playing Games (Gentile et al., 2017). Importantly, frequent video game play cannot, alone, serve as the basis for diagnosis. Indeed, studies have revealed that pathologic video game use and

high game play frequency are functionally distinct, although they are typically highly correlated. Therefore, this new study was required to investigate how addiction in video gaming negatively affects mental health of teenagers (Gentile et al., 2017).

The second study on video gaming examined whether actual-ideal self-discrepancy (AISD) is related to pathological gaming through escapism as a means of reducing depression for adolescent massively multiplayer online gamers (Li, et al, 2017). A discrepancy-reduction motivation model of pathological video gaming was tested. A survey was conducted on 161 adolescent gamers from secondary schools (Li, et al, 2017). Two mediation effects were tested using path analysis: (a) depression would mediate the relationship between AISDs and escapism, and (b) escapism would mediate the relationship between depression and pathological gaming (Li, et al, 2017). Results support the hypotheses stated above. The indirect effects of both AISD and depression were significant on pathological gaming. AISD and escapism also had direct effects on pathological gaming (Li, et al, 2017). The present study suggests that pathological behaviors may be over-regulated coping strategies of approaching the ideal self and avoiding the actual self (Li, et al, 2017). Limitations were that responses may not be indicative of all adolescent high school students and there may be concerns about social desirability and group because the survey part of the methodology was self-reported, which may create bias. Therefore, this new study which is more inclusive was required to research on the psychological effects of pathological gaming among all teenagers.

In the third study, two wave panel data were used from two surveys of 1,928 adolescents aged 13 to 17 years. The surveys included measures of video game use, video

game addiction, depression, heavy episodic drinking, academic achievement, and conduct problems. The data was analyzed using first differencing, a regression method that is unbiased by time invariant individual factors (Brunborg, Mentzoni, & Frøyland, 2016). The results were as follows; video game addiction was related to depression, lower academic achievement, and conduct problems, but time spent on video games was not related to any of the studied negative outcomes (Brunborg et al., 2016).The findings were in line with a growing number of studies that have failed to find relationships between time spent on video games and negative outcomes (Brunborg et al., 2016). The current study is also consistent with previous studies in that video game addiction was related to other negative outcomes, but it made the added contribution that the relationships are unbiased by time invariant individual effects (Brunborg et al., 2016). However, future research should aim at establishing the temporal order of the supposed causal effects (Brunborg et al., 2016). Researchers in this study have addressed the effects of violent video games on adolescents (Yao, Zhou, Li, & Gao, 2019). This study points out how preexisting conditions recent acts of extreme violence involving teens and associated links to violent video games have led to an increased interest in video game violence **(**Yao et al., 2019). Research suggests that violent video games influence aggressive behavior, aggressive affect, aggressive cognition, and physiological arousal (Yao et al., 2019). The study relies on General Aggression Model (GAM) to explain the mechanism behind the link between violent video games and aggressive behavior. However, the influence of violent video games as a function of developmental changes across adolescence has yet to be addressed. The purpose of this review is to integrate the GAM

with developmental changes that occur across adolescence **(**Yao et al., 2019). Limitations of this study are not noted. The only observed limitation is that of race which may be a major factor, as it is unknown whether race may play a major role in teenagers' background and violent behaviors. I used this study to show that there is a relationship between violent video games and psychological effects such as violent behaviors, anxiety and depression in teenagers; video games influence aggressive behavior, aggressive affect, aggressive cognition, and physiological arousal such as anxiety and depression **(**Yao et al., 2019). Therefore, a new study is needed to research further the relationship between the influence of violent video games, when it comes to aggressive behavior, aggressive affect, aggressive cognition, and physiological arousal such as depression/anxiety in teenagers. I used this study to show that there is a link or connection between violent video games and depression in teenagers which can eventually lead to aggressive behavior such as shooting (Yao et al., 2019).

According to Pew, (2017), puzzle and strategy games are the most popular genres among those who often or sometimes play video games**.** Around six-in-ten of these adults play puzzle and strategy games (62% play each type), according to the 2017 survey. Meanwhile, 49% play adventure games, 42% play shooter games, 39% play role-playing games, 33% play team sport or racing games and 32% play simulation games. Women who often or sometimes play video games are more likely than men to play puzzle games (72% vs. 52%) (Pew, 2017). This genre is also more popular among game players ages 65 and older than among those ages 18 to 29 (74% and 56% of whom, respectively, play puzzle games). This study is very informative but the teen's group is

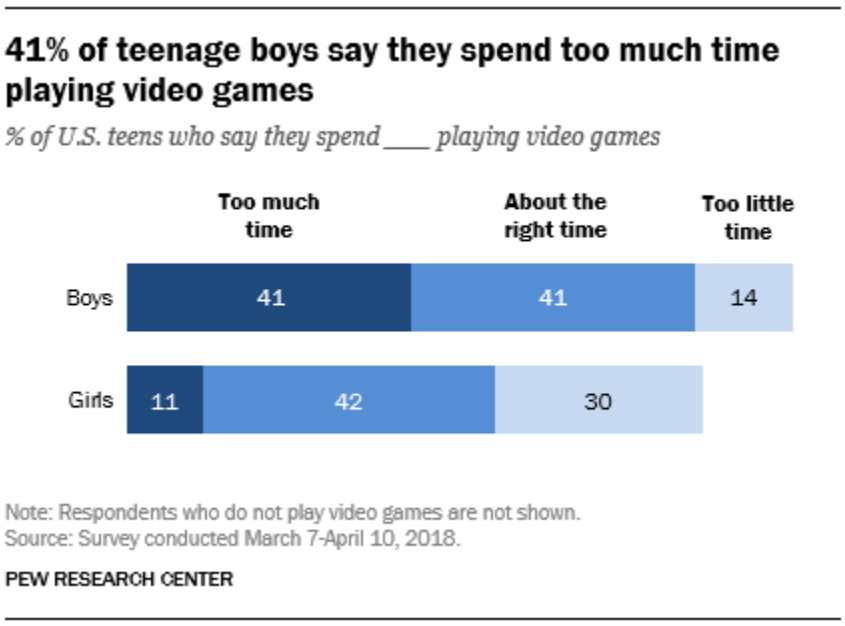
omitted. A similar study should be implemented including teenagers. It would be interesting to see if their preference is the same as that of young adults and adults; puzzle, strategy, and adventure and shooter games respectively. That's why this new study that's emphasizes on the effects of anxiety and depression in teenagers was recommended.

Gaming is popular among teens – especially teenage boys (Pew, 2017) as seen on the figure 3 below, more than eight-in-ten teens (84%) say they have a game console at home or have access to one, and 90% say they play video games on a computer, game console or cell phone, according to a Center survey of people ages 13 to 17 conducted in 2017. Substantial majorities of both boys and girls play video games and have access to a video game console, but gaming is nearly ubiquitous among teenage boys. An overwhelming 92% of teen boys have access to a game console, compared with 75% of girls. And 97% of teen boys play video games on some kind of device, compared with 83% of girls (Pew, 2017). The gap in this research is that the researchers did not mention how long these teenagers spend on the games consoles that most of them possess. Knowing how long teenagers spend on these gadgets will help in determining whether screen time has any psychological impact when it comes to video gaming in teenagers.

In Pew, (2018) teenagers are divided on whether they spend too much or too little time playing video games (Pew, 2018). A quarter of teens (26%) believe they spend too much time playing video games, while a similar share (22%) feels they spend too little time doing so. And as with video game playing in general, these findings differ by gender (Pew 2018). Four-in-ten boys ages 13 to 17 (41%) say they spend too much time playing video games, nearly four times the share of girls who say the same (11%). And a larger

share of boys (65%) than girls (50%) have cut back on the amount of time they spend playing games. Three-in-ten girls believe they spend too little time playing games, a view shared by just 14% of boys (Pew, 2018) as seen on figure 4 below.

Figure 4*Average Time Boys Spend on Video Games*



Note. Adapted from "Lenhart, A. (2018)" . Pew Internet & American Life Project. Lenhart, A. (2018). Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewresearch.org/fact-tank/2018/09/17/5-facts-about-americans-and-video-games/. Copyright 2018 by Pew Research Center .Reprinted with permission

Limitation in this study, is that the researchers did not mention how long is too long or how short is too short, and if both short and long screen time has the same impact

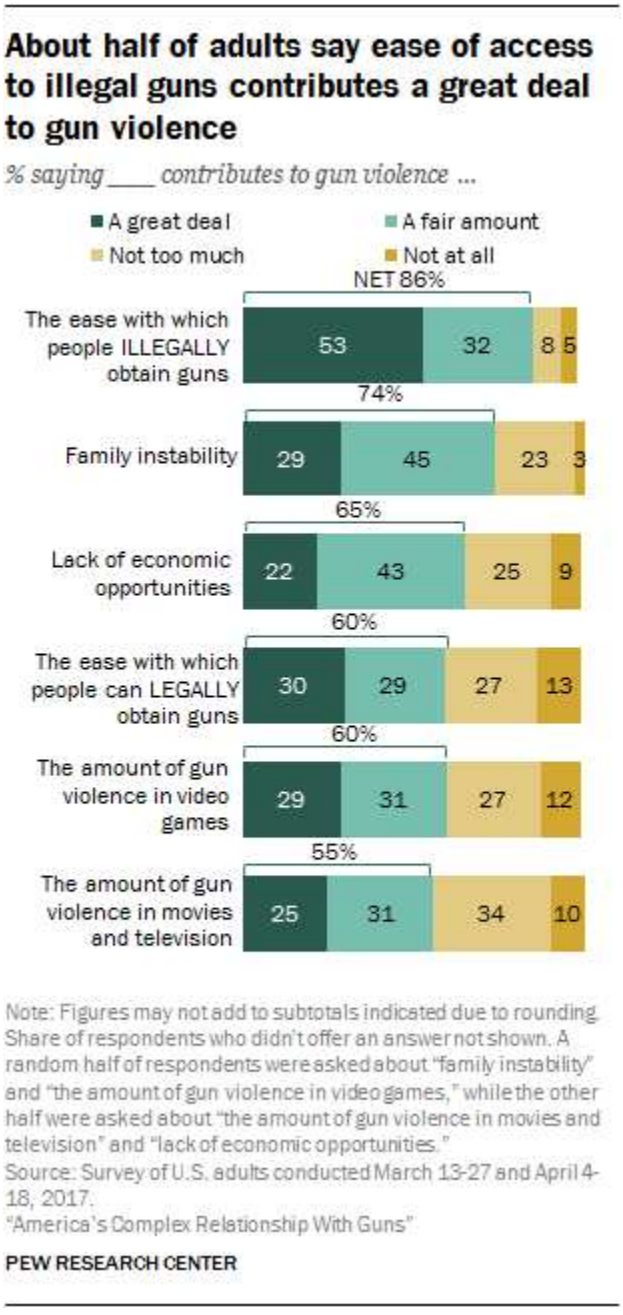
on teens as shown on figure 8 above. We are also not told if the participants represented all races, this could lead to selection bias if the issue of race was not put into consideration. That's why this new study that puts screen time and race into consideration was required. This will give more accurate results and a better representation.

A number of studies such as (Pew, 2017) and **(**Kirsh, 2018), have pointed out that watching video games may lead to violence. Many Americans point to forces beyond gun access as contributing factors in gun violence in the U.S. For example, roughly three-quarters (74%) of Americans say family instability contributes a great deal or fair amount to gun violence (Pew, 2017). Fewer cite a lack of economic opportunities (65%) and the amount of gun violence in video games (60%) and movies and TV (55%) as contributing factors. Majority of adults – especially seniors – believe video games are a contributing factor to gun violence (Pew, 2017). Six-in-ten adults say the amount of gun violence in video games contributes a great deal or a fair amount to gun violence in the country today, according to the Center's 2017 survey. Among adults ages 65 and older, 82% say video game gun violence contributes a great deal or a fair amount to the country's gun violence (Pew, 2017); as shown on figure 9 below. From this study we see that six-in-ten adults say the amount of gun violence in video games contributes to violence, therefore, a new study is required to study this critical factor; because as we have seen in other studies, teenagers who are depressed mostly are involved in violence. There is a link between violent video games, depression, and violent behaviors according to **(**Yao et al., 2019). This relationship between violence, depression and violent video games in

teenagers needs to be studied in detail. This will help in tackling the social issue of depression if at all violent video games have anything to do with it. I used this study to point out the relationship between violent video games, depression and violence. This new study included the background and where the participants live because these two factors, environmental and who the individuals associate with may contribute a lot to the findings. For instance, those teenagers who live in crimes infected areas or whose friends are violent may be influenced to do or behave the same (CDC, 2019) unlike their counterparts who live in quiet neighborhoods and with friends who are not violent.

Figure 5

How Guns Access Has Contributed to Violence among Depressed Teenagers



Note. Adapted from "Pew Internet & American Life Project. (2017)". Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewsocialtrends.org/2017/06/22/views-of-guns-and-gun-violence/#ease-of-

access-to-illegal-guns-seen-as-the-biggest-contributor-to-gun-violence. Copyright 2017 by Pew Research Center. Reprinted with permission

Other adverse effects of anxiety and depression in teenagers

According to CDC, (2018) there have been high incidences of drug overdose and suicides among teenagers in the last 5 years; following depression and anxiety in this country. According to the CDC report, U.S. life expectancy drops amid disturbing rise in overdoses and suicides; life expectancy, which averaged 78.6 years in 2017, a decrease of 0.1 from the year before, to the rise in deaths from overdose and suicide (CDC, 2018). The same report also indicates that more than 70,000 people died of drug overdoses last year alone (CDC, 2018). This number marks a nearly 10 percent increase from 2016 and the highest ever in the United States for a single year (CDC, 2018). This is a drastic increase bearing in mind that only about 17,000 people died of overdoses in 1999 (CDC, 2018). To be more specific, the number of deaths involving synthetic opioids, such as fentanyl has increased by 45 percent in the span of a single year, from 2016 to 2017 (CDC, 2018). According to the report by Cunningham, Walton, & Carter, (2018), the total death rate for 13- to 17-year-olds in the United States declined 33% between 1999 and 2013 but then suddenly soared 12% between 2013 and 2016 (Cunningham et al., 2018). This rise in deaths is attributable to injury-related deaths, such as traffic accident fatalities, drug overdoses, homicides and suicides, as opposed to illnesses. Most of these factors are commonly associated with mental health; mainly depression and anxiety (Cunningham et al., 2018). Thabrew, Stasiak, Hetrick, Wong, Huss, & Merry, (2017),

study shows how death rate has increased in teenagers from 1999 to 2016. Most of these incidences are associated, connected or linked with either anxiety or depression (Thabrew et al., 2017). This is the reason why it is important to look at those factors that are associated with both anxiety and depression. Therefore, a new study is required to study how anxiety and depression are tied up with overdose and suicide and what can be done to tackle this social problem. Controlling factors that lead to depression and anxiety will adversely control deaths that occur as a result of overdose and suicide respectively. These factors include anxiety, depression, overdose and suicide. Controlling one will directly or indirectly affect the other since they are tied up together as per (Thabrew et al., 2017)

Various factors such as long screen time, video gaming, and cyber bullying, have been associated with high incidences of both anxiety and depression in teenagers in the last five years. According to (Rachel et al., 2016), cyber bullying may have even more harmful outcomes to adolescents' mental health, including substance abuse, increased suicidal ideation and suicide attempts. Rachel et al. (2016) study showed that the likelihood of committing suicide attempts is up to twice as high among victims and aggressors, as compared to those not involved in cyber bullying. Studies such as psychguides.com (2019) shows that video gaming can lead to addiction and isolation that can eventually cause depression and anxiety (psychguides.com, 2019). Those who isolate themselves from others in order to play video games may miss out on family events, outings with friends. If this continues to be a pattern for a long period of time, however, addicts might find themselves without any friends at all. This may eventually lead to depression and anxiety (psychguides.com, 2019). Markham, (2018) study indicates that

young people who spend seven hours or more a day on screens are more than twice as likely to be diagnosed with depression or anxiety than those who use screens for an hour a day (Markham,2018) Finally, as per the Schrobsdorff, (2016) severe gender disparity is demonstrated when it comes to depression and anxiety. In the U.S., 19.5% of girls experienced at least one major depressive episode while only 5.8% of boys did (Schrobsdorff, 2016). The pediatrics study researchers suggested that adolescent girls may be more exposed to risk factors such as cyber-bullying and frequent use of cell phones (Schrobsdorff, 2016). I used all the above studies (Markham, 2018), (Schrobsdorff, 2016), and (psychguides.com, 2019) to show that there is a relationship between, video gaming, cyber bullying, and long screen time and depression/anxiety in teens between the age of 13-17 years.

According to Merikangas, Nakamura, & Kessler, (2015), when it comes to mental health in teenagers, anxiety disorders were the most common condition (31.9%), followed by behavior disorders (19.1%), mood disorders (14.3%), and substance use disorders (11.4%), with approximately 40% of participants with one class of disorder also meeting criteria for another class of lifetime disorder (Merikangas et al ., 2015). To be more precise, the overall prevalence of disorders with severe impairment and/or distress was 22.2% (11.2% with mood disorders, 8.3% with anxiety disorders, and 9.6% behavior disorders) (Merikangas et al., 2015). The median age of onset for disorder classes was earliest for anxiety (6 years), followed by 11 years for behavior, 13 years for mood, and 15 years for substance use disorders (Merikangas et al ., 2015). Merikangas et al. (2015) concluded that, approximately one in every four to five youth in the U.S. meets criteria

for a mental disorder with severe impairment across their lifetime (Merikangas et al., 2015). The likelihood that common mental disorders in adults first emerge in childhood and adolescence highlights the need for a transition from the common focus on treatment of U.S. youth to that of prevention and early intervention (Merikangas et al., 2015). I used this study to point out that these is a need of early intervention and treatment of teenagers who are depressed since most of the depressed adults started this problem when they were teenagers (Merikangas et al., 2015). This will bring social change since healthy teenagers' means healthy and reliable future leaders in the community. The study however does not address ways and methods of early prevention and detecting mental health especially anxiety and mental health. Therefore, this new study was required to provide this vital information.

Media Background Statistics

On July 6, 2015, there was an article in the New York Times in which the American Academy of Pediatrics (AAP), as well as a few clinical psychologists, discussed screen time and indicated that though devices such as tablets and cell phones are starting to take over the electronic world, the television remains popular with children and acts as a babysitter for some families (Brody, 2015). The American Academy of Pediatrics announced in 2013 during a policy statement that an average 13 to 17-year-old spends nearly eight hours a day on the screen (American Academy of Pediatrics [AAP] (2015). They are actually able to pack a total of 10 hours a day as a result of media multitasking (using more than one medium at a time), spending some hours on TV, phone, iPods, pads, AAP (2015).

The negative impact of video games surfaced due to the mass killings that occurred in recent years. The popular press indicated the Sandy Hook Elementary School mass shooting was directly tied to the excessive gaming that the gunman was involved in each day. As a result of the Sandy Hook shooting President Obama requested that Congress allocate $10 million specifically for researching the effects that video gaming involvement has on violence (Granic, Lobel, & Engels, 2014). While a large amount of research exists about the influence of violent video game play, focus has been slanted to reflect the negative effects (Granic et al., 2014). Granic et al. looked at the beneficial outcomes in the cognitive, motivational, emotional, and social domains. According to Press News (2015), scientists have investigated the effects of violent video game use for more than two decades (APA, 2015). Multiple meta-analyses of the research have been conducted. Quantitative reviews since APA's 2005 Resolution that have focused on the effects of violent video game use have found a direct association between violent video game use and aggressive outcomes (American Psychological Association's [APA], 2015) Although the effect sizes reported are all similar according to this study, (0.19, 0.15, 0.08, and 0.16, respectively), the interpretations of these effects have varied dramatically (APA, 2015). This has contributed to the public debate about the effects of violent video games (APA, 2015). As a result of this, several jurisdictions have attempted to enact laws limiting the sale of violent video games to minors (American Psychological Association's [APA], (2015). In 2011, the US Supreme Court considered the issue in Brown v. Entertainment Merchants Association, concluding that the First Amendment fully protects violent speech, even for minors (APA, 2015). Therefore this new study was

required in order to look at the adverse effects of video gaming too. The main gap here is to research on how violence portrayed on video games influence video gamers negatively. In other words, to research on whether, violence portrayed on the characters in the video games motivate or influence those who play them to be violent in anyway. This new study was able to look in details how video games can lead to anxiety/ depression among teenagers. This will help to bridge the gap in these media studies. There have been a number of highly publicized shootings such as those at Columbine massacre (1999); CO theatre shootings (2012), Sandy Hook massacre (2012); Washington Navy Yard massacre (2013); Virginia Tech; Charleston Church; Las Vegas; and Sutherland, Texas, among others. The most recent mass shooting happened in Parkland, Florida, where 17 people were killed, including students (CNN Library, 2018). Shooters in most of these cases have been associated with past history of cyber activity. Cyber activity as noted by Tierney has great impact when it comes to shaping perceptions of the population especially teenagers. Multiple studies support Tierney's argument that media play essential roles in dictating and swaying people's perceptions (Follman, 2015; Keane, 2015; Lopatto, 2015), but researchers have not gone deeper into identifying the roles played by video gaming and if all video games (violent and non-violent) affect people the same. Many studies have reported the link between cyber activities and the development of compulsive behavior. According to van den Eijnden, Lemmens, and Valkenburg (2016), who did a research on social media disorder scale, cyber active individuals tend to feel restless whenever they cannot access their messages from the social media applications. According to Rosenberger, (2016), nine of 10 people suffer

from phantom vibration syndrome (PVS); where they mistakenly think their mobile phone is vibrating in their pocket (Rosenberger, 2016). Many individuals may not see these two foregoing illustrations of social media or cyber activity disorder as something intense, but an addicted person's perception regarding his cell phone's vibration can be critical because obsession manifested through frequent monitoring of social media messages can exhibit anxiety (Bashir & Bhat, 2017). That's the main reason why this new study was conducted; to study the anxiety aspect in relation to cell phone usage, as well as violence that has been noted above due to video games playing (both violent and non-violent).

Summary of the Literature Review

In summary of Chapter 2, I found studies on dependent-variable depression/anxiety, independent-variable bullying and independent-variable long screen time and video games. Among the dependent variable depression/anxiety, the evidence of research provided that some teenagers between ages 13-17 are depressed as a result of cyber bullying, long screen time and video gaming. Depression was shown to have a relationship between suicides, violence, and drug addiction. Additional issues stemming from depression were reviewed in Chapter 2. The relationship between depression and anxiety found by investigators showed a strong relationship between the three variables. The studies were of a qualitative, focus group, experimental, and quantitative nature, described earlier in the review. I started the second section by defining anxiety and depression and also displaying the cause, predisposing factors complication and types of depression and anxiety. I was also able to discuss the consequences of cyber bullying.

They include, peer victimization, low academic performance, injuries, and increasing violence among the participants, and psychological issues showed that bullying resulted in depression and low self-esteem. The second independent variable long screen time showed factors of media influence such as possible cyber bullying especially girls, although undefined. Consequences of long screen time were anxiety, exposure to cyber bullying, and depression. Overall, the different studies provided empirical evidence showing that teenagers between the ages of 13-17 in the US who are victims of bullying are more at risk for depression, suicide, poor health, low academic performance, violence, drug addiction and hence short life expectancy. In Chapter 3, I will explore these issues with the theoretical framework [Social Ecological Model] (SEM) to answer my questions (McLeroy, Steckler, and Bibeau, 2012) as well as social cognitive theory (SCT).

Chapter 3: Research Method

Introduction

This chapter is an explanation of the quantitative methods used to analyze the association of perceptions toward factors leading to anxiety and depression in teenagers. I explain the research methodology as well as the sampling techniques. Instruments used as well as data collection procedures are presented. The analytical approach including statistics is discussed, along with threats to internal and external validity. Researchers and health professionals are concerned about depression, suicide and suicidal behavior, and cyber bullying among teenagers as the rate has been going up as seen in Chapter 2. Being bullied is related to depression, mental illness, violent and aggressive behavior, and suicidal ideation (CDC, 2019). Teenage depression is a chronic health condition that can continue into adulthood if not treated. According to CDC, (2019) depression is associated with suicide, and suicide among people aged 13 to 17 years was the third leading cause of death in United States in 2015 at a rate of 12.5 per 100,000 (CDC,2019).

Although numerous studies have assessed the association between playing video games or other nonacademic computer use (watching online videos, using social network sites, chatting, and browsing websites) and depression, few studies have examined how cyberbullying, screen time, and video gaming contribute to depressive symptoms and suicidal behavior in teenagers. Thus, the purpose of this study was to determine how the association between playing video, cyberbullying, screen time influences depressive symptoms (which may eventually lead to suicidal behavior) among US adolescents (CDC, 2019).

Population

The rate of depression among teenagers in the US has skyrocketed in the last 5 years. In addition, long screen time, cyberbullying, and video gaming have been on the rise and all have been associated with high rate of depression in teenagers. Depression is raising concerns about health status and life expectancy among teenagers in the US. The age range in my study was participants 13 to 17 years of age. The teenagers who were subjects of the original survey were currently enrolled in the CDC YRBSS. Therefore, in analyzing data and information from the YRBSS (2019), I sought to test for an association between risk and protective factors among teenagers between the ages 13-17 who have been exposed to screen time especially, prolonged nonschool related media use in relation to depression. I also sought to test the impact of cyberbullying and video gaming, and long screen time among this age group in relation to depression.

Targeted Population

The targeted population was teenagers in YRBSS (2019) who were male or female and racially diverse, and who were cyberbullied, used video games, and also spent time on a screen. They were compared to those teenagers who spend no or minimum time on screens, do not play or play less than 2 hours of video games a day and are not cyberbullied. In addition, those teenagers who had more than 1 to 2 hours of screen time were compared to those teenagers who had 4 or more hours of screen time per day. The participants were all between `13-17 years.

Eligibility

In the original survey study YRBSS (2019) teenagers between ages 13-17 were currently enrolled were eligible to participate in the study. This included teenagers who were cyber bullied, not bullied, played video games, and spent some time on their screens.

Characteristics of the Study Population

Races/ethnicities included the YRBSS were Black, White, Hispanics, non Hispanics, Indian American, and Asian teenagers in the USA. Male and female genders were included. The ages of participants who were surveyed were 13 through 17. Eligible participants were given a survey to complete with a response. The responses were coded from m to x, and questions asked, "How many times" using a Thurstone scale (has a number of *agree* or *disagree* statements) to survey the targeted adolescents about being threatening texts or messages; there were "yes" and "no" dichotomous responses for cyberbullying. Each coded response was given definition by the original investigators' codebook and databases from the YRBSS (2019).

Variables in the Database

Nominal variables like person, age, and video gaming were generated by the YRBSS (2019). The independent variable, cyberbullying, was dichotomous as a response, however, cyberbullying was measured in an interval format for response. The variable, screen time, was measured in an interval format for responses.

Sampling Method and Sampling Procedure

Sampling Method

The sampling method was convenience sampling. This sampling method was chosen because investigators already compiled the data. Babbie (2007) found that convenience sampling is the choice of sampling method when secondary data is used. We will use data on 13,677 adolescents from the 2019 Youth Risk Behavior Survey (YRBS), administered by the Centers for Disease Control and Prevention. YRBS, which has been conducted biennially since 1991, uses a 3-stage cluster-sampling design to monitor priority health-risk behaviors among nationally representative samples of private school and public-school students in grades 9 through 12 in the United States. In 2019, the sample size was13,677, the school response rate was 75%, the student response rate was 80%, and the overall response rate was 60% (YRBS, 2019). For me to come up with the right sample size for this study, I used G*power to calculate it. I started with calculation of the effect size. Based on Christopher (2019), the effect size is the [mean of the experimental group]- [mean of the control group]/standard deviation. In knowing the effect size, and given that the study used Spearman's correlation, Mann-Whitney U tests, Kruskal–Wallis tests, and ordinal regressions, multiple sample size calculations were conducted. As I mentioned earlier G*Power was used to calculate a valid sample size for the study. Power is conventionally set at .80 (Cohen, 1988), which implies that a study investigating a true effect will correctly reject the null hypothesis 80% of the time and may report a false negative (commit a Type II error) in the remaining 20% of cases (Howell, 2010). The dependent variable, depression/anxiety in teenagers, was used in six

different analyses, thereby increasing likelihood of Type-I error. To control for the likelihood of committing a Type I error, a Bonferroni correction was applied (Tabachnick & Fidell, 2019). Here is an example of how to apply Bonferroni correction; The Bonferroni correction sets the significance cut-off at α/n (Tabachnick & Fidell, 2019). For example, if 20 tests and α = 0.05; one would only reject a null hypothesis if the p-value is less than 0.0025 (Tabachnick & Fidell, 2019). So, in this study, to determine the correction, the original alpha value (.05) was divided by the number of the 6 analyses conducted on the same dataset that used the same dependent variable (depression/anxiety in teenagers). This resulted in alpha value of .008 to be used for analyses (Suresh & Chandrashekara, 2016). Secondly, since I used Mann–Whitney U test nonparametric equivalent of the independent sample t test, I adjusted the sample size by adding 15% as an adjustment for more accuracy (Suresh & Chandrashekara, 2016) recommended that when using a nonparametric test, the researcher should first compute the sample size required and then add 15% as an adjustment (Suresh & Chandrashekara, 2016). For the ANOVA with five groups (cyber bullying, video games, screen time, age, and sex), using a medium effect size of .25, an alpha of .05, and a generally accepted power of .80 (Howell, 2010), plus 15 % adjustment I got 180 participants for each group. With all the above G*power calculations I will need approximately 2,700 participants for this study.

Sampling Procedure

The sampling procedure included random selection of teenagers who were studied in the original survey database YRBSS (2019). I did not analyze all data for all students in the database. From the main database, I only analyzed the minimum sample size that I

needed to conduct my analysis. This information was collected at a national level and from participating U.S. states, participating territories, participating urban schools' districts, and some of the tribal territories. No resource constraints are directly associated with using the YRBSS.

Instrumentation and Measurements

Instrument

The name of the instrument used is the YRBSS (2019)**.** This survey was taken by the YRBSS (2019)**.** It lists questions about the independent (i.e., cyber bullying and screen time), dependent (i.e., teenage depression) variables, and other confounding variables, such as past medical history of depression in parents among the targeted teenager's population. Permission was received from CDC YRBSS (2019) representative**.** The instrument was found to be scientifically valid and reliable CDC YRBSS (2019). CDC data from the YRBSS, 2019 was examined for this study using quantitative data analysis to assess adolescent health risk behaviors. The standard questionnaire for the 2019 YRBSS included a total of the 17,025 sampled students submitted questionnaires; 13,677 questionnaires were usable after data editing. I was able to use 10,909 participants after data cleaning. Chapter 4 further shows the clarity of the myriad variables analyzed from the CDC, 2019 YRBSS questionnaire.

Instrument validation

This instrument has provided consistent results over 30 years. Youth Risk Behavioral Surveillance Survey (YRBSS) was established in 1991, the YRBSS, a national school-based survey, has been used to survey high school youth and locally, at

the state level, to survey middle school youth across the United States regarding avoidable behaviors that lends to the primary reasons for morbidity and mortality among adolescents such as depression, anxiety, cyber bullying, addiction just to mention but a few. Data gathered from the YRBSS has consistently shown the relevance of information from surveillance systems and its importance for organizing and assessing programs that enhance the health and well-being of the public; in this case teenagers (Brener et al., 2015) Although the prevalence of behaviors may have increased and decreased over time; there have been prevalence changes, these changes have been gradual either up or down and results have not bounced around CDC YRBSS (2019).

Survey Analysis

The data-collection instrument used in this study is a survey. Sullivan &Artino, (2017), found that surveys may be descriptive, explanatory, and used for exploratory purposes, such as a study about teenagers and depression. The unit of analysis in this study is the participants. Surveying teenagers between the ages of 13-17 as the unit of analysis allows the individuals to respond or be informed. The survey instrument in this case was used to sample a large population of teenagers that is too large to observe directly, making the survey instrument the preference of choice. The YRBSS data analysis for 2019 was completed using logistic regression. Logistic regression is considered one of the most effective ways to ascertain whether a change that has occurred is statistically significant especially among myriad prevalence estimates (Brener et al., 2015). The use of multiple statistical tests is deemed appropriate when seeking to ensure validity of the data received from each participating site. Using myriad programs ensured

that missing data, inconsistent data, questionnaires that have been modified, and sensitivity to noted differences were accounted for. Data are available in SPSS format and was used for the data analysis in this study.

Survey Issues

Generally, surveys are self-reporting. Therefore, self-reporting nature of surveys may introduce bias. An example is that a teenager may decide to cut off the number of hours that he/ she spends on the screen and say that he/she spends most of the time reading to impress the researchers (Sullivan &Artino, 2017). Therefore, the participant may not answer the questions truthfully. In addition, surveys may allow researcher bias as researchers may seek their own ideas and concepts and organize those ideas and concepts into a questionnaire. One way to deal with the issues of bias is to limit biased wording in the survey (Sullivan & Artino, 2017).

Measurement

The CDC YRBSS (2019) measured teenagers' responses to screen time, video gaming and cyber bullying. In addition, control variables of race, age, and sex were allowable measures in the survey. Suicide and violence were also looked at since these are the main adverse effects of anxiety and depression (CDC, 2016).

Race

Controlled Variables Race Questions of race were queried by, "What is your race?" Teenagers were prompted to respond with several choices coded alphabetically from A to E. Response choices to answer that questions were A=American Indian, B=Asian, C=Black, D=Native Hawaiian and E= White. The Hispanic or Latino category

was of a dichotomous nature, coded numerically from 1=yes to 2=No with a response of "yes" or "no" (YRBSS, 2019).

Age

The question of age was explored by the question, "How old are you?" The range of responses was from 13 to 17 years of age. The variable was coded numerically from 2=13, 3=14, 4=15, 5=16 and 6=17.

Gender

The question of gender was questioned by, "What is your sex?" The numerically coded responses were 1 and 2 with a dichotomous response of "female" or "male" respectively.

Race was controlled by only selecting those races of CDC YRBSS (2019) teenagers who are members of the targeted population used in the study. Age was controlled by only selecting those teenagers aged 13 to 17 in the US.

Independent Variables

Cyber Bullying

Cyber bullying in the survey was presented as a dichotomous variable in the study and asked adolescents, "During the past 12 months have you ever been cyber bullied on by your peers or unknown people?" The responses were coded from 1 to 2 with answers "yes" or "no" respectively (YRBSS, 2019). Cyber bullying Q24, long screen time and video gaming may be the result of anxiety and depression in teenagers. The cyber bullying question was "During the past 12 months, have you ever been electronically bullied? (Include being bullied through e-mail, chat rooms, audio calls, Instagram, snap

chat, twitter, instant messaging, video calls, or texting)," also with a yes/no answer option.

Screen Time

Cyber bullying may be the result of long screen time and this can lead to anxiety or depression or both in teenagers' communities and neighborhoods. Therefore, it is important to look at each of these variables because they can enhance each other simultaneously. The independent variable in the study described by the authors was, "On an average school day, how many hours do you spend on screens not counting schoolwork?" The responses were coded from a to g with answers, screen Q79?" The responses were coded from a to g with answers, such as, A= 0 hours on screen B=less than 1 on screen, C=1 hour a day on screen D=2hrs E= 3hours, F=4 hours, G=5 hours. The variable 0 was listed as the missing data variable. The intention was to show how many hours teenagers spent on screens.

Video Gaming

Video gaming may lead to long screen time and this can lead to anxiety or depression or both in teenagers' communities or neighborhoods. Therefore, it is important to look at each of these variables because they can enhance each other simultaneously. The independent variable in the study described by the CDC YRBSS (2019) was, "On an average school day, how many hours do you play video games?" The responses were coded from a to g with answers, such as, A=No playing video games per day. B= Less than 1 hour of playing video games C=1 hour per day of playing video games, D=2 hours per day of playing video games, E=3 hours per day of playing video

games, F= 4 hours per day and G=5 or more hours per day. The variable zero was listed as the missing data variable. The intention was to show how many hours teenagers spent on video games. ‘’On an average school day, how many hours do you play video or computer games or use a computer for something that is not schoolwork. The participants are supposed to count time spent on the screen playing video games. Gadgets such as Xbox, PlayStation, an iPods or other tablet, a smart phone are considered.

Dependent Variable

Depression and anxiety among teenagers

Cases of depression among teenagers are increasing by date in the US in the last five years. The cause of concern is increasing in the US about depression and further examination helps provide interventions to help parents, teachers, communities, and neighborhoods of involved teenagers.

Depression

Depression was measured by the CDC YRBSS (2019) and the survey questioned, “During the past month, on how many days did you feel lonely, unwanted, and self-harm and ideas of committing suicide.” The question will be alphabetically coded from a to d, and numerically ranged from 0 days to 30 days. Time less than 0 to 1 day was considered not depressed, 1-5 days mild, 5-10 days moderate, and more than 10 days severe. Depressive symptoms were defined as the presence of feelings of sadness, hopelessness, unwanted, unloved, not fitting in a group and rejection, in response to the question, “During the past 12 months, did you ever feel so sad or hopeless almost every

day for more than a week such that it affected your day to day activities such as interacting with friends and family, doing school work, and eating?"

Suicide and violence (as adverse effects of depression)

There are several questions on the questionnaire and a few ways to know the severity of depression. I chose those questions that will help me to know the severity of depression. For instance, if one has attempted suicide in the last 12 months this may indicate severe depression, if one has thought about committing suicide in the last 12 months, may show moderate depression and if one has not contemplated suicide in the last 12 months may indicate no depression or mild depression. Suicide and violence were looked at as adverse effects of depression and not as dependent or independent variables. Results to support the relationship between depression and suicide/violence are in summary and appendix B sections since suicide and violence are not variables (but have major link to the dependent variable) in the study.

Data Analysis Plan

Data Collection

Data were collected in the original study by the researcher in CDC YRBSS and I used this secondary data for this study. The CDC YRBSS (2019) study provided the framework of data that was used in this study.

Software to be used

Statistical Package for the Social Sciences (SPSS) version 27 software was used to analyze the secondary from CDC YRBSS, (2019). Data generated from the 2019 YRBSS questionnaire was transmitted for use and analysis using the Statistical Package

for the Social Sciences (IBM – SPSS), specifically answering the following. My IRB approval number is 10-02-20-0399941.

Research Questions and Hypotheses

RQ1. Is there a relationship between screen time (amount of time spent on the screen) and depression/anxiety in teenagers between ages 13-17 in the United States?

H0: There is no statistically significant relationship between screen time and depression/anxiety conditions in teenagers between ages 13-17 in the USA.

H1: There is a statistically significant relationship between screen time and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

RQ 2, Is there a relationship between video gaming and depression/anxiety in teenagers between ages 13-17 in the USA?

H0: There is no statistically significant relationship between video gaming and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

H1: There is statistically significant relationship between video gaming and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

RQ 3, Is there a relationship between cyber bullying and depression/anxiety in teenagers between ages 13-17 in the USA?

H0: There is no statistically significant relationship between cyber bullying and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

H1: There is statistically significant relationship between cyber bullying and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

RQ 4, Is there a relationship between screen time, video games, cyber bullying and depression/anxiety in teenagers between ages 13-17 in the USA?

H0: There is no statistically significant relationship between cyber bullying, video games, and screen time and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

H1: There is statistically significant relationship between screen time, video games, cyber bullying and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

Analysis

My Dependent Variable (DV) is categorical and Independent Variables (IV) are categorical too. So, for analysis I used binomial logistic regression for multivariable analysis and Chi –square for bivariate since my variables are categorical. The descriptive statistics was used since it gives frequencies (laerd statistics, 2019). It was used in this study to test the relationship between long screen time, video gaming as well as cyber bullying and the dependent variable (depression).

Threats to Validity

External-Validity Threats

External validity is the extent to which the results of a study can be generalized to and across other situations, people, stimuli, and times can influence the outcome of a research (Patino, & Ferreira, 2018). In my survey design, a major threat to external validity is the generalization of a variable which could occur when prior thoughts and ideas are considered (Patino, & Ferreira, 2018). An example is a teenager who has heard from friends that those teenagers who spend long time on screen may be considered lazy or not contributors in the community. This may affect how he answers the question in order to impress the researchers. Such a participant may choose to reduce the number of hours that is spent on screen to look "good" hence giving inaccurate information. To limit this issue, participants were advised on the importance of being truthful on the answers/ responses that they gave (Patino, & Ferreira, 2018).Secondly, external validity was increased by using broad inclusion criteria that result in a study population that more closely resembles real-life participants (Patino, & Ferreira, 2018).

Internal-Validity Threats

Validity refers to the degree of confidence that the causal relationship being tested is trustworthy and not influenced by other factors or variables (Patino, & Ferreira, 2018). To increase internal validity in this study, researchers ensured careful study planning and adequate quality control and implementation strategies-including adequate recruitment strategies, data collection, data analysis, and sample size (Patino, & Ferreira, 2018). As a result of the above precautions, there were no internal threats. Secondly, all those who

were participating were informed on the importance of being truthful on the answers that they gave. The outcome of the study depended on their accurate responses. Researchers also promised to the participants that the answer given will be confidential and the results of the study will only be used to improve programs and policies for the all the teenagers in the US when it comes to teenage depression.

Confidentiality and Participant Protection

Protection and confidentiality of all data included Institutional Review Board (IRB) approval. CDC research certifies the data is secure and no participants' names or information about their residence is attached to the data**.** I will continue to protect the confidentiality of the participants by not discussing or sharing any of the data to unauthorized individuals. The data will be code protected and must be destroyed 5 years after completing the study. Any information that I share with authorized individuals is encrypted. One needs a password to get to my data storage unit (computer). Secondly, public use of data available online at Centers for Disease Control and Prevention does not identify any student participant by name, does not provide personal information on students as individuals. Finally, CDC does not provide school or region of the participants. CDC protects the demographic information by not making it available in public domain.

Summary

In Chapter 3, I presented the methodology of the study; the data-analysis plan for the study; and threats to validity, confidentiality, and ethics for all participants in the research. My methodology presented the sample target population, sample size, and

instrumentation, and measures of the selected instrumentation. I also explained data analysis plan. Finally, threats to validity were described and how to limit those threats was presented. The goal of the next chapter (4) is to provide the study results and demonstrate that the methodology described in Chapter 3 was followed.

Chapter 4: Results

Introduction

Chapter 4 presents the results of the study. The chapter initiates with its organization and the characteristics of the participants. I include the details of the participants' perceptions of depression in teenagers. Chapter 5, then, will focus on the discussion, conclusion and recommendations.

The purpose of this study was to test the relationships between depression and cyberbullying, video gaming, and screen time among teenagers between ages 13-17 in the United States. Using secondary data from CDC YRBSS (2019), I examined the dependent variable depression/anxiety. Depressive symptoms were defined as the presence of feelings of sadness or hopelessness in response to the question and the question asked was: "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 independent variables were screen time, cyberbullying, and video gaming. The covariables were race, gender, and age. The following research questions and hypotheses were used to guide this study:

RQ1. Is there a relationship between screen time (amount of time spent on the screen) and depression/anxiety in teenagers between ages 13-17 in the United States?

H0: There is no statistically significant relationship between screen time and depression/anxiety conditions in teenagers between ages 13-17 in the USA.

H1: There is a statistically significant relationship between screen time and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

RQ 2, Is there a relationship between video gaming and depression/anxiety in teenagers between ages 13-17 in the USA?

H0: There is no statistically significant relationship between video gaming and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

H1: There is statistically significant relationship between video gaming and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

RQ 3, Is there a relationship between cyber bullying and depression/anxiety in teenagers between ages 13-17 in the USA?

H0: There is no statistically significant relationship between cyber bullying and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

H1: There is statistically significant relationship between cyber bullying and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

RQ 4, Is there a relationship between screen time, video games, cyber bullying and depression/anxiety in teenagers between ages 13-17 in the USA?

H0: There is no statistically significant relationship between cyber bullying, video games, and screen time and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

H1: There is statistically significant relationship between screen time, video games, cyber bullying and depression/anxiety between teenagers at the age of 13-17 both black and white in the USA.

This chapter provides results from the data analysis and answers to each research question. It also includes the data collection method used for this study, demographics of the participants, tables and figures that support the narrative of the data, and ancillary analysis. The conclusion of this chapter gives a summary of the major findings resulting from this inquiry.

Data Collection

This study included data collected from the CDC through the YRBSS. The data was not restricted and was available for download and analysis in SAS Input, SAS format, and SPSS syntax formats. Self-reported data from the 2019 YRBSS were used for analyses in this study. The data is open domain, and therefore I filled out a form to CDC via email and one of the representatives sent me a link which I used to download the data**.** I used archival data gathered in the original survey by the CDC 2019. The survey data were input into SPSS by the original researchers. I obtained the data in October 2020. The data were already in SPSS and therefore I had to analyze the data using SPSS. I

extracted the data from the original survey on 0ctober 14th, 2020 and analyzed the data set on October 20th, 2020 for, 13,677 participants, assessing for missing cases on the variables of interest. I conducted the final analyses on 10,909 participants. The following characteristics led to elimination of cases: younger than 13 years old, older than 17 years old, and those who omitted the question about age, depression, and cyber bulling, video games, and screen time. This left us with 10, 909 participants for analysis after data filtration. The target population included teenagers between ages 13-17. The YRBSS survey participation was administered after parental permission was received. Questions on self-injuries, suicide, and violence were also included since the two are associated with depression among teenagers (CDC, 2019)

Descriptive Statistics

Of the 13,677 participants included in the dataset, most were between the ages of 13 and 17 (10,909, 100 %). Male and female participants were well represented. Slightly more participants from the 16 year old (30.4%) responded than from other age levels. Majority of the participants were white (49.7%), and the least identified others (1.2 %). Frequencies and percentages are presented in Table 1 below.

Table 1

*Frequencies and Percentages for Student Demographics (*N = *10,909)*

Demographic categories		*N*	Marginal Percentage
Race			
Asian		211	4.5%
American/Indian		615	9.8%
Black		2688	34.8%
Others		61	1.2%
White		7334	49.7%
Age			
13 yrs		1317	7.2%
14 yrs		1345	7.3%
15 yrs		3117	29.3%
16 yrs		3265	30.4%
17 yrs		2765	25.8%
Gender			
Female		5628	52.5%
Male		5281	47.5%
Hispanic or Latino			
Yes		2485	23.2%
No	o	8424	76.8%
Total		10909	100.0%

The students' video gaming and screen time ranged from 1-5 hours per day. 45.9 % of the population spent 3-5 hours or more per day video gaming while 20.2% spent 3-5 watching TV (screen time). 30.9% of the population watched TV (screen time) 1-2 hours per week while 25.5% of the population played video games for 1-2 hours per day. 36.7 % of the population reported feeling sad and hopeless (depression) while 15.9% of the population was cyber bullied (See Table 2 below).

Table 2

Case Processing Summary

		N	Marginal Percentage
Sad and hopeless	Yes	4001	36.7%
	No	6908	63.3%
Electronically bullied at school	Yes	1731	15.9%
	No	9178	84.1%
Television watching/Screen time	None	3060	28.1%
	<1h/d	2260	20.7%
	1h/d	1587	14.5%
Hours per day (h/d)	2h/d	1794	16.4%
	3h/d	1068	9.8%
	4h/d	484	4.4%
	5h/d	656	6.0%
Computer use / video gaming	None	1952	17.9%
	<1/d	1176	10.8%
	1h/d	1117	10.2%
Hours per day(h/d)	2h/d	1665	15.3%
	3h/d	1690	15.5%
	4h/d	1067	9.8%
	5h/d	2242	20.6%
Valid		10909	100.0%
Missing		0	
Total		10909	

Note. The abbreviation h/d means hours per day and N/A means does not watch TV or play video games.

Prior to conducting the analyses, I assessed the data for potential covariates of race, sex, and age. I conducted chi-square analyses to detect statistically significant relationships between race, sex, and age, and the dependent variable of depression and anxiety (Q25). Race (Q5), sex (Q2), and age (Q1) were all found to be statistically related to depression and anxiety among teenagers (see table 3-8 below). From Table 3 below,

we see that girls 46.0% were more likely to be depressed than boys 26.3%. From table 5 we also see that depression generally increased with age; 33.3% for 13 year olds, 34.7% 14 year olds, 35.2% 15 year olds, and 38.2% for 16 year olds with an exception of 17 year olds who had 37.3%. About race on table 7, white participants 25.3% were more likely to be depressed, followed by black 6.1% and the least likely were others 0.2%.

Table 3

Gender Crosstab

		Female		Male		All	
		N	%	*N*	%	*N*	%
Sad and hopeless	Yes	2611_a	46.0%	1362_b	26.3%	3973	36.6%
	No	3071_a	54.0%	3818_b	73.7%	6889	63.4%
Total		5628	100.0%	5281	100.0%	10909	100.0%

Each subscript letter denotes a subset of What is your sex categories whose column proportions do not differ significantly from each other at the .05 level.

Table 4

Chi-Square Tests

	Value	*df*	*P*-value (2-sided)	*P*-value (2-sided)	*P*-value (1-sided)
Pearson Chi-Square	451.414[a]	1	.000		
Continuity Correction[b]	450.567	1	.000		
Likelihood Ratio	457.339	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	451.373	1	.000		

Note. Table 3 above shows the P-value of depression between males and females participants of age 13-17. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1894.69. b. Computed only for a 2x2 table. N of Valid Cases 10909.

Table 5

Age Crosstab

		13 yrs		14 years		15years		16years		17years			
		N	%	N	%	N	%	N	%	N	%	N	%
Sad and hopeless	Yes	7[b, c, d, e]	33.3%	546[d, e,a,,b]	34.7%	1117[c, e,a]	35.2%	1263[b,a]	38.2%	1043[b, c, d, e]	37.3%a	4001	36.7%a,b
	No	14[b, c, d, e,b]	66.7%	1029[d, e,a]	65.3%	2055[c, e,a]	64.8%	2047[b,a]	61.8%	1751[b, c, d, e,b]	62.7%a,b	6908	63.3%a,b
Total		1317	100.0%	1345	100.0%	3117	100.0%	3265	100.0%	2765	100.0%	10909	100.0%

Note. Each subscript letter denotes a subset of race categories whose column proportions do not differ significantly from each other at the .05 level. a stands for White, b Black,, c American Indians, d Asian, and e others.

Table 6

Age Chi-Square Tests

	Value	*df*	*p*-value
Pearson Chi-Square	24.601[a]	5	.000
Likelihood Ratio	23.912	5	.000
Linear-by-Linear Association	2.602	1	.107

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.70. Each subscript letter denotes a subset of how old are you categories whose column proportions do not differ significantly from each other at the .05 level. Number of Valid Cases 10909. Table 6 above shows the significance of depression on age group 13-17 for both males and females.

Table 7

Race Crosstab

			Race					
			Asian	Am/ Indians	Black	Others	White	Total
Sad and hopeless	Yes	Count	26[a, b, c, d, e, ,]	2380[b, c, a]	386[a, b, e,,c]	821[a, a, b]	290[a]	2414
		% of Total	2.2 %	2.9 %	6.1%	0.2%	25.3%	36.7 %
	No	Count	38[a, b, c, d, e,]	4224[b, c, a]	602[a, b, e,]	1171[a, e,]	362a	8495
		% of Total	0.3%	31.5 %	4.5%	8.7%	2.7%a	63.3 %
Total		Count	211	615	2688	61	7334	10909
		% of Total	4.5%	9.8 %	34.8 %	1.2%	49.7%	100.0%

Note. Each subscript letter denotes a subset of race categories whose column proportions do not differ significantly from each other at the .05 level. a stands for White, b Black,, c American Indians, d Asian, and e others.

Table 8

Race Chi-Square Tests

	Value	df	*p*-value
Pearson Chi-Square	61.275[a]	8	.000
Likelihood Ratio	61.046	8	.000
N of Valid Cases	10909		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 19.07.

Note. Table 8 above shows the p-value of depression on racial groups for both males and female participants of age 13-17.

I controlled for all three covariates in the analysis. I used the dependent variable, depression/anxiety, in seven different analyses, thereby increasing the likelihood of a Type I error. To control for the likelihood of committing a Type I error, I applied a Bonferroni correction (Tabachnick&Fidell, 2015). To determine the correction, I divided the original alpha value (.05) by the number of analyses (7) conducted on the same dataset with the same dependent variable (depression among teenagers) as seen on the above tables (4 and 8). Below are additional results about suicide and violence which are both linked to depression as seen in this study. There is more interpretation of these findings in chapter 5.

Relationship between depression and violence among teenagers

From the tables below we see that there is a significant relationship between, depression/ hopelessness and violence. This is shown by the goodness of fit, test of parallel lines tests below. Those teenagers that are depressed also have safety concerns in school, are bullied or bully others, and also carry weapons to school. This explains why gun violence has become more rampant in schools (CDC, 2019). Therefore, the more the cases of depression among teenagers the more gun violence in schools and vice versa. The significance levels on the following tables is .000 as seen on the (Tables 9-11) below. Since the value is way below the P value; it shows that those children that are depressed can be violent to themselves and those around them. Unlike those who are not depressed.

Table 9

Case Processing showing depression and Violence

		N	Marginal Percentage
Sad and hopeless	Yes	3326	37.1%
	No	5643	62.9%
Carried a gun to school	0 days/ month	8627	96.2%
Number of days one carried guns to school in a month(days/month)	1day/ month	95	1.1%
	2-3 days/ month	83	0.9%
	4-5 days/ month	38	0.4%
	6 or > /month	126	1.4%
Safety concern at school	o days/ month	8267	92.2%
	1 day/month	363	4.0%
Number of days participants were worried about safety concerns in school(days/month)	2-3 days/ month	228	2.5%
	4-5 days/ month	43	0.5%

Case Processing showing depression and Violence

		N	Marginal Percentage
	6 or more days/ month	68	0.8%
Threatened at school	0 times/ year	8344	93.0%
Number of times threatened at school (number of times/ per year). Rangers from (0 times, 11 or more times a year).	1 time/ year	312	3.5%
	2-3/ year	174	1.9%
	4-5 times/ year	54	0.6%
	6-7 times/ year	22	0.2%
	8-9 times/ year	14	0.2%
	10-11 times/ year	6	0.1%
	11 0r more times/ year	43	0.5%
Bullied at school	yes	1768	19.7%
	No	7201	80.3%
Valid		8969	100.0%
Missing		1940	
Total		10909	

Table 10

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1117.925			
Final	328.742	789.183	16	.000

Note. Table 10 above shows the significance level of 0.000. This shows a significant association between depression and violence.

Relationship between depression and suicide among teenagers

From the tables below we see that there is a significant relationship between, depression/ hopelessness and suicide. This is shown by the goodness of fit, test of parallel lines tests below. Those teenagers that are depressed also have safety concerns in school, are bullied or bully others, and also carry weapons to school. They have also attempted injurious suicide. This is a big threat them and those around them. This explains why gun violence and suicidal thoughts and cases have become more rampant in schools (CDC, 2019). Therefore, the more the cases of depression among teenagers the more gun violence in schools, suicidal thoughts and cases and vice versa. The significance levels on the following tables are .000 as seen on the (Tables 11-14 below). Since the value is way below the *P* value; it shows that those children that are depressed can be violent to themselves and those around them. Unlike those who are not depressed.

Table 11

Crosstab Showing Attempted Suicides

		Attempted suicide (Number of times suicide attempted rages from 1 to 5).											
		0 times		1 time		2-3 times		4-5 times		5 or more		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Sad and hopeless	Yes	2522[a]	33.3%	373[b]	77.7%	229[c]	89.8%	36[c, d]	92.3%	40[b, d]	78.4%	3200	38.1%
	\No	5056[a]	66.7%	107[b]	22.3%	26[c]	10.2%	3[c, d]	7.7%	11[b, d]	21.6%	5203	61.9%
Total		7578	100.0%	480	100.0%	255	100.0%	39	100.0%	51	100.0%	8403	100.0%

Note. Each subscript letter denotes a subset of Attempted suicide categories whose column proportions do not differ significantly from each other at the .05 level. a stands for White, b Black,, c American Indians, d Asian, and e others.

Table 12

Chi-Square Tests Suicide and Depression

	Value	df	P-value
Pearson Chi-Square	766.892[a]	4	.000
Likelihood Ratio	773.835	4	.000
Linear-by-Linear Association	619.418	1	.000
N of Valid Cases	8403		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.85.

Table 13

Crosstab Injurious suicide attempt

	Did not attempt injurious suicide		Yes it did lead to injury		Did not lead to injury		Total	
	N	%	N	%	N	%	N	%

Sad and hopeless	Yes	2140_a	33.7%	160_b	92.5%	406_b	88.3%	2706	38.8%
	No	4209_a	66.3%	13_b	7.5%	54_b	11.7%	4276	61.2%
Total		6349	100.0%	173	100.0%	460	100.0%	6982	100.0%

Each subscript letter denotes a subset of Injurious suicide attempt categories whose column proportions do not differ significantly from each other at the .05 level.

Table 14

Chi-Square Tests Injurious results

	Value	df	P-value
Pearson Chi-Square	753.573[a]	2	.000
Likelihood Ratio	783.110	2	.000
Linear-by-Linear Association	687.770	1	.000
N of Valid Cases	6982		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 67.05.

Research Question 1

Research Question 1 was: Is there a relationship between screen time (amount of time spent on the screen) and depression/anxiety in teenagers between ages 13-17 in the United States? To assess this research question, I used logistic regression for analysis. An alpha of .05 was used for the analyses, indicating a 95% confidence interval. The analyses were two-tailed tests. Both tests helped to detect an association between screen time and anxiety/depression among the participants. The analysis showed a significant relationship. The goodness of fit is significant .000, suggesting that the more hours the participant spent on the screen, the more signs of anxiety /depression they demonstrated. Therefore, we accept the H1 that there is a statistically significant association between screen time and depression/anxiety among teenagers between the age of 13-17 both black and white in the USA.

Further, I conducted F Test for heteroskedasticity using dependent variable depression and independent variable screen time and the results indicated a valid diagnostic while performing the logistic regression analysis. In other words, it gave me an idea of how well my model fits my data ($p < .001$, $F = 29.192$, Table 15 below)

Table 15

F Test for Heteroskedasticity[a,b,c]

F	df1	df2	Sig.
29.192	1	10909	.000

a. Dependent variable: Sad and hopeless
b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

Table 16

Case Processing Summary For Screen Time

		N	Marginal Percentage
Sad and hopeless	Yes	4001	36.7%
	No	6908	63.3%
Television watching/Screen time Numbers of hours on screen per day ranging from no TV watching to 5/hrs or more per day.	No TV	3060	28.1%
	< 1 hr/day	2260	20.7%
	1 hr/day	1587	14.5%
	2 hrs/day	1794	16.4%

Case Processing Summary For Screen Time

		N	Marginal Percentage
	3hrs/day	1068	9.8%
	4hrs/day	484	4.4%
	5 hrs or more/ day	656	6.0%
Valid		10909	100.0%
Missing		0	
Total		10909	

Table 17

Parameter Estimates for Number of Hours Watching Television or on Screens per day on Depression.

						Odds	95% Confidence Interval for Exp(B)	
Hours per day	B	Std. Error	Wald	df	p-value	ratio	Lower	Upper
Intercept	.336	.073	21.079	1	.000			
1 hour	.113	.081	1.963	1	.161	1.120	.956	1.312
2 hours]	.291	.084	12.012	1	.001	1.338	1.135	1.577
3 hours	.356	.089	16.130	1	.000	1.427	1.200	1.698
4 hours	.247	.086	8.177	1	.004	1.280	1.081	1.515
5 hours]	.134	.094	2.062	1	.151	1.144	.952	1.374
6 hours	.127	.114	1.249	1	.264	1.135	.909	1.418
7 hours	0[b]	.	.	0	.	.	.	.

Note. a. The reference category is: sad and hopeless

b. This parameter is set to zero because it is redundant.

Results

All of the odd ratios (ORs) on table 17 above are more than 1. This means that that the odds of TV watching/screen time in each of the risk levels were more than the odds of depression (sad and hopeless) in the reference level. In other words, if the OR is more than 1, then TV watching/screen time and sad/hopeless/depression are positively associated, and the presence of one event increases the odds of the other event. It also appears to have been no one in the category or categories above 6 hours, so no inference can be made since no parameter was calculated. Looking at the odd ratios above, we can conclude that those teenagers who spend more time on the screen are more prone to depression especially between 2-4 hours a day. Screen time between 2- 4 hours is statistically significant since the significant values above are below the value 0.05.To elaborate further by looking at the odd ratios above, for every 2-4 hours spent on screen, the level of sadness and hopelessness increases by 1.338, 1.427, 1.280, respectively; meaning that screen time increases the level of sadness and hopelessness in teenagers. In other words, the odds of outcome depression (sad and hopeless) among those with risk factor long screen time of 2, 3, and 4 hours per day are 1.338, 1.427, 1.280 more times (respectively) the same odds among those without risk factor long screen time .

Research Question 2

Research Question 2 was: Is there a relationship between video games and depression/anxiety in teenagers between ages 13-17 in the United States? RQ2. Is there a relationship between video games and depression/anxiety in teenagers between ages 13-

17 in the United States? To assess Research Question 2, I conducted a chi-test as bivariate analysis test. The analyses results indicated a statistically significant relationship between the variables video gaming and sadness/hopelessness since the significance values are.000 which is below the p-value 0.05.

Table 18

Chi-Square Tests Showing Association Between Depression and Video Gaming

	Value	df	P-value
Pearson Chi-Square	200.364[a]	6	.000
Likelihood Ratio	198.623	6	.000
Linear-by-Linear Association	120.317	1	.000
N of Valid Cases	10909		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 468.91.

Using binomial logistic regression (on Table 19 below), we see that the results are statistically significant since the significant value is below the P- value 0.05. This indicates that, overall, the regression model is statistically significant. In other words, the regression model statistically and significantly predicts the outcome variable, meaning that video gaming increases the level of sadness and hopelessness in teenagers. Exp (B) is more than 1. In other words, if the Exp (B) is more than 1, then video gaming and sad/hopeless/depression are positively associated, and the presence of one event video gaming increases the odds of sadness/hopelessness by 1.713 times.

Table 19

Variables in the Equation on Video Games

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.538	.018	872.773	1	.000	1.713

Table 20

Model Summary on Video Games

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.124[a]	.015	.015	.479

a. Predictors: (Constant), q80=7.0, q80=6.0, q80=3.0, q80=2.0, q80=4.0, q80=5.0

Note: Q80 above is video gaming question and the number of hours spent on video gaming.

Table 21

Model Summary Results on Video Games

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.124[a]	.015	.015	.47882	.015	33.900	6	12946	.000

a. Predictors: (Constant), q80=7.0, q80=6.0, q80=3.0, q80=2.0, q80=4.0, q80=5.0

Results for Table 21 Above

The model table above provides the *R* and R^2 values. The *R* value represents the simple correlation and is 0.124 (the "R" Column), which indicates a high degree of correlation. The R^2 value (the "R Square" column) indicates how much of the total variation in the dependent variable, sad and hopeless, can be explained by the independent

variable, video gaming. In this case, 15% can be explained. The significance level above is .000 which is statistically significant. Therefore, there is a statistically significant association between depression and video gaming in teenagers. The more hours teenagers participate in video games the more they feel sad and hopeless. The less ours they play video games the less they feel sad.

Table 22

Parameter Estimates Showing association between Video Gaming and Depression

Q25=1 Sad and hopeless/ Depression[a]		B	Std. Error	Wald	df	p-value	Odds ratio	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
.Q80 computer use/ video gaming/ hrs/day	Intercept	.130	.039	10.991	1	.001			
	[Computer use / video gaming=1hr/day]	.501	.058	73.598	1	.000	1.650	1.472	1.850
	[Computer use / video gaming=2hrs/day]	.608	.069	76.943	1	.000	1.837	1.603	2.104
	[Computer use / video gaming=3hrs/day]	.740	.072	105.887	1	.000	2.097	1.821	2.414
	[Computer use / video gaming=4hrs/day]	.637	.062	105.067	1	.000	1.892	1.675	2.137
	[Computer use / video gaming=5hrs/day]	.448	.061	53.878	1	.000	1.565	1.389	1.764
	[Computer use / video gaming=6hra/day]	.154	.069	5.018	1	.025	1.167	1.020	1.336
	[Computer use / video gaming=7]	0[b]	.	.	0	.	.	.	.

a. The reference category is: sad and hopeless

b. This parameter is set to zero because it is redundant.

Results For Table 22 Above

On table 22 above, all of the odd ratios (ORs) are more than 1. This can be interpreted as showing higher risk of (hours spent in video gaming) as compared with the

reference category (depression/sad and hopeless). This means that that the odds of video gaming in each of the risk levels were more than the odds of depression (sad and hopeless) in the reference level. In other words, if the OR is more than 1, then video gaming and sad/hopeless/depression are positively associated, and the presence of video gaming increases the odds of depression (sad and hopeless). It also appears to have been no one in the category or categories above 7 hours, so no inference can be made since no parameter was calculated. Looking at the Exp (B) results above, we can conclude that those teenagers who spend more time on video games are more prone to depression especially between 1-6 hours a day. To elaborate further by looking at the Exp (B) above, for every 1-6 hours spent on screen, the level of sadness and hopelessness increases by 1.650, 1.837, 2.097, 1.892, 1.565,and 1.167 respectively; meaning that video gaming increases the level of sadness and hopelessness in teenagers. In other words, the odds of outcome depression (sad and hopeless) among those with risk factor video gaming of 1-6 hours per day are 1.650, 1.837, 2.097, 1.892, 1.565,and 1.167 times more (respectively); the same odds among those without risk factor video gaming between 1- 6 hours a day. We can also see that the results is statistically significant since the significant values above are below the value 0.05.Here, $p < 0.01$, which is less than 0.05, and indicates that, overall, the regression model statistically significantly predicts the outcome variable (i.e., it is a good fit for the data). Secondly, the model table above provides the R and R^2 values. The R value represents the simple correlation and is 0.124 (the "R" Column), which indicates a high degree of correlation. The R^2 value (the "R Square" column) (21 & 23 above) we are able to show how much of the total variation in

the dependent variable, sad and hopeless, can be explained by the independent variable, video gaming. In this case, 15% can be explained. From this study we learn that 15% of the population who are involved in video gaming for more than 5 hours a day has negative impact when it comes to depression. The more hours teenagers spend on video games the more they get sad and hopeless. Finally, by looking at the Chi-square results on (table 18 above) the P-value is .000 which is statistically significant. Therefore, we can conclude that there is a statistically significant association between depression and video gaming in teenagers. The more hours teenagers participate in video games the more they feel sad and hopeless. The fewer hours they play video games the less they feel sad. To elaborate further by looking at the (odds ratio) results of those who played video games for 1-6 hours; their odds ratio results is 1.650, 1.837, 2.097, 1.892, 1.565,and 1.167 respectively. This means that, every time a teenager plays video games for 1-6 hours, the level of depression increases by 1.650, 1.837, 2.097, 1.892, 1.565, and 1.167 respectively. In other words, the odds of outcome depression (sad and hopeless) among those with risk factor video gaming for 1-6 hours per day are 1.650, 1.837, 2.097, 1.892, 1.565,and 1.167 (respectively) more times likely to develop depression (sad and hopeless) among those without risk factor video gaming.

Research Question 3

Research Question 3 was: Does cyber bullying have a significant relationship with depression among teenagers between ages 13-17 in America? To assess this question, I implemented a chi-squared analysis. A chi-square analyses, and logistic

regression, have shown the results of both significant association between cyber bullying and depression/hopelessness (on tables 23 to 29 below).

Table 23
Sad and hopeless x Electronically bullied at school Cross tabulation

		Electronically bullied at school					
		Yes		No		Total	
total		N	%	N	%	N	%
Sad and hopeless	Yes	1140	65.9%	2861	31.2%	4001	36.7%
	No	591	34.1%	6317	68.8%	6908	63.3%
Total		1731	100.0%	9178	100.0%	10909	100.0%

Table 24
Chi-Square Tests for Cyberbullying and Depression

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	754.407[a]	1	.000		
Continuity Correction[b]	752.914	1	.000		
Likelihood Ratio	727.084	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	754.338	1	.000		
N of Valid Cases	10909				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 634.86.

b. Computed only for a 2x2 table

Table 25

Symmetric Measures for Depression and Cyberbullying

			Asymptotic		Approximate
		Value	Standard Error[a]	Approximate T[b]	Significance
Nominal by Nominal	Phi	.263			.000
	Cramer's V	.263			.000
Ordinal by Ordinal	Gamma	.620	.017	25.047	.000
	Spearman Correlation	.263	.010	28.466	.000[c]
Interval by Interval	Pearson's R	.263	.010	28.466	.000[c]
N of Valid Cases		10909			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Results

Tables 24 and 25 above show the significance value of 0.000. Since this value is way lower than 0.01 then; we can conclude that there is a statistically significant association between cyber bullying and depression. Those teenagers who are cyber bullied are more likely to be sad and hopeless unlike those who are not cyber bullied**.**

Using regression for cyber bullying and depression

Table 26

Model Summary[c] Showing Association Between Depression and Cyberbullying

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.256[a]	.066	.065	.466
2	.257[b]	.066	.066	.466

a. Predictors: (Constant), bullied
b. Predictors: (Constant), bullied, not bullied
c. Dependent Variable: Sad and hopeless

Results

The model summary table above provides the *R* and R^2 values. The *R* value represents the simple correlation and is 0.256 for those who are bullied and .257 for those who were not bullied (the "R" Column), which indicates a high degree of correlation. The R^2 value (the "R Square" column) indicates how much of the total variation in the dependent variable, sad and hopeless, can be explained by the independent variable, cyber bullying. In this case, 66 % for those who were bullied and not bullied can be explained.

Table 27

Variables in the Equation Showing those Electronically Bullied in School

		B	S.E.	Wald	df	P-value	Odds ratio
Step 1[a]	Electronically bullied at school	1.421	.050	801.670	1	.000	4.139
	Constant	-2.056	.094	478.532	1	.000	.128

a. Variable(s) entered on step 1: Electronically bullied at school.

Results

Variables in the Equation table above shows a significant value of 0.000. This can be interpreted that there is a significant association between depression and cyber

bullying. Here, p <0.01, which is less than 0.05, and indicates that, overall, the regression model statistically significantly predicts the outcome variable (i.e., it is a good fit for the data).This means that those who bullied tend to get more depressed unlike their counterparts who are not bullied. The odds ratio of those who are bullied is 4. 139. By looking at the this odds ratio, every time a teenager is cyber bullied the level of sadness increases 4 times; compared to those who are not bullied. In other words, the odds of outcome depression (sad and hopeless) among those with risk factor cyber bullying are. 4 times more likely to develop depression unlike those without risk factor cyber bullying.

Table 28

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	not_bullied	.115[b]	2.422	.015	.021	.031

a. Dependent Variable: Sad and hopeless
b. Predictors in the Model: (Constant), bullied

Table 29

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.35	1.69	1.63	.124	10909
Residual	-.687	.654	.000	.466	10909
Std. Predicted Value	-2.315	.435	.000	1.000	10909
Std. Residual	-1.474	1.403	.000	1.000	10909

a. Dependent Variable: Sad and hopeless

Research Question 4

Research Question 4 was: Is there a relationship between the three independent variables above (screen time, video games and cyber bullying) and depression/anxiety in

teenagers between ages 13-17 in the USA? To determine whether there is a significant relationship between the independent variables in the above three research questions, and depression in teenagers between ages 13-17, I performed binomial logistic regression and a chi –square for the bivariate test. The results are statistically significant for the relationship between the 3 independent variables with depression while controlling for age, sex, and race (Table 33 below).

Table 30

Model Fitting Information for Independent Variables and Depression

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	7104.199			
Final	5783.528	1320.671	24	.000

Results

The results of the chi-square test above is statistically significant because the significance level is.000 which is way below the P-value .05. Therefore, there is statistically significant relationship between the 3 independent variables and the dependent variable while controlling for age, sex, and race (Table 30).

Table 31

Model Summary for Independent Variables and Depression

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	14474.776[a]	.110	.151

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Results

Nagelkerke R Square on table 31 above shows that this logistic regression model can explain 15.1% of the relationship between the three independent variables (screen time, video gaming and cyber bullying) in the research questions and dependent variable (depression/sadness and hopelessness) in teens between 13-17 years old, both black and white in America when controlling for age, sex and race.

Table 32

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.914	8	.546

Results for Table 32 Above

I also performed Hosmer and Lemeshow Test in logistic regression to test the goodness- of- fit of the model. Significance level on table 32 above is .546 (non-statistically significant) because it is above the p-value significance level.005. This is expected in Hosmer and Lemeshow Test to indicate the goodness -of -fit of this model.

Table 33

Variables in the Equation Showing Association Between the three Independent Variables, age, Race, and Depression

							Odds	95% C.I.for EXP(B)	
		B	S.E.	Wald	df	P-value	ratio	Lower	Upper
Step 1[a]	How old are you			34.741	5	.000			
	Age 13 yrs	.151	.578	.068	1	.043	1.163	.375	3.609

Variables in the Equation Showing Association Between the three Independent Variables, age, Race, and Depression

	B	S.E.	Wald	df	P-value	Odds ratio	95% C.I.for EXP(B) Lower	Upper
Age 14yrs	.352	.081	18.863	1	.000	1.423	1.213	1.668
Age 15yrs	.293	.070	17.547	1	.000	1.341	1.169	1.538
Age 16yrs	.104	.069	2.292	1	.130	1.110	.970	1.270
Age 17yrs	.146	.071	4.248	1	.039	1.157	1.007	1.330
Sex (1) F	.812	.041	384.161	1	.000	.444	.409	.482
Electronically bullied at school (1)Yes	1.322	.056	561.843	1	.000	.723	.239	.297
Television watching/Screen time none			22.198	6	.001			
Television watching/Screen time(less than 1/day	-.072	.090	.649	1	.420	.930	.780	1.109
Television watching/Screen time(1hr/day)	.145	.094	2.379	1	.123	1.157	.961	1.391
Television watching/Screen time(2 hr/day)	.180	.100	3.281	1	.070	1.198	.985	1.456
Television watching/Screen time(3/hrs/day)	.099	.097	1.042	1	.307	1.104	.913	1.334
Television watching/Screen time(4hrs/day)	.002	.104	.001	1	.018	1.998	.814	1.222
Television watching/Screen time(5hrs or more /day)	.081	.125	.419	1	.017	1.084	.849	1.384
Computer use / video gaming no gaming			151.968	6	.000			

Variables in the Equation Showing Association Between the three Independent Variables, age, Race, and Depression

	B	S.E.	Wald	df	P-value	Odds ratio	95% C.I.for EXP(B) Lower	Upper
Computer use / video gaming(less than 1hr/day)	.636	.065	94.693	1	.000	1.888	1.661	2.146
Computer use / video gaming(1/hrs/day)	.540	.077	48.515	1	.000	1.715	1.474	1.997
Computer use / video gaming(2hrs/day)	.608	.080	57.472	1	.000	1.836	1.569	2.149
Computer use / video gaming(3hrs/day)	.562	.069	65.545	1	.000	1.754	1.531	2.010
Computer use / video gaming(4hrs/day)	.347	.068	26.194	1	.000	1.415	1.239	1.616
Computer use / video gaming(5 hrs or more/day)	.092	.077	1.449	1	.029	1.097	.944	1.275
Race			52.163	5	.000			
Race Others	.149	.218	.350	1	.554	1.138	.742	1.744
Race Black	.391	.128	11.357	1	.001	1.539	1.198	1.977
Race white	.506	.102	20.876	1	.000	1.594	1.305	1.946
Race Asians	.199	.300	.438	1	.508	1.220	.677	2.198
Race American Indians	.322	.092	13.933	1	.000	1.408	1.176	1.685
Constant	.305	.131	5.464	1	.019	1.357		

a. Variable(s) entered on step 1: How old are you, What is your sex, Electronically bullied at school, Television watching/Screen time, Computer use / video gaming, race.

The odd ratios (ORs) on table 33 above are more than 1 in teens between 13-17 years. The ORs for those who do video gaming for more than 1 hour a day is also more than 1.The same case applies to TV watching (screen time). When it comes to race, black, white and American Indians also have ORs more than 1.This means that the odds of TV watching/screen, video gaming, and cyber bullying in each of the risk levels were more than the odds of depression (sad and hopeless) in the reference level. For instance, the table shows that the odds of having depression are .444 times greater for females as opposed to males. While the odds of having depression/sadness and hopelessness is .723 times greater for those who are cyber bullied as opposed to those who are not cyber bullied. In other words, if the ORs are more than 1, then TV watching/screen time, video gaming and cyber bullying and sad/hopeless/depression are positively correlated, and the presence of one of the three independent variable event increases the odds of dependent variable (sadness and hopeless/depression). Looking at the odd ratios above, we can conclude that those teenagers who spend more time on the screen, plays video games, and are also cyber bullied, are more prone to depression especially among teenagers between ages13-17 both black and white in America; than those who are not exposed to these risk factors.

Conclusion of the research questions results

From the research questions analysis above, this study has shown a significant relationship between depression and screen time, video gaming and cyber bullying. We have also analyzed the YRBS, 2019 data that addresses suicide and violence to see if depression leads to suicide and violence results in teenagers. The results show that those

teenagers that are depressed are also prone to suicide and violence and suicide (see results on tables 9-10 & 11-14 respectively). This is also discussed in chapter 5 as adverse effects of depression in teenagers. With these results, we can now explain why there has been an increase in anxiety, depression, suicide, and violence in teenagers in the USA in the last 5 years (CDC, 2019).

Summary

The purpose of this study was to determine how the association between screen time, cyber bullying, playing video, or computer games or other nonacademic computer use (watching online videos, using social network sites, chatting, and browsing websites) and depression (a feeling of hopelessness and loneliness) among American teenagers. To determine the relationship between (Q25) depression as the dependent variable and screen time (Q79) as the independent variable. I conducted both chi -square and binomial logistic regression showed great significant relationship between (Q79) hours spent on the screen and depression (Q25). On table 18 above, (RQ1) screen time between 2- 4 hours is statistically significant since the significant values above are below the value 0.05.To elaborate further by looking at the odd ratios above, for every 2-4 hours spent on screen, the level of sadness and hopelessness increases by 1.338, 1.427, 1.280, respectively; meaning that screen time increases the level of sadness and hopelessness in teenagers. To assess associating between (RQ2) video gaming (Q80) and depression (Q25), I conducted logistic regression for the analysis. On table 25 above, all of the odd ratios (ORs) are more than 1. This can be interpreted as showing higher risk of (hours spent in video gaming) as compared with the reference category (depression/sad and

hopeless). For (RQ3) cyber-bullying logistic regression was performed and the odds ratio of those who are bullied is 4. 139. This means that, every time a teenager is cyber bullied the level of sadness increases 4 times; compared to those who are not bullied (Table 27 above). For the (RQ4) all the three independent variables are combined, to see if there is a significant relationship between them and depression when controlling for age, sex and race. Logistic regression was used and the results shows significant relationship between independent variables and the dependent variable see results (on table 33 above). More results (on tables A13-A14).

I proposed logistic regression with depression/anxiety (Q25) as the dependent variable, bullying (yes vs. no) as the independent variable, and age, sex, and race (White vs. other) as the covariates. Prior to analysis, I assessed the assumptions of the logistic regression—statistical relationships between the covariates and the dependent variable test of parallel lines, and adequate cell count. Examining the statistical relationships between the dependent variable (depression/anxiety) and the control variables (age, sex, and race) yielded statistically significant findings. Age, sex, and race were appropriate as covariates in the regression analysis. See results on (tables 1-7). The test of parallel lines assumption assesses whether there is a significant difference between the models with the regression lines constrained to be parallel for each level of the dependent variable (depression/anxiety). The results of the test of parallel lines were significant. Therefore, the null hypothesis; cyber bullying, does not have a significant relationship with anxiety/depression among teenagers between ages 13-17 in the US can be rejected.

Study Results

The demographics of this student population (N = 10,909) included 26% of students who were 16 years of age, the number of participants while 13-year-old had 0.1% the least number of participants. There was a small gender difference of participants, with 47% males and 53% females. White middle school students made up greatest percentage of the participants, with (68%) participants. Hispanic/Latino was (26%) while 74% where non-Hispanic/Latino 74% as summarized in Table 1.

Research Question 1 was the following: "Is there a relationship between screen time (amount of time spent on the screen) and depression/anxiety in teenagers between ages 13-17 in the United States? To assess or answer the above research question, I conducted Chi-square, and logistic regression. I conducted the logistic regression to detect an association between screen time and depression among the participants. The analysis showed a significant regression, suggesting that students who spent long hours on the screen tended to be more prone to anxiety or depression. I conducted the chi square analysis to detect differences in the degree of anxiety/depression by hours spent on the screen. The Chi square test showed a significant difference in hours spent on the screen by level of anxiety/depression on the participants. This test was also significant; indicating those participants who spent 2 hours on screen had less signs of (anxiety/depression as shown on chapter 2) than those who spent more than 4 hours on screen a day. I conducted the logistic regression with anxiety/depression as the dependent variable, screen time as the independent variable, and age, sex, and race as the covariates. This test was significant, indicating that, after controlling for age, sex, and race, long

screen time predicted signs of anxiety/depression among teenagers. For those participants who had less than 1 hour of screen time, there is a decrease in the log odds of being depressed or anxious. The results also indicated that for those participants who had more than 4 hours of screen time, there is an increase in the log odds of being depressed or anxious. For this reason, I rejected the null hypothesis— long screen time, does not have a significant relationship with depression/anxiety in teenagers between the age of 13-17 in the US. Research Question 2 was the following: "Is there a relationship between video gaming and depression/anxiety in teenagers between ages 13-17 in the United States? To assess or answer research question 2, I conducted binomial logistic regression which showed to detect an association between video and depression among the participants. The analysis showed a significant negative association, suggesting that students who spent long hours on video games tended to be more prone to anxiety or depression. I also conducted a chi –test which showed that the more hours participants spent time on video games, the more anxious/depressed they became. Since the significant value is 0.000, we reject the HO and accept the H1 that there is a significant association between depression and video gaming. To determine where the statistical differences lay in the second research question, I used binomial logistic regression. The odds of outcome depression (sad and hopeless) among those with risk factor video gaming for 1-6 hours per day are 1.650, 1.837, 2.097, 1.892, 1.565,and 1.167 (respectively) more times likely to develop depression (sad and hopeless) among those without risk factor video gaming (table 22). Results are statistically significant at .000. Since the significant value is 0.000, we reject the HO and accept the H1 that there is a significant relationship between depression and

video gaming. Additionally, I conducted the logistic regression with anxiety/depression as the dependent variable, video games as the independent variable, and age, sex, and race as the covariates. This test was significant, indicating that, after controlling for age, sex, and race, video games predicted signs of anxiety/depression among teenagers. For those participants who had less than 1 hour of video games, there is a decrease in the log odds of being depressed or anxious. The results also indicated that for those participants who had more than 3 hours of video games, there is an increase in the log odds of being depressed or anxious. For this reason, I rejected the null hypothesis— video games, does not have a significant relationship with depression/anxiety in teenagers between the age of 13-17 in the US. Research Question 3 was the following: "Is there a relationship between cyber bullying and depression/anxiety in teenagers between ages 13-17 in the USA?" To assess this question, I proposed a chi-square analysis and binomial logistic regression. I used the chi-square analysis to detect a relationship between cyber bullying and depression. The chi-square analysis conducted to assess the relationship between anxiety/depression and cyber bullying was significant. A small number of participants indicated they were not bullied and yet had signs of anxiety/depression (as indicated on chapter 2). This was unexpected since this point out that there is another cause of depression rather that cyber bullying. On the other hand, more participants than expected indicated they were cyber bullied, and this made them feel depressed and anxious. They also mentioned that they felt like causing harm to themselves, hurting or bullying those who did this to them, had suicidal thoughts and others had attempted suicide (all these are signs of depression as shown on chapter 2 of this study). Fewer participants than

expected indicated they were cyber bullied, but this did not make the anxious. There were more participants indicating they were not bullied and therefore were not anxious or depressed. I conducted chi -square test to determine if there is any significant relationship between anxiety/depression by cyber bullying (yes vs. no). The results of the chi- square were significant, indicating that those participants who were not bullied were happier and did not show signs of anxiety or depression unlike those participants who were bullied (they showed more signs of anxiety /depression). I proposed a binomial logistic regression with depression as the dependent variable, bullying (yes vs. no) as the independent variable, and age, sex and race as the covariates and the results were statistically significant with a significance value .000 which is below the p-value .05. Therefore, I rejected null hypothesis— cyber bullying, does not have a significant relationship with anxiety/depression among teenagers between ages 13-17 in the US. For research question 4 above, I was able to determine a relationship between the three independent variables above (screen time, video games and cyber bullying) and depression/anxiety in teenagers between ages 13-17 in the USA. To determine whether there is a significant relationship between the independent variables in the above three research questions, and depression in teenagers between ages 13-17, I performed binomial logistic regression. The results were significant ($p<.05$) for the relationship between the 3 independent variables with depression while controlling for age, sex, and race (Table 33 above). Further, significant relationship between depression, as a result of long screen time, video gaming and cyber bullying in teenagers in particular groups of age 13-17 yrs, males and females, and both black and white in the USA (Tables 30-33

above). Chapter 5 contains a summary and interpretation of findings and concludes with implications for social change and recommendations for further study.

Chapter 5: Discussion, Conclusions, and Recommendation

The main goal of this study was to test the relationships between depression among teenagers in the United States and cyberbullying, screen time, and video gaming. Four research questions were examined for this study. The first question was, is there a relationship between screen time (amount of time spent on the screen) and depression/anxiety in teenagers between ages 13-17 in the United States? The second question was, is there a relationship between video gaming and depression/anxiety in teenagers between ages 13-17 in the United States? The third question was, is there a relationship between cyber bullying and depression/anxiety in teenagers between ages 13-17 in the United States?

A key finding of this study from Research Question 1 is that exposure to long screen time had a statistically significant positive association with anxiety and depression among teenagers in the US. The key finding from Research Question 2 was that there was a statistically significant positive association between video gaming and anxiety and depression in teenagers. There was also positive association between depression and violence. Another key finding from Research Question 3 was that there was a statistically significant positive association between cyberbullying and anxiety and depression in teenagers. The presence of cyberbullying was also associated with self-harm, violence, suicidal thoughts and attempting suicide.. Moreover, having been electronically bullied was a statistically significant factor in being the perpetrator of bullying others. Finally, a key finding from Research Question 4 was that there was a statistically significant positive association between depression and the three independent variables. The three

valuables (cyberbullying, long screen time, and video gaming) increase the level of anxiety and depression in teenagers.

Interpretation of the Findings

After analysis of secondary data from the 2019 YRBSS survey using binomial logistic regression for multivariable analysis and chi-square for bivariate analysis (because my independent variables [IVs] were categorical and the dependent variable [DV] was also categorical), I found a positive association between depression in teenagers and screen time, cyberbullying and video gaming. This confirmed findings from a study by Hinduja & Patchin (2018) which showed that victims of cyberbullying are more likely to feel depressed, lonely, and anxious more than their nonvictimized counterparts. There was also a connection between depression and violence and self-injury (those subjects who present with symptoms of severe depression also are involved in violence and self-injury, and suicide attempts). Youth violence was measured by the variables of violence or violent behaviors from the 2019 YRBSS (carrying a weapon, physical fighting, and physical fighting with injuries, bullying others). After examining the results, I found a statistically significant positive relationship between long screen time and depression among teenagers. I also found statistically significant positive association between video gaming and depression among this age group. This finding confirmed the research of video game use and aggressive outcomes (Anderson et al. 2016). Although the effect sizes reported are all similar according to this study, (0.19, 0.15, 0.08, and 0.16, respectively), the interpretations of these effects varied (APA, 2016). It also supports a study by Serena (2019) which found that children who are more

likely to become addicted to video games (the researchers call "pathological" video gaming) are those who spend a lot of hours playing these games, have trouble fitting in with other kids, and are more impulsive than those children who are not addicted (Serena, 2019). Anderson et al. (2016) found that exposure to violent video content especially for long hours increased the potential for negative outcomes, thus supporting the need to minimize the amount of time engaged in video gaming. Anderson et al. (2016) also examined research that showed a link between playing video games and aggression. They concluded that media that encourages positive socialization can be helpful for teenagers but long hours in video gaming can be deleterious to the social well-being of teenagers between the ages of 13-17. The greater the exposure to video gaming, the greater the risk for anxiety and depression, and aggressive behavior like self-inflated injuries and hurting other people (Anderson et al., 2016). This finding held true in this study, which analyzed the association between suicidal thoughts (see Tables 11-14 and Tables B1-B11); violence (see Tables 9-10 and Tables B12-B16); and depression, video gaming, screen time, and cyberbullying among teenagers (Tables A1-A18). The binomial logistic regression for Research Question 1 showed some level of association between long screen time and depression in teenagers (see Table 17). Research Question 2 also showed some level of association between video gaming and depression in teenagers. Logistical regression and chi-square results showed a statistically significant positive association between video gaming and depression in teenagers. According to Lee et al. (2017) playing nonacademic video games for 5 or more hours per day has significant impact on teenagers when it comes to anxiety and depression. Our new study has also

been able to show significant association between video gaming and depression in teenagers between 13-17 years (see Table 22 above). Analysis of Research Question 3 showed some level of association between cyber bullying and depression in teenagers (Table 27). This finding supports the assertion that young people require support because of the stress that personal victimization such as cyber bullying can create (Wade et al., 2015). Critical attention to the association between long screen time, cyber bullying and teenage depression is very important when creating programs that include teenagers, family and social networks, hospitals, schools, and youth programs that reduce the impact of cyber activity among teenagers (LeBlanc et al., 2015). Depression and anxiety among teenagers are not a result of a single variable (Anderson et al., 2016); therefore, finding an association between long screen time, cyber bullying and video gaming and depression/anxiety among teenagers may be a catalyst for further discussion on prevention of the same. Finally, analysis of Research Question 4 showed some level of association between independent variables and dependent variable when controlling for age, gender, and race. Looking at the odds ratio (on table 33 above), we can conclude that those teenagers who spend more time on the screen, plays video games, and are also cyber bullied, are more prone to depression especially among teenagers between ages13-17 both black and white in America; than those who are not exposed to these risk factors.

Theoretical Framework

Maslow's safety component, used as the theoretical framework for this study, may suggest that teenagers who are bullied severely may feel threatened; therefore,

he/she may watch turn out to be violent, get depressed or anxious, or bully others to revenge. Those effects would be the most probable outcome following bullying conditions, from the previous literature, Bandura's (1999, as cited in the "Social Cognitive Theory," 2010) SCT suggested that teenagers who observes bullying is more likely to bully. This behavior may lead to self-inflated-injuries, injuries to other people, depression, anxiety, and other adverse effects like suicide or suicidal thoughts. Although in the study I only quantified the variable bullying, the possibility of one learning how to bully and imitating those behaviors are more likely from the findings. The findings relate bullying, violence and depression in this theory. Although this is not fully quantified in the study; the likelihood of a teenager being bullied and becoming a bully themselves are more likely, according to this theory. This relationship may only exist by accepting and conducting more studies of those bully-victims who have become bullies themselves.

Limitations of the Study

The YRBSS elicited self-reported data that do not allow the researcher to account for over/under reporting of teenagers' behavior. The use of data from a sample based in a school setting does not allow for inclusion of teenagers behavioral health risks from those who are home schooled or absent on the day the survey was administered. Only those who had parental participation permission were allowed to take the survey. This means that not everyone was able to participate; hence limiting students' participation. This study was further limited by the data that was missing. Those students who never completed answering all the survey questions were recorded as missing. With the above limitations, the results may not be an accurate representation of students who fit the

criteria (teenagers between ages 13-17 in the US) for participation. Another limitation is in the way screen time was measured. Assessing screen usage through estimated and self-reported time measurements is inherently flawed by tracking people's computer usage and finding that the raw screen time estimates were seriously overstated or understated. Although this study examined daily screen time and video gaming time, future studies of the impact of media usage might consider using a frequency scale to account for the current habit of quickly checking in with most technology on a phone. Another limitation is the broad categories used in assessing screen time and video gaming. Along the same lines, the current study only assessed raw daily screen time with television, DVDs and video games, but did not assess the content of that screen time.

Recommendations

I recommend that the cross-sectional data for YRBSS from previous years be analyzed for any changes and similarities and compared with 2019 results, which might indicate a difference in behavior from year to year of teenagers between the age of 13-17 in the US. YRBSS should also partner with other organizations such as hospitals and E-learning platforms so that they can get information from those teenagers who do home schooling or take online classes. Those students who were absent during the survey should be given an opportunity to participate in the survey when they get back. By doing this, survey will have more representation and inclusion. The National Institutes for Health (2016) shared guidelines as follows for appropriate screen time: Under the age of 2, there should be no screen time, and over the age of 2, screen time should be limited to 1-2 hours per day (DHHS, 2015; Kaneshiro et al., 2015). Brown, Shifrin and Hill (2015)

called attention to whether this guideline should be altered, given that over 30% of children in the United States are introduced to a mobile device before toilet training begins. Therefore, the National Institutes for Health (2016) guidelines should be revisited since we see children being introduced to gadgets at a very early age. This continues to early childhood and by the time this child is a teenager; he/she is addicted to cyber activity**.** From my study in chapter 3 we also see that; the American Academy of Pediatrics announced in 2013 during a policy statement, "Children, Adolescents, and the Media," from the Kasier Family Foundation study that was conducted in 2010 "The average 8 to 10-year-old spends nearly eight hours a day with a variety of different gadgets (AAP, 2015). Teenagers switch from one gadget to another in a single day. Information and education should be provided to these teenagers, that switching gadget for instance playing video games and then switching to a phone to call friends is all screen time. Therefore, parents and care givers should give this information out there as well as set a good example, that switching gadgets does not mean less time on screen. According to the American Academy of Pediatrics, Growing Up Digital: Media Research Symposium, parents should take an active role in spending time with their children as they engage in media use involving screen time (Brown et al., 2015). Children especially teenagers still require set limits and parental role models; however, because unstructured play time is a time that children are most creative (Brown et al., 2015), these new guidelines should be further researched**.** My study confirmed the need for vigilance in the amount of time teenagers are engaged in long screen time. Surveillance is recommended for the teenagers screen time. Education about media should be implemented in the home

and among constituents who work with teenagers, including enforcing time limits for chatting with friends on social media or playing of video/computer games on an average school day, using media effectively, and helping teenagers exercise self-control when engaging in media use is very crucial**.** This will help in reducing anxiety, depression, violence, and cyber bullying which are mostly associated with long screen, cyber activity in general as demonstrated in this study. Anderson et al. (2016) confirmed that teenagers spend a substantial amount of time engaged in the media. The need for vigilance remains vital, as violent media such as video games, cyber bullying may be accessed during unstructured free time and may be substantially influential during the growing years (Anderson et al., 2016). Some pediatricians recommend parents of school age children to watch TV with them and monitor any computer or screen use (Healthcare.org, 2020). They also say that it is important to balance screen time with other healthy behaviors. They encourage teens to be active 15 minutes for every hour of screen time and she stresses limiting overall screen time to two hours a day, excluding homework (Healthcare.org, 2020).

Implications

From the four research questions above, we see a significant association between video gaming, long screen time, cyber bullying, and anxiety/depression among teenagers between ages 13-17. The analysis done also demonstrates some of the depression adverse effects such as violence, self injury, and suicide. According to (CDC, 2019), suicide is one of the leading causes of deaths among teenagers. Therefore, avoiding factors that lead to depression that can eventually lead to is violence and suicide; is a great step in

reducing mortality rate among this age group (CDC, 2019). In support of the collaborative efforts of Healthy People 2020, CDC, and the U.S. Department of Health and Human Services, local, community and national effort in the US should continue to be centered on decreasing anxiety, and depression among the teenagers between 13-17 years in the US. In using YRBSS 2019 data, the differences among the teenagers may not be captured. The data received were not stratified by where the students lived in the city, what their home setting was like, what other risks the students were exposed to, and what supports were in place. A statistically significant association between long screen time, cyber bulling, and video gaming and the likelihood of anxiety and depression among teenagers is one of the findings from this study. Secondly, cyber bullying was associated with other violence variables such as self-harm, carrying weapons, bullying others in return, engaging in physical fights hence hurting others and themselves (see the results on tables 11-14). I was able to analyze the results of violence as a result of depression and the results are significant (See tables 9-10) Therefore from the results we can comfortably conclude that violence is directly proportional and associated with depression among teenagers aged 13-17 years in America. This YRBSS survey is fully supported by a number of studies in chapter 2 of this study. Some of these studies include those that point out the adverse effects of cyber bullying: - Various studies have shown life threatening consequences of cyber bullying such as self-harm and suicide. Targets of cyber bullying are at a greater risk than others of both self-harm and suicidal behaviors (John *et al.*, 2018). Approximately 18% of youth report self-harming at least once, impacting one in four girls and one in 10 boys (Monto, McRee, & Deryck, 2018). About

6% of students have digitally self-harmed, or anonymously posted online or shared hurtful content about oneself (Patchin & Hinduja, 2017). According to (Hinduja & Patchin, 2018), students who experienced cyber bullying are nearly 2 times more likely to attempt suicide. Current research suggests that suicide ideation and attempts among adolescents have nearly doubled since 2008 (Plemmons *et al.*, 2018), making suicide is the 2nd leading cause of death among teenagers and young adults (CDC, 2017) . Just like these previous studies, I analyzed the YRBS, 2019 data and I had significant results that, those teenagers that are depressed are prone to suicide or suicidal thoughts (tables 11-14) and also more results on tables graph B1 and tables B1- B12 below). Therefore, we can also conclude that depression in directly proportional to suicide and suicidal thoughts. This explains why there had been an increase in violence and suicidal cases among teenagers between ages 13-17 in the last 5 years in America (CDC, 2019). Approximately, one in 20 teenagers experience suicide in single year (Andriessen, Dudley, Draper, & Mitchell, 2019). Self- harm and suicide are adverse effects of anxiety /depression leading to high mortality in this age group. Because of the deleterious impact that long screen time can have on teenagers, it is important to initiate programs that provide structure and sensitivity to all teenagers in the US. In an effort to support social change, encouraging policymakers to implement programs that minimize screen time, address teenager anxiety and depression variables, discourage cyber bullying, and encourage teenage engagement to healthier activities such as games, crafts, camping , fishing, cooking classes just to mention but a few. Such activities will keep them occupied hence do less cyber activities. The launch of such healthy activities or programs

that systematically and holistically address how teenagers occupy free time will reduce unhealthy habits among them. Replacing carrying of weapons, violence, self inflated injuries, or physical fighting (which are associated with depression as we saw earlier), with alternative positive activities would promote a healthy environment for teenagers, their peers, friends, families, and communities where these teenagers reside.

Social-Change Implications

The social-change potential of this study is that understanding the relationship between long screen time, video gaming and cyber bullying may help to prevent teenage anxiety and depression. As previously stated, teenage anxiety/depression rates are increasing in the US. According to the CDC (2018) website, teenage depression and anxiety has gone up by 22%. The main aim of this study was to show that cyber bullying, long screen time, video gaming may lead to anxiety/depression which can lead to complications such as violence, self-inflated injuries, and suicide among teenagers. The outcome in this study is in line with one of the recent studies concerning cyber bullying, violence and screen time in teenagers. The study Keikha, M. et al., 2020, found that children and adolescents who share most of their time on screen are at greater risk for violent behaviors including physical fight, victim and bully. The social-change implication here would be to alert schools, health care providers, public health educators, families, and communities to allow cyber bullying prevention programs, self-inflated injuries prevention programs, suicidal thought and suicide prevention programs, depression and anxiety prevention programs to help in reducing the rate of anxiety and depressive case among teenagers (CDC, 2018). Removing any barriers that may prevent

these programs is also very important. Motivating teenagers to attend these programs is important as well. The social-change implication in this study is the above intervention programs to prevent depression and anxiety among teenagers. Supporting international organization that shed light in this area such as world health organization (WHO) will help to bring more awareness. According to WHO, gaming disorder is defined in the 11th Revision of the International Classification of Diseases (ICD-11) as a pattern of gaming behavior ("digital-gaming" or "video-gaming") characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences (WHO, 2018).According to WHO this is an addictive behavior, result in significant impairment in personal, family, social, educational, occupational or other important areas of functioning if not controlled (WHO, 2018).

Conclusion

This study was focused on a sample (N =10,909) of teenagers between ages 13-17 years who participated in the CDC, YRBSS biennial survey, 2019. This survey solicited self-reported information in four main areas including screen time, depression, video gaming, cyber bullying, violence unintentional injuries and violence. Through the literature review, I learned that adolescents 13-17 years old are a vulnerable population (Anderson et al., 2016). During unstructured free time, some teenagers play video/computer games or are on screen for long hours each day (Brener et al., 2015). I also learned that anxiety and depression among teenagers is most likely in individuals

with other risk factors such as history of cyber bullying or being bullied, low socioeconomic status and status and poor family support (PEW, 2016). After finding that teenagers who spend long hours on screen are susceptible anxiety and depression, I concluded that prevention should focus on positive communication and problem-solving along with minimizing time spent on screens; also noted in the literature and study results (Brown et al., 2015). Having teenagers open up to their parents, teachers, or other guardians on what they go through each day as well as limit their screen time, may be one of the primary prevention efforts that may be helpful in modifying maladaptive behaviors among teenagers. This will also minimize negative peer influence as noted in the literature review and analyzed among the ancillary data. In other words, teenagers require structured free time, adult support, family support and community commitment (CDC, 2018). This study aligns with the overarching goals of (CDC, 2019) to maintain a safe living environment, safe schools, a safe working environment and a safe place for our children and the public at large. Since this has been the focus of this study, it remains important to continue surveillance of the mental, physical and emotional complexities that often accompany teenagers. However, one perspective which has been highlighted as a result of this study is this: some of the teenagers that had long screen time, participated in cyber bullying or were cyber bullied, or engaged in video games especially violent games and for long hours had signs of anxiety or depression. This means that there was a statistically significant association between exposure to cyber bullying, long screen time and video gaming and the likelihood of anxiety and depression among teenagers in the US. The results from this study can help with the visibility of social change as teenagers,

parents, public health, health care providers, agency workers, teachers, social workers, psychologists, and policy makers are consistently educated about the perils or adverse effects of long screen time, cyber bullying and video gaming in teenagers. Through the results of this study, all caregivers, parents and guardians are encouraged to apply constructive support for teenagers who show signs of anxiety and depression or require assistance with conduct, attitude, and learning on the dangers of these variables. Learning that is directed towards discouraging long screen time, cyber bulling, and video gaming among teenagers, and siphoned toward the availability of programs which promote: supporting each other as teenagers, growing in knowledge, learning positive life-long skills such as music and games, reaching toward goals for a better future, promoting love, care, and kindness among teenagers and maintaining the wisdom that decisions and actions of today impact society at-large. It is my sincere hope that with continued efforts from teenagers, parents, teachers, and guardians to limit screen time among teenagers, discouraging cyber bulling, and playing video games all day long (this study has shown 5 or more hours of screen time entertainment (not educational work) a day has depressive effects, therefore, other better ways to spend time and to steer these youth onto the path away from anxiety and depression, are necessary (for instance, playing board games, painting and playing ball games); as teenage anxiety and depression is preventable.

References

American Academy of Pediatrics Committee on Public Education. (2001). Children, adolescents, and television. *Pediatrics, 107*(2), 423-426. https://doi.org/10.1542/peds.107.2.423

American Academy of Pediatrics Council on Communications and Media. (2013). Children, adolescents, and the media. *Pediatrics, 132* (5) 958-961. https://doi.org/10.1542/peds.2013-2656

American Psychological Association, (2015, August). Resolution on violent video games [Press release]. https://www.apa.org/news/press/releases/2015/08/violent-video-games.pdf

American Psychological Association. (2021). *Violence*. http://www.apa.org/topics/violence/index.aspx

Anderson, J., Breshnahan, M., & Musatics, C. (2015). Combating weight-based cyber bullying on Facebook with the dissenter effect. *Cyber psychology, Behavior and Social Networking*, 17, 281-286. https://doi.org/10.1089/cyber.2013.0370

Anderson & Jiang. (2018, September 27). A majority of teens have experienced some form of cyberbullying. *Pew Research Center*. https://www.*pewinternet.org*/2018/09/27/a-majority-of-teens-have-experienced-some-form-of-cyberbullying

Andriessen, K., Dudley, M., Draper, B., & Mitchell, P. B. (2018). Suicide bereavement and postvention among adolescents. *Understanding and measuring the grief experiences of adolescents-with a focus on bereavement by suicide*, 153. http://unsworks.unsw.edu.au/fapi/datastream/unsworks:54721/SOURCE02?view=true#page=173

Ang, R. P. (2015). Adolescent cyberbullying: A review of characteristics, prevention and intervention strategies. *Aggression and Violent Behavior, 25*, 35-42. https://doi.org/10.1016/j.avb.2015.07.011

Appel, M., Stiglbauer, B., Batinic, B., & Holtz, P. (2015). Internet use and verbal aggression: The moderating role of parents and peers. *Computers in Human Behavior,* 33, 235-241. https://doi.org/10.1016/j.chb.2014.01.007

Anxiety and Depression Association of America. (2021). Anxiety and Depression in Children. https://adaa.org/living-with-anxiety/children/anxiety-and-depression

Associated Press. (2015, March 25). *Virginia Tech gunman's mental health records found. Retrieved August* 4, 2019. https://www.foxnews.com/story/virginia-tech-gunmansmental-health-records-found

Babbie, E. R. (2018). Practice of social research. (T. C. Wagenaar, Ed.). Wadsworth.

Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health,* 13, 623-649. http://www.Uky.edu/~eushe2/Bandura/Bandura1998PH.pdf

Bandura, A. (2015). Social cognitive theory of moral thought and action. In *Handbook of moral behavior and development* (pp. 69-128). Psychology Press.

Bashir, H., & Bhat, S. A. (2017). Effects of social media on mental health: *A review*. *International Journal of Indian Psychology*, *4*(3), 125-131. https://doi.org/10.25215/0403.134

Bauman, S., & Bellmore, A. (2015). New directions in cyber bullying research. *Journal of School Violence*, *14*(1), 1-10. https://doi.org/10.1080/15388220.2014.968281

Bauman, S., & Newman, M. L. (2015). Testing assumptions about cyber bullying: Perceived distress associated with acts of conventional and cyber bullying. *Psychology of Violence*, *3*(1), 27-38. https://doi.org/10.1037/a0029867

Beale, A. V., & Hall, K. R. (2017). Cyber bullying: What school administrators (and parents) can do. *Clearing House*, 81(1), 8-12. https://doi.org/10.1016/j.chb.2014.01.007

Beiter. R, Nash. M, McCrady. D, Rhoades. M., Linscomb. M, Clarahan.,S, Sammuth. S, (2015). https://doi.org/10.1016/j.jad.2014.10.054

Bjelopera, J., Bagalman, E., Caldwell, S., Finklea, K., & McCallion, G. (2018). *Public mass shootings in the United States: Selected implications for federal public health and safety policy*. https://fas.org/sgp/crs/misc/R43004.pdf

Bottino, S. M. B., Cottino, C. M. C., Regina, C. G., Correia, A. V. L., & Ribeiro, W. S. (2015). Cyberbullying and adolescent mental health: *Systematic review*. Cadernos de Saúde Pública, 31(3), 463-475. http://doi.org/10.1590/0102-311X00036114

Brener, N. D., Kann, L., Shanklin, S., Kinchen, S., Eaton, D. K., Hawkins, J., & Flint, K. H. (2015). Methodology of the youth risk behavior surveillance system – 2015.

Morbidity and Mortality Weekly Report, March 1, 2015, 63(1). www.cdc.gov/mmwr/preview/mmwrhtml/rr6201a1.htm

Brown, J. D., & Goodin, A. J. (2018). Mass casualty shooting venues, types of firearms, and age of perpetrators in the United States, 1982–2018. *American Journal of Public Health*, 108(10), 1385-1387. http://doi.org/10.2105/ajph.2018.304584

Browne, K. J., & Hamilton-Giachritsis, C. (2015). The influence of violent media on children and adolescents: A public health approach. The Lancet, 365(9460), 702-710. http://doi.org/10.1016/S0140-6736(05)17952-5

Brunborg, Geir Scott, Mentzoni, Rune Aune , & Frøyland, Lars Roar (2019). https://doi.org/10.1556/JBA.3.2014.002

Brunborg, G. S., Mentzoni, R. A., & Frøyland, L. R. (2016). Is video gaming, or video game addiction, associated with depression, academic achievement, heavy episodic drinking, or conduct problems?. *Journal of behavioral addictions*, *3*(1), 27–32. https://doi.org/10.1556/JBA.3.2014.002

Burstein B, Agostino H, Greenfield B. Suicidal Attempts and Ideation Among Children and Adolescents in US Emergency Departments, 2007-2015. *JAMA Pediatr.* Published online April 08, 2019. doi:10.1001/jamapediatrics.2019.0464

Bushman, B. J., & Huesmann, L. (2015). Twenty-five years of research on violence in digital games and aggression revisited: A reply to Elson and Ferguson. *European Psychologist*, 56(4), 471-493

Caitlin Faas, Mark J.,Benson, Christine E. Kaestle & Jyoti Savla. (2018). Socioeconomic success and mental health profiles of young adults who drop out of college,

Journal of Youth Studies, 21:5, 669-686, . https://doi.org/10.1080/13676261.2017.1406598

Capurso, S., Paradžik, L., & Čale Mratović, M. (2017). Cyberbullying among children and adolescents—An overview on epidemiological studies and effective preventive programs. *Criminology & Social Integration Journal*, 25(1), 127-137.

Caroline E. Kim (2018), Insta-Fringement: What is a Fair Use on Social Media? 18 J. Marshall Rev. Intell. Prop. L. 102 (2018). Retrieved from https://repository.jmls.edu/ripl/vol18/iss1/5/

Carter Brown, C. J., Courson, P., & Brown, P. (2015, April 10). *Four school stabbing victims in critical condition; teen suspect charged as adult*. Retrieved from https://edition.cnn.com/2015/04/09/justice/pennsylvania-school-stabbing/index.htm

Centers for Disease Control and Prevention [CDC]. (2015). Fact sheet: *Understanding bullying*. Retrieved June 17, 2016, from https://www.cdc.gov/violenceprevention/pdf/bullying-factsheet508.pdf

Center for Disease Control (CDC), National Center for Injury Prevention and Control (2018). *Preventing bullying*. Retrieved from https://www.cdc.gov/violenceprevention/pdf/bullying-factsheet508.pdf

Centers for Disease Control and Prevention (CDC). (2018). *WISQARS Leading Causes of Death Reports*. Retrieved from https://webappa.cdc.gov/sasweb/ncipc/leadcause.html

Centers for Disease Control and Prevention. (CDC). (2019, February 5). *The social-ecological model: A framework for prevention*. Retrieved August 6, 2019, from https://www.cdc.gov/violenceprevention/publichealthissue/social-ecologicalmodel.html

Centers for diseases control and prevention [CDC], (2019). Retrieved from https://www.cdc.gov/nchs/nhis/index.htm

Christopher R Brydges, PhD, Effect Size Guidelines, Sample Size Calculations, and Statistical Power in Gerontology, *Innovation in Aging*, Volume 3, Issue 4, August 2019, igz036, https://doi.org/10.1093/geroni/igz036

Chuck, E., Johnson, A., & Siemaszko, C. (2018). *17 killed in mass shooting at high school in Parkland, Florida*. Retrieved from https://www.nbcnews.com/news/us-news/policerespond-shooting-parkland-florida-high-school-n848101

Clarke, S., Allerhand, L. A., & Berk, M. S. (2019). Recent advances in understanding and managing self-harm in adolescents. *F1000Research*, *8*, F1000 Faculty Rev-1794. https://doi.org/10.12688/f1000research.19868.1

CNBC-Reuters. (2019, July 9). *Facebook is not invited to White House social media summit*: Company. Retrieved July 11, 2019, from https://www.cnbc.com/2019/07/09/facebook-isnot-invited-to-white-house-social-media-summit-company.html

CNN Library. (2018). *Deadliest mass shootings in modern US history fast facts.* Retrieved April 22, 2018, from https://edition.cnn.com/2018/09/16/us/20-deadliest-mass-shootings-in-ushistory-fast-facts/index.html

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2015). Applied multiple regression/correlation analysis for the behavioral sciences (3rd Ed.). New York, NY: Routledge.

Common Sense Media, Inc. (2015). The common sense census: Media use by tweens and teens. Retrieved from https://www.commonsensemedia.org/sites/default/files/uploads/research/census_executivesummary.pdf.

Costello, C. R. & Ramo, D. E. (2017). Social media and substance use: What should we be recommending to teens and their parents? *Journal of Adolescent Health*, 60, 629-630. Retrieved from http://dx.doi.org/10.1016/j.jadohealth.2017.03.017.

Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approach (5th ed.). Thousand Oaks, CA: Sage publications.

C.S. Mott Children's Hospital National Poll on Children's Health. (2015). Top 10 child health problems: More concern for sexting, internet safety. C.S. *Mott Children's Hospital, the University of Michigan Department of Pediatrics and Communicable Diseases, and the University of Michigan Child Health Evaluation and Research (CHEAR) Unit*, 24 (3). Retrieved from https://mottpoll.org/reports-surveys/top-10-child-health-problems-more-concern-sexting-internet

Cunningham, R. M., Walton, M. A., & Carter, P. M. (2018). The Major Causes of Death in Children and Adolescents in the United States. *The New England journal of medicine*, *379*(25), 2468–2475. https://doi.org/10.1056/NEJMsr1804754

Darcy, O. (2019, May 3). *Louis Farrakhan, Alex Jones and other 'dangerous' voices banned by Facebook and Instagram*. Retrieved from

https://edition.cnn.com/2019/05/02/tech/facebook-ban-louis-farrakhan-infowars-alexjones-milo-laura-loomer/

Dongdong Li, Albert Liau &, Angeline Khoo, (2017). https://doi.org/10.1089/cyber.2017.0463

Elsass, H. J., Schlidkraut, J., & Stafford, M. C. (2015). Breaking news of social problems: Examining media consumption and student beliefs about school shootings. Criminology, Crim. Just. L & Soc'y, 15, 31.

Gaffney, H., Farrington, D. P., Espelage, D. L., & Ttofi, M. M. (2018). Are cyber bullying intervention and prevention programs effective? *A systematic and meta-analytical review. Aggression and Violent Behavior.* Retrieved from https://www.sciencedirect.com/science/article/pii/S1359178918300697

Gaffney, H., Ttofi, M. M., & Farrington, D. P. (2018). Evaluating the effectiveness of school-bullying prevention programs: *An updated meta-analytical review. Aggression and Violent Behavior*. Retrieved from https://www.sciencedirect.com/science/article/pii/S1359178918300727

Gao, Y., Wei, E. K., Arron, S. T., Linos, E., Margolis, D. J., & Mansh, M. D. (2017). Acne, sexual orientation, and mental health among young adults in the United States: A population-based, cross-sectional study. *Journal of the American Academy of Dermatology*, https://doi.org/10.1016/j.jaad.2017.06.004

Garber, J., & Weersing, V. R. (2016). Comorbidity of Anxiety and Depression in Youth: Implications for Treatment and Prevention. *Clinical psychology: a publication of*

the Division of Clinical Psychology of the American Psychological Association, *17*(4), 293–306. https://doi.org/10.1111/j.1468-2850.2010.01221.x

Gentile, D. A., Anderson, C. A., Yukawa, S., Ihori, N., Saleem, M., Ming, L. K., . . . Sakamoto, A. (2017). The effects of prosocial video games on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies. *Personality and Social Psychology Bulletin*, 35, 752–763. https://doi.org/:10.1177/0146167209333045

Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.). (2018). *Health behavior and health education: Theory, research, and practice* (4th ed.). San Francisco, CA: JosseyBass.

Goldstein, S. E. (2016). Adolescents' disclosure and secrecy about peer behavior: Links with cyber aggression, relational aggression, and overt aggression. *Journal of Child and Family Studies*, 25(5), 1430-1440. https://doi.org/:10.1007/s10826-015-0340-2

Goldstein, S. E. (2015). Parental regulation of online behavior and cyber aggression: Adolescents' experiences and perspectives. Cyberpsychology: *Journal of Psychosocial Research on Cyberspace*, 9(4), article 2. https://doi.org/:10.5817/CP2015-4-2

González-Bueso, V., Santamaría, J. J., Fernández, D., Merino, L., Montero, E., & Ribas, J. (2018). Association between Internet Gaming Disorder or Pathological Video-Game Use and Comorbid Psychopathology: A Comprehensive

Review. *International journal of environmental research and public health*, *15*(4), 668. https://doi.org/10.3390/ijerph15040668

Granic, I., Lobel, A., & Engels, R. C. M. E. (2014). The benefits of playing video games. *American Psychologist, 69*(1), 66–78. https://doi.org/10.1037/a0034857

Harrison, T. (2016). Virtuous reality: moral theory and research into cyberbullying. *Ethics and Information Technology*, 17(4), 275-283. https://doi.org/10.1007/s10676-015-9382-9

Healthcare.org, (2020). https://newsroom.osfhealthcare.org/screen-time-for-kids-how-much-is-too-much/

Hinduja, S. (2018). The ecology of schools: Fostering a culture of human flourishing & developing character. Federal Commission on School Safety. Cyberbully Research Center. https://cyberbullying.org/federal-commission-on-school-safety

Hinduja, S. & Patchin, J. W. (2015). Cyber bullying fact sheet: Identification, prevention, and response. *Cyber bullying Research Center*. Retrieved 6/11/2015, from https://cyberbullying.org/Cyberbullying-Identification-Prevention-Response2015.pdf

Hinduja, S. & Patchin, J. W. (2019). *School bullying rates increase by 35% from 2016 to 2019*. Retrieved 6/11/19, from https://cyberbullying.org/school-bullying-rates-increase-by-35-from-2016-to-2019

Hinduja, S. (2018). The ecology of schools: Fostering a culture of human flourishing & developing character. Federal Commission on School Safety. Cyber bully Research Center. https://cyberbullying.org/federal-commission-on-school-safety

Hinduja, S. & Patchin, J. W. (2018). Cyber bullying fact sheet: Identification, prevention, and response. Cyberbullying Research Center. Retrieved 6/11/2018, from https://cyberbullying.org/Cyberbullying-Identification-Prevention-Response2018.pdf

Hinduja, S. & Patchin, J. W. (2018). Sexting – A brief guide for educators and parents. Cyberbullying Research Center. Retrieved 6/11/19, from https://cyberbullying.org/sexting-research-summary.pdf

Hollá, K., Fenyvesiová, L., & Hanuliaková, J. (2017). Measurement of Cyber-bullying severity. *The New Educational Review*, 47(1), 29-38. https://doi.org/ 10.15804/tner. 2017.47.1.02

Jean M. Twenge, (2017). Retrieved from https://childmind.org/report/2017-childrens-mental-health-report/anxiety-depression-adolescence/ *Clinical Psychological Science,* 7(2), and 397–397. https://doi.org/10.1177/2167702618824060

Jetelina, K. K., et al. (2018). Mechanisms and frequency of violent injuries among victims and perpetrators of bullying. *Journal of Adolescent Health*, 64(5), p. 664-670. Retrieved from https://www.sciencedirect.com/science/article/pii/S1054139X18307560

Jiang, J. (2018). Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewresearch.org/internet/2018/08/22/how-teens-and-parents-navigate-screen-time-and-device-distractions/

John, A., Glendenning, A. C., Marchant, A., Montgomery, P., Stewart, A., Wood, S., Lloyd, K., & Hawton, K. (2018). Self-Harm, Suicidal Behaviours, and Cyberbullying in Children and Young People: Systematic Review. *Journal of medical Internet research*, *20*(4), e129. https://doi.org/10.2196/jmir.9044

Kandlapalli, N., Shinde, S., Shriramoji, P., Uke, P., & Chaudhary, S. (2017). Defending mechanism for cyber bullying. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 2(2), 716-719. ISSN: 2456-3307.

Karl Andriessen, Elizabeth Lobb, Jane Mowll, Michael Dudley, Brian Draper & Philip B. Mitchell (2019) Help-seeking experiences of bereaved adolescents: A qualitative study, Death Studies, 43:1, 1-8, DOI: 10.1080/07481187.2018.1426657

Knoll, J I, V. L., & Annas, G. D. (2016). Mass shootings and mental illness. In L. H. Gold & R. I. Simon (Eds.), *Gun violence and mental illness* (pp. 81-104). Arlington, VA: American Psychiatric Association.

Kodish, T., Herres, J., Shearer, A., Atte, T., Fein, J., & Diamond, G. (2016). Bullying, depression, and suicide risk in a pediatric primary care sample. Crisis: *The Journal of Crisis Intervention and Suicide Prevention*, doi:10.1027/0227-5910/a000378

Laerd statistics, (2019). Retrieved from https://statistics.laerd.com/spss-tutorials/spearmans-rank-order-correlation-using-spss-statistics.php#:~:text=The%20Spearman%20rank-order%20correlation,at%20least%20an

Laird, S. (2015). Cyber bullying rampant on the internet. Retrieved from http://www.cyberbullyhotline.com/07-10-12-scourge.html

Landoll, R. R., La Greca, A. M., Lai, B. S., Chan, S. F., & Herge, W. M. (2015). Cyber victimization by peers: Prospective associations with adolescent social anxiety and depressive symptoms. *Journal of adolescence*, *42*, 77–86. https://doi.org/10.1016/j.adolescence.2015.04.002

Law, D. M., Shapka, J. D., Hymel, S., Olson, B. F., & Waterhouse, T. (2015). The changing face of bullying: An empirical comparison between traditional and internet bullying and victimization. Computers in Human Behavior, 28(1), 226–232. http://doi.org/10.1016/j.chb.2011.09.004

LeBlanc, M., Self-Brown, S., Shepard, D., & Kelley, M. L. (2015). Buffering the effects of violence: Communication and problem-solveing skills as protective factors for adolescents exposed to violence. *Journal of Community Psychology*, 39(3), 353-367. DOI: 10.1002/jcop.20438

Lee HH, Sung JH, Lee J, Lee JE, (2017). Retrieved from https://www.cdc.gov/pcd/issues/2017/17_0151.htm: http://dx.doi.org/10.5888/

Leiman Parker, E. M. (2018). Are neighborhood factors associated with teen dating violence: Let us examine the evidence. In D. Wolfe & J. R. Temple (Eds.), *Adolescent dating violence: Theory, research, and prevention (pp. 261-281). Cambridge*, MA: Academic Press

Lenhart, A (2018). Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewresearch.org/internet/2018/06/27/cyberbullying/

Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2015). *Teens & mobile phones*. Retrieved from Pew Internet & American Life Project website: http://www.pewinternet.org/Reports/2015/Teens-and-Mobile-Phones.aspx.

Lenhart, A. (2015). Teens, Smartphones & Texting. Pew Research Center (Vol. i). Retrieved from http://pewinternet.org/Reports/2015/Teens-and-smartphones.aspx

Lenhart, A. (2015). Teens, Social Media and Technology Overview 2015.Retrieved from http://pewinternet.org /Reports/2015/Teens-and-smartphones.aspx

Lenhart, A. (2019). Teens, Smartphones & Texting. Pew Research Center (Vol. i). Retrieved from http://pewinternet.org/Reports/2019/Teens-and-smartphones.aspx

Lenhart, A. (2016). Teens, Social Media and Technology Overview 2016.Retrieved from http://pewinternet.org /Reports/2019/Teens-and-smartphones.aspx

Lenhart, A., Madden, M., & Hitlin, P. (2015). Teens and technology: Youth are leading the transition to a fully wired and mobile nation. Washington, DC: Pew Internet and American Life Project, 86, 37–45. Retrieved from http://www.citeulike.org/group/22/article/833263

Lenhart, A. & Pew Research Center (2017). Teens, social media & technology overview 2017: Smartphones facilitate shifts in communication landscape for teens. Retrieved from http://www.pewinternet.org/files/2017/04/PI_TeensandTech_ Update2017_0409151.pdf.

Levine David, (2017). Retrieved from https://health.usnews.com/health-care/patient-advice/articles/2017-04-21/what-are-the-risks-of-untreated-depression

Li, D, Liau, A, and Khoo, A. (2017). Cyber psychology, Behavior, and Social Networking.Sep 2016.535-539.http://doi.org/10.1089/cyber.2016.0463

Lin, L.., Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., … Primack, B. A. (2016). *Association Between Social Media Use and Depression Among U.S. Young Adults*. *Depression and anxiety*, 33(4), 323–331. doi:10.1002/da.22466. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4853817/

Lulu Garcia-Navarro, (2017). Retrieved from https://www.npr.org/2017/12/17/571443683/the-call-in-teens-and-depression

McGinty, E. E., Webster, D. W., Jarlenski, M., & Barry, C. L. (2015). News media framing of serious mental illness and gun violence in the United States, 1997-2015. *American Journal of Public Health*, 104(3), 406-413.

Madden, M., Lenhart, A., & Duggan, M. (2015). *Teens and technology* 2015. Retrieved from http://httpwww.facebook.comwww.youthtoday.org/hotdocs/PIP_TeensandTechnology2013.pdf

Markham Heid, (2018). Retrieved from http://time.com/5437607/smartphones-teens-mental-health/

Markham Heid, (2018). Retrieved from http://time.com/4974863/kids-smartphones-depression/

Martin A. Monto, Nick McRee, and Frank S. Deryck, (2018). *Non suicidal Self-Injury among a Representative Sample of US Adolescents, 2015, American Journal of Public Health* 108, no. 8: pp. 1042-1048, Retrieved from https://ajph.aphapublications.org/doi/10.2105/AJPH.2018.304470

Meindl, J. N., & Ivy, J. W. (2017). Mass shootings: The role of the media in promoting generalized imitation. *American Journal of Public Health*, 107(3), 368-370.

Merikangas, K. R., He, J. P., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., Benjet, C., Georgiades, K., & Swendsen, J. (2015). Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication--Adolescent Supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, *49*(10), 980–989. https://doi.org/10.1016/j.jaac.2015.05.017

Merikangas, K. R., Nakamura, E. F., & Kessler, R. C. (2015). Epidemiology of mental disorders in children and adolescents. *Dialogues in clinical neuroscience*, *11*(1), 7–20.

Messias, E., Kindrick, K., & Castro, J. (2015). School bullying, cyber bullying, or both: correlates of teen suicidal in the 2015 CDC Youth Risk Behavior Survey. Comprehensive psychiatry, 55(5), 1063-8. https://doi.org/10.1016/j.comppsych.2015.02.005

Miranda, S. M., Young, A., & Yetgin, E. (2016). Are social media emancipatory or hegemonic? Societal effects of mass media digitization. *MIS Quarterly*, 40(2), 303-329.

Mitchell, M. L., & Jolley, J. M. (2015). Research design: Explained (5th ed.). Belmont, CA: Wadsworth.

Monica Anderson & Jingjing Jiang (2018). Retrieved from http://www.pewinternet.org/2018/05/31/teens-social-media-technology-2018/

Monto, McRee, & Deryck, (2018). "Nonsuicidal Self-Injury Among a Representative Sample of US Adolescents, 2015", *American Journal of Public Health* 108, no. 8 (August 1, 2018): pp. 1042-1048.doi.org/10.2105/AJPH.2018.304470

Myers, C. A., & Cowie, H. (2019). Cyberbullying across the Lifespan of Education: Issues and Interventions from School to University. *International journal of environmental research and public health*, *16*(7), 1217. https://doi.org/10.3390/ijerph16071217

National Alliance on Mental Illness [NAMI] (2015). *Suicide*. Retrieved from https://www.nami.org/NAMI/media/NAMI-Media/Images/FactSheets/Suicide-FS.pdf

National Center for Education Statistics [NCES], (2016). Retrieved from https://doi.org/10.1089/cyber.2015.0419

National Center for Education Statistics [NCES], U.S. Department of Education. (2016). *Student reports of bullying and cyber-bullying: Results from the 2015 School Crime Supplement to the National Crime Victimization Survey*. Retrieved from https://nces.ed.gov/pubs2017/2017015.pdf

National Eating Disorders Association [NEDA] (2016). Body-Shaming + Cyberbullying. Retrieved from https://www.nationaleatingdisorders.org/blog/body-shaming-cyberbullying

National Institute of Mental Health [NIMH], (2017). Retrieved from https://www.nimh.nih.gov/health/statistics/major-depression.shtml

National Institute of Mental Health [NIMH], (2017). Retrieved from https://www.nimh.nih.gov/health/topics/suicide-prevention/index.shtml#part_153177

Nixon, C. L. (2015). Current perspectives: the impact of cyberbullying on adolescent health. *Adolescent Health, Medicine and Therapeutics*, 5, 143–158. http://doi.org/10.2147/AHMT.S36456

Naslund, J. A., Aschbrenner, K. A., Marsch, L. A., & Bartels, S. J. (2016). The future of mental health care: peer-to-peer support and social media. *Epidemiology and psychiatric sciences, 25(2), 113-122.*

Ojanen, T., Sijtsema, J. J., & Rambaran, A. J. (2015). Social goals and adolescent friendships: Social selection, deselection, and influence. *Journal of Research on Adolescence*, 23(3), 550–562. http://doi.org/10.1111/jora.12043

Pabian, S., & Vandebosch, H. (2016). An investigation of short-term longitudinal associations between social anxiety and victimization and perpetration of traditional bullying and cyberbullying. *Journal of Youth and Adolescence*, 45(2), 328-339. doi: 10.1007/s10964-015-0259-3

Pantic, I., Damjanovic, A., Todorovic, J., Topalovic, D., Bojovic-Jovic, D., Ristic, S., & Pantic, S. (2015). Association between online social networking and depression in high school students: Behavioral physiology viewpoint. Psychiatria Danubina, 24(1), 90–93.

Park, S. Y., Holody, K. J., & Zhang, X. (2015). Race in media coverage of school shootings: A parallel application of framing theory and attribute agenda setting. *Journalism & Mass Communication Quarterly*, 89(3), 475-494.

Patchin & Hinduja, (2019). Retrieved from *School bullying rates increase by 35% from 2016 to 2019*. Retrieved 6/11/19, from https://cyberbullying.org/school-bullying-rates-increase-by-35-from-2016-to-2019

Patchin & Hinduja, (2018). Retrieved from Cyber bullying fact sheet: Identification, prevention, and response. Cyberbullying Research Center. Retrieved 6/11/2018,

from https://cyberbullying.org/Cyberbullying-Identification-Prevention-Response2018.pdf

Patchin, J. W. (2019). Summary of our cyber bullying research (2007-2019). *Cyber bullying Research Center*. Retrieved from https://cyberbullying.org/summary-of-our-cyberbullying-research

Pew Internet & American Life Project, Lenhart, A (2017, June 20). Teenage life online: The rise of the instant-message generation and the Internet's impact on friendships and family relationships. Washington, DC:

Pew Internet and American Life Project (2017, June 20). Retrieved from http://www.pewnet.org. Teenage life online: The rise of the instant-message generation and the Internet's impact on friendships and family relationships. Washington DC: Author.

Pew Internet & American Life Project. Lenhart, A. (2018). Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewresearch.org/fact-tank/2018/09/17/5-facts-about-americans-and-video-games/

Pew Internet & American Life Project. (2019). Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewsocialtrends.org/2019/02/20/most-u-s-teens-see-anxiety-and-depression-as-a-major-problem-among-their-peers/

Pew Internet & American Life Project. Lenhart, A. (2018). Project History: Pew research center's Internet and American life project. Retrieved from

https://www.pewresearch.org/internet/2018/03/01/social-media-use-in-2018/pi_2018-03-01_social-media_0-02/

Pew Internet & American Life Project. (2018). Project History: Pew research center's Internet and American life project. Retrieved from http://pewInternet.org/StaticPages/About-Us/Project-History.aspx

Pew Internet & American Life Project. Lenhart, A (2019). Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewresearch.org/fact-tank/2019/07/12/a-growing-number-of-american-teenagers-particularly-girls-are-facing-depression/

Pew Internet & American Life Project. (2017). Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewsocialtrends.org/2017/06/22/views-of-guns-and-gun-violence/#ease-of-access-to-illegal-guns-seen-as-the-biggest-contributor-to-gun-violence

Primack, Brian et al., (2018), Retrieved from *Psychiatry.* 2018;66(2):181-188. doi:10.1001/archgenpsychiatry.2008.532.

Plemmons, Hall, Doupnik, Gay, Brown, Browning, Casey, Freundlich, David P. Johnson, Lind, Rehm, Thomas and Williams ((2018). Retrieved from https://doi.org/10.1542/peds.2017-2426

Primack B, Swanier B, Georgiopoulos AM, Land SR, Fine MJ (2018). Association Between Media Use in Adolescence and Depression in Young Adulthood: A

Longitudinal Study. *Arch Gen Psychiatry.* 2009;66(2):181–188. doi:10.1001/archgenpsychiatry.2008.532

PsychGuides.com (2019). Retrieved from https://www.psychguides.com/guides/video-game-addiction-symptoms-causes-and-effects// gov/pmc/articles/PMC3832462

Rachel Young, Roma Subramanian, Stephanie Miles, Amanda Hinnant & Julie L. Andsager (2016). Retrieved from https://www.tandfonline.com/doi/full/10.1080/10410236.2016.1214214?src=recsys

Reid, D. J., & Reid, F. J. M. (2017). Text or talk? Social anxiety, loneliness, and divergent preferences for cell phone use. Cyberpsychology &Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society, 10(3), 424–435. http://doi.org/10.1089/cpb.2006.9936

Rosenberger, (2016). Retrieved from https://www *independent.co.uk*/lifestyle/health-and-families/health-news/phantom-vibration-syndrome-up-to-90-per-cent-of-people-suffer-phenomenon-while-mobile-phone-is-in

Rosenman, R., Tennekoon, V., & Hill, L. G. (2016). Measuring bias in self-reported data. *International journal of behavioural & healthcare research*, *2*(4), 320–332. https://doi.org/10.1504/IJBHR.2011.043414

Rozsa, L., Epstein, K., Mettler, K., & Bever, L. (2019, March 25). *Parkland community 'shocked' after student's suicide — the second in a week, officials say*. Retrieved July 27, 2019, from

https://www.washingtonpost.com/nation/2019/03/24/parkland-student-diesapparent-suicide-police-say/?noredirect=on&utm_term=.7d69adf60cfe

Ryan R. Landoll et al, (2015). Retrieved from https://doi.org/10.1016/j.adolescence.2015.04.002

Sameer Hinduja & Justin W. Patchin (2018): Connecting Adolescent Suicide to the Severity of Bullying and Cyberbullying, *Journal of School Violence*, DOI: 10.1080/15388220.2018.1492417.

Schrobsdorff, S (2016). Retrieved from http://time.com/author/susanna-schrobsdorff/ https://doi.org/10.1111/jcap.12163

Seabrook, E. M., Kern, M. L., & Rickard, N. S. (2016). Social Networking Sites, Depression, and Anxiety: A Systematic Review. *JMIR Mental Health*, 3(4), e50. doi:10.2196/mental.5842

Selfhout, M. H. W., Branje, S. J. T., Delsing, M., ter Bogt, T. F. M., & Meeus, W. H. J. (2018a). Different types of Internet use, depression, and social anxiety: The role of perceived friendship quality. Journal of Adolescence, 32(4), 819–833. http://doi.org/10.1016/j.adolescence.2018.10.011

Serena Gordon, (2019). Retrieved from https://consumer.healthday.com/mental-health-information-25/addiction-news-6/video-game-addiction-tied-to-depression-anxiety-in-kids-648899.html

Smith, A. (2015). US Smartphone Use in 2015. Retrieved from http://www.pewinternet.org/files/2015/03/PI_Smartphones_0401151.pdf

Smith, A & Anderson, M, (2018). Project History: Pew research center's Internet and American life project. Retrieved from https://www.pewresearch.org/internet/2018/03/01/social-media-use-in-2018/pi_2018-03-01_social-media_0-03/

Steven J. Kirsh, (2018). Retrieved fromhttps://doi.org/10.1016/S1359-1789(02)00056-3

Sullivan, G. M., & Artino, A. R., Jr (2017). How to Create a Bad Survey Instrument. *Journal of graduate medical education*, *9*(4), 411–415. https://doi.org/10.4300/JGME-D-17-00375.1

Suresh, K., & Chandrashekara, S. (2016). Sample size estimation and power analysis for clinical research studies. *Journal of human reproductive sciences*, *5*(1), 7–13. https://doi.org/10.4103/0974-1208.97779 (Retraction published J Hum Reprod Sci. 2016 Jul-Sep;8(3):186)

Tabachnick, B. G., & Fidell, L. S. (2019). Using multivariate statistics (7th ed.). Boston, MA: Pearson.

Thabrew, H., Stasiak, K., Hetrick, S. E., Wong, S., Huss, J. H., & Merry, S. N. (2017). Psychological therapies for anxiety and depression in children and adolescents with long□term physical conditions. *The Cochrane Database of Systematic Reviews*, *2017*(1), CD012488. https://doi.org/10.1002/14651858.CD012488

T. Hartley, Michael & Bauman, Sheri & Nixon, Charisse & Davis, Stan. (2015). *Comparative study of bullying victimization among students in general and*

special education. Exceptional children, 81, 176-193. 10.1177/0014402914551741

Thelegendsworld.com (2018). Retrieved from https://www.thelegendsworld.com/2018/08/11/addicted-online-the-ultimate-guide/

Triola, M. F. (2018). Essentials of statistics (6th ed.). Boston, MA: Pearson Education.

Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science*, 6, 3–17. https://doi.org/10.1177/2167702617723376

US Department of Health and Human Services/Centers for Disease Control and Prevention [CDC] (2018). Youth Risk Behavior Surveillance — United States, 2017 *Morbidity and Mortality Weekly Report* (MMWR). (67)8. Retrieved from https://www.cdc.gov/healthyyouth/data/yrbs/pdf/2018/ss6708.pdf

U.S. Department of Justice, Bureau of Justice Statistics (2015). Student victimization in U.S. schools. *Results from the 2015 School Crime Supplement to the National Crime Victimization Survey. National center for Education Statistics*. Retrieved from https://nces.ed.gov/pubs2015/2017015.pdf

Vidal, C., Lhaksampa, T., Miller, L., & Platt, R. (2020). Social media use and depression in adolescents: a scoping review. *International review of psychiatry (Abingdon, England)*, *32*(3), 235–253. https://doi.org/10.1080/09540261.2020.1720623

Villafranca. A, (2018). Retrieved from https://www.thelegendsworld.com/2018/08/11/addicted-online-the-ultimate-guide/

Weeks, J. W., Jakatdar, T. A., & Heimberg, R. G. (2016). Comparing and contrasting fears of positive and negative evaluation as facets of social anxiety. *Journal of Social and Clinical Psychology,* 29, 68–94. doi:10.1521/jscp.2016.29.1.68

Whitney DG & Peterson M., (2019). Retrieved from US National and State-Level Prevalence of Mental Health Disorders and Disparities of Mental Health Care Use in Children. *JAMA Pediatr.* 2019;173(4):389–391. doi:10.1001/jamapediatrics.2019.5399

Wolke, D., & Lereya, S. T. (2015). Long-term effects of bullying. *Archives of disease in childhood*, *100*(9), 879–885. https://doi.org/10.1136/archdischild-2015-306667

World Health Organization [WHO], (2018). Retrieved from https://www.who.int/news-room/q-a-detail/gaming-disorder

Yao, M., Zhou, Y., Li, J., & Gao, X. (2019). Violent video games exposure and aggression: The role of moral disengagement, anger, hostility, and disinhibition. *Aggressive behavior*, *45*(6), 662–670. https://doi.org/10.1002/ab.21860

Yen, J.-Y., Yen, C.-F., Chen, C.-S., Wang, P.-W., Chang, Y.-H., & Ko, C.-H. (2015). Social anxiety in online and real-life interaction and their associated factors. *Cyberpsychology, Behavior, and Social Networking,* 15(1), 7–12. http://doi.org/10.1089/cyber.2015.0015

Zycha, I., Farrington, D. P., and Ttofi, M. M. (2018). Protective factors against bullying and cyberbullying*: A systematic review of meta-analyses. Aggression and Violent Behavior,* 45, pg. 4-19. Retrieved from https://www.sciencedirect.com/science/article/pii/S1359178918300557#ks0005

Appendix A: Binomial Logistic Regression

Finally, I conducted an binomial logistic regression using dependent variable depression and independent variable screen time and the results indicated a significant relationship between screen time and depression among the participants (p <.001, Tables A1-A2 below).

Showing significance of screen time on depression (see tables A1-A2)

Table A1

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.536	.018	841.784	1	.000	1.710

Table A2

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	31.461	6	.000
	Block	31.461	6	.000
	Model	31.461	6	.000

Results

(Tables A1 and A2) above shows the significance value of 0.000. Since these values are way lower than the p-value 0.05, then we can conclude that there is statistically significant relationship between screen time and depression. Those teenagers who spend

more time on their screen are more likely to be sad and hopeless unlike those who spend less time on screen**.**

Question 2

Significance of video games on depression in teenagers using Binomial logistic regression (See tables A3- A6)

Table A3

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.538	.018	872.773	1	.000	1.713

The Exp(B) above 1.713. Since the odd ratio is more than 1, this means that those teenagers that are exposed to video games are 1.713 times to be depressed than those who do not play video games.

Table A4

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Computer use / video gaming	200.364	6	.000
		Computer use / video gaming(1)	5.717	1	.017
		Computer use / video gaming(2)	13.871	1	.000
		Computer use / video gaming(3)	34.302	1	.000
		Computer use / video gaming(4)	27.033	1	.000
		Computer use / video gaming(5)	.891	1	.034

	Computer use / video gaming(6)	22.259	1	.000
Overall Statistics		200.364	6	.000

Table A5

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	16853.436[a]	.015	.021

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Nagelkerke R Square on the above table shows that the model explains 21% of the way video gaming may influence depression.

Results

Tables A3-A5 above shows significant values of 0.00. Since this value is less that the alpha value.01, the model used in the study is fit.

Question 3

Significance of cyber bullying on depression in teenagers using Binomial logistic regression (See tables A6-A8)

Table A6

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.547	.018	927.598	1	.000	1.728

Table A7

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Electronically bullied at school(1)	883.358	1	.000
	Overall Statistics		883.358	1	.000

Table A8

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	850.968	1	.000
	Block	850.968	1	.000
	Model	850.968	1	.000

Results

Tables A6-A8 above shows significant values of 0.00. Since this value is less that the alpha value.01, the model used in the study is fit.

[Significance **of video games on depression using Chi-Test (see Tables A9 & A10)**

Table A9

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	180.675[a]	6	.000
Likelihood Ratio	178.950	6	.000

Linear-by-Linear Association	105.812	1	.000
N of Valid Cases	10909		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 391.33.

Table A10

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Nominal by Nominal	Phi	.129			.000
	Cramer's V	.129			.000
Ordinal by Ordinal	Gamma	-.141	.013	-10.433	.000
	Spearman Correlation	-.101	.010	-10.606	.000[c]
Interval by Interval	Pearson's R	-.098	.010	-10.336	.000[c]
N of Valid Cases		10909			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Table A11

Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.332[a]	.110	.109	.455	.110	80.171	19	12318	.000

a. Predictors: (Constant), q24=2.0, q80=1.0, q1=5.0, q79=2.0, q1=2.0, q79=6.0, q80=6.0, q2=2.0, q79=5.0, q80=3.0, q1=3.0, q80=2.0, q79=3.0, q80=5.0, q1=6.0, q79=4.0, q80=4.0, q1=4.0, q79=1.0

Results

The model summary table above provides the *R* and R^2 values. The *R* value represents the simple correlation and is 0.332 considering, age, ethnicity, screen time, video gaming, and cyber bullying. (the "**R**" Column), which indicates a high degree of correlation. The R^2 value (the "**R Square**" column) indicates how much of the total variation in the dependent variable, sad and hopeless, can be explained by the independent variables, video gaming, screen time, and cyber bullying. In this case, 11 % for those who were bullied, involved in video gaming and spend time on screen can be explained.

Table A12

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	315.902	19	16.626	80.171	.000[b]
	Residual	2554.575	12318	.207		
	Total	2870.476	12337			

a. Dependent Variable: Sad and hopeless

b. Predictors: (Constant), q24=2.0, q80=1.0, q1=5.0, q79=2.0, q1=2.0, q79=6.0, q80=6.0, q2=2.0, q79=5.0, q80=3.0, q1=3.0, q80=2.0, q79=3.0, q80=5.0, q1=6.0, q79=4.0, q80=4.0, q1=4.0, q79=1.0

Regression established that daily time spent watching TV, cyber bullying, and video gaming could statistically significantly predict depression (feeling sad and hopeless). In ANOVA table above $F(19, 12318) = 80.2$, $p = .0001$ and time spent watching TV, cyber bullied and video gaming accounted for 11% of the explained variability in teenage depression as seen on(on the model summary table above) . This indicates that, overall,

the model applied can statistically significantly predict the dependent variable, depression.

Research Question 3

Depression and cyber bullying

Chi- test

Table A13
Sad and hopeless x Electronically bullied at school Crosstabulation

		Electronically bullied at school					
		Yes		No		Total	
total		N	%	N	%	N	%
Sad and hopeless	Yes	1140_a	65.9%	2861_b	31.2%	4001	36.7%
	No	591_a	34.1%	6317_b	68.8%	6908	63.3%
Total		1731	100.0%	9178	100.0%	10909	100.0%

Each subscript letter denotes a subset of Electronically bullied at school categories whose column proportions do not differ significantly from each other at the .05 level.

Table A14
Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	754.407[a]	1	.000		
Continuity Correction[b]	752.914	1	.000		
Likelihood Ratio	727.084	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	754.338	1	.000		
N of Valid Cases	10909				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 634.86.
b. Computed only for a 2x2 table

Research Question 4

Relationship between Depression and the three independent variables

Table A15

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	985.708	19	.000
	Block	985.708	19	.000
	Model	985.708	19	.000

Table 18 above shows binomial logistic regression. The three variables have statistically significant relationship with depression in teenagers since the p-value above is 0.000.

Appendix B: Adverse Effects of Depression in Teenagers Between Ages 13-17 in the United States

1. Relationship between depression and suicide among teenagers

Chi square test showing relationship between depression/ hopelessness and suicide in teenagers

From the results on Tables 48-59 below, significance level is .000. This is way more less that the P value 0.005. Therefore, there is a significant relationship between depression/ hopelessness and suicide. Those teenagers that are depressed are more likely plan, attempt or commit suicide. This helps to explain why the suicide cases have increase a lot in the last five years (CDC, 2019). The more children are depressed, the higher the incidences of suicide or suicide attempts**.**

Table B1

Crosstab

		Bullied at school				Total	
		yes		no			
		N	%	N	%	N	%
Sad and hopeless	yes	1363_a	62.2%	2617_b	30.2%	3980	36.7%
	no	830_a	37.8%	6042_b	69.8%	6872	63.3%
Total		2193	100.0%	8659	100.0%	10852	100.0%

Each subscript letter denotes a subset of Bullied at school categories whose column proportions do not differ significantly from each other at the .05 level.

Table B2

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Nominal by	Phi	.266			.000

Nominal	Cramer's V	.266			.000
Ordinal by Ordinal	Gamma	.583	.016	25.872	.000
	Spearman Correlation	.266	.010	28.749	.000[c]
Interval by Interval	Pearson's R	.266	.010	28.749	.000[c]
N of Valid Cases		10852			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Table B3

Crosstab

		Made a suicide plan				Total	
		yes		no			
		N	%	N	%	N	%
Sad and hopeless	yes	1454_a	82.5%	2520_b	27.8%	3974	36.7%
	no	308_a	17.5%	6558_b	72.2%	6866	63.3%
Total		1762	100.0%	9078	100.0%	10840	100.0%

Each subscript letter denotes a subset of Made a suicide plan category whose column proportions do not differ significantly from each other at the .05 level.

Table B4

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Nominal by Nominal	Phi	.419			.000
	Cramer's V	.419			.000
Ordinal by Ordinal	Gamma	.849	.009	39.063	.000
	Spearman Correlation	.419	.009	48.079	.000[c]
Interval by Interval	Pearson's R	.419	.009	48.079	.000[c]
N of Valid Cases		10840			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Table B5

Crosstab

		Considered suicide				Total	
		yes		no			
		N	%	N	%	N	%
Sad and hopeless	yes	1784_a	84.0%	2187_b	25.1%	3971	36.6%
	no	340_a	16.0%	6541_b	74.9%	6881	63.4%
Total		2124	100.0%	8728	100.0%	10852	100.0%

Each subscript letter denotes a subset of Considered suicide categories whose column proportions do not differ significantly from each other at the .05 level.

Table B6

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Nominal by Nominal	Phi	.485			.000
	Cramer's V	.485			.000
Ordinal by Ordinal	Gamma	.880	.007	46.576	.000
	Spearman Correlation	.485	.008	57.837	.000[c]
Interval by Interval	Pearson's R	.485	.008	57.837	.000[c]
N of Valid Cases		10852			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Table B7

Crosstab

	Attempted suicide(Number of times suicide attempted rages from 1 to 5).	Total

		o times		1 time		2-3 times		4-5 times		5 or more			
		N	%	N	%	N	%	N	%	N	%	N	%
Sad and hopeless	yes	2522_a	33.3%	373_b	77.7%	229_c	89.8%	$36_{c, d}$	92.3%	$40_{b, d}$	78.4%	3200	38.1%
	No	5056_a	66.7%	107_b	22.3%	26_c	10.2%	$3_{c, d}$	7.7%	$11_{b, d}$	21.6%	5203	61.9%
Total		7578	100.0 %	480	100.0 %	255	100.0 %	39	100.0 %	51	100.0 %	8403	100.0 %

Each subscript letter denotes a subset of Attempted suicide categories whose column proportions do not differ significantly from each other at the .05 level.

Table B8

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	766.892[a]	4	.000
Likelihood Ratio	773.835	4	.000
Linear-by-Linear Association	619.418	1	.000
N of Valid Cases	8403		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.85.

Table B9

Crosstab

		Injurious suicide attempt						Total	
		Did not attempt injurious suicide		Yes it did lead to injury		Did not lead to injury			
		N	%	N	%	N	%	N	%
Sad and hopeless	Yes	2140_a	33.7%	160_b	92.5%	406_b	88.3%	2706	38.8%
	No	4209_a	66.3%	13_b	7.5%	54_b	11.7%	4276	61.2%
Total		6349	100.0%	173	100.0%	460	100.0%	6982	100.0%

Each subscript letter denotes a subset of Injurious suicide attempt categories whose column proportions do not differ significantly from each other at the .05 level.

Table B10

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	753.573[a]	2	.000
Likelihood Ratio	783.110	2	.000
Linear-by-Linear Association	687.770	1	.000
N of Valid Cases	6982		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 67.05.

Table B11

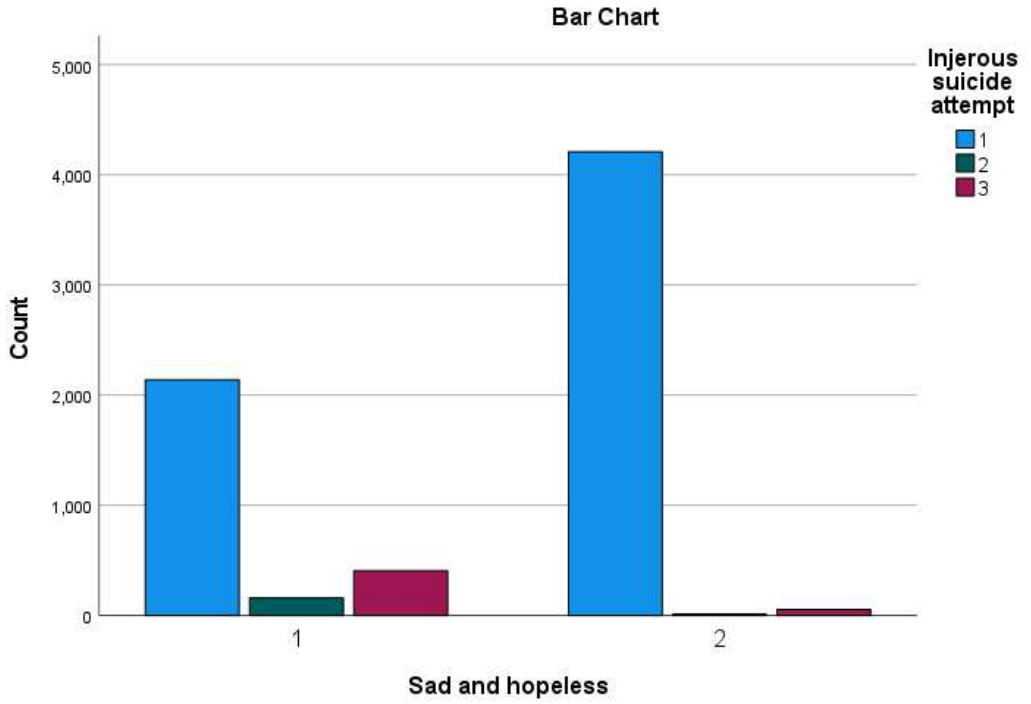
Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Nominal by Nominal	Phi	.329			.000
	Cramer's V	.329			.000
Ordinal by Ordinal	Gamma	-.880	.015	-23.806	.000
	Spearman Correlation	-.328	.010	-28.962	.000[c]
Interval by Interval	Pearson's R	-.314	.010	-27.619	.000[c]
N of Valid Cases		6982			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.



Note. Injurious suicide attempt 1 did not attempt, 2 yes led to injury, 3 no, did not lead to injury

1 sad/hopeless and 2 not sad/hopeless

Figure B1. *A graph showing relationship between depression and injurious suicide attempt*

1. Relationship between depression and violence among teenagers

From the tables below we see that there is a significant relationship between, depression/ hopelessness and violence. This is shown by the goodness of fit, test of parallel lines tests below. Those teenagers that are depressed also have safety concerns in school, are bullied or bully others, and also carry weapons to school. This explains why gun violence has become more rampant in schools (CDC, 2019). Therefore, the more the cases of depression among teenagers the more gun violence in schools and vice versa.

The significance levels on the following tables are .000 as seen on the (Tables B12-) below. Since the value is way below the P value; it shows that those children that are depressed can be violent to themselves and those around them. Unlike those who are not depressed.

Table B12

Case Processing Summary

		N	Marginal Percentage
Sad and hopeless	Yes	3326	37.1%
	No	5643	62.9%
Carried a gun to school	0 days/ month	8627	96.2%
Number of days one carried guns to school in a month(days/month)	1day/ month	95	1.1%
	2-3 days/ month	83	0.9%
	4-5 days/ month	38	0.4%
	6 or > /month	126	1.4%
Safety concern at school	o days/ month	8267	92.2%
Number of days participants were	1 day/month	363	4.0%

worried about safety concerns in school(days/month)	2-3 days/ month	228	2.5%
	4-5 days/ month	43	0.5%
	6 or more days/ month	68	0.8%
Threatened at school	0 times/ year	8344	93.0%
Number of times threatened at school (number of times/ per year). Rangers from (0 times, 11 or more times a year).	1 time/ year	312	3.5%
	2-3/ year	174	1.9%
	4-5 times/ year	54	0.6%
	6-7 times/ year	22	0.2%
	8-9 times/ year	14	0.2%
	10-11 times/ year	6	0.1%
	11 0r more times/ year	43	0.5%
Bullied at school	yes	1768	19.7%
	No	7201	80.3%
Valid		8969	100.0%
Missing		1940	
Total		10909	

Table B13

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1117.925			
Final	328.742	789.183	16	.000

Link function: Logit.

Table B14

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	148.704	125	.073
Deviance	169.042	125	.005

Link function: Logit.

Table B15

Pseudo R-Square

Cox and Snell	.084
Nagelkerke	.115
McFadden	.067

Link function: Logit.

Table B16

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	328.742			
General	328.742	.000	0	.

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Logit.

Figure B2.

An Email Snap Shot Showing Permission to Use Images From PEW Research Center