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PIXELATED SCAPEGOAT:  
FALSE CONNECTIONS BETWEEN VIDEO GAMES AND VIOLENT CRIME IN  
AMERICA'S LARGEST CITIES

by

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B.A. University of Central Florida, 2018

A thesis submitted in partial fulfillment of the requirements  
for the degree of Master of Arts  
in the Department of Sociology  
in the College of Sciences  
at the University of Central Florida  
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## **ABSTRACT**

For too many years, the public perception of violent crime has been viewed through the warped lens of media representations and reporting of mass killings, the likes of Columbine, Sandy Hook, and Parkland, while ignoring the body counts that rack up year after year in America's own cities. Many pundits and politicians declare cultural decay and glorification of violence in video games as the main reason for mass shootings. However, these same voices fail to take the explanation any further to explain the eruptions of violence that rack up thousands of lives a year in large metropolitan areas. The question then, is a simple one. If violent video games are responsible for the recent upticks in mass public violence, then should it not also be true that violent video games have some causal connection to everyday violent crime? This study aims to answer this question and then some. Using the 100 most populous cities as sample, traditional criminological explanations for violent crime, such as poverty, income inequality, population density, segregation, divorce, and the contexts of our racialized past, will be compared to simple measures of video games prevalence, such as sales figures and surveys that detail video game preferences, in explaining homicide and aggravated assault rates in the cities over a five-year period. Using OLS regression analyses, the results suggest that video games, when taken by themselves, have a negative relationship with both homicide and aggravated assault rates, meaning that the more video games sold in any given city, violent crime is lower. However, when taken together with the traditional explanations of violent crime in the same model, video game related sales and public sentiments fall short of significance when compared to variables like poverty and historical racial segregation.

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## CHAPTER 1: INTRODUCTION

“Through TV and moving pictures a child may see more violence in thirty minutes than the average adult experiences in a lifetime. What children see on the screen is violence as an almost casual commonplace of daily living. Violence becomes the fundamental principle of society, the natural law of humanity. Killing is as common as taking a walk, a gun more natural than an umbrella. Children learn to take pride in force and to feel ashamed of ordinary sympathy. They are encouraged to forget that people have feelings” (Wertham, 1954; pg. 34). This quote is attributed to Fredric Wertham’s 1954 book, “The Seduction of the Innocent”. Wertham was the child psychiatrist who led the war against comic books in the 1950’ and 60s, claiming explicitly that the new medium was harmful to the minds of children. The quotes age may seem quaint in parts, but its sentiment lives on more than 60 years later. The villain who now corrupts the moral character of our youth takes a different form: video games.

After the tragic shooting in El Paso, Texas in 2019, President Trump said in the press conference following the event, “We must stop the glorification of violence in our society...this includes the gruesome and grisly video games that are now commonplace. It is too easy today for troubled youth to surround themselves with a culture that celebrates violence” (Berenson, 2019). The familiarity of these quotes should be striking considering the years of change that separate the two. Let us not forget that while Fredric Wertham waged his war against comic books, people of color still could not drink from the same water fountains nor learn in the same classrooms as whites.

Just as Wertham failed to perceive greater threats posed to the society of his time, so too does Donald Trump fail to perceive sources of injustice in our time. In 2017 alone, there were 17,284 homicides in the United States (Uniform Crime Report, 2017), and 346 of those homicides were from “mass shootings,” 0.02% of homicides in the U.S. (GVA, 2017). Also, in 2017, the Las Vegas and Sutherland Springs church shootings occurred, claiming 59 and 27 victims respectively, each accounting for 0.005% of homicides in the United States. The other mass shootings that remain branded in the public psyche, Columbine, Virginia Tech, Sandy Hook, and Stoneman Douglas, together claimed 92 lives across 19 years. The tragedies of these events should not be minimalized or forgotten. However, tragedies of this scale occur every year, more than once, in some of the United States’ largest cities, and the names of the victims go unsung in the annals of history.

In 2017, the homicide rate in St. Louis, Missouri was 64 per 100,000, in Birmingham, Alabama it was 52.7 per 100,000, in Baltimore, Maryland it was 51.1 per 100,000, in New Orleans, Louisiana it was 40 per 100,000, in Chicago, Illinois, it was 20 per 100,000 (UCR, 2017). To put this into perspective, in 2016 San Salvador had a homicide rate of 136 per 100,000, Guatemala sat at 70.8 per 100,000, and Tijuana, Mexico had a rate of 49.8 per 100,000. Some of these cities and countries have been defined as active war zones (Muggah & Tobón, 2017). In St. Louis, a homicide rate of 64 per 100,000 translates into 205 lives, in Baltimore, 342 lives, in Birmingham, 110 lives, and in New Orleans 157 lives, and in Chicago, a jaw dropping 653 lives (UCR, 2017). Listed here are only five cities in only one year. In one year in five cities, 1,467 lives were lost. At first glance, it is almost insulting that the 92 lives lost in public shootings over the past 19 years have managed to overshadow the 1,467 lives lost in one year

alone. Only when placed side by side does it become clear that larger problems loom over the United States. Unfortunately, public mass shootings attract the media and violent crime in major metropolises slide into shadow. Even worse, some public representatives tend to draw attention even further away from places like St. Louis or Chicago and lure the spotlight towards the “culture of violence.”

In the wake of public rampage shootings, many of the questions that percolate into view include: What was the motivation? Who was the shooter? How many died? *Did the shooter play violent video games?* Despite many years and a vast collection of research suggesting that video games are not significantly related to violent crime (Bensley & Eenwyk, 2001; Ward, 2011; Markey et. al., 2014; Cunningham et. al., 2016; Stacey, 2016; Markey & Ferguson, 2017; DeCamp & Ferguson, 2017; Przybylski & Weinstein, 2019), the public’s perception that violent video games have some causal relationship with violence persists. A 2017 Pew report suggests that as many as 60% of adults in the U.S. believe that gun violence in video games is a significant contributor to gun violence in the real world (Parker et. al., 2017).

Much of the research done investigating the “problem” of violent video games has been firmly planted in psychology laboratories. This research has proven invaluable in showing that the effects of video games are complex. Research shows that the effects vary depending on the type of video game being played, how long it’s being played, why it’s being played, who is playing, and who it is being played with. Different video game studies have at once shown that games can increase aggression, increase prosocial thinking, increase cognitive functioning, and decrease cognitive functioning all depending on the question being asked (Gentile, Bender, & Anderson 2017; Boot, Blakely, & Simons, 2011; Greitemeyer & Osswald, 2010; Gentile, 2009).

The hypothesis that video games are responsible, or at least partly responsible, for the recent trends in mass shootings is unsubstantiated thus far (Ferguson, 2008; Ferguson, Coulson, & Barnett, 2011; Karnedy, 2016; Markey & Ferguson, 2017). But *the idea* that violent video games are a significant risk factor in influencing potential mass shooters has implications not just for mass murder, but for violent crime in general. If violent video games can push individuals to commit violent criminal acts, the massive popularity of video games around the world should have brought about a violent crime explosion the likes of which have never been seen before.

This study is an attempt to identify the far-reaching effects that video games may (or may not) have on violent crime rates in the United States' largest cities. Some of these cities are home to violent crime rates higher than anywhere else in the United States. Violent crime does not exist in a vacuum, just as video game culture does not. The phenomena that impact violent crime, such as concentrated poverty, income inequality, high divorce rates and population density have been described as the "structural covariates of homicide" (Land, McCall, & Cohen, 1990; McCall, Land, & Parker, 2010). If it is true that violent video games impact criminal behavior, it should also be true that high crime areas should be home to a thriving video game culture. There may also be "structural covariates of gaming": necessities in an area that allows for a thriving video game community. Factors include the availability of video game stores, quality of internet, availability of internet, percentage of the population owning a gaming device, and so on. The question is this, which has a more powerful influence on violent crime, the structural covariates of violent crime or the structural covariates of gaming?

## CHAPTER 2: LITERATURE REVIEW

### *Why Video Games?*

Before unveiling links in the chain of causation between violent crime, video games, and social environment, we must first ask, why video games? This seemingly arbitrary pastime has garnered a lot of attention for itself in the decades since its inception. In 1992 and 1993, two video games made their debut to the excitement and mortification of the general public: Mortal Combat (Midway Games, 1992) and DOOM (id Software, 1993). These two games made waves in entertainment for three reasons. The first reason is obvious, the blood and the gore. Even in a pixelated form that would seem quaint to us today, the ability to blow off a demon's head in DOOM or rip out the spine of your opponent in Mortal Kombat was edgy in the 1990's video game market. Mortal Kombat is the seed that germinated the Entertainment Software Rating Board (ESRB) which operates to this day to help prevent underaged youth from buying video games for mature audiences. The second reason is that *you*, the player, could activate the carnage yourself. Sure, you could watch RoboCop (1987) stick a sharp blade into Kurtwood Smith's neck or in the same film watch Paul McCrane melt alive in toxic waste, but you couldn't commit the deed *yourself*. The third reason video games ignited panic in parents is because *kids* wanted to play them. Most of the marketing campaigns were directed towards children. The threat of morally corrupting kids is and always has been a cardinal sin in the eyes of parents, and the backlash that ensued reflected as much.

"We're talking about video games that glorify violence and teach children to enjoy inflicting the most gruesome forms of cruelty imaginable", (Washington Post, 1993). This is

from an interview with Senator Joseph Lieberman following an incident involving his son's exposure to Mortal Kombat for the first time in 1993. If the quote seems familiar, it's because its echo has been heard in recent years. Kentucky Governor Matt Bevin had this to say after the Stoneman Douglas High School massacre, "There are video games that...celebrate the slaughter of people. There are games that literally replicate and give people the ability to score points for...finishing someone off who's lying there begging for their life. We are desensitizing young people to the actual tragic reality and permanency of death" (Leland Conway Show, 2018). What this goes to show is that not much has changed in the minds of many public representatives, nor has it necessarily changed in the eyes of the public. A 2017 Pew report suggests that as many as 60% of adults in the U.S. believe that gun violence in video games is a significant contributor to gun violence in the real world (Parker et. al., 2017). If this was true, one begins to wonder how many gamers have transformed into violent lunatics after "exposure" to this cultural pestilence.

As of 2019, 75% of US households have at least one "gamer" in the household who plays 3 or more hours of video games per week and 65% of Americans play some form of video game every day, from Solitaire, to Candy Crush, to World of Warcraft (ESA, 2019). Sixty percent of "gamers" play on their smart-phone, 52% play on a personal computer, and 49% have a dedicated game console, such as a PlayStation or and Xbox, since many gamers play on multiple devices (ESA, 2019). Let's put this into perspective. Sixty-five percent of the United States is equivalent to around 200 million people. When Europe, Asia, Australia, and the rest of the world are added, conjecture puts the number of gamers in the world somewhere around 2.5 billion (Gough 2019). Total consumer spending on video games and their associated technologies such as consoles, controllers, etc., for the United States went from \$35 billion in 2018 to \$43.4 billion

in 2019. It is also true that the US video game industry has added \$11.7 billion to the country's GDP (ESA 2018, 2019). There doesn't appear to be any sign that video games will lose popularity any time soon.

According to the same 2019 Entertainment Software Association report, 20.9% of video game sales are in the "shooter" genre and 7.8% are in the "fighting" genre. Let's pretend for a moment that each of those genre-specific sales represents a single gamer. This is probably inaccurate because the same gamer can, and likely does, buy more than one type of game (ESA 2018, 2019). But for the sake of argument, let's play along. Those genre-specific sales translate into 57.6 million people in the United States playing shooting and fighting games. If these figures are similar around the world, that translates into around 700 million people playing shooting and fighting games. If the theory that violent video games desensitize people to the point where they, "forget that people have feelings," and are motivated to commit appalling violent crimes, there should be legions of gamers out there committing atrocities every day in multiple countries around the world.

On an episode of Fox & Friends, commenting on the El Paso Walmart shooting, Dan Patrick the Lieutenant Governor of Texas, claims to, "look at the common denominators", and asks, "what has changed in this country? We've always had guns, we've always had evil... but I see a video game industry that teaches young people to kill" (Patrick, 2019). Unfortunately for this claim, violent crime rates have seen a steep decline in the United States since DOOM and Mortal Kombat debuted in the 1990s, and non-war related homicide deaths seem to be slowly declining around the world as well (Eisner, 2003; GHDE 2017). There must be some reason why violent video games and other violent media are not doing the corrupting work that people like

Dan Patrick, Matt Bevin, Donald Trump, and Joseph Lieberman say they are doing to today's youth. The question is, why not?

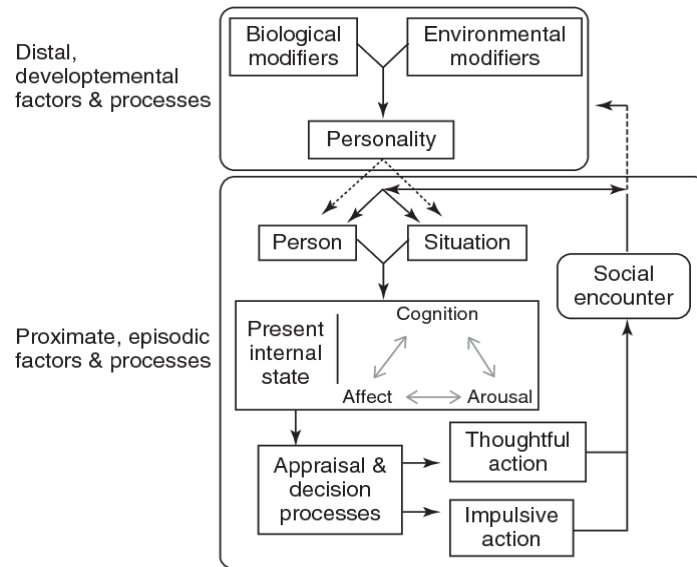
### ***Violent Video Games, Aggression, and Violence***

Following the 2018 Sante Fe High School shooting that claimed the lives of ten students, the lieutenant Governor Dan Patrick had this to say on CNN, "97%... of teenagers view video games, and 85% of those video games are violent. ...what are these games showing you how to do? Kill people. ... The vast majority [of psychologists and psychiatrists] will tell you it leads them to become numb to violence, to have less empathy to their victims and be more aggressive" (Simon, 2018). These are very particular claims. Teenagers will become, "numb to violence", they will have, "less empathy to their victims", and they will, "be more aggressive" after, "viewing video games". What does it mean for a violent video game, or any piece of violent media for that matter, to influence a person to such a degree that they are motivated to physically assault or even murder another human being? Let's take this one step at a time. First order of business is understanding how a person's aggression is influenced or influenceable. To do this, the General Aggression Model (GAM) will be discussed. Second, what role does violent media playing the causal chain that leads to an aggressive behavior or thought? Lastly, conflicting evidence will be considered regarding aggression, violent crime, and the path between the two. It is important to understand the potentially important differences between criminal violence, like assault and homicide, and laboratory aggression.



## *The General Aggression Model*

The General Aggression Model (GAM; Anderson & Bushman, 2002; DeWall, Anderson, & Bushman, 2011) is defined as a social-cognitive model and attempts to bridge the gap between neuroanatomical, psychological, and sociological forces that play important roles in the production of aggressive and violent behaviors. As a testament to its ambitions, the model was designed to incorporate social learning theory, script theory, cognitive neo-association theory, excitation transfer theory, social information processing theory, and the cognitive/behavioral processes underlying systematic desensitization therapy (Anderson & Bushman, 2002; 2018). It suggests an explanatory power that can illuminate the processes of violence that occur not just within university facilities, but *outside* of a laboratory context and in short or long terms time horizons. This theoretical framework turns on two definitions that are often emphasized and defined in the studies and papers that apply the GAM. The two definitions are aggression and violence. Aggression is often defined as, “behavior intended to harm another person who does not want to be harmed” (Anderson & Bushman, 2002). Violence then is defined as behavior intended to do extreme physical harm, such as injury or death (Anderson & Bushman, 2002). GAM operates on three fundamental stages that help explain a, “single episodic cycle of aggression” (See Figure 1; DeWall, Anderson, & Bushman, 2011).



**Figure 1.** The General Aggression Model

The stages are, (1) the individual and the situational inputs (personality predisposition, mood, provocation, violence exposure), (2) internal states (arousal, cognition, general affect), and (3) the outcome of the decision-making process (thoughtful or impulsive).

<u>Proximal Causal Factors</u>		<u>Distal Causal Factors</u>
<u>Person</u>	<u>Situation</u>	<u>Environmental modifiers</u>
Aggression scripts	Alcohol & other drugs	Antisocial peers
Attitudes towards violence	Bad moods	Cultural norms, teachings
Cultural stereotypes	Diffusion of responsibility	Deprivation
Dehumanization of others	Frustration	Difficult life conditions
Displacement of responsibility	Noise	Exposure to violent media
Hostile biases	Other Provocations	Group conflict
Long-term goals	Pain/discomfort	Maladaptive families/parenting
Low agreeableness	Social context (bar, church...)	Victimization
Moral justification of violence	Social Exclusion	Violent neighborhood
Narcissism	Social stress	<u>Biological modifiers</u>
Normative beliefs	Threatening/fearful stimuli	ADD/ADHD
Poor impulse control	Uncomfortable temperature	Impulsivity deficits
Psychopathy	Violent media	Low arousal
Self-efficacy beliefs	Weapons	Low serotonin
Self-image (tough, strong...)	Witnessed violence	Other genetic risk factors
Unstable high self-esteem		Poor Executive Function
		Various Hormones

**Figure 2.** GAM - Proximal & Distal Causal Factors

What solidifies a pattern of behavior in the GAM is the feedback loop that perpetuates it. This means that when an aggressive encounter occurs (shoving, shouting, thinking aggressive thoughts, exposure to violent images, etc.), it exists to prime the individual to react in a similar way given a comparable context in either of the stages to behave the same way in the future. Under the light of GAM, violent media such as television, movies, music, and video games seem to be part of the mechanism that propels certain individuals, with certain predispositions, under certain circumstances, to lash out in a litany of ways. Presentation matters as well. "...How violence or aggression is presented can alter its meaning for the audience and may moderate viewers' behavioral, cognitive, and emotional reactions" (Anderson et al., 2003). This means that the differences between cartoonish aggression such as Bowser bumping a Mario Kart (1992) off a cliff and realistic violence such as ripping your human opponent in half in Mortal Kombat 11 (2019) may well be significant, even though both are described as aggressive in studies of media violence (Thompson & Haninger, 2001; Gentile et al., 2007). It is within the framework of the General Aggression Model (GAM) that the research in the next section is situated.

### *Early Research on Media Violence & Aggression*

Aside from being deployed usefully in understanding suicide, intimate partner violence (IPV), and intergroup violence (DeWall, Anderson, & Bushman, 2011), GAM has been implemented to understand the subtle, but real, effects that media violence exposure can have on human aggression (Plante & Anderson, 2017). At first, the primary focus of media violence studies was television and movies. There are, in fact, differences in effect based on the type of

engagement with violent media (Greenfield, 2014). For instance, violent movies, television, and music are consumed *passively*. That is, the user does not add input to the media that could affect it. Video games on the other hand, are *active* in that the user does ad input to the system which changes the engagement with the medium. One cannot change the lyrics of a song or a scene in a movie (besides turning it off) but one can choose *not* to pull the trigger or make other equivalent decisions in video games.

Short-term, experimental methodologies consisted of exposure and effects over time periods ranging from minutes to days. The experiments often played out in a typical fashion, where randomly assigned groups would watch either a non-violent or violent movie or television episode, and then the subjects would be observed. What was being observed or recorded varies from study to study. There are studies where physical violence is expressed after exposure to violent media. The logic is that the best predictor of violence in the future is violence in the past (Huesmann & Moise, 1998; Tremblay, 2000), and since children around the age of seven have more trouble than older children distinguishing reality from fiction (Davies, 1997), it seems important to take seriously the occurrence of aggressive feelings and thoughts following experience and exposure with violent media of all types, especially in children.

For example, in one early study (Josephson, 1987) a group of young boys aged seven to nine were split in two, where one group watched a violent movie and the other a non-violent movie. After watching the movie, the children played a floor hockey game and were observed for the number of times each boy hit, knocked, tripped, or shoved another boy during the game. Results showed that the boys who watched the violent movie were moderately more likely than the boys who watched the non-violent movie to act in these aggressive ways. There is another

longitudinal study done between 1977 and 1992, where TV consumption and peer-nominated aggression were associated with aggressive behavior later in life (Huesmann, Moise, Podolski, & Eron, 2003). However, in much of the research on aggression and media, what is recorded is not real violence per se, but aggressive feelings and aggressive thoughts (Anderson et al., 2003),

Aggressive thinking is usually a belief set or posture towards a given stimulus that is aggressive or violent. Aggressive thinking can occur without the emotions of anger, disgust, or embarrassment. Aggressive emotions are just that, the feelings inside that prime an individual to lash out. Emotions and thinking influence each other. For instance, many high-octane action sequences, scenes of violence, or sexually explicit scenes in television and video games increase physiological arousal. Physiological arousal is measured by increases in heart rate, blood pressure, and activity in the region of the brain responsible for fight or flight (Gentile, Bender, & Anderson, 2017; Anderson & Bushman, 2018). Aggressive and violent acts in media will stimulate these same arousal circuits in the brain, increase the heart rate and increase blood pressure. When thinking about GAM, the arousal prompted by violent imagery has the potential to reinforce these same responses, thus making it more likely (in theory) that someone with repeated exposure to violent stimuli will be more likely to react aggressively under similarly provocative circumstances in the real world. As evidence of this link, one paper describes instances of imitation, e.g., copycat crimes (Huesmann & Kirwil, 2007). For instance, in one anecdote: “A teenager who is arrested for delinquency and taken to a police station suddenly grabs an officer’s gun, shoots him, walks down the corridor of the station shooting others systematically, steals a police car, and races away. The scene closely mimics a scenario from the

video game Grand Theft Auto, which [the teenager] has been playing over and over” (pg. 555, Huesmann & Kirwil, 2007). The real question is, how many others have done the same thing?

One metaanalysis summarizing most of the research up until 2001 found that most methodologically valid studies published on the topic of violent video game exposure and aggressive cognition (thoughts) and aggressive affect (feelings) reported small, but significant results correlating them (Anderson & Bushman, 2001). There is also cross-cultural evidence supporting the link between violent media of all types and short-term aggressive effects in multiple countries including Australia, China, Croatia, Germany, Japan, Romania, the United States (Anderson et al. 2017). This study in particular used questionnaires that measured self-reported aggression such as, “if someone pushes me, I would push back,” verbal aggression, “I can’t help but getting into arguments with people who disagree with me,” and relational aggression, “I sometimes spread rumors that may hurt someone,” and found positive relationships between these measures and violent media exposure.

### *Desensitization, Empathy, & Consensus*

Besides aggression and violence, many researchers and parents find the phenomenon of desensitization to violence and reductions in empathy just as important in the causal framework of real-life aggression. The common definition of desensitization is, “the process through which a person’s emotional reactions to some stimulus habituate and diminish over time with repeated exposures to that stimulus (Anderson & Bushman, 2018; Wolpe, 1958). It is important to recognize that desensitization to violence is not always a necessarily negative thing. Surgeons, police, soldiers, or even homicide researchers need to have some degree of

desensitization to operate, but it is often perceived as negative for young children.

Desensitization, or dehumanization, is also present on the list of relevant influences in the General Aggression Model.

Early research attempted to evaluate exposure to violent video games and desensitization to images of real-world violence by measuring heart rate and galvanic skin response as measures of physical responsiveness (Carnagey, Anderson, & Bushman; 2007). The results showed significant deviations in heart rate and galvanic skin response between participants who played a violent video game for 20 minutes before viewing real violence and those who played non-violent video games. In 64 gamers who played 25 minutes violent video games and were subjected to an EEG (electroencephalogram) scan to measure desensitization to violent imagery, participants who did not respond as much to the violent imagery were also more likely to play a louder noise blast in the years of an opponent who lost a reaction time task (Engelhardt et al., 2011). Desensitization to violence through violent video games has also been linked to reductions in helping behaviors (Bushman & Anderson, 2009). In this study, a group of college students (320) played either a violent video game or a non-violent one and were left to deal with a staged fight outside of the experiment room. In the study, participants who played the violent video game took longer to interject and help. In the same paper, similar results were found following a violent movie.

Desensitization also has an indirect impact on a person's potentially aggressive reaction. Instead of impacting aggression directly, exposure to violent media may reduce empathy with others, thus leading to more aggressive or violent impulses going uninhibited. Empathy, or lack thereof, has also been linked to aggressive behavior (Eisenberg, 2000; Marshall & Marshall,

2011). Empathy is described as, “the intellectual identification with, or vicarious experiencing of the feelings, thoughts, or attitudes of another; the imaginative ascribing to an object, as a natural object or work of art, feelings, or attitudes present in oneself” (Zinn, 1993).

In 2003 a research team (Funk et al., 2003) administered a questionnaire to a group of thirty-five 8-10 year olds who were asked how much they played video games and the types of video games they played. Funk et al. took measures regarding attitudes towards aggression and empathy and presented vignettes in images that depict acts of aggression that should elicit empathy. For instance, one vignette had a little girl tripping, falling, and injuring her knee. Long-term exposure to violent video games was associated with lower empathy score responses to these images. A meta-analysis was conducted testing the validity of many of the claims discussed thus far, such as the impacts of short versus long term violent video game exposure on desensitization, empathy, aggression, and arousal in studies from the United States to Japan (Anderson et al., 2010). Once all studies were accounted for based on rigorous inclusion parameters, there were 221 effect size estimates and over 130,000 participants across all of the studies. Regarding empathy and desensitization, violent video games were significantly associated with lower empathy despite differences in methodologies and culture. Similar findings in this study were reported for aggressive cognition and behavior.

In 2017, the American Psychological Association Task Force decided to take on the violent video game debate. They investigated studies published between 2009 and 2013 and other existing literature surrounding the debate about the adverse effects of violent video games on society. The team ultimately concluded that there are, “robust correlations between violent video game use and aggressive behavior...violent video game use is associated with growth in



aggressive behavior over time...outcomes demonstrate clear and consistent adverse effects of violent video game exposure on the social and cognitive behaviors of children, youth and adults” (Calvert et al., 2017, pg. 137-138). The team also investigated empathy and desensitization, concluding that there is a, “decrease in positive outcomes such as pro-social behavior, empathy, and sensitivity to aggression” (Calvert et al., 2017, pg. 141). Despite all the evidence surrounding aggression, the task force also concluded that it, “did not find sufficient studies to evaluate whether there is a link between violent video game use and criminal behavior” (Calvert et al., 2017, pg. 141). This comment matters more than all of the violent video game research combined and will be discussed further in later sections.

For now, one thing is certain regarding the topic of video games and their effects on behavior and thinking: there are impacts. What matters is the thinking surrounding the problem. Discussion of causality often gets muddled in the media, even if the relationships discussed are elaborated on and have important caveats attached to them. It is a matter of probabilistic causality. This topic is touched on beautifully by Bushman & Anderson (2015, pg. 1810),

*“The old “necessary and sufficient” rules of causality commonly taught in introductory logic courses do not apply in most of modern medical, behavioral, and social science. As an example, the scientific community has known for decades that habitual tobacco smoking causes lung cancer. Even the general public now accepts this fact. However, not all people who smoke get lung cancer, and some people who do not smoke get lung cancer. The former violates the “sufficiency” rule, whereas the latter violates the “necessity” rule. In short, smoking is neither a necessary nor a sufficient cause of lung cancer. Yet we “know” that smoking causes lung cancer. The resolution to this paradox is simple. Causality in this context is probabilistic. The short statement, “Smoking causes lung cancer,” really means, “Smoking causes an increase in the likelihood of contracting lung cancer.” Similarly, when media violence researchers say that “Violent media cause aggression,” they mean that “Violent media exposure causes an increase in the likelihood of aggression.”*

The real question then becomes, how much of an increase in the likelihood of aggression does exposure to violent video games induce? What forces increase, reduce, or deadlock the effects discussed thus far? The “consensus” on violent video games have been thoroughly challenged in multiple arenas and the conversation is far from over.

### *Critiques & Contradictory Evidence*

The general thrust of the research discussed thus far is an indirect attempt to help explain real world violence. There is no denying the swath of evidence linking exposure to violent media and aggressive behavior in the long and the short term (Plante & Anderson, 2017). Most, if not all, of the research reviewed up to this point and the mountain of research not included have used seemingly well-designed experimental, longitudinal, and cross-cultural methodologies to measure aggressive behavior. It may seem like the case is closed and that video games may indeed be the villain of this story of human aggression. But one would be mistaken for jumping to conclusions. There is an entire wing of research that presents evidence that contradicts the “consensus” discussed thus far. This research creates complications in the discourse surrounding the truly complex causal mechanism between a human being, their environment, and the commission of a violent criminal offense.

Much violent video game research relies on measures and methodologies of aggression that have remained hitherto unmentioned but cannot be understated or overlooked when discussing connections being made between violent video games and aggression. One cannot ask study participants to commit violence in the name of science, so indirect methods are the only paths by which laboratory and correlational research can be accomplished. This is not a dig at the

research or the researchers who have worked diligently and with good intentions to illuminate the relationships between human aggression and violent media. On the contrary, the evaluation of the evidence has been in a good faith attempt to engage with the merits of such research and engage it on its own terms, illustrating the claims with vivid examples of the connections drawn. The studies dealt with thus far have used questionnaires (parent, peer, teacher, and self-reports) to detail the degrees of aggressive cognition, affect, and behavior primarily among youth. The measures include feelings, thoughts, and acts of aggression directed at friends, peers, parents, and teachers after being exposed to violent media for various periods of time measuring ranges from minutes to years.

However, the limits of laboratory and correlational methodologies have and will continue to be a weakness in social science despite the best intentions and methodological designs. Critique is both necessary and warranted in science to achieve the clearest picture of reality. In social science, this task is made difficult by the whirlwind of variables that confound and confuse attempts to draw such pictures. In the pages that follow methodologies will be criticized and evidence will be presented that will blur the picture in very significant ways by detailing pathways and effects that can change the influences that violent video games can have on an individual. From reductions in aggression to the promotion of prosocial behavior, increases in empathy and maybe even a reduction in crime, video games are not corroding the fabric of society as the previous research suggests.

With that in mind, the first order of business is critiques of methodologies. As stated a moment ago, scientists cannot ask participants to commit violence in the conventional sense of injuring or killing another human being. Proxy measures are the only route into the phenomenon

before the threshold of liability is crossed. One such proxy is known as the Taylor Competitive Reaction Time Test (TCRTT) also used and labeled as the Competitive Reaction Time Test (CRTT). It is used in a multitude of research causally connecting video game aggression and “real-life” aggression (Anderson et al., 2004; 2007; Bartholow, Sestir, & Davis, 2005; Anderson & Carnagey, 2009; Bartlett et al. 2009).

The TCRTT is arranged to create the illusion that a participant is competing with another person in a competition to see who can press a button faster. The confederate is often not another participant, but an illusion to allow for the next stage of the test. The “winner” of the competition gets to punish the other “participant” with a noise blast (between 0 dB and 95 dB) or a splash of hot sauce for their opponent who doesn’t like spicy food. Aggressive behavior is indicated by the volume of the sound or amount of hot sauce prescribed by the winner for the “loser”. These methods are well worn and defended in psychological research regarding tendencies toward aggressive behavior (Anderson & Bushman, 1997; Giancola & Parrott, 2008) but they are also heavily criticized (Ferguson et al., 2008; Ferguson & Rueda, 2009; Adachi & Willoughby, 2011; Elson et al., 2014).

For instance, there is more to a violent video game than just violence. There is pacing, character scripts, objectives, and degrees of frustration, skill, or competitiveness. These confounding factors are almost never accounted for in video game aggression studies and if they are, inconsistently accounted for. When understanding violence in the framework of the General Aggression Model (Anderson & Bushman, 2002), there have been attempts to account for things like difficulty and frustration (Anderson & Carnagey, 2009). This is convoluted when one remembers that video game violence is supposed to influence aggressive behavior by provoking

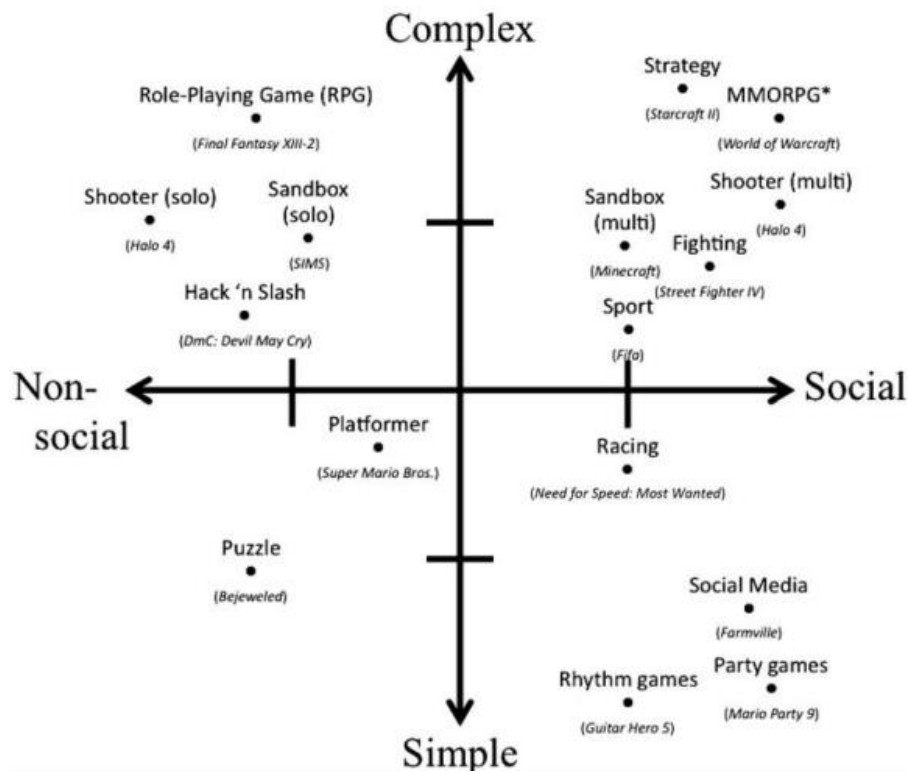
physiological arousal, aggressive thoughts, and aggressive feelings. “Thus, some of the video game dimensions that Anderson and colleagues have attempted to match are not actually characteristics of the video games themselves, but instead are variables related to one's internal state” (Adachi & Willoughby, 2011, pg. 58).

Adachi & Willoughby (2011) also raise the issue of competitiveness in both the TCRTT and violent video games. Many video games are incentivized to gain high scores, points, and ranks in order to move forward and become more powerful. Be it against artificial enemies like in DOOM or “real enemies” like in Fortnite (2017), the root of violent video games is essentially competitive. Therefore, “if the main intent for participants to deliver intense punishments to their opponents is to gain an advantage in the competition, instead of to actually cause harm to their opponents, then the TCRTT would actually be measuring competitiveness rather than aggression. Furthermore, participants may not even consider the fact that they could be causing harm to their opponents, depending on how immersed they become within the competition” (Adachi & Willoughby, 2011, pg. 60). In one test of the TCRTT, Fergusson et al. (2008) found that scores on the test were not related to aggressive personality traits, commission of domestic violence, or violent criminal behaviors.

What these observations do to the conversation is not trivial. Understanding that errors in methodology and spurious correlations are not the results of incompetent research design, incompetent researchers, or malicious intent to mislead on the part of violent video game researchers who are confident in the dangers of violent video games. What it does mean is that the issues surrounding violent video games are misunderstood due to the incompleteness in the research. As stated previously, video games are incredibly complex technologies. Nothing like

video games has ever permeated the human condition before. Agency, decision making, emotional storytelling, violence, realism, entertainment, competition and cooperation have never been bundled together into diverse experiences until the last few decades, and the games keep getting *better*. A single video game can encapsulate all these things, while some video games capture only a few, yet they are all lumped into the same category in the public eye.

Just like books, there are genres. A horror game like *Dead Space* (2008), where you are a lone engineer on a spaceship taken over by a zombie-like alien force and left to fend for yourself against hordes of human corpses taken over by the alien couldn't be more different from an open world RPG like *Fallout 4* (2015). Set in post-nuclear-war Boston, you play a mother (or father) hell bent on finding your missing son somewhere out there in the nuclear wasteland, taking out zombies, monsters and raiders that get in your way, forging alliances, and making moral decisions that impact other people in the wasteland. Both games use firearms (or tools that shoot projectiles) and melee weapons to take out enemies; some zombies, some humans, some monsters. Yet the motivations, goals, settings, tones, pace, and style are wholly different. In one, you are stuck on a ship with tight corridors, in the other, you have all of Boston to explore. In one, you can make friends, in the other you are alone. In one, the fate of the wasteland comes down to decisions you make, in the other, your decisions are limited to survival. Yet in both games, you can blow heads off and sever limbs. To claim that "violent" video games is a distinguishable definition that encapsulates all that matters in a video game is missing most of the picture. Complexity and sociality are but two dimensions in which video games can be differentiated (see Figure 3). Even still, violence is present in multiple games in each quadrant.



**Figure 3.** Game Genres - Complexity & Sociality. Conceptual map of video game genres based on levels of complexity and social interaction (Granic, Lobel, Engels, 2014) \*MMORPG: Massively Multiplayer Online Role-Playing Game

The people that play violent video games are just as diverse as the games themselves. Even worse, these diverse people, playing various games, play for different reasons, in different contexts, and for different periods of time. With the variability at play here it is difficult not to look at video games as Daphne Bavelier does. As Bavelier puts it, “One can no more say what the effects of video games are, than one can say what the effects of food are” (Bavelier et al., 2011, p. 763). With this idea in tow and since the majority of the analysis thus far has focused on the complexities of the “violent video games make for more aggressive people” argument, equal focus will be allotted to the lighter side of the video game debate: the benefits of video games.

## *The Benefits of Video Games*

With the discussion surrounding video games being predominantly situated into context of fear and societal risk, it seems prescient to redirect the spotlight. To set the stage, a qualification is in order. The potentially positive effects of video games do not *cancel* the potentially negative effects discussed thus far. What it does do is complicate the conversation about the causal mechanism between a video game and real-world violence. Of course, proponents of the media aggression – real-world aggression link never make this claim, it is often digested by the public incorrectly.

In 2014, a meta-analysis reviewed 98 independent studies attempting to coax out the different effects that different types of games can have on behavior (Greitemeyer & Mügge, 2014). This meta-analysis focused on the differences between anti-social, violent video games and prosocial, helping video games in their effects on aggression and prosocial behaviors. It found that, “video gameplay can both negatively and positively affect the player” (pg. 581) and that, “...the overall effect sizes of violent video game exposure ( $r = .18$ ) and prosocial video game exposure ( $r = .22$ ) were relatively similar in terms of their magnitude” (pg. 583). The analysis both confirmed that video game aggression does increase aggressive cognition and “behavior” (in the form of the TCRTT) and that prosocial video games increase prosocial behavior and decrease aggressive cognition (Greitemeyer & Mügge, 2014). What does this mean? It means that video games can and do have an impact on social conduct, no matter how minutely.



The following section will be scaffolded onto a literature review titled, “The Benefits of Playing Video Games,” by Isabela Granic, Adam Lobel, and Rutger Engels (2014). The positive aspects of video games are divided up into four subsections: cognitive, motivational, emotional, and social. Cognitive benefits consist of visual-spatial and problem-solving skills. In many video games, particularly fast-paced shooters, fast reflexes, quick attention allocation, boosted mental rotation abilities, and high spatial resolution processing are the skills needed to win and succeed. It turns out that gamers who regularly play shooting and action games have these skills in spades when compared to non-gamers (C.S. Green & Bavelier, 2012) and these skills are comparable to collegiate level training courses designed to produce the same effects (Uttal et al., 2013). Even more impressive and important for real-world outcomes, these same spatial skills predict achievement in STEM (Science Technology Engineering Math) fields (Wai, Lubinski, Benbow, & Steiger, 2010). Outside of shooters and action games, many video games have puzzles or puzzle-like game mechanics that are left for the player to deal with little to no instruction on how to accomplish the puzzles. This is often the realm of strategy and role-playing games like World of Warcraft (2004) or StarCraft (2017). One longitudinal study showed that adolescents who reported playing strategic video games also reported better problem-solving skills and had better academic grades over a year’s time (Adachi & Willoughby, 2013). This is just the beginning.

Motivational benefits are also in the repertoire of positive video game effects. Motivational benefits usually take the form of persistence and effortful engagement in the face of challenge, adversity, and failure (Dweck & Molden, 2005). Video games are home to many motivational and goal-oriented incentive structures, yet failure seems to be the most important when it comes to valuable skills that can be taken away from the virtual environment. Just about

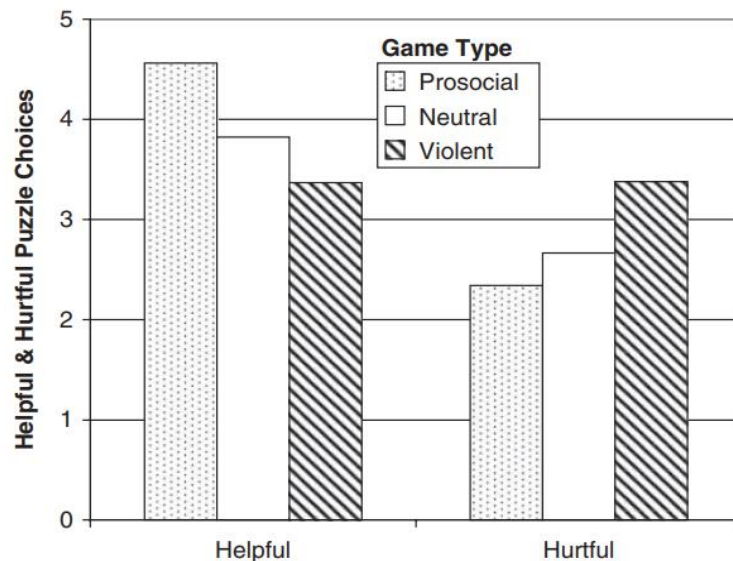
every video game on the market and in the past have fail states, where one does not accomplish a given challenge and therefore must try all over again. The essential message that is expressed by the incentive structures of most video games is, “persistence in the face of failure reaps valued rewards” (Granic, Lobel, & Engels, 2014, pg. 6; Ventura, Shute, & Zhao, 2013), a lesson as useful as it is timeless.

Yet another benefit of video gameplay comes in the form of emotional regulation. A great deal of research has been done exemplifying the ability of gamers who play games of their own preference allows them to increase positive emotions, improve mood, encourage relaxation, and even fend off anxiety (Ryan, Rigby, & Przybylki, 2006; Russoniello, O’Brien, & Parks, 2009; 2009; McGonigal, 2011). As an adaptation and emotional regulation strategy, video games have been documented as a common tactic to help regulate emotions (Olson, 2010). Positive emotional regulation strategies such as acceptance and problem-solving in concert with positive emotion have been linked to social support and reductions in symptoms of depression and anxiety (Aldao, Nolen-Hocksema, & Schweizer, 2010).

The final and arguably most important potential benefit extracted from video games are social in nature. The ESA 2019 report holds that 63% of adult gamers play with others online for an average of 4.8 hours per week or in-person for an average of 3.5 hours per week. The most popular shooter on the market currently is the infamous Fortnite (2017) which drops you either alone or with a team onto a map with 100 others, where you must coordinate and compete to eliminate all other players to claim victory. The other very famous online open-world RPG is of course, World of Warcraft (2005) which pits you in a massive open world with hundreds of other players with differing skill sets to either cooperate to take down legendary monsters or compete

alone or together in guilds in massive battles. World of Warcraft still captures the attention of around 3 million gamers around the world, where Fortnite now dominates the hearts and minds of 250 million gamers! Even humble Farmville on Facebook boasts millions of daily users.

What these games have in common is not just social interaction but design that encourages cooperation and helping behaviors. There is an entire class in MMORPG's (Massively Multiplayer Online Role Playing Games) and other socially-oriented games called the "healer" or "medic," a class specifically designed not to fight but to heal teammates and revive them in times of defeat. One important longitudinal study consisting of participants ranging from 5<sup>th</sup> to 8<sup>th</sup> graders in Japan and Singapore, and college students in the U.S. showed that prosocial video game content, as opposed to strictly uncooperative violent video game content, resulted in increased prosocial actions known as helping behaviors (Gentile et al., 2009; See Figure 4).



**Figure 4.** Prosocial vs. Violent Video Games. Helpful and hurtful behavior as a function of type of video game. Helpful behavior defined as choosing easier tasks for partners, hurting defined as choosing difficult tasks. (Gentile et al., 2009)

There is also evidence suggesting that prosocial video gameplay increases the availability of prosocial thoughts (in the form of anagram lexical decision tasks), increases empathy, and extraordinarily, decreases Schadenfreude (Greitemyery, Osswald & Brauer, 2010; Greitemeyer & Osswald, 2011). Schadenfreude is the German word for, “taking joy in others pain”. One would be forgiven for expecting that prosocial gameplay without violence is the only style of video game capable of producing such effects. One would again be mistaken for thinking this. There is research that shows that cooperation is the key element when discussing prosocial outcomes, even in violent video games.

In one study, players engaged either cooperatively or competitively in a popular online shooter Halo II (Ewoldsen et al., 2012). Players who played cooperatively were more likely to make fair exchanges compared to players who played competitively. Similar results were produced but with the added element of cooperating with an outgroup member (member wearing a rival university t-shirt), and results showed that cooperative gameplay even in violent settings produced fairer exchanges even between outgroup members when compared to competitive play (Velez et al., 2014). In another case (Ferguson & Garza, 2011), 873 youth between ages 12 and 17 were screened for violent video game exposure, parental involvement in gaming, youth civic engagement (e.g., “I have volunteered in my community”), and online prosocial behavior (e.g., “When you play computer or console games, how often do you help or guide other players?”). Results showed that violent video gameplay was moderated by parental involvement and cooperative online behaviors, while also showing that community engagement was not significantly affected by violent video gameplay even when all other variables were controlled for.

What this goes to show is that video games, even violent video games, are layered by so many complex interaction styles and moderating effects that violence cannot alone produce the aggression expected from well-done laboratory research. The next questions that emerge take the analysis one step farther: what effects do video games produce on real-world violence? It is a very important question, one that begins to show where the rubber does or does not meet the road on societal risk that violent video games do or do not pose. Remember that the American Psychological Task Force (Calvert et al., 2017) failed to produce evidence that video games have any significant impact on the commission of violent criminal acts. The following section will explain why the team came to that conclusion.

### *Video Games and Crime in the Real World*

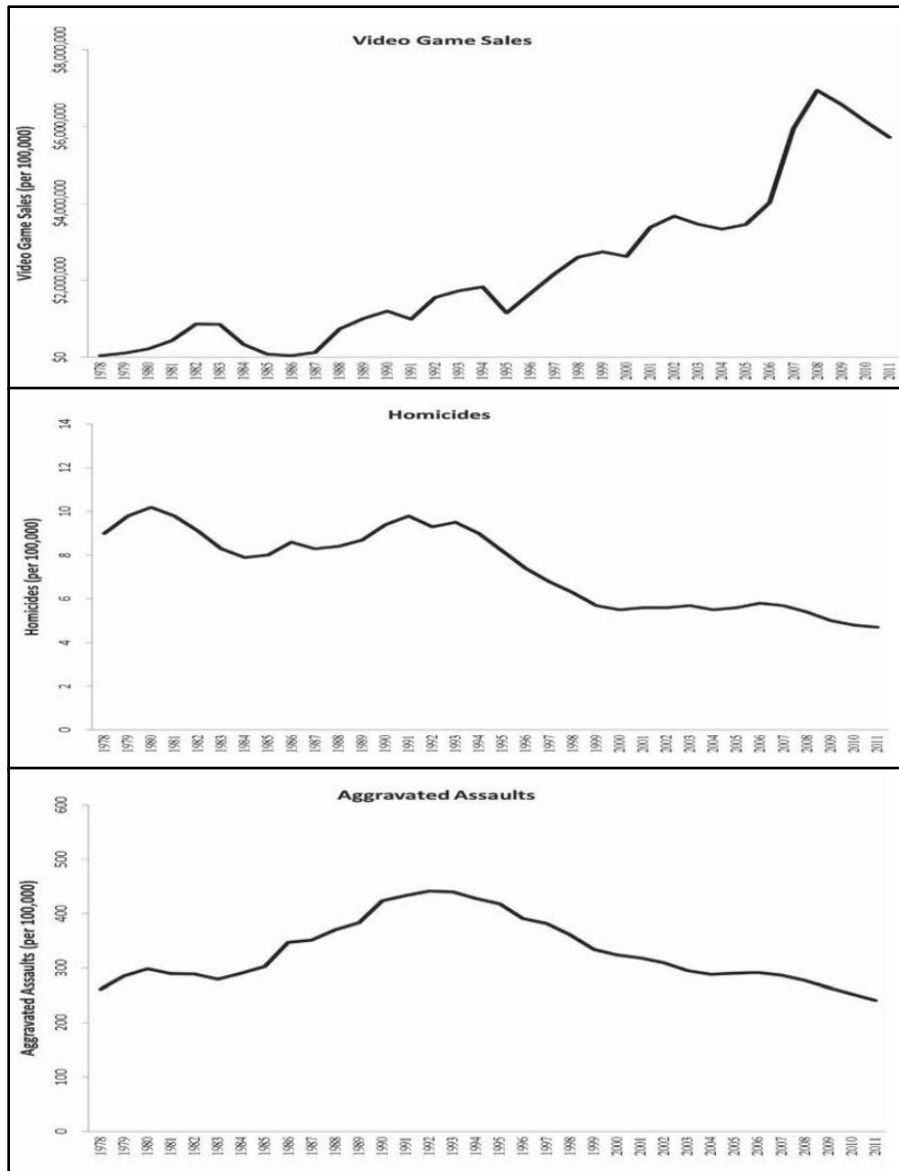
Injury and death are by far two of the most consequential negative outcomes that determine public and private policy decisions. Whether it is in a factory, in a neighborhood, or at the gym, injury and death are the metrics which almost all rules are defined to avoid and protect against. When discussing potential danger to the social fabric, these two variables are the first to be discussed. Disease, war, natural disaster, nutrition, pharmaceuticals, guns, on-the-job risk, insurance, and government policy are just a few nouns whose discussions orbit injury and death. It follows then that an analysis of violent video games should also revolve around death and injury to determine the true threat that society is faced with. It turns out that there is not much to go on thus far.

Recall the validity of the competitive reaction time test as it relates to real-world aggression. Ferguson et al. (2009) attempted to validate the Taylor Competitive Reaction Time

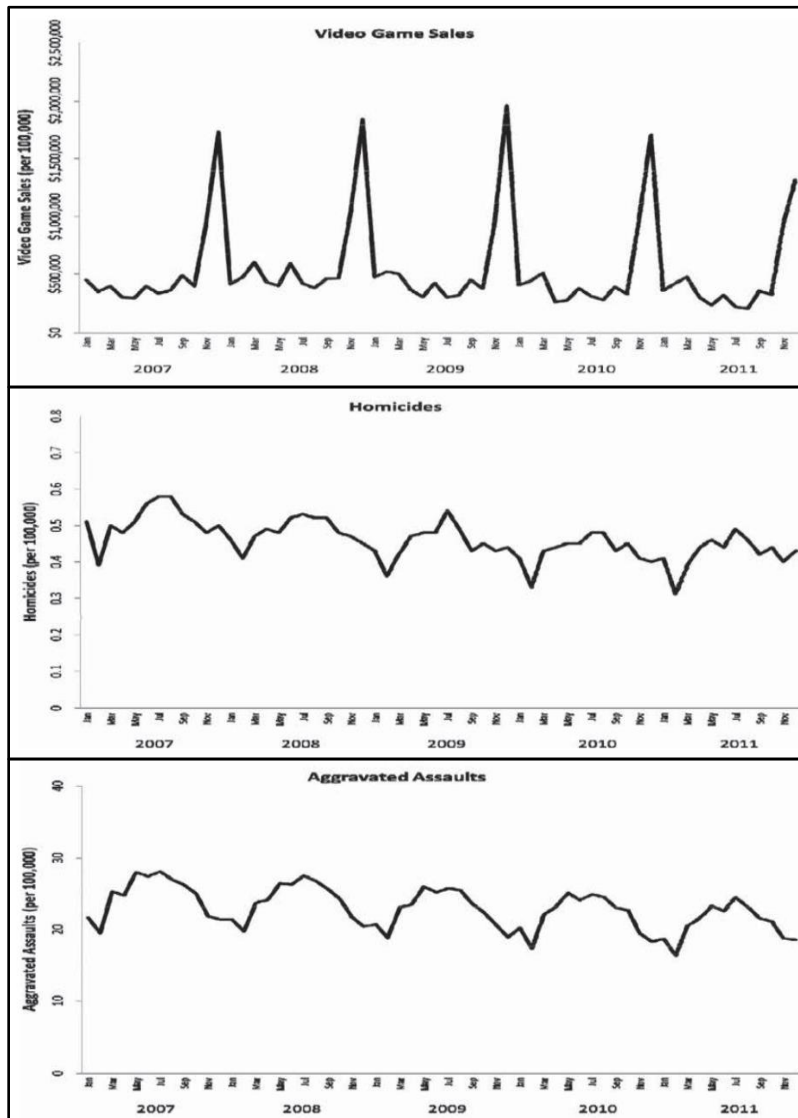
Test and instead found that the test results had almost nothing to do with violent crimes such as domestic abuse, assault or homicide. Instead, trait aggression, family violence, and male gender were far better predictors of violent crime compared to violent video games (Ferguson, Rueda, Cruz, & Ferguson, 2009). Other research on the topic of violent crime and violent video games have been done to substantiate the claim that video games have a miniscule and transient impact on the likelihood that a human being will murder or assault another human being. Of course, a statement of this magnitude needs to be caveated with the statement: depending on the person.

Following the sales figures of violent video games and juxtaposing them against violent crime rates would seem like a fitting start when attempting to draw a line between video games and violence. Remember that 27% of video game sales are in the “action” genre, 21% are in the “shooter” genre, 11% are in the sports genre, and 8% are in the “fighting” genre. That is 67% of video games with competitive, aggressive, and violent themes. Not to mention 11.3% are in the Role-Playing Game (RPG) genre, which consists of games like *The Elder Scrolls: Skyrim* (2012), *Fallout 4* (2015) and *The Witcher 3: Wild Hunt* (2015), some of the top-grossing RPG’s in the 21<sup>st</sup> century, where players have the ability to decapitate and maim enemies with swords or firearms. With RPG’s added, there are potentially 78% of game sales in genres with violent themes. Let’s also remember that potentially 200 million people are playing video games in the United States as of 2019. Seventy-eight percent of 200 million gamers is 156 million gamers playing games that involve fighting, competing, shooting, maiming, or injuring. If the hypothesis that violent video games indeed make players more aggressive and therefore prone to violence, these facts should translate into violent crime rates skyrocketing in the United States and countries around the world.

Following this logic, Markey, Markey, & French (2014) pull crime data from the FBI's Uniform Crime Report (UCR) and juxtapose them against the video game sales between 1978 and 2011. The team also compared sales between 2007 and 2011 on a monthly basis. They found no relationship between video game sales and homicides or assault. (See Figure 5 & Figure 6).



**Figure 5.** Annual changes in video game sales, homicide & aggravated assault rates between 1978-2011 were negatively correlated ( $r(32) = -.84, p < .01$ ). (Markey, Markey, & French, 2014)



**Figure 6.** Monthly change in video game sales, homicide rates, and assault rates between 2007 and 2011. Changes in sales were unrelated ( $r(58) = -.15, p = .25$ ) to homicide rates. (Markey, Markey, & French, 2014)

Cunningham, Engelstatter, & Ward (2016) used the National Incident Based Reporting System (NIBRS) and the UCR between 2005 and 2010 to compare sales figures of all video games and “intensely violent” video games while also including variables like time on market, game quality, play data on play since purchase, and peak buying seasons (like Christmas) to calibrate their analysis. They not only found that violent crime and video game sales covariates are

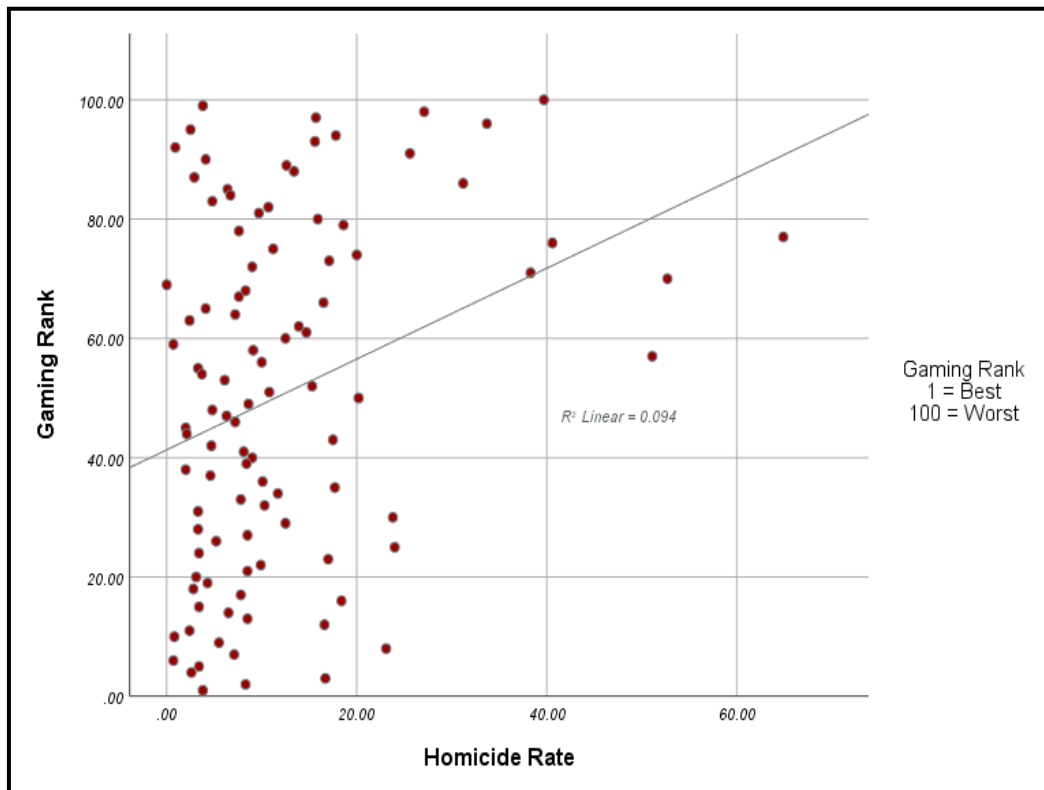


unrelated, but in some cases inversely related, where crime went down after popular video game releases.

Ward (2011) uses video game stores and related establishments per county in the U.S. between 1994 and 2004, monthly unemployment rates, Law Enforcement assaulted or killed, all major crimes ranging from homicide to motor theft to burglary, County Business Patterns (CBP) for employment and payroll data, mortalities between the ages of 10 and 25, earnings per capita, and a host of other variables to show that crime tends to decrease with more video game establishments per county. The results also provide evidence that other factors, such as poor economic standing, percentage population aged 15-24, and unemployment rates are far better predictors of violent crime than any video game-related variables, a discussion that will be expanded upon later.

In a paper presented at the Homicide Research Working Group (Segal, 2019), homicide rates in the United States 100 largest cities were plotted against WalletHub's Best Cities for Gamers ranking (McCann, 2018). The rankings were based on a scoring system that considered three main variables: gaming environment, gaming opportunities, and Internet Quality/Speed. These are labeled by Segal as the structural covariates of gaming (SCG). The SCG, as opposed to the structural covariates of homicide (SCH; McCall, Parker, & MacDonald, 2008; McCall, Land, & Parker, 2010) are made up of variables like video game stores per capita, share of households owning a computer or smartphone, video game job openings, video game-related college degrees, internet access, internet speed and lots more. These variables were scored based on a proprietary algorithm unique to WalletHub, and then cities were rank ordered as the best to worst gaming cities. For instance, the best gaming city was Seattle, Washington, where the city was

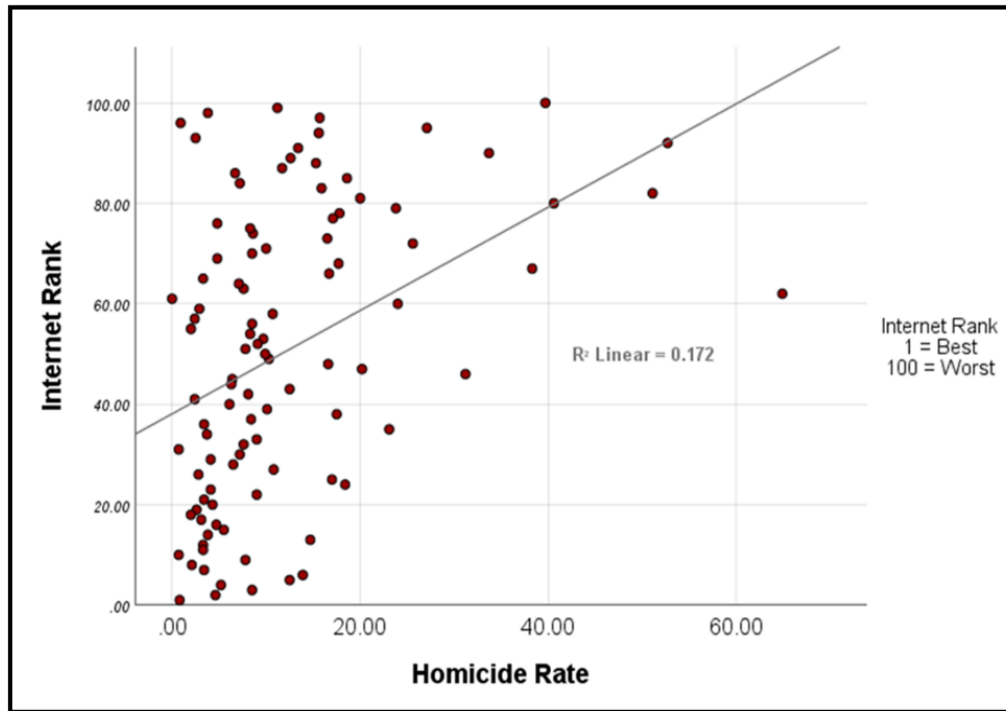
ranked as having the 5<sup>th</sup> best gaming environment, 5<sup>th</sup> best internet quality, and 3<sup>rd</sup> best gaming development opportunities. The worst city for gaming was Detroit, coming in with the worst gaming environment and internet quality, and ranked 82<sup>nd</sup> for gaming opportunities. Segal (2019) then plotted these ranks against the homicide rates of the same 100 cities. When environment, opportunity, and internet scores are compiled into one score then plotted against homicide rates, the cities with *lower* gaming scores were significantly associated with *higher* homicide rates (See Figure 7).



**Figure 7.** Gaming Rank vs. Homicide Rates in 100 Largest U.S. Cities. Aggregated gaming scores ranked from 1 – 100 where 100 is the poorest gaming score and 1 is the best. Plotted over 2017 homicide rates from the Uniform Crime Report. Gaming rank significantly related to higher homicide rates (\* $r = .282$ , \* $\chi^2 = 18.25$ , \* $p < .01$ ) (Segal, 2019).

However, once disaggregated, the gaming opportunity and environment had no significant relationship to homicide rates ( $r = .156$ ,  $p < .126$ ;  $r = .038$ ,  $p < .708$ ). Instead, internet

access and quality, a common proxy measure for socioeconomic status (Howard, Busch, & Sheets, 2010; Witte & Mannon, 2010; Robinson et. al., 2015), were the most important variables in the SCG (See Figure 8).



**Figure 8.** Internet Rank vs. Homicide Rates in 100 Largest U.S. Cities. Cities ranked by internet quality and coverage from 1 – 100, where 100 is the poorest internet score and 1 is the best. Plotted over 2017 homicide rates from the Uniform Crime Report. Internet quality and access significantly related to higher homicide rates (\* $r = .450$ , \* $\chi^2 = 37.6$ , \* $p < .001$ ) (Segal, 2019)

What this means for the conversation about violent video games and their relationship to crime is deeply important. What the research presented suggests is that other variables are far more important in predicting violence than all measurements of video games and video game related activity (thus far). Trait aggression, history of family violence, income, and internet access (a proxy for SES) were far more powerful variables in predicting violence. This implies that violence is more than media exposure.

Recall that most of the violence in the United States takes place in just a few cities: St. Louis, Baltimore, New Orleans, Birmingham, Detroit, and the like. All have hundreds of deaths combined each year. Not due to disease, car accidents, heart attacks or obesity, but from gun related homicides (Messner, 1982; McCall, Land, & Parker, 2010; Wintemute, 2015). The section that follows examines the trajectory of violence through history, through the research surrounding the causal mechanisms of lethal and non-lethal violence, and how these explanations are far more powerful predictors of violence than any media exposure studies to date. The implications of this chapter and the next will show why the conversation about violent video games as it relates to rampage shootings is wasted energy when compared to the violence problems in cities like St. Louis and Baltimore, which very often go undiscussed.

### ***Violence in the Real World***

Human violence has been a subject of horror and spectacle throughout written history. In fact, one would be hard pressed to open any history book without encountering some reference to violence or war. Some of our oldest stories, from the Epic of Gilgamesh to the Iliad and the Odyssey, are replete with violence. The most well known form of violence, due to its finality, is homicide: the deliberate and *unlawful* killing of one person by another (Oxford English, 1884). If it went unnoticed, unlawful is the key word. “Justified” killing, in the form of war, defense, and punishment has been the status quo for most of history. Tribes raided and pillaged neighbors, kings sacked cities, and nations collided in some of the most horrific displays of violence known to the animal kingdom.

Wars and atrocities throughout history are well-known illustrations of the darkness that lurks inside the human mind. The 20<sup>th</sup> century is particularly well known for its violence, for within its 100-year spread 142 million lives met their end from war and government atrocity. The years 1900 through 1999 are home to the First and Second World Wars, claiming 15 million and 55 million lives respectively, the Chinese and Russian Civil Wars, claiming three million and nine million lives, and the reigns of Joseph Stalin and Mao Zedong, claiming 20 million and 40 million lives (Pinker, 2011). Trying to imagine 142 million people is almost unfathomable. To understand the scale an illustration is in order. Every 12 years, 120 million people gather for the Kumbh Mela festival in India and the gathering can *literally be seen from space* (Bagla, 2019). Killing on a massive scale for reasons of policy or conquest never seemed to foster sensations of horror in the general public until the 20<sup>th</sup> century when the industrial war machines of the most powerful nations on earth were capable of annihilating thousands of lives in the span of a few hours with the mere goal of capturing a hill or a town.

Luckily, citizens and tribespeople around the globe for millennia have scorned the act of unjustified killing not motivated by hatred of another group. Killing within the group, that is killing one's countrymen, neighbors, or leaders *without just cause*, has almost always resulted in immediate action against the killer (Devine, 1978; Boehm, 2012). Unfortunately, "just cause" can be redefined to fit the needs of whoever wields the sword. The earliest known laws to be recorded, The Code of Hammurabi, written somewhere between 1795 and 1750 BC, prescribes prohibitions against killing in one form or another. The punishments for these crimes, of course, are also murder or some form of injury. The code has it that if a man or woman murders another, the punishment is impalement. If a physician accidentally kills a patient, his hands will be cut

off. If an architect's building fails and kills the inhabitants, the builder is put to death. The hierarchies of the time also have it that the killing of a peasant, slave, or livestock results in the punishment of replacement or repayment. Unfortunately, the human appetite for violence and punishment almost always gets out of hand, resulting in the punishments of crimes that are not particularly harmful.

Flash-forward two thousand years to the Roman empire, where criminals, vagrants, slaves, and prisoners of war would be thrown into the famous Colosseum to maim each other or be maimed by exotic animals to the delight of massive crowds (Futrell, 2006). Between games and races, blasphemers, Christian martyrs, and other criminals (murderers, thieves, rapists, enemies of the state, etc.) would be publicly executed in the most horrible ways possible. In one particularly horrid example, the criminals would be seated on a seesaw, yes, the same seesaw found in a children's playground, and the "show" would begin.

*"With a flourish, trapdoors in the floor of the arena were opened, and lions, bears, wild boars and leopards rushed into the arena. The starved animals bounded toward the terrified criminals, who attempted to leap away from the beasts' snapping jaws. But as one helpless man flung himself upward and out of harm's way, his partner on the other side of the seesaw was sent crashing down into the seething mass of claws, teeth and fur"* - Cristin O'Keefe Aptowicz, 2016

Jump another two thousand years to England in the 17<sup>th</sup> and 18<sup>th</sup> centuries, where "The Bloody Code" punished more than 200 violent and non-violent offenses with death. One could not steal, commit adultery, be in the company of gypsies, nor show "particularly strong evidence of malice between the ages of 7 and 14", without facing the hangman (Godfrey & Lawrence, 2005). These executions and spectacles, from the time of Hammurabi to 19<sup>th</sup> century England, were held in public for the citizens and their children to watch as a reminder of what befell those who broke

the law. The great and horrible irony is that in each of these places and times, “murder” was against the law. Even to this day, the death penalty is legal in 20 states in America. The good news is, hundreds of citizens would be executed under “The Bloody Code” and thousands in the Colosseum, only 25 were executed in the U.S. in 2018 (Execution Database, 2018). There is another great factor that these times had in common as well.

Violence in the world and across history has a single variable that is the one great universal in the study of human violence. It is by far the biggest risk factor that exponentially increases both your likelihood of being a violent criminal and being violently victimized. No, it is not guns, though that does increase chances of a deadly encounter (Branas et al., 2009). No, it isn't drugs, alcohol, bullying, abuse, or violent media. It isn't even your genetics per se. It's being a male. Violent crime is a notoriously male enterprise all over the world. In every human culture, males commit between 70 to 95% of all violent crime and are also between 70 and 95% the victims of these violent crimes (UNODC, 2019). In almost every human culture studied, males (more than females) are more prone to play-fight in youth and adulthood, bully others, fight, carry weapons, fantasize about killing, actually kill, rape, start wars, and fight in wars (Goldstein, 2001; Pinker, 2002; Archer, 2004; Buss, 2005; Archer, 2006, 2009; Geary, 2010; Pinker, 2011).

The fact that this trend emerges *everywhere* on the planet and throughout almost all of history leads many scholars to believe that there is, in fact, a biological element at play (Wilson & Daly, 1985, Daly & Wilson, 1983, 1988, 2017; Pinker, 2002). Though socialization and cultural notions of masculinity most certainly play huge roles, “the first domino is almost certainly biological” (Pinker, 2011, pg. 517). Even in our closest cousins, the chimpanzee,

gorilla, and orangutan, the male half of the population commits 90 to 95% of the violence (Wrangham & Peterson, 1996; Wilson et al. 2014). This is offset of course by the wonderful bonobos, who buck this trend (Sommit, 1990; De Waal, 1995; Hare, Wobber, & Wrangham, 2012). Even non-state, tribal, and preindustrial societies fall victim to this unfortunate trend, where war and lethal violence are overwhelmingly male habits (Nivette, 2011; Fry & Söderberg, 2013; Whyte, 2015).

It isn't up for debate: males, *on average*, commit more violence than females. This of course doesn't mean that women can't be violent or are not capable of incredible violence, they most certainly are, and *culture does play an important role* in how this manifests around the world (Law, 1993; Jones, 2009). However, these occurrences are few and far between. The fact is simply that all the evidence gathered so far points to women being less lethally violent *on average* across almost every human population when compared to men. In the nature v. nurture debate regarding the violence difference between the sexes, the ball is in natures' court. Until societies emerge where these trends are counteracted – where men and women are equally responsible for violence or women are committing the majority of violence – the consensus will stand. Until that fateful day, being male is a risk factor that accounts for almost all violence throughout the world.

One could be forgiven for interpreting this information as a particularly dark representation of human nature. To “demonize” half of the human population may seem crass or even irresponsible. To claim any inherent human nature seems to clash with the ideals that we have the power to change. However, there is a different way of looking at this issue that doesn't force us to ignore the facts, but also allows us to focus on the variables that are within our power.



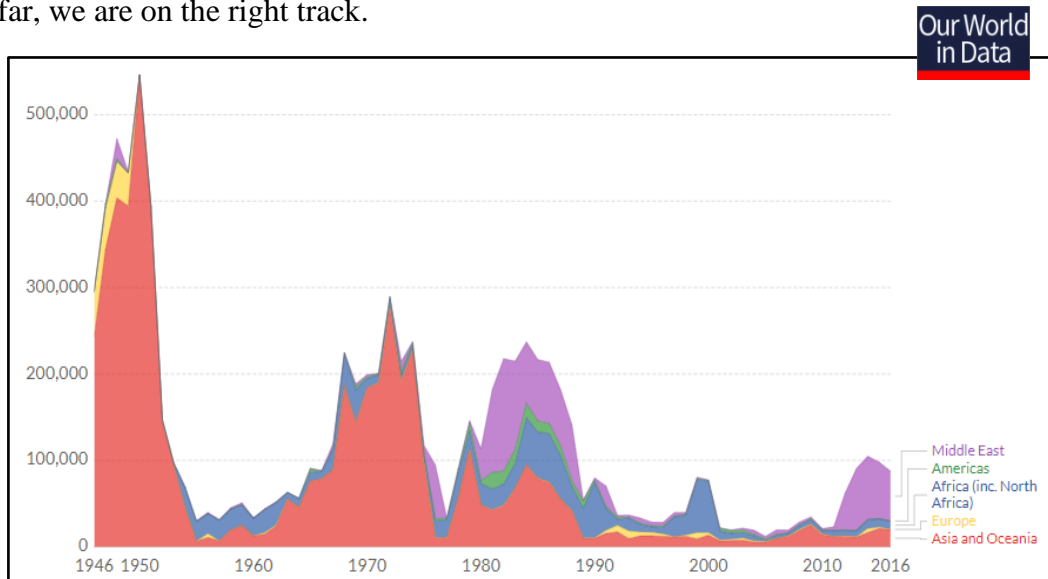
The only way to solve a problem is to understand all the elements at play. One cannot successfully design a skyscraper without knowing the strengths and weaknesses of the components that one is working with. In this way, we cannot address human violence without incorporating the ugly facts that seem to show no signs of going away. However, one need not try to change human nature to deal with the problem of human violence. Society has been chipping away at the problem for centuries, and the data might surprise you.

### *The Surprising Decline in Violence*

Watching the evening news alone could lead anyone to have the impression that the world is getting *more* violent as time progresses. With tales of beheadings, chemical weapons, government oppression, drug wars, human trafficking, police brutality, political riots, public mass shootings, and the rise of white nationalism, it is difficult not to see the world as a seething pot on the brink of overflowing. Global tensions do seem to be ramping up given many recent political events in the United States, the European Union, China, North Korea, Russia, Syria, Africa, Central and South America over the last five to ten years (Global Trends, 2015). The world does *seem* to be getting more dangerous.

From a long-term historical perspective, however, the trend lines seem to tell a different story. Since the unleashing of the hydrogen bombs on Japan in 1945 and the subsequent Cold War that brought the world to the brink of collapse, no world power has confronted another on the battlefield, apart from the Korean War (Levi & Thompson, 2011). What caused the utter chaos of the two world wars was the industrial capacities of the richest and most powerful nations diverting almost all their resources to manufacture and sustain ground and armored

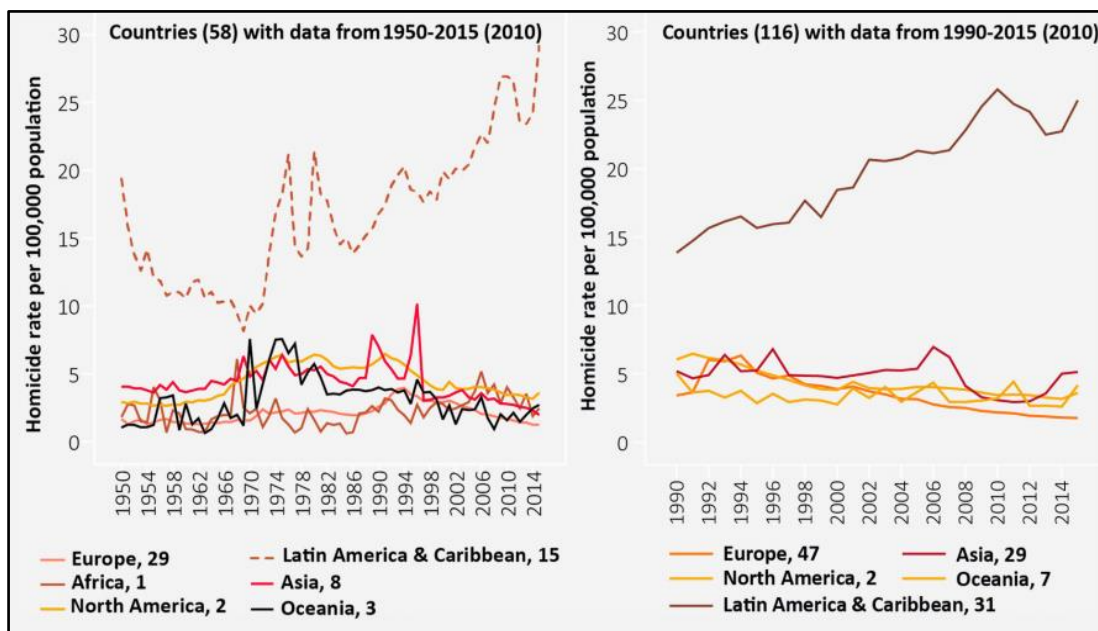
combat that was fought by millions of combatants in some of the world’s largest cities. Nothing on that scale has even come close to occurring since. The rate of battle deaths in state-based armed conflicts show impressive signs of decline when compared to the world wars (PRIO, 2008; UCDP, 2016; Roser, 2016; See Figure 9). Despite the horrors of the proxy wars between the United States and other world powers and their impacts on Asia and the Middle East (which are inexcusable), the mayhem caused and life lost have not even come close to approaching the toll of the world wars. This is not to say that then next world war isn’t right around the corner, but so far, we are on the right track.



**Figure 9.** Battle-related deaths in state-based conflicts since 1946, by world region. The region refers not to the location of the battle but to the location of the primary state or states involved in the conflict (see 'Sources' tab). Only conflicts in which at least one party was the government of a state and which generated more than 25 battle-related deaths are included. The data refer to direct violent deaths (i.e. excluding outbreaks of disease or famine). (Roser, 2016; Our World in Data: War and Peace)

When it comes to violent crime, the trends are in much the same direction depending on where you are (Eisner 2003). In most of Europe, violent crime has been and continues to be distinctively low when compared to the rest of the world. For instance, *almost all* of Europe has a homicide rate lower than 2 per 100,000 with the exception of the Netherlands, Latvia,

Lithuania, and Estonia (Eurostat, 2017). As of 2017, Canada, Australia, China, Japan, and Peru all had homicide rates below 4 per 100,000 (Global Burden of Disease, 2017; UNODC, 2019). Unfortunately, the trend in reduced violence has not caught on in many parts of Africa, Russia, the Caribbean, Central and South America. In 2017 Russia had a homicide rate of 14.8 per 100,000 (Global Burden of Disease, 2017), in 2014 Africa sat at 12.5 per 100,000 (UNODC, 2014). It is clear that the majority of the homicide in Africa is in the Southwest where South Africa, Mozambique, Kenya, Zimbabwe, Tanzania, Ethiopia, Somalia, and Sudan reside. As of 2017, Mexico, Venezuela, El Salvador, Brazil, Honduras, and Columbia account for 25% of all homicides committed around the world (Muggah & Tobón, 2017).



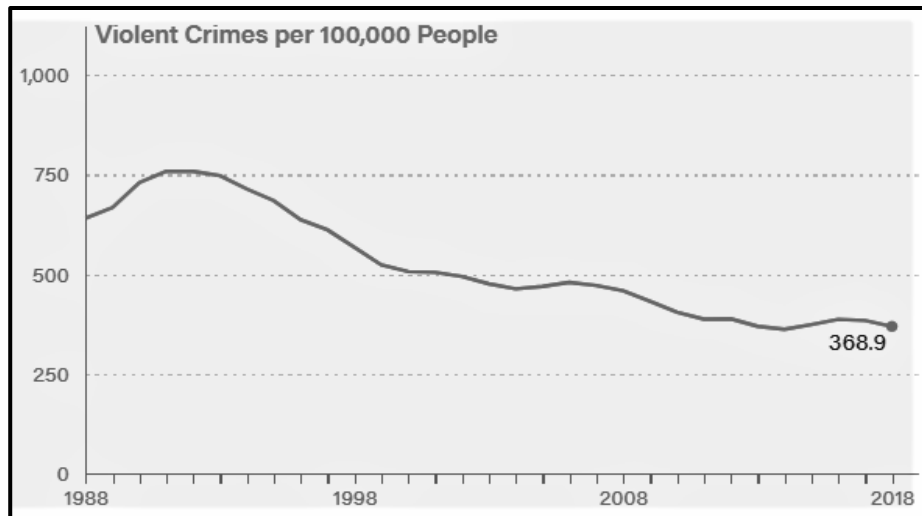
**Figure 10:** Homicide trends, by region and subregion 1950-2015 (58 countries) and 1990-2015 (116 countries; Africa not included). (United Nations Office on Drugs and Crime, 2019)

As far as the undeveloped world is concerned (where the data is available and reliable), violent crime is still a very serious problem, especially in terms of absolute number of victims, but historically speaking, the developed and developing world are very slowly inching in the right

direction. But among the developed world, one country stands in league of its own, with violence rates that soar above its peers in every time zone: the United States.

### *A Brief History of Violent Crime in the United States*

It should come as no surprise to anybody that the United States is the odd one out, especially regarding violent crime. Recall that the majority of Europe had a homicide rate below 2 per 100,000, and Canada looked much the same at 1.51 per 100,000 in 2017 (GBDCN 2017). Even India (if the data is reliable), one of the most densely populated countries in the world, sat at a homicide rate of around 3.22 per 100,000 (GBDCN, 2017). The United States had a homicide rate of 5.3 per 100,000 in 2017 (Uniform Crime Report, 2017) which fell to a solid 5.0 per 100,000 in 2018 (UCR, 2018) When it comes to violent crimes in general, including aggravated assault, robbery, and rape, the U.S. currently sits at a rate 368.9 per 100,000, which is 3.9% lower than 2017 (UCR, 2018) and the lowest it's ever been. Aggravated assault, the underrecognized crime which sits in the shadow of homicide, makes up 66.9% of all violent crime in the United States. Fortunately, homicide rates in the U.S. have been declining since its most recent peak of 9.8 per 100,000 in 1991 (Cooper & Smith, 2011), and violent crime rates in general have been doing much the same (UCR, 2018, See Figure 11).



**Figure 11:** Violent crime rate trends in the United States between 1988 and 2018. (Uniform Crime Report, 2018)

The fact remains that the United States stands out amongst its contemporaries as both the richest country in the world and the most violent. Many theories have been presented to explain the unique nature of violence in the United States. The farther back into history one goes, the more interesting the theories become. Some ideas hold that cultures of honor paired with the widespread availability and legality of firearms fueled the culture now known as the, “Wild West” and the honor culture of the South. Much of the country west of the Mississippi up until the 19<sup>th</sup> century was not under competent government rule. Much of the criminal justice infrastructure (or lack thereof) was completely incompetent, underfunded, and understaffed (Courtwright, 1996). The only methods of defending your honor, your livestock, or your trade goods was to do it yourself. The cliché “wild west” was in fact not far off the bullseye. Homicide rates in Dodge City were 100 per 100,000 and Wichita is estimated to have a rate of 1,500 per 100,000 (Courtwright, 1996; Roth, 2009)! Even logging, railroad, and mining towns even further west were estimated to have average homicide rates of 83 per 100,000 (Courtwright, 1996). It all makes sense when one realizes that the majority of fortune seekers headed west to strike gold or

start a new life were single men and there was no substantial law enforcement that could enforce the law effectively (Courtwright, 1996). Violence in the West did not begin to decline until civilization finally caught up after the Civil War. But the Civil War started its own problems in the East, particularly in the South.

The Civil War is oft remembered as the worst bloodbath on American soil (minus the elimination of the Native Americans of course). The war was between the Northern Union and the Southern Confederacy due to the conflicts stirred by the abolishing of slavery. The divide between the north and the south was no coincidence or matter of chance. The financial stability of the two regions were distinctively different, where the north relied heavily on urban development and industry while the south relied on more agrarian exploitations. This divide sets the stage for the next explanation for American exceptionalism in violence: the culture of the South. Like the wild west, government positions on violence were lukewarm at best, leaving the duty of law, order, revenge, and self-veneration to the mob or to vigilante justice. Eric Monkkonen (1989) diagnoses the situation eloquently,

*“the South had a deliberately weak state, eschewing things such as penitentiaries in favor of local personal violence...most killings...in the rural south were reasonable, and in the sense that the victim had not done everything possible to escape from the killer, that the killing resulted from a personal dispute, or because the killer and victim were the kinds of people who kill each other” - pg. 94, pg. 157*

This is among the better snapshots of what a culture of honor looks like. In cultures of honor, instrumental or predatory violence, like getting someone out of the way so you can open your plantation on their land or killing for no reason at all is a no-go. What is greenlit is when someone insults your intelligence, abilities, or prowess. Then, all bets are off, draw you

yellowbelly. What accentuated this culture was the uniquely American Second Amendment of the Constitution. European countries had and has no such thing. As Steven Pinker (2011) puts it, “Americans in the South and West never fully signed on to a social contract that would vest the government with a monopoly on the legitimate use of force” (pg. 99). Homicide rates were particularly high in the South when compared to the North due to confrontational duels and otherwise antagonistic behavior towards rivals (Roth, 2009).

The culture of honor managed to survive to this day. Studies have tried to understand the elevated homicide rates in the Southern United States by attempting to decouple the culture of honor from factors like poverty, but to no avail (Huff-Corzine, Corzine, & Moore, 1986). There are critiques of the subculture theory, showing that higher quality statistical analyses reduce the significance of the subculture explanation, however, they are not eliminated, leaving plenty of room for explanation for the subculture theory (Whitt, Corzine, & Huff-Corzine, 1995; Huff-Corzine et al., 2001). Two studies illuminate the subculture of the south in impressively creative ways.

In one study, fake letters regarding interest in jobs were sent to Northern companies and Southern ones. The letters contained an anecdote specifying a felony charge. The felony detailed in the letter admits of a fight started in a bar by a drunkard claiming to have slept with the letter writers wife and laughing in their face about it, which leads to a scuffle outside resulting in the use of pipe to murder the drunkard. Companies in the North did not respond with a job application, many companies in the south did (Cohen & Nisbett, 1997). In one other, a laboratory study was set up with participants who go to college in the north but were born and raised in the South. On the way to the “study” participants were run into by a confederate. No, a confederate

is not a Southern sympathizer, a confederate is a person planted by the experimenter to run into the real participant on purpose. When the confederate engages the participant, the confederate mutters, “asshole” at the participant. Blood samples were then drawn from the participants. Students who grew up in the South showed higher levels of testosterone and cortisol (stress hormones) and even shook the experimenter’s hand harder (Cohen et al., 1996)!

The history of American violence is rooted in long periods of untamed and lightly governed terrain where young males were encouraged to defend themselves at the slightest glance of disapproval or whiff of challenge. Even women were slightly more likely to take out their frustration on their adulterous lovers (Roth, 2009). From the wild west to the rural south, cultures of honor permeated the land and law enforcement was either complacent or complicit in the fair and worthy settling of a score where the stronger or faster man successfully defended themselves against an interloper or vagrant of one sort or another. The culture of the south, and the west, frankly, can be summated in this quote about the culture’s infiltration on the power dynamics of politics:

*“Public men with the loftiest of political ambitions were the most likely to fight, since they needed to preserve their standing and protect their reputations. When William Crawford, the future U.S. senator and secretary of the Treasury, was an aspiring young politician in Georgia, he was asked by a group of speculators to join their latest venture. He wanted nothing to do with these men, who had been involved in the Yazoo scandal, so he spurned their offer publicly. Peter Van Allen, one of the speculators, challenged Crawford to a duel. Crawford killed Allen and became a political star”. – Roth, (2009), pg. 213*

Roth’s primary purpose in *American Homicide* (2009), wasn’t to push the southern culture of violence theory, though it is interwoven into his larger thesis. Rather Roth believes that cultures of honor were and are symptoms of deeper root causes. Contrary to the narrative that will be spun in future sections, Roth does not entirely buy into the idea that poverty and



unemployment have as much effect as they are made out to throughout American history. He explains that during the Great Depression in the 1930's, when these two variables were at their most extreme, homicide rates actually fell in many cities, "from New York to New Orleans to San Francisco" (pg. 9). Roth instead suggests that there are four macro variables that play the biggest roles in the ebb and flow of American and Western European violence all the way back to the founding of the nation to the current status quo. The fluctuations are based less on current societal and economic conditions and more on the realm of public opinion, the zeitgeist.

The first variable that Roth points to is "the belief that the government is stable, and that its legal and judicial institutions are unbiased and will redress wrongs and protect lives and property" (pg. 18). When the government is unstable, it lacks authoritative pull. This can happen during civil war, revolution, or military occupation. Even more common is when government leaders are factionalized and reduced to infighting over the reins of power. In these circumstances, citizens take justice upon themselves, form coalitions based on identity or political party, label outsiders, and the escalation to violence begins. If this sounds strangely familiar, it is because we are living through one of these very moments right now. Identity politics has seized the land, be it by race, gender, or political party, and the oval office is occupied by one of the most polarizing figures in recent political memory. In the past six years, there have been three government shutdowns, two of those occurred under the current president's administration, costing the government seven billion dollars (Hicks, 2013; Congress Budget Office, 2019) . Stability would not be the word used to describe the current era. The second process, which interacts strongly with the first, is trust in the government and its legitimacy.

When people think that the government represents them and their ideals, people trust their local institutions more and by extension their neighbors. Roth walks through the late 19<sup>th</sup> and early 20<sup>th</sup> centuries in America as the government failed to establish itself as trustworthy in many communities, particularly the South and the urban North (Roth, 2009, pg. 21). Trust in the government has been eroding quickly in recent years thanks to countless corruption scandals and the ascension of misinformation warfare. As test of Roth's theory, the current political climate represents the ticking of the first two boxes: instability and illegitimacy. Counter to Roth's expectations, things appear to be going well when refereeing to most violent crime trends (See Figure 11 above). However, it is difficult for one to avert their eyes from the political divide that continues to grow between republicans and democrats in the United States. It is even harder not to see the rise of public mass shootings (Lankford, 2016; Pan, 2018; Rocque & Duwe, 2018). Public sentiment is split on the "problem of immigration", and a few have already begun taking the law into their own hands, take the recent El Paso shooting for example. Only time will tell how much longer 'til the powder keg is lit.

The third historical constant in Roth's checklist is patriotism and kinship with fellow citizens (pg. 21). Like the previous two, trust and respect, a sense of community and solidarity is essential in keeping a society together as long as that community incorporates a large enough percentage of the population. Tribes are a great example of successful solidarity. No, not hunter gatherer tribes, though that also fits the model. The tribes being referred to here are more like teams. A sense of identity is staked to a variable that connects you to others whom you automatically share an important connection with. The best way this works is when people stake their identity to a thread that is shared by everyone in sight, like humanity or nationhood.

However, as Roth rightly points out, this is double edged sword, and in all likelihood most people don't fit into your tribe, and that is when things often get ugly for "others". Roth put it succinctly, "when men draw the boundary between 'us' and 'them' in a way that excludes a substantial portion of the population, the potential for homicide is high" (pg. 22). This occurs in American history quite a lot, obviously during and after the Civil War, during many woman's liberation movements, during the Civil Rights movement, and right now between democrats and republicans.

The last variable is different from the other three in that it does not rise and fall "in lockstep" with the other three variables. It is the belief that the social hierarchy is legitimate. Roth claims that this variable does not influence homicide as much as the other two, but in the modern climate, this may not be true. It certainly wasn't true in 1945 China, 1917 Russia, 1789 France, or 1776 America when entire revolutions erupted as a reaction to perceived inequalities. In more recent eras, Roth documents spikes in homicide when men were threatened by women's liberation movements and when white men were threatened by the Emancipation Proclamation and the Civil Rights Act of 1964.

Throughout history,

*"if men are insecure about their standing (or prospective standing) in society – if they have no hope of winning respect, if they are embittered by a sudden loss of standing, or if the criteria for respect suddenly change or become a matter of dispute – they are more likely to become violent, because every insult, every challenge, and every setback takes on greater significance. Disputes with peers, no matter how trivial they might seem to an outsider, become defining moments in which reputations can be permanently damaged"* – Roth, pg. 24

If this sounds familiar to anyone, it's because it is a mirror image of the masculinity cultures that emerge in disadvantaged cities of urban America. Modern American gangs and drug rings, especially from the crime boom in the 80's and early 90's, take on exactly this shape and

form (Diamond, 2001; Barid, 2012). Thanks largely to socioeconomic forces that will be discussed in the next section, many disenfranchised men in poor urban and suburban environments seek meaning in the status hierarchies of the area. Roth even describes a story about two teenagers who gun down their old “colleague” for taking more than his fair share of a burglary. This happened in 1995 Columbus, Ohio, which Roth later describes as abandoned by deindustrialization processes that left the area, “blighted by unemployment, empty storefronts, abandoned houses, deteriorating schools, and the toxins the factories left behind” (pg. 24), the perfect environment for crime rates to skyrocket, as we will discuss later. Even worse, in the current political environment, knowledge about the growing wealth and income inequality gap in the United States (Keister & Moller, 2000; Saez & Sucman, 2016) is allowing this ideal to spread outside of disenfranchised, high crime rate areas, and into the public conversation (Picchi, 2019; Telford, 2019). Things are not looking up for the United States according to Roth’s list of variables. The United States currently checks all four boxes, unstable government, distrust in the government, lack of patriotic solidarity, and the growing sentiment of an illegitimate social hierarchy. What could go wrong?

### *The Structure of Modern American Violence*

Since the days of the Wild West and Civil War, the nature of violent crime and our understanding of it has drastically changed. Among the more important advances has been in the direction of understanding. The modern view of violent crime does not just incorporate the psychology of a violent criminal. As the trends discussed earlier show, violence is in retreat. Since there hasn’t been enough time for evolution to change the genomes of Homo Sapiens, social structures and values must have changed. Since the Civil War, the demographics of

American work has changed thanks to first and second wave feminism and the Civil Rights movement. Since the Second World War, American industries have changed and continue to change in response to technological or organizational developments. These changes impact American communities and households in positive and negative ways. Through these changes, a few elements of American life have proved to be more important in explaining crime than any of these changes combined. These are structural variables that emerge due to the confluence of industrial and economic changes that impact families all over the country.

These systemic, societal causes of violent crime are now thought to stem from things like economic deprivation, income inequality, broken families in poverty, divorce, population density, and unemployment. These are identified as the structural covariates of homicide (Land, McCall, & Cohen, 1990; McCall, Parker, & MacDonald, 2008; McCall, Land, & Parker, 2010). These variables have been identified as particularly stable predictors of increased violent crime rates at multiple levels of analysis, from cities, to counties, to states through multiple decades spanning all the way back to the 1960's. What this social-ecological framework allows is the explanation of the place-based nature of crime. It's clear that violent crime clusters in space for non-random reasons (Baller et al., 2001; Stretesky, Schuck, & Hogan, 2004; Weisburd, Groff, & Yang, 2012). What this means is that the circumstances in areas with high crime rates seem to follow similar patterns, and the most potent of these patterns is resource deprivation and concentrated poverty (Wilson, 1987; Sampson et al., 1997).

The exodus of industrial manufacturing jobs in the 70's and 80's, known as industrial restructuring, left many lower-class workers both unable to relocate or find jobs. This process set the stage for the modern phenomena where poverty and disadvantage are spatially determined,

where communities are deprived of resources like quality health care, local business, and employment networks (Wilson 1987). These factors reinforce each other and produce isolated cultures that react to scarcity by finding ways to cope that are outside the mainstream methods. Resource deprivation sets the stage for future generations while efforts to reverse the process become harder and harder.

*“In structurally disorganized slum communities it appears that a system of values emerges in which crime, disorder, and drug use are less than fervently condemned and hence expected as part of everyday life. These ecologically structured social perceptions and tolerances in turn appear to influence the probability of criminal outcomes and harmful deviant behavior.”*  
- Sampson & Wilson, 1995; pg. 47

East St. Louis is a tragic model for this style of urban decay. East St. Louis was among the major midwestern cities that African Americans flocked to during the Great Migration between 1916 and 1970, escaping the oppression of Jim Crow laws. This process was met with no shortage of racist controversy, but the city managed to hold together. East was booming with job opportunities in the 1950’s, at one point dubbed an “All-American City” and “Pittsburgh of the West”. Throughout the 60’s and 70’s, however, manufacturing and railroad industries began relocating, leaving behind the (majority black) citizens who could not afford to relocate with them. Between 1960 and 1990, East St. Louis went from a population of 81,000 to 40,000, where it remains 97% African American (US Census, 2018). There are many places like East St. Louis out there, including Detroit, Baltimore, Birmingham, and New Orleans (cities we will become familiar with very soon) that take on the same narrative. The story starts with an influx of African American’s following the Great Migration, the industrial boom followed by industrial restructuring, residential segregation of lower-class African Americans, then punctuated by the outmigration of the affluent middle class.

In a situation where few jobs are available and public institutions like public schools and underfunded and unkept, people are forced to hold down multiple menial jobs in retail or hospitality, barely capable of dealing with transportation issues, health care, or child rearing and often dropping out of high school to live with extended family, join a gang or prostitution ring (Hamer, 2011). It follows that the so called, “code of the street” (Anderson, 1999) which emerges organically as a reaction to the lack of opportunity and isolation. In these circumstances many turn to “off the books” methods by profiting off illegal drugs and prostitution which fuel gang-style fractioning and cycles of retributive violence between them, sending the violent crime rates into the stratosphere, where violence is tantamount to status (Kubrin & Weitzer, 2003).

Further exasperation of these circumstances manifests in very high incarceration rates which systematically remove young men from the population, forcing the burden of child rearing, home care, and financial stability onto the shoulders of single mothers and their extended family, thus producing the connection between single motherhood, fatherless homes, and violent crime (Messner & Sampson, 1991). Men who are released from prison often fall right back into the routines of the subculture of crime due to their unemployability as ex-convicts, thus producing the high recidivism rates seen in the same disadvantaged areas (Kubrin & Stewart, 2006; Bellair & Kowalski, 2011). These same forces produce another side effect that pushes this feedback loop even further down the hole, it produces higher rates of divorce (one of the primary covariates of homicide).

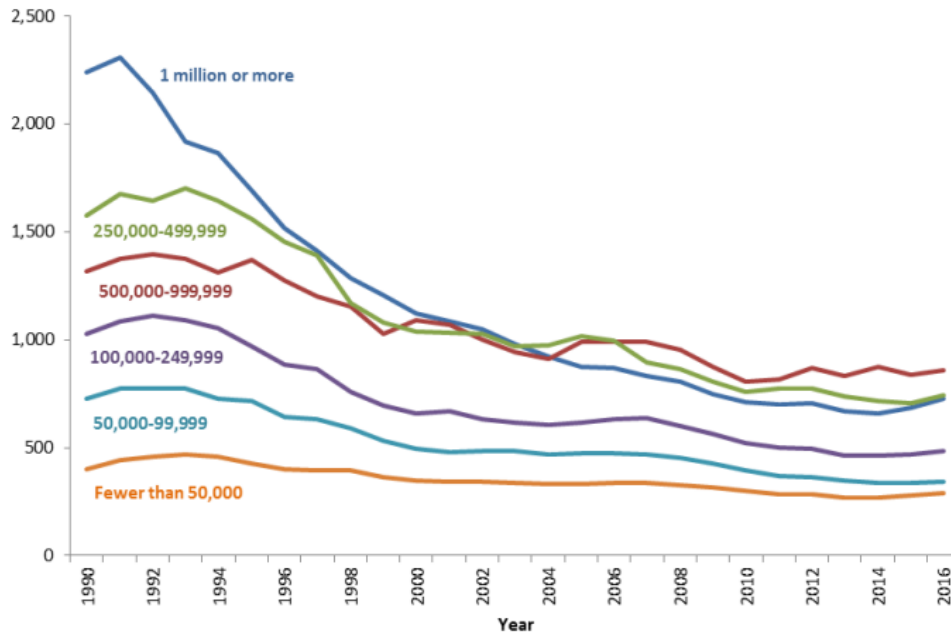
Divorce in the household has been shown to increase the potential suicide, domestic violence, and violent crime rates in general (Gruber, 2004; Stevenson & Wolfers, 2006; Stolzenberg & D’Alessio, 2007; Ca’ceres-Delpiano & Giolito, 2012). Domestic violence

happens to account for 21% of violent victimization not including homicide (Truman & Morgan, 2015). Even children in the household who are exposed to divorce tend to marry earlier and are more likely to get separated, thus increasing the chances of suicide and domestic abuse down the line (Manzingo, 2000; Gruber, 2004). It should come as no surprise then to find that domestic abuse is significantly higher in African American and white communities that are afflicted with high rates of poverty, poor job stability and poorer educational institutions (Benson et al., 2004). This brings up another topic that is often overlooked. The conversation surrounding violent crime is often situated in the context of black communities, which is warranted due to the fact that this community is disproportionately afflicted by these ailments for reasons explained earlier. However, it turns out that the same structural factors have been shown to impact white and Hispanic populations in similar socioeconomic circumstances (Krivo & Peterson, 1996; Lee, 2000; Wheelock, 2006). The primary differences between these populations of lower-class citizens is geographic concentration. We find that poverty and crime rates are spatially distributed differently between these groups, where African American and Hispanic poverty rates are often far more concentrated where white poverty rates are more geographically distributed (Lee, 2000).

The covariates of violent crime also include another important note, population size and population density, particularly at the city-level of analysis (Messner, 1982; Bailey, 1984; Land, McCall, & Cohen, 1990; James, 2018). Population and population density are linked logarithmically, which essentially means that relationships are exponential and can only be linearized by changing the graphical scale in orders of magnitude. However, crime and population trends have shifted, making population a bit less powerful predictor of violent crime.



For instance, violence increases rose together between 2014 and 2015 despite differences in city sizes, from 1 million or more down to fewer than 50,000 (James, 2018; See Figure 12).



**Figure 12:** Violent crime rates by city size in the United States between 1990 and 2016. (James, 2018; FBI, Crime in the United States, 1990-2016)

Large cities are also known for having relatively stable crime trends over the course of multiple years and even decades (McCall, Parker, MacDonald, 2008), where smaller, more rural, cities and towns have violent crime rates that can fluctuate wildly due to the change in crime rate that a few crimes can exact on the data.

In large cities, a single crime among hundreds will change the rate slightly. Take for example a hypothetical city with a population of 250,000, where 300 crimes are committed in one year and 310 are committed in the next, the crime rate changes from 120 per 100,000 to 124 per 100,000, a reasonable fluctuation. If in a smaller place with a population of 25,000, one year there are 3 violent crimes, and in the next there are 6, the rate goes from 12 per 100,000 to 24 per

100,000. In these cases, the rates are unreliable indicators of the real level of crime. This is why cities are better laboratories for violent crime when compared to smaller towns. This does not discount the different causal frameworks at work in smaller more rural area, nor does it disregard the importance of understanding violence in those circumstances. It is simply a matter of scale that makes cities more dangerous in terms of lives lost, and therefore more pertinent to study.

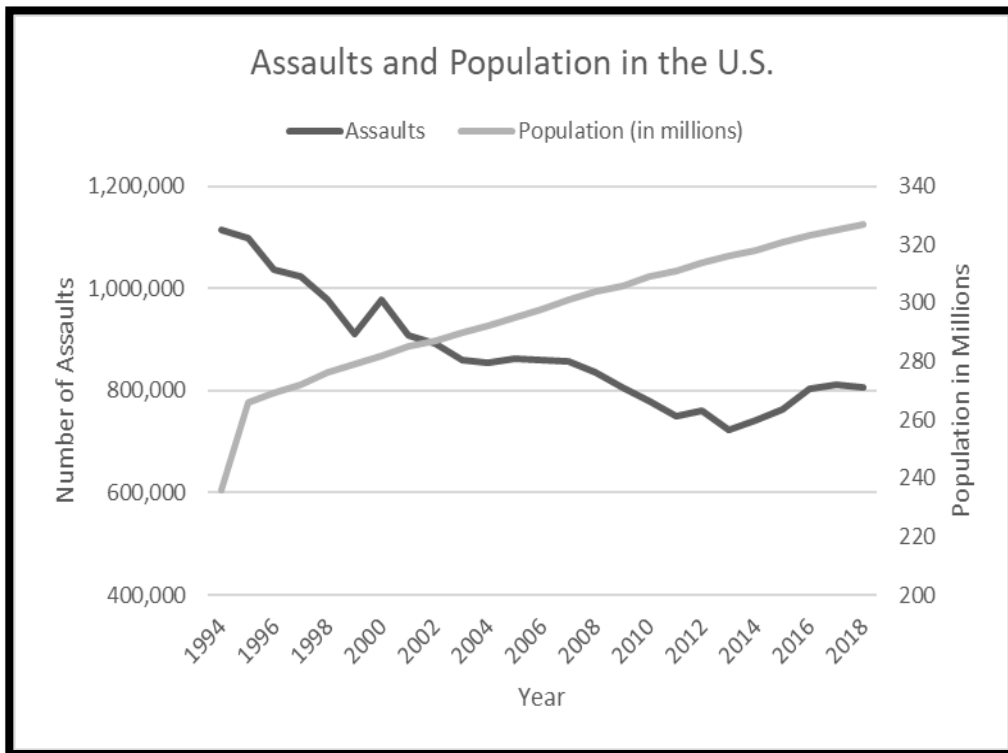
A complicated methodological debate has been waged trying to effectively separate many of these predictors from each other in multiple-regression analyses, a phenomenon called multicollinearity. Collinearity throws off statistical inferences and significance due to the interaction and confounding effects that these variables all have on each other (Land, McCall, & Cohen, 1990). For example, the existence of the racial component of crime in the United States is intercorrelated (therefore, collinear) with other components like absolute and relative economic deprivation, percentage of households where both parents are not present, or female lead households with children. What this means is that the structural covariates of homicide: economic and resource deprivation, percentage of divorced males, population density, and percentage of children not living with both parents, cut across racial lines and explain violence in the United States on a larger scale and at multiple levels of analysis (cities and states).

### *A Brief Digression on Aggravated Assaults*

The majority of the discussion thus far has been framed in context of homicide and killing. Though homicide is the most salient violent crime, it is certainly not the only crime that characterizes violence. Earlier in the paper, we remember that most violent crime is not murder, but aggravated assault. Among all the violent crimes, homicide is the rarest across cultures and

history (Wolfgang, 1958; Daly & Wilson, 2017). Aggravated assault is defined as, “an attack by one or more persons on another with the purpose of inflicting serious bodily injury (FBI, 2018). In 2018, homicide accounted for 1.3% of violent crime in the U.S., where aggravated assaults make up 66.9% of violent crime followed by robbery at 23.4% (UCR, 2018).

In 2018, there were a total of 807,410 assaults in the United States (UCR, 2018), which seems like a lot until you realize that for the past three decades, assault rates have been descending with all of the other violent crimes, even as the population has been growing (See Figure 13). Unfortunately, not much research seems to surface that focuses primarily on aggravated assault.



**Figure 13:** Aggravated Assault & Population Trends in the U.S. 1994-2018. Number of aggravated assaults (dark line) for the years 1994 through 2018 plotted against the U.S. population (light line) for the same years. Data from FBI Uniform Crime Reports 1994 – 2018, and Census Bureau 1994 – 2018.

The work that has been done has been restricted to case studies in specific places like Dallas, Texas (Harries & Stadler, 1986), Little Rock, Arkansas (Drawve & Barnum, 2018), and Miami-Dade County, Florida (Bunting et al., 2018). In Little Rock, the most important predictive factors of assault were proximity to public high schools, motels or hotels, lottery retailers, and bus stops (Drawve & Barnum, 2018). In Miami-Dade, factors like time (the middle of the night), day of the week (weekends), poverty rates, ethnic diversity, and median age (younger) were the most significant (Bunting, et al., 2018). In Dallas, heat and time of the year (summer) interacted with socioeconomic variables like poverty to increase the aggravated assault rates (Harries & Stadler).

When the research focus isn't on assault, it is often lumped together with the other violent crimes like robbery, rape, and homicide. Fortunately, this research also points in the same directions that homicide research does. Poverty and income inequality are the biggest predictors, but assaults are also influenced by illegal drug markets, gang activity, number of bars and entertainment venues in certain locations. (Blau & Blau, 1982; Hsieh & Pugh, 1993; Short, 1997; Fajnzylber, Lederman, & Loayza, 2002; Martinez, Rosenfeld, & Mares, 2008; Drucker, 2011). Not much is needed to separate the structural covariates of homicide from the structural covariates of aggravated assault, as they seem to respond to the same suite of environmental factors.

## *A Brief Glance at Violence in Large American Cities*

It now seems appropriate to take a brief glance at the current state of affairs in some of America's largest cities. Of the 100 largest cities, the ten most violent are St. Louis, Missouri, Birmingham, Alabama, Baltimore, Maryland, New Orleans, Louisiana, Detroit, Michigan, Baton Rouge Louisiana, Cleveland, Ohio, Kansas City, Missouri, Memphis, Tennessee, and Newark New Jersey. Detroit had the fifth highest homicide rate clocking in at a rate of 39.2 per 100,000, which translated into 261 murders.

Detroit also had an aggravated assault rate of 1,490 per 100,000, which translates into 9,920 reported assaults. The smallest of the top ten, Birmingham, had a homicide rate of 41.8 per 100,000 and an aggravated assault rate of 1,336 per 100,000, which translates into 88 murders and 2,816 assaults. Of the top ten, St. Louis had the highest homicide rate of 61.4 per 100,000 and an aggravated assault rate of 1,174 per 100,000, which translates into 187 murders and 3,577 assaults. Baltimore has a homicide rate of 51.4 and assault rate of 892 per 100,000, coming in at 309 deaths and 5,364 assaults. The record in 2018 for most murders goes to Chicago, with a shocking 563 murders and a whopping 15,312 assaults. Due to its large size, a population of 2,719,151, the homicide rate does not represent the bloodshed, coming in at 20.7 per 100,000 and an assault rate of 563 per 100,000. The top 20 most violent large cities in 2018 can be seen in Table 1, organized by homicide rate.

**Table 1.** Top 20 Homicide Rates in U.S. Cities

City	Homicide Rate	Homicides	Assault Rate	Assaults
St. Louis	61.42	187	1,174	3,577
Baltimore	51.4	309	892	5,364
Birmingham	41.76	88	1,336	2,816
Detroit	39.2	261	1,490	9,920
New Orleans	37.2	147	649	2,564
Baton Rouge	34.88	79	524	1,187
Memphis	28.6	186	1,378	8,947
Kansas City	27.7	137	1,145	5,665
Newark	26.5	75	408	1,155
Cleveland	22.5	86	853	3,257
Philadelphia	22	351	490	7,712
Chicago	20.7	563	563	15,312
Cincinnati	19	57	430	1,288
Pittsburgh	18.8	57	289	877
Indianapolis	18.8	162	842	7,250
Milwaukee	16.9	99	946	5,549
Oakland	16.5	70	551	2,338
Tulsa	14.9	60	739	2,982
Louisville	12.9	80	?	?
Stockton	10.6	33	945	2,952

Twenty cities with the highest homicide rates (per 100,000 citizens) in the U.S. Also included are the total number of homicides, assaults, and assault rates (per 100,000) in each city. Data from FBI Uniform Crime Reports 2018.

If this doesn't concern you yet, remember only five cities have been discussed thus far. Of these five cities, there were 1,408 murders and 36,989 assaults, which account for 8.7% of nationwide homicides and 4.5% of nationwide aggravated assaults. When the rest of the top twenty are added, 3,087 murders and 90,712 assaults are added to the list, making up almost one of every five homicides and one of every ten assaults in the entirety of the United States. It's is also apparent at a glance that violence tends to spill over into assault rates as well, though not reliably.

It is for these reasons that the largest cities in the United States will be used for the current study. After all this talk of violence, it is important to remind readers that this thesis is about the effects that video games may or may not have on the types of real-world violence just reviewed.

### ***Research Question***

How do the measures of gaming prevalence compare to the structural covariates of violent crime in explaining violent crime in the 100 most populated cities in the United States?

**H<sup>1</sup>:** Video game sales will have no significant associations with violent crime rates

**H<sup>2</sup>:** Video game attitudes and habits will have no associations with violent crime rates

**H<sup>3</sup>:** Poverty rates will be significantly associated with violent crime rates

**H<sup>4</sup>:** Divorce rates will be significantly associated with violent crime rates

**H<sup>5</sup>:** Population density will be significantly associated with violent crime rates

## CHAPTER 3: METHODOLOGY

Selection of the cities to construct the dataset to be analyzed was done by identifying the 100 largest cities based on the 2017 Census population estimates. The year, 2017 was chosen because the data used for gaming identifiers, violent crime, and the covariates of crime are between the years 2013 and 2017. The list of the most populated cities in 2017 can be seen in Table 2. Violent crime in these cities were measured by the homicide and aggravated assault rates per 100,000 citizens from the Federal Bureau of Investigations' Uniform Crime Report for the years 2013 through 2017. The six variables that acted as our structural covariates of violent crime are population density, percentage population with incomes at or below poverty levels, marital statuses for populations aged 15 years or older, percentage population black, the Gini Index measure of inequality, and the dissimilarity index for racial segregation, which were pulled from the 2017 American Community Survey (ACS) 5-year estimates, from the data service SocialExplorer, and from a 2010 dataset on segregation done by DeWitt & Frey (2018) from the University of Michigan Ann Arbor. The ACS 5-year estimate survey started in 2013 and ran through 2017 and samples every census block group in the United States and Puerto Rico. In order to measure poverty, the Census Bureau uses a combination of income variables and family demographic indicators to determine who is in poverty. Earnings, public assistance, debt, alimony, child support, and veteran benefits are paired with demographics such as the number of persons over age 65 and/or under 18 years of age in the household and the overall number of persons in the household to determine poverty.



To identify the popularity, presence, or otherwise potential impact that video games played in these cities, the SimmonsLOCAL US surveys between the years 2013 and 2017 was used and accessed through the online data service, SimplyAnalytics. The 2013 through 2017 SimmonsLOCAL US full year consumer survey samples were collected in the Fall seasons of the years 2013 – 2016, where fielding ends late fall and data is released to the marketplace in the spring of the following years. The surveys measure 30,000 participants across 210 American Designated Market Areas (DMA's; including 100 largest cities in the US) with data estimated down to the block group level using samples for ages 18+ with detailed analysis for brand level and media usage behavior. The 210 DMA's are selected by the Nielsen Company to estimate the cost of advertising. The DMA's include the largest cities in the United States.

The questions pulled from the 2013 through 2017 SimmonsLOCAL US survey will include: "Do you spend more time playing video games than watching TV?", and, "Would you consider video games your main source of entertainment?" Percentages of the sample that agreed with either of these statements is the proxy measure for the presence of gamers in the cities. To further substantiate the presence of video games, The Easy Analytic Software, Inc. Consumer Expenditures Database (EASI CEX) was employed, accessed through the data service SimplyAnalytics. The EASI Consumer Expenditures Database compiles data from multiple sources, including: the U.S. Department of Labor, Bureau of Labor Statistics Consumer Expenditure surveys (2013-2016) and the American Community Survey (ACS) 5-year, 3-year, and 1-year estimates. The variables pulled from the EASI CEX include the household average spending on video game related software, hardware, and accessories for or from the Nintendo

Wii, Gameboy, GameCube, PlayStation, Nintendo DS, Xbox, and PlayStation Portable in the years 2013 through 2017.

**Table 2.** Top 100 Most Populous Cities in the U.S.

<b>RANK</b>	<b>City</b>	<b>State</b>	<b>2018 Population</b>
1	New York City	New York	8,580,015
2	Los Angeles	California	4,030,668
3	Chicago	Illinois	2,719,151
4	Houston	Texas	2,340,814
5	Phoenix	Arizona	1,679,243
6	Philadelphia	Pennsylvania	1,573,688
7	San Antonio	Texas	1,541,456
8	San Diego	California	1,438,060
9	Dallas	Texas	1,359,133
10	San Jose	California	1,030,796
11	Austin	Texas	983,366
12	Jacksonville	Florida	907,529
13	Fort Worth	Texas	893,997
14	San Francisco	California	888,653
15	Columbus	Ohio	880,182
16	Charlotte	North Carolina	873,363
17	Indianapolis	Indiana	860,902
18	Seattle	Washington	746,046
19	Denver	Colorado	719,116
20	Washington D.C.	Maryland	702,756
21	El Paso	Texas	692,100
22	Boston	Massachusetts	687,584
23	Nashville	Tennessee	673,008
24	Detroit	Michigan	665,713
25	Portland	Oregon	658,347
26	Oklahoma City	Oklahoma	653,865
27	Las Vegas	Nevada	653,840
28	Memphis	Tennessee	649,243
29	Louisville	Kentucky	619,287
30	Baltimore	Maryland	601,188
31	Milwaukee	Wisconsin	586,315

32	Albuquerque	New Mexico	562,935
33	Tucson	Arizona	535,236
34	Fresno	California	529,153
35	Sacramento	California	507,298
36	Mesa	Arizona	497,275
37	Kansas City	Missouri	494,536
38	Atlanta	Georgia	491,626
39	Colorado Springs	Colorado	484,233
40	Miami	Florida	479,009
41	Raleigh	North Carolina	476,746
42	Long Beach	California	467,512
43	Virginia Beach	Virginia	454,098
44	Omaha	Nebraska	450,364
45	Oakland	California	424,275
46	Minneapolis	Minnesota	420,721
47	Tulsa	Oklahoma	403,060
48	Arlington	Texas	401,248
49	New Orleans	Louisiana	395,009
50	Tampa	Florida	394,507
51	Wichita	Kansas	391,586
52	Bakersfield	California	384,188
53	Cleveland	Ohio	381,803
54	Aurora	Colorado	368,518
55	Anaheim	California	354,553
56	Honolulu	Hawaii	351,280
57	Santa Ana	California	334,613
58	Riverside	California	331,606
59	Corpus Christi	Texas	328,183
60	Lexington Fayette	Kentucky	325,813
61	Stockton	California	312,080
62	Henderson	Nevada	309,155
63	St. Paul	Minnesota	308,138
64	St. Louis	Missouri	304,462
65	Pittsburgh	Pennsylvania	303,147
66	Cincinnati	Ohio	299,092
67	Anchorage	Alaska	297,952
68	Plano	Texas	291,671
69	Orlando	Florida	290,553
70	Greensboro	North Carolina	290,519

71	Lincoln	Nebraska	287,870
72	Irvine	California	286,720
73	Newark	New Jersey	283,092
74	Toledo	Ohio	276,172
75	Durham	North Carolina	274,006
76	Chula Vista	California	271,434
77	St. Petersburg	Florida	269,645
78	Fort Wayne	Indiana	267,852
79	Jersey City	New Jersey	264,720
80	Laredo	Texas	262,034
81	Madison	Wisconsin	260,427
82	Scottsdale	Arizona	260,189
83	Lubbock	Texas	260,188
84	Chandler	Arizona	254,773
85	Reno	Nevada	254,431
86	Buffalo	New York	254,004
87	Glendale	Arizona	251,269
88	North Las Vegas	Nevada	247,680
89	Gilbert	Arizona	246,601
90	Winston-Salem	North Carolina	245,549
91	Norfolk	Virginia	243,085
92	Chesapeake	Virginia	242,958
93	Irving	Texas	242,873
94	Fremont	California	236,566
95	Hialeah	Florida	235,081
96	Garland	Texas	232,421
97	Boise City	Idaho	228,900
98	Baton Rouge	Louisiana	226,505
99	San Bernardino	California	216,995
100	Birmingham	Alabama	210,710

## *Population Measures*

The populations of the 100 largest cities do not fluctuate wildly across the 2013 – 2017 time span. For instance, in 2013 and 2017, the most populated city in the United States (by a wide margin) is New York City, with a population of 8,396,126 in 2013 and a population of 8,616,333 in 2017. The least populated of the 100 cities in 2017 was Birmingham, Alabama, with a population of 210,710. The lower rungs of the population list exchange places often, where cities drop off and back onto the list by year. To stay consistent, Birmingham was used for the years 2013-2016, though technically it did not belong on the list in those years. Across 2013, 2014, 2015, 2016, and 2017, thirty-five to thirty-seven cities are within the population range of 200,000 to 299,000, sixteen to seventeen cities are within the population range of 300,000 to 399,000, twelve to thirteen cities are within the population range of 400,000 to 499,000, three cities are within the 500,000 to 599,000 range, ten to twelve cities are within the 600,000 to 699,000 range, only one or two cities are within the 700,000 to 799,000 range (no city is in this range in 2015), five to six cities are within the 800,000 to 899,000 range, and two to three cities are within the 900,000 to 999,000 range. When entering range of millions in population, five cities lie within the one million to two million range and two cities lie within the two million to three million range. Los Angeles alone goes from high three million to four million between 2014 and 2017, and New York sits alone in the eight million range.

The American Community Survey (ACS) 5-year estimates produce a population density per square mile estimate that ranges from 175 person per square mile (Anchorage, Alaska) to 28,284 persons per square mile (New York City). Twelve cities range between 175 and 1,999

persons per sq. mile, twenty-six cities range between 2,000 and 2,999 persons per sq. mile, twenty-three cities range between 3,000 and 3,999 persons per sq. mile, eleven cities range between 4,000 and 4,999 persons per sq. mile, eight cities range between 5,000 and 5,999 persons per sq. mile, nine cities range between 6,000 to 9,999 persons per sq. mile, and eleven cities range between 10,000 to 28,000 persons per sq. mile.

The ACS-5-year estimates also take stock of the Gini index, another one of our measures for economic hardships within our 100 cities. The Gini index is designed to measure income inequality. The distribution of income within a city, county, state, or nation can be one of three things: equally distributed amongst the inhabitants within any given boundary (measured as 0 on the Gini index), completely focused in the hands of one person or group of persons (as measured as 1 on the Gini index), and everything in between zero and one. The idea of the Gini index to measure how far away society is from an imagined “perfect” income distribution. Among our sample of 100 cities, the Gini measures range from a low of 0.38 in Gilbert, Arizona to a high of 0.58 in Atlanta, Georgia. Twenty-five cities have Gini index measures between the low of 0.38 and 0.45, forty-three cities sit between 0.46 and 0.49, and thirty-two cities lie between 0.5 and the high of 0.58.

Lack of internet access affects both gamers and non-gamers and is suggestive of poor socioeconomic standing. Thus, percentage of the populations within our big 100 without internet access is another population variable in this analysis. The data comes again from the ACS 5-year estimates. The city with the smallest percentage of its population without internet access is Gilbert, Arizona, coming in at 4%, while the city with the largest percentage of its population without internet access is Laredo, Texas, coming in at 35% of its population without internet

access. Thirteen cities have between 4% and 9.9% of the population without internet, twenty cities have between 10% and 14.9% of the population without internet, thirty-six cities have between 15% and 19.9% of its population without internet, seventeen cities have between 20% and 24.9% of its population without internet, and fourteen cities have between 25% and 35% of its population without internet.

### ***Structural Covariates of Violent Crime***

The ACS 5-year also produces estimates on racial composition across the five-year time span, and percentage of the population that is African American will be the primary racial measure for this analysis. The percentage of black Americans across the 100 cities ranges from 0.42% in Laredo, Texas to 79.12% in Detroit, Michigan. There are twenty cities that have between 0.42% and 4.9% Black populations, twenty cities with between 5% and 9.9%, eighteen cities with between 10% and 19.9%, twenty with between 20% and 29.9%, thirteen cities with between 30% and 49.9%, and nine cities with between 50% and 79.12%.

The ACS 5-year estimate produces poverty estimates as well, which are also presented in the form of percentage of population that falls below poverty level within a census place. Percentages of the population that fall under the poverty line range from 3.18% in Fremont, California to 32.17% in Detroit, Michigan. There are sixteen cities with between 3.18% and 9.49% of the population below the poverty line, sixteen cities between 9.5% and 11.99%, fifteen cities between 12% and 13.4%, nineteen cities between 13.5% and 15.9%, sixteen cities between 16% and 18.9%, and seventeen cities between 19% and 32.17%.

Next on the list of variables accounted for by the ACS 5-year estimates is the percentage of the population aged fifteen years and older that is divorced. Divorced populations range from a low of 6.18% in Fremont, California to 15.77 percent in Spokane, Washington. There are fourteen cities with percentage of divorced population between 6.18% and 8.99%, eighteen cities between 9% and 10.29%, eighteen between 10.3% and 11.09%, nineteen cities between 11.1% and 12.29%, fifteen cities between 12.3% and 13.19%, and sixteen cities between 13.2% and 15.77%.

As discussed previously, income distribution, and therefore crime distribution, fall on racial lines. In 2010, John Paul DeWitt and William H. Frey from the University of Michigan Ann Arbor Population Studies Center produced a dataset detailing racial distribution in many United States metropolitan areas, including our big 100. To do this, they deployed the dissimilarity index. The dissimilarity index measures the relative separation or integration of groups across all neighborhoods of a city or metropolitan area. If a city's white-black dissimilarity index or white-Hispanic dissimilarity index were 55, that would mean that 55% of whites in a given city would need to move to other neighborhoods to create even racial distribution. Like the Gini index, a score of 100 equals perfect segregation, while a score of zero equals perfectly integrated. Considering the differences of racial composition of minorities across the United States, measures of dissimilarity for both black and Hispanic populations will be used.

Regarding the dissimilarity index for Black-White disparity, the lowest dissimilarity score belongs to Gilbert, Arizona with a score of 20.3, while the largest score belongs to Chicago, Illinois, with a score of 84.3. Twenty-six cities have score between 20 and 39, eighteen



cities have scores between 40 and 49, twenty-eight cities have scores between 50 and 59, nine cities have between 60 and 69, seventeen cities have between 70 and 79, and only two cities, New York and Chicago, have scores above 80. Regarding the index for the Hispanic-White disparity, the lowest dissimilarity score belongs to, again, Gilbert, Arizona, which sits at 13.6, while the highest score belongs to Oakland, California, with a score of 67.9. Thirteen cities have scores from 13 to 29, twenty-two cities have scores between 30 and 39, thirty-four cities have scores between 40 and 49, twenty cities have scores between 50 and 59, and eleven cities have scores between 60 and 68.

### ***Video Games as Preferred Entertainment***

Moving away from population demographics, we will now go over the data regarding video game spending and video game related habits in the 100 cities. First is survey data from the SimmonsLOCAL US survey of the 210 DMA's which include our 100 most populated cities. The two questions used to estimate the percentages of the population that are interested in video games include: "Would you consider video games to be your main source of entertainment?" and, "Do you spend more time playing video games than watching TV?". Questions were answered with a Likert Scale which consisted of answers ranging from, "agree a lot", "agree a little", "don't know", "disagree a little", and "disagree a lot". For this analysis, the percentage of participants who answered either "agree a lot" or "agree a little" to either of these questions will be considered as part of the population that prefers video games over other sources of entertainment, thus providing a useful proxy measure for the presence of gamers in any given city. If necessary, five-year mean values will be calculated.

Up first is the question, “Would you consider video games to be your main source of entertainment?”. In 2013, the city with the lowest percentage of the sampled population that agree that video games could be considered their main source of entertainment was Scottsdale, Arizona at 4.46% agreement, where the city with the highest percentage was Newark, New Jersey at 16.28%. Twenty cities had between 4.46% and 6.49% of the sample agree with the statement, thirty cities had between 6.5% and 7.49% agreement, twenty one cities had between 7.5% and 8.49% agreement, seventeen cities had between 8.5% and 9.49%, and twelve cities have had between 9.5% and 16.28% agreement that video games would be considered their main source of entertainment.

In 2014, the city with the lowest percentage who agreed with this statement was San Francisco, California at 4.16%, where the city with the highest percentage was Norfolk, Virginia at 11.7% agreement. Eighteen cities had between 4.16% and 5.9% of the sample agree with the above statement, twenty-three cities had between 6% and 6.79% agree, sixteen cities had between 6.8% and 7.39% agree, twenty-one cities had between 7.4% and 7.96% agree, twelve cities had between 8% and 8.49% agree, and ten cities had between 8.5% and 11.7% agree that video games could be considered their main source of entertainment.

In 2015, the city with the lowest percentage of the sampled population that agree that video games could be considered their main source of entertainment was Anaheim, California at 5.3%, and the city with the highest percentage who agreed was Riverside, California at 12.34%. Eighteen cities had between 5.3% and 6.9% of the sample agree, eighteen cities had between 7% and 7.59% agree, fourteen cities had between 7.6% and 7.9% agree, seventeen cities had

between 8% and 8.78% agree, sixteen cities had between 8.8% and 9.4% agree, and seventeen cities had between 9.5% and 12.34% agree with the statement.

In 2016, the city with the lowest percentage of the sampled population that agreed that video games could be considered their main source of entertainment was Hialeah, Florida at 4.35%, where the highest percentage belongs again to Norfolk, Virginia sitting at 13.77% of the sampled population in agreement. Seventeen cities had between 4.35% and 6.7% agreement, nineteen cities had between 6.8% and 7.79%, twenty-one cities had between 7.8% and 8.49%, eighteen cities had between 8.5% and 8.99%, thirteen cities had between 9% and 9.99%, and twelve cities had between 10% and 13.77% agreement.

For 2017, the city with the lowest percentage of agreement that video games could be considered their main source of entertainment belongs to Laredo, Texas which sat at 5.06%, where the highest percentage of agreement went to Philadelphia, Pennsylvania which sat at 13.94%. Eighteen cities had between 5.3% and 7.6% agreement, nineteen cities had between 7.7% and 8.69%, eighteen cities had between 8.7% and 9.39% agreement, seventeen cities had between 9.4% and 9.99% agreement, sixteen cities had between 10% and 11.4% agreement, and twelve cities had between 11.5% and 13.94% agreement.

The second question on the SimmonsLOCAL U.S. survey asked participants whether they agreed that they spent more time playing video games than watching TV. In 2013, the city with the lowest percentage of agreement that they prefer video games to television of entertainment was Anaheim, California with 5.47% agreement, and the city with the highest percentage of agreement was Boston, Massachusetts with 13.81% agreement. Twenty-one cities had between 5.47% and 7.9% agreement, twenty-nine cities had between 8% and 8.9%

agreement, twenty-one cities had between 9% and 9.9% agreement, seventeen cities had between 10% and 10.9% agreement, and eleven cities had between 11% and 13.81% agreement that they spent more time playing video games compared to watching TV.

In 2014, the city with the lowest percentage of agreement that they prefer video games to television of entertainment belongs to Scottsdale, Arizona at 5.16%, where the highest percentage of agreeing participants goes to Norfolk, Virginia at 14.3%. Sixteen cities had between 5.16% and 7.4% agreement, thirteen cities had between 7.5% and 7.99%, twenty cities had between 8% and 8.8%, twenty cities had between 8.9% and 9.49%, sixteen cities had between 9.5% and 9.9%, and fourteen cities had between 10% and 14.3% agreement.

In 2015, the city with the lowest percentage of agreement was Birmingham, Alabama at 5.71%, where the city with the highest percentage was Riverside, California at 11.83%. Eighteen cities had between 5.71% and 7.4% agreement, eighteen cities had between 7.5% and 8.29%, nineteen cities had between 8.3% and 8.79%, eighteen cities had between 8.8% and 9.49%, fourteen cities had between 9.5% and 10.49%, and thirteen cities had between 10.5% and 11.83%.

In 2016, the city with the lowest percentage of agreement was Hialeah, Florida at 4.63%, where the city with the highest percentage of agreement was Buffalo, New York. Thirteen cities were between 4.63% and 6.9% agreement, twenty-two cities were between 7% and 7.9%, sixteen cities were between 8% and 8.49%, fifteen cities were between 8.6% and 8.99%, eighteen cities were between 9% and 9.99%, and sixteen cities were between 10% and 13.7%.

In 2017, the city with the lowest percentage of agreement was Laredo, Texas at 6.61%, where the city with the highest percentage of agreement was Detroit, Michigan at 16.92%.

Sixteen cities had between 6.61% and 8.99% agreement, fourteen cities had between 9% and 9.4% agreement, nineteen cities had between 9.5% and 10.49%, twenty-one cities had between 10.5% and 11.49%, seventeen cities had between 11.5% and 12.9%, and thirteen cities had between 13% and 16.92% agreement.

### ***Video Game Spending***

Next up is video game related hardware spending per household between 2013 and 2017. Again, hardware consists of consoles (PlayStation 4, Xbox One, Nintendo Switch, etc.), controllers, chargers, headsets, and other accessories. Each year is very different in where the cities fall on their spending in this area, which means that five-year averages will be the necessary metric here. For instance, the lowest average household spending per year ranges from \$19.33 in Detroit, Michigan for 2013, to \$33.15 in Hialeah, Florida for 2014, to \$18.32 in Detroit for 2015, to \$45.54 in Detroit for 2016, to \$23.33 in Detroit for 2017. Regarding the most spending, numbers range from \$62.83 in Fremont, California for 2013, to \$65.94 in Fremont, California for 2014, to \$136.46 in Fremont for 2015, \$78.10 in Fremont for 2016, and \$61.64 in Gilbert, Arizona for 2017.

For the year 2013, nineteen cities averaged between \$19.33 and \$34 per household spending on video game hardware, fifteen cities averaged between \$35 and \$39 in hardware spending, twenty-nine cities averaged between \$40 and \$44.99, twenty-five cities averaged between \$45 and \$49.99, and twelve cities have averaged between \$50 and \$62.83 in hardware spending.

For the year 2014, nineteen cities averaged between \$30.00 and \$39.99 per household spending on video game hardware, twenty-two cities averaged between \$40.00 and \$44.99 per household, twenty-two cities averaged between \$45 and \$47.99, thirteen cities averaged between \$48.00 and \$49.99, eleven cities averaged between \$50.00 and \$54.99, and thirteen cities averaged between \$55.00 and \$66.00 on hardware.

For the year 2015, nineteen cities averaged between \$18.32 and \$34.99 per household, seventeen cities averaged between \$35 and \$39.99, twenty cities averaged between \$40 and \$42.99, sixteen cities averaged between \$43.00 and \$49.99, seventeen cities averaged between \$50.00 and \$64.99, and eleven cities averaged between \$65.00 and \$136.50 in average household spending on hardware.

For 2016, nineteen cities averaged between \$45.00 and \$50.99 in household spending on gaming hardware, twenty-one cities averaged between \$51.00 and \$52.99, nineteen cities averaged between \$53.00 and \$54.99, nineteen cities averaged between \$55.00 and \$56.99, eleven cities averaged between \$57.00 and \$59.99, and eleven cities averaged between \$60.00 and \$79.00.

For 2017, nineteen cities average between \$23.00 and \$39.99 household spending on video game hardware, eighteen cities averaged between \$40.00 and \$44.99, sixteen cities averaged between \$45.00 and \$47.99, nineteen cities averaged between \$48.00 and \$50.99, twelve cities averaged between \$51.00 and \$52.99, and sixteen cities that averaged between \$53.00 and \$62.00.

This leads us to the next economically related variable in this analysis, average household spending on video game related software. This can be defined as game sales, both physical and

digital, in-game purchases, such as micro-transactions, and subscriptions. Just like hardware sales, software sales vary from year to year, thus rendering five-year averages necessary. In 2013, the highest average software sales were \$2.47 in Laredo, Texas, in 2014, the highest sales sat at \$7.82 per household in Fremont, California, in 2015 it was \$12.19 in Gilbert, Arizona, in 2016 it was 14.55 again in Gilbert, and in 2017 it was in Washington, D.C. at \$14.92 average spending per household. On the lower end of the scale in 2013 sits Detroit, Michigan at \$0.96, in 2014 it's Hialeah, Florida with \$2.55 average software sales per household, in 2015 its Detroit again with \$7.27, in 2016 its Honolulu with an average of \$8.35, and in 2017 its Hialeah again with \$11.50 average household spending on video game related software.

In 2013, fourteen cities averaged between \$0.96 and \$1.49 in software spending per household, nineteen cities averaged between \$1.50 and \$1.69, fourteen cities averaged between \$1.70 and \$1.79, sixteen cities averaged between \$1.80 and \$1.89, fifteen cities averaged between \$1.9 and \$1.99, and twenty-two cities averaged between \$2.00 and \$2.47 in software spending.

In 2014, fifteen cities averaged between \$2.55 and \$3.55 in software spending per household, sixteen cities averaged between \$3.56 and \$4.00, fifteen cities averaged between \$4.00 and \$4.55, eighteen cities averaged between \$4.56 and \$5.00, nineteen cities averaged between \$5.00 and \$6.00, and seventeen cities averaged between \$6.00 and \$8.00. In 2015, fourteen cities averaged between \$7.27 and \$9.00 in average household spending on video game related software, seventeen cities averaged between \$9.00 and \$9.49, twenty-one cities averaged between \$9.50 and \$10.00, twenty-one cities averaged between \$10.00 and \$10.39, seventeen

cities spent between \$10.40 and \$10.69, and ten cities averaged between \$10.70 and \$12.20 in household spending on video game software.

In 2016, eleven cities averaged between \$8.35 and \$10.99 in average household spending on video game software, twenty-one cities averaged between \$11.00 and \$11.99, twenty cities averaged between \$12.00 and \$12.49, twenty-six cities averaged between \$12.50 and \$12.99, eleven cities averaged between \$13.00 and \$13.29, and ten cities averaged between \$13.30 and \$14.55 in household spending on video game related software.

In 2017, fourteen cities averaged between \$11.50 and \$12.60 in average household spending on video game related software, eighteen cities averaged between \$12.61 and \$12.99, twenty-one cities averaged between \$13.00 and \$13.29, twenty cities averaged between \$13.30 and \$13.59, fourteen cities averaged between \$13.60 and \$13.99, and thirteen cities averaged between \$14.00 and \$14.99.

### ***Violent Crime***

Our last set of variables are of the dependent variety: violent crime. As stated previously, homicide and aggravated assault data were pulled from the publicly available FBI Uniform Crime Reports (UCR) from the years 2013 through 2017. Let's begin with homicides rates from 2013 through 2017. It is important to note that the crime listed in the UCR are reported crime, thus rendering all unreported crime invisible from the analysis. Considering that many homicide rates don't fluctuate in large cities quite as much as they would in less populated areas, it is still possible to see quite large fluctuations. Also, throughout the five-year time span, there are cities with unavailable homicide data. In 2013, there are three cities with unavailable homicide data: Honolulu, Hawaii, Columbus, Ohio, and Durham, North Carolina. In 2014, there are four cities



with unavailable homicide data: Wichita, Kansas, Fort Worth, Texas, Glendale, Arizona, and Scottsdale, Arizona. In 2015, the cities are: Cleveland, Ohio, Newark, New Jersey, and Portland, Oregon. In 2016 nor in 2017 is there any missing data. With this in mind, five-year averages will be used as measures for the violence in our 100 cities.

### *Homicide Rates*

In 2013, the homicide rates ranged from a low of 0.44 per 100,000 in Gilbert, Arizona and a high of 45.15 per 100,000 in Detroit Michigan. Twenty cities had homicide rates that ranged between 0 and 2.9 per 100,000, twenty-three cities had rates between 3 and 5.9 per 100,000, nineteen cities had rates between 6 and 7.9 per 100,000, nineteen cities had rates between 8 and 15.9 per 100,000, and sixteen cities had rates between 16 and 45.15 per 100,000.

In 2014, the homicide rates ranged from a low of 0 per 100,000 in both Gilbert, Arizona and Irvine, California to a high of 49.9 in St. Louis, Missouri. Sixteen cities ranged from rates of 0 to 2.9 per 100,000, sixteen cities ranged from rates 3 to 4.49 per 100,000, fifteen cities ranged from 4.5 to 5.9 per 100,000, seventeen cities ranged from 6 to 8.49 per 100,000, sixteen cities ranged from 8.5 to 16.5 per 100,000, and sixteen cities ranged from 16.6 to 49.9 per 100,000.

In 2015, the homicide rates ranged from a low of 0 .36 per 100,000 in Lincoln, Nebraska to a high of 59.3 in St. Louis, Missouri. Eighteen cities ranged from rates of 0.36 to 2.99 per 100,000, seventeen cities ranged from rates 3 to 5.49 per 100,000, fifteen cities ranged from 5.5 to 6.9 per 100,000, seventeen cities ranged from 7 to 10.9 per 100,000, fifteen cities ranged from 11 to 17.9 per 100,000, and fifteen cities ranged from 18 to 59.3 per 100,000.

In 2016, the homicide rates ranged from a low of 0 per 100,000 in Fremont, California to a high of 59.8 in St. Louis, Missouri. Seventeen cities ranged from rates of 0 to 2.99 per 100,000, eighteen cities ranged from rates 3 to 5.99 per 100,000, twenty cities ranged from 6 to 8.9 per 100,000, eighteen cities ranged from 9 to 14 per 100,000, thirteen cities ranged from 15 to 22 per 100,000, and fourteen cities ranged from 23 to 59.8 per 100,000.

In 2017, the homicide rates ranged from a low of 0 per 100,000 in Lincoln, Nebraska to a high of 66.1 in St. Louis, Missouri. Fourteen cities ranged from rates of 0 to 2.99 per 100,000, twenty cities ranged from rates 3 to 5.99 per 100,000, twenty cities ranged from 6 to 8.9 per 100,000, fifteen cities ranged from 9 to 12.49 per 100,000, sixteen cities ranged from 12.5 to 18.9 per 100,000, and fourteen cities ranged from 19 to 66.1 per 100,000.

The five-year averages for homicide rates should come as no surprise then, with St. Louis coming in at number one with an average homicide rate of 54.5 per 100,000, while the lowest average homicide rate, 0.52 per 100,000, falls in Fremont, California.

### *Aggravated Assault Rates*

Moving on to aggravated assault rates, it is important to make some caveats. First, different states and even different jurisdictions within the same states can have different definitions for aggravated assault, some even have different names for the crime, such as battery or assault. Thus, the aggravated assault data are not as reliable as our homicide data, where the definition is the same across all jurisdictions: dead by murder. The crimes listed in the UCR are reported crimes, thus rendering all unreported crime invisible from the analysis. Many aggravated assault rates don't fluctuate in large cities quite as much as they would in less

populated areas, however it is still possible and known to see quite large fluctuations across even a five-year time span. Also, throughout the five -year time span, there are cities with unavailable assault data. In 2013, the cities are Chicago, Illinois, Honolulu, Hawaii, Durham, North Carolina, and Columbus, Ohio. In 2014, the cities are Wichita, Kansas, Fort Worth, Texas, Honolulu, Hawaii, Glendale, Arizona, and Scottsdale, Arizona. In 2015, the cities are Cleveland, Ohio, Newark, New Jersey, and Portland, Oregon. In 2016, there is no missing data, but in 2017, Lubbock, Texas is missing.

In 2013, aggravated assault rates ranged from a low of 25 per 100,000 in Irvine California to a high of 1,256 per 100,000 in Detroit, Michigan. Seventeen cities had aggravated assault rates between 25 and 199 per 100,000, twenty cities had rates between 200 and 299 per 100,000, twenty-two cities had between rates between 300 and 399 per 100,000, twelve cities had rates between 400 and 499 per 100,000, sixteen cities had rates between 500 and 699 per 100,000, and nine cities had rates between 700 and 1,256 per 100,000.

In 2014, aggravated assault rates in our large cities ranged from a low of 23 per 100,000 in Irvine, California to a high of 1,342 per 100,000 in Detroit, Michigan. Eighteen cities had rates between 23 and 210 per 100,000, sixteen cities had rates between 211 and 289 per 100,000, seventeen cities had rates between 290 and 369 per 100,000, seventeen had rates between 370 and 489 per 100,000, thirteen cities had rates between 490 and 649 per 100,000, and fourteen cities between 650 and 1342 per 100,000.

In 2015, aggravated assault rates ranged from a low of 22.5 per 100,000 in Irvine, California to a high of 1,163.2 per 100,000 in Memphis, Tennessee. In nineteen cities, rates ranged from 22.5 per 100,000 to 199.9 per 100,000, in sixteen cities rates ranged from 200 per

100,000 to 299 per 100,000, twenty cities ranged from 300 per 100,000 to 399 per 100,000, seventeen cities ranged from 400 per 100,000 to 499 per 100,000, eleven cities ranged from 500 per 100,000 to 699 per 100,000, and fourteen cities ranged from 700 per 100,000 to 1163.2 per 100,000.

In 2016, aggravated assault rates ranged from a low of 21 per 100,000, again in Irvine, California, to a high of 1,475.7 per 100,000 in Detroit, Michigan. In seventeen cities, rates ranged between 21 per 100,000 and 199 per 100,000, seventeen cities had rates between 200 per 100,000 and 299 per 100,000, twenty-two cities had rates between 300 per 100,000 and 399 per 100,000, eighteen cities between 400 per 100,000 and 549 per 100,000, fourteen cities between 550 per 100,000 and 799 per 100,000, and twelve cities between 800 per 100,000 and 1,475 per 100,000.

In 2017, aggravated assault rate ranged from a low of 24 per 100,000, once again in Irvine, California, to a high of 1,519.6 per 100,000, once again in Detroit, Michigan. Eighteen cities had rates that ranged between 24 per 100,000 and 199 per 100,000, sixteen cities had rates that ranged between 200 per 100,000 and 299 per 100,000, fifteen cities had rates that ranged between 300 per 100,000 and 399 per 100,000, twenty one cities that ranged between 400 per 100,000 and 499 per 100,000, sixteen cities ranged between 500 per 100,000 and 749 per 100,000, and thirteen cities ranged between 750 per 100,000 and 1,519.6 per 100,000.

The five-year average for aggravated assault should also come as no surprise, where the highest aggravated assault rate is in Detroit, Michigan, with a rate of 1,343 per 100,000 inhabitants, while the lowest rate, 23.26 per 100,000, is in Irvine, California.

## *Analysis*

Basic frequencies and descriptive statistics, such as means and standard deviations, were run in order to characterize the dataset used in this analysis. Correlations were run for all the variables in order to determine the strength of the relationships among the variables and how they are affecting the regression analysis. An OLS (Ordinary Least Squares) Regression was used because the dependent variables, homicide and aggravated assault rates, are rates rather than counts, which assume linear correlations. Three separate models will be produced in order to compare the potency of each relevant or potentially relevant explanations for homicide and assault rates in the 100 cities that make up our data set.

The first model consists of the classic criminological and sociological explanations for violent crime: percentage of the population in poverty, percentage of the population that is black, percentage of the population that is divorced, percentage of the population without internet connection, Black/White segregation as measured by the Dissimilarity index, Hispanic/White segregation as measured by the Dissimilarity index, the Gini index, and population density. The second model consists of our measures for video game prevalence: percentage of the population that prefers video games to television, percentage of the population that identify video games as their main choice in entertainment, hardware sales, and software sales. The third model combines all our predictor variables into one. Each model was run separately for homicides and assaults, considering the potentially different causalities for each. Collinearity diagnostics, such as tolerance tests and variance inflation factors (VIF) were run to determine collinearity among the variables. The VIF cutoff used for this analysis will be four, following Fischer and Mason (1981). Basic correlations will be run among the variables to determine underlying relationships

that are influencing the regression analysis. Five-year averages will be used for all the variables in this analysis.

## CHAPTER 4: RESULTS

Taking a quick glance at the data will give a clearer picture of the 100 cities and how they all relate to our variables (see Table 3). The average homicide rate is 10.73 per 100,000, two times higher than the national average of 5 per 100,000 ( $SD = 10.37$ ; FBI, 2018), where the average aggravated assault rate is 414.3 per 100,000, also two times higher than the country's average of 246 per 100,000 ( $SD = 255.35$ ; FBI, 2018). The average percentage of the population in poverty for the cities was 14.3% ( $SD = 5.75$ ) where the national average in 2018 was 11.8% (Census Bureau, 2018), population divorced was 11.23% ( $SD = 2.07$ ), population without internet was 17.59% ( $SD = 6.61$ ) which is more than double the national number in 2012, which was only 6% (FCC, 2012). The percentage of the city's population of African American was 20.24% ( $SD = 17.83$ ), also above the national average of 13% (Census Bureau, 2018). Black/White Dissimilarity scores, remember act as a measure for segregation, showed an average of 52 ( $SD = 15.45$ ), which again means that 52% of the White population would have to move into Black neighborhoods, or vis versa, to create equal distribution. In other words, many of our cities are highly segregated. The average Hispanic/White dissimilarity index for our cities is 43.78 ( $SD = 12.07$ ), which again means that in order to achieve "perfect integration", 43% of white households would have to move into Hispanic neighborhoods, or vis versa. The average Gini coefficient measure of economic inequality for the sample of cities is 0.47 ( $SD = .039$ ), just below the nation average of 0.49 (Duffin, 2019). Again, this means that income distribution is about halfway between perfect equality (a score of 0) and perfect inequality (a score of 1). The average population density in the 100 cities is 4,819 persons per square mile ( $SD = 4,203$ ) and the average population of the sample is 635,149 ( $SD = 961,438$ ).

When it comes to video game prominence within the cities, there was an average of \$47.24 in household spending per year on video game related hardware (SD = 6.87) and an average spending of \$8.37 on video game related software (SD =0.34). When it comes to the average percentage of the population within these cities that prefer video games over television or prefer video games as their main source of entertainment, 9.22% of the sampled populations agreed that they prefer video games to TV (SD =1.17) and 8.13% agreed that video games are their main source of entertainment (SD =1.05). Next, let's take a look at how all of the variable relate to one another.

**Table 3.** Descriptive Statistics

<b>Variables</b>	<b>Mean</b>	<b>Std. Deviation</b>
Homicide Rate 5-Year Avg.	10.73 per 100,000	10.37 per 100,000
Aggravated Assault Rate 5-Year Avg.	414.3 per 100,000	255.35 per 100,000
Video Games as Main Source of Entertainment	8.13% Agree	1.05%
Video Games Preferable to Television	9.22% Agree	1.17%
Video Game Hardware Spending 5-Year Avg.	\$47.24	\$6.87
Video Game Software Spending 5-Year Avg.	\$8.37	\$0.34
% Population w/o Internet	17.59%	6.61%
% Population Divorced	11.23%	2.07%
% Population in Poverty	14.33%	5.75%
% Population African American	20.24%	17.83%
Gini Index Scores	0.47	0.039
Black/White Dissimilarity Scores	52	15.45
Hispanic/White Dissimilarity Scores	43.78	12.07
Population Density	4,819.43 / sq. mile	4,203.26 / sq. mile
Population 5-Year Avg.	635,149	961,438
Population Density Nat. Log	13.01	0.68
Population Nat. Log	8.2	0.73



## *Video Game Spending & Entertainment Preference*

The two survey questions, whether video games are considered a main source of entertainment and whether video games are preferable to watching TV, relate to each other and video game related spending in important and counter-intuitive ways (See Table 4). For starters, the two survey questions are highly correlated with one another ( $r = .933$ ,  $p < .001$ ), which means that they should, in theory, be measuring the same phenomenon: percentage of the population that likes (and likely plays) video games. When a person answers that they prefer video games to TV, it is likely, though not certain, that the same person will also answer that video games are their main source of entertainment (a detail that will become important down the line). Immediately things get interesting when glancing at the relationship between video game spending and video game preferences.

Both video game related hardware and software spending is *negatively* related to *both* entertainment questions. Hardware spending and preference for video games over television and preference for video games over other sources of entertainment are opposed significantly ( $r = -.278$ ,  $p < .01$ ;  $r = -.250$ ,  $p < .01$ ). The same can be said, but to a lesser extent, regarding video game related software spending ( $r = -.062$ ;  $r = -.051$ ). What this means is two-fold. For starters, it means that video game related spending does not necessarily assume that video games are the preferred form of entertainment. Thus, illuminating a variable that needs to be taken stock of that is potentially more important than spending and preferences: time spent playing video games. All four variables used in this analysis are proxy measures for video game popularity in our big cities, not direct measurements. Parents buy their children video games, yet the children

do not answer these survey questions nor do the parents necessarily play the video games they buy. People buy video games as gifts. Even more, people buy and play video games, yet still prefer TV, movies or music over them. Spending and entertainment preferences do not share a one-to-one relationship. Secondly, what this means moving forward, all results should be taken with a healthy grain of salt, as the measurements here are not reliable measurements of video game playing within a given area. With all of this in mind, let's see how these variables relate to our violent crime measures: average homicide and aggravated assault rates between 2013 and 2017.

**Table 4.** Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Homicide Rate	1.00												
(2) Aggravated Assault Rate	.783***	1.00											
(3) VG as Main Ent.	.309**	.293**	1.00										
(4) VG Preferred Over Television	.294**	.266**	.933***	1.00									
(5) VG Hardware Spending	-.747***	-.62***	-.250**	-.278**	1.00								
(6) VG Software Spending	-.402***	-.394***	-.062	-.051	.563***	1.00							
(7) % Population W/O Internet	.694***	.605***	.048	.029	-.724***	-.613***	1.00						
(8) % Population in Poverty	.706***	.542***	.011*	.179	-.631***	-.464***	.846***	1.00					
(9) Gini Index Scores	.587***	.485***	.182	.174	-.523***	-.368***	.497***	.509***	1.00				
(10) % Population African American	.793***	.593***	.340**	.330**	-.666***	-.167	.454***	.511***	.544***	1.00			
(11) Black/White Dissimilarity	.718***	.554***	.229*	.238*	-.601***	-.267**	.553***	.534***	.770***	.752***	1.00		
(12) Hispanic/White Dissimilarity	.414***	.379***	.001	-.012	-.212*	-.01	.321**	.374***	.462***	.409***	.570***	1.00	
(13) % Population Divorced	.215*	.267**	-.049	.011	-.494***	-.372***	.243*	.049	-.025	.082	-.019	-.166	1.00
(14) Population Density	.025	-.59	.135	.135	.16	-.094	.095	.263**	.263**	.006	.290**	.17	-.531***
(15) Population	.196	.175	.033	.08	.001	.021	.119	.09	.297**	.149	.001	.543***	-.105

\* p < .05, \*\*p < .01, \*\*\* p < .001

Things start to get weird again when seeing the strange differences between spending and entertainment preferences as they related to violent crime rates (see Table 5). Counter to expectations, percentage of the population that prefer video games over TV and other forms of entertainment are *positively* correlated with increased homicide rates *and* aggravated assault rates to a significant degree ( $r = .309, p < .01$ ;  $r = .293, p < .01$ ). What this means cannot be entirely discerned because all the assumptions that follow based on those relationships get thrown into the air when video game related spending is considered. Both hardware and software spending are *negatively* related to homicide rates ( $r = -.747, p < .001$ ;  $r = -.402, p < .001$ ) and aggravated assault ( $r = -.62, p < .001$ ;  $r = -.394, p < .001$ ) and with higher degrees of significance. This means that the higher the sales figures in a given city, the lower the corresponding violent crime rates were.

**Table 5.** Correlations - Violent Crime & Video Games

	Homicide Rates	Aggravated Assault Rates
Video Games as Main Source of Entertainment	.309**	.293**
Video Games Preferable to Television	.294**	.266**
Hardware Spending 5-Year Avg.	-.747***	-.62***
Software Spending 5-Year Avg.	-.402***	-.394***

\*  $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Even further, the strength of the correlations regarding spending are far stronger than the relationships to entertainment preferences. What this means cannot be entirely determined either until regressions are run. What this does do is invite a degree of uncertainty. The positive relationship of entertainment preferences to violent crime can mean a great deal of things that have nothing to do with video games leading to violence.

Then again, the same can be said for the negative relationship to video game spending. One needs to first ask how our video game variables relate to our crime-related variables.

### *Structural Covariates of Violent Crime*

Considering the years of criminological and sociological research on violent crime, it should come as no surprise that many of the hypotheses and theories discussed in the paper thus far are validated in this study. Almost every single predictor of violent crime is significantly associated with both homicide rates and aggravated assault rates (see Table 6). Only two variables, population density and population, are insignificantly related to violent crime rates. Due to the non-linearity of population and population density within the 100 cities, both variables were naturally logged to account for their exponential nature. Still, no relationship could be found to violent crime.

**Table 6.** Correlations - SCVC vs. Video Games

	Homicide Rates	Aggravated Assault Rates
% Population w/o Internet	.694***	.605***
% Population in Poverty	.706***	.542***
Gini Index Scores	.587***	.485***
% Population African American	.793***	.593***
Black/White Dissimilarity Scores	.718***	.554***
Hispanic/White Dissimilarity Scores	.414***	.379***
% Population Divorced	.215*	.267**
Population Density (Nat. Log.)	.025	-.59
Population 5-Year Avg. (Nat. Log.)	.196	.175

\* p < .05, \*\*p < .01, \*\*\* p < .001

The most potent variables among all of the structural covariates as they relate to homicide were the percentage of the population that is black or African American ( $r = .793, p < .001$ ), followed closely by Black/White Dissimilarity scores ( $r = .718, p < .001$ ), and poverty ( $r = .706, p < .001$ ). Though these three variables were extremely potent, this should not downplay the extreme significance of the other variables. Percentage of the population without internet ( $r = .694, p < .001$ ), Gini index scores ( $r = .587, p < .001$ ), Hispanic/White Dissimilarity scores ( $r = .414, p < .001$ ), and percentage of the population divorced ( $r = .215, p < .05$ ) are all significantly correlated with increased homicide rates as well as aggravated assault rates. When it comes to aggravated assault, these seven variables lose a small degree of association, but retain significance levels below .001 (see Table 6). The only variable that has a greater association to aggravated assaults than to homicide is percentage of the population that is divorced ( $r = .267, p < .01$ ). The next question to ask is, how do all our variables relate, and how might the impact each other.

### ***Video Gaming vs. Structural Covariates of Violent Crime: Correlations***

To understand the results of regressions, we must first understand how all our variables relate to each other. For instance, remember that preferring video games as your main source of entertainment was positively correlated with higher homicide and aggravated assault rates. Preference for video games as the main source of entertainment is positively correlated with some of the structural covariates of violent crime as well, which may explain the connection to higher violent crime rates. It is significantly related to percentage of the population in poverty ( $r = .254, p < .05$ ), percentage of the population African American ( $r = .340, p < .01$ ), and

Black/White Dissimilarity scores ( $r = .229, p < .05$ ). However, preference for video games over TV, rather than preference for video games over all forms of entertainment, is *not* significantly associated with poverty ( $r = .179$ ) though it is still significantly associated with African American population ( $r = .330, p < .01$ ) and Black/White Dissimilarity ( $r = .238, p < .05$ ).

This gets flipped on its head once more by video game related hardware and software spending, which are negatively correlated with all but two of the structural covariates of violent crime (population and population density), and to a much more powerful extent. In other words, the positive correlations between video game/entertainment preferences and the structural covariates are far *weaker* than the negative correlations between video game related spending and the structural covariates.

For instance, video game hardware spending is negatively correlated with Black/White Dissimilarity ( $r = -.601, p < .001$ ), percentage African American ( $r = -.666, p < .001$ ), the Gini measure of economic inequality ( $r = -.523, p < .001$ ), poverty ( $r = -.631, p < .001$ ), population divorced ( $r = -.494, p < .001$ ), and percentage of the population without internet ( $r = -.724, p < .001$ ) to a more significant degree than a general preference for video games is related to the same variables. The structural covariates of violent crime are also highly intercorrelated, which will play a significant role in the decisions to come as we whittle down our variables for our final regression analysis.

## *Collinearity*

Earlier in the paper we discussed the issue of collinearity in the social science, and in particular violent crime studies. As we stated earlier, collinearity throws off statistics when multiple variables interact in the same direction thus confounding significance values and confusing the analysis (Land, McCall, & Cohen, 1990). To deal with collinearity, tolerance tests were run in order to detail the degree of collinearity in this data set before we run our regressions (see Table 7). Since the final model will include every variable, tolerance tests were run on all of the variables. As stated previously, the standard, but conservative, VIF cutoff in criminology is four (Fischer and Mason, 1981).

The initial tests for collinearity are detailed in Table 7. Unfortunately, many variables appeared to be collinear, thus forcing a decision on which variables to keep and which variables to toss out. The variables with collinearity were three of the four video game variables: video games as main source of entertainment (VIF = 9.24), video games preferred to TV (VIF = 8.6), hardware spending (VIF = 4.76), percentage of the population without internet (VIF = 7.4), percentage of the population in poverty (VIF = 7.06), and Black/White dissimilarity (VIF = 5.12).



**Table 7.** Collinearity - All Variables

	Tolerance	VIF
Video Games as Main Source of Entertainment	.108	9.24*
Video Games Preferable to Television	.116	8.6*
Hardware Spending 5-Year Avg.	.21	4.76*
Software Spending 5-Year Avg.	.455	2.2
% Population w/o Internet	.135	7.4*
% Population in Poverty	.142	7.06*
Gini Index Scores	.364	2.74
% Population African American	.367	2.75
Black/White Dissimilarity Scores	.195	5.12*
Hispanic/White Dissimilarity Scores	.519	1.92
% Population Divorced	.322	3.104
Population Density	.389	2.57
Population 5-Year Avg.	.543	1.84

\*VIF > 4

In order to dissect out the important variables, we will refer once more to the correlations to determine what is worth keeping and what is not. Let's begin with the video game variables, particularly related to entertainment preference. The difference between preferring video games over TV (VIF = 8.6) and preferring video games as your main source of entertainment (VIF = 9.24) was slim, as these two variables are among the most highly intercorrelated variables in the dataset ( $r = .933$ ,  $p < .001$ ) and thus are collinear together. This means that one of the two variables must go. Choosing which variable to let go was a difficult decision. Preference for video games as a primary source of entertainment, rather than just over TV, holds more theoretical water because preferring video games over all other sources of entertainment has greater implications. If one prefers video games over any other entertainment source, the likelihood that that person plays more video games than a person who prefers video games over TV but not movies or sports, is greater. On this basis the variable of preferring video games over TV will be removed.

The next issue of collinearity is between the two variables: percentage of the population without internet (VIF = 7.4) and percentage of the population in poverty (VIF = 7.06). Again, these two variables were highly correlated ( $r = .846$ ,  $p < .001$ ), and thus collinear. This decision was much easier to make than the first on the simple basis that it has already been discussed. Percentage of the population without internet has been used as a proxy measure for socioeconomic status before (Howard, Busch, & Sheets, 2010; Witte & Mannon, 2010; Robinson et. al., 2015), thus making this variable redundant. Percentage of the population without internet will be removed from the final analysis.

The next and final issue of collinearity is between Black/White Dissimilarity scores (VIF = 5.12), our measure for racial segregation, and the percentage of the population that is African American (VIF = 2.75). It is important to realize that though percentage of the population that is African American does not have a VIF score above four, correlations tell us that Black/White Dissimilarity is highly correlated with it ( $r = .752$ ,  $p < .001$ ). Although these two variables measure distinctly different things, it is no mistake that areas with a high percentage of African Americans and high homicide rates ( $r = .793$ ) also have a significantly high degree of racial segregation ( $r = .718$ ), for the same reasons discussed previously in the literature review. Since percentage of the population that is African American acts as solid racial metric and dissimilarity scores essentially point to the same general phenomenon, Black/White Dissimilarity scores will be dismissed in the final analyses. Our other measure for segregation, Hispanic/White Dissimilarity, will be kept as it is our only other racial measure for differing demographics across the United States. Failure to include a measure for percent non-white Hispanic is a mistake that

should be remedied in future studies. The final list of variables and their correspondent VIF scores are represented in Table 8.

**Table 8.** Collinearity - Final Variables

	Tolerance	VIF
Video Games as Main Source of Entertainment	.817	1.22
Hardware Spending 5-Year Avg.	.222	4.5*
Software Spending 5-Year Avg.	.51	1.96
% Population in Poverty	.339	2.95
Gini Index Scores	.467	2.14
% Population African American	.436	2.23
Hispanic/White Dissimilarity Scores	.475	2.11
% Population Divorced	.332	3.01
Population Density (Nat.Log)	.526	1.901
Population 5-Year Avg. (Nat.Log)	.566	1.76

\* VIF > 4

Eagle-eyed readers will immediately notice a slight oversight on one particular variable, hardware spending, which has a VIF noticeably above the established cutoff of four. The reason why it will remain in the analysis where other variables have been removed is two-fold. For one, it is one of the most significant variables in the whole analysis. Secondly, the reason it is collinear is because it is negatively associated with almost every structural covariate of violent crime, as discussed in a previous section. It is for these reasons that it will remain in the analysis. Now the final regression analyses are ready to be run.

## *Video Games vs. Structural Covariates of Violent Crime: Regressions*

In order to answer the fundamental question that this thesis poses, our video game related variables will have to be integrated with the structural covariates of violent crime to determine which factors hold the most weight when trying to explain violence our 100 most populous cities. To do this, three models will be run for homicide rates and aggravated assault rates separately, as they are separate (though subtly connected) phenomena. The first model will include the three video game variables: percentage of the population that prefers video games as their main source of entertainment, the five-year spending average on video game-related hardware, and the five-year spending average on video game-related software. The second model will include the remaining structural covariates of violent crime: percentage of the population in poverty, Gini index of income inequality scores, the percentage of the population that is African American, Hispanic/White Dissimilarity scores (to measure Hispanic segregation), percentage of the population that is divorced, the naturally logged versions of population density, and the naturally logged versions of the five-year average populations. Finally, the third model will include all of the variables together and the wheat shall be sorted from the chaff.

### *Homicide*

Model 1 is meant to see how our video game variables fair in explanatory power by themselves without any of our structural covariates of violent crime as controls (see Table 9). We can see that video game related hardware spending stands immensely significant in the negative direction ( $\beta = -.498, p < .001$ ), which means that the more video game related hardware sales in

any given city, the lower the homicide rates are likely to be. Software related spending also registered significant in the negative direction as well ( $\beta = -.185, p < .05$ ), though to a lesser extent. Interestingly, the percentage of the population that prefers video games as their main source of entertainment fell out of the realm of significance and into the realm of irrelevance. And this even before our controls are added to the model. Where the basic correlations showed a potentially worrying positive correlation ( $r = .309, p < .01$ ) to higher homicide rates, this regression nullifies those relationships. Overall, Model 1 still had a relatively high adjusted  $R^2$  of .389 ( $F = 22.04$ ). Keep these values in mind when we discuss their changes when they interact with our structural covariate controls.

Model 2 describes the structural covariates and paints an interesting picture. Only two variables come out as having significant impact on the regression analysis: percentage of the population in poverty ( $\beta = .207, p < .01$ ) and percentage of the population that is African American ( $\beta = .683, p < .001$ ). The adjusted  $R^2$  is astronomically high, coming in at a whopping .701 ( $F = 34.09$ ). What this essentially means is that Model 2, the structural covariates of violent crime, supposedly accounts for 70 percent of the variance that causes homicide rates to go up. Luckily this is not entirely unprecedented, as the seminal piece on the structural covariates of violent crime by Land, McCall & Cohen (1990) also produced adjusted  $R^2$  values as high as .896 (pg. 941) using most of the same variables.

**Table 9.** OLS Regressions – Homicide (N = 100)

	Homicide		
	Model 1	Model 2	Model 3
	$\beta$	$\beta$	$\beta$
Video Games as Main Source of Entertainment	<b>.134</b> (.798)		<b>-.033</b> (.605)
Hardware Spending	<b>-.498***</b> (.132)		<b>.074</b> (.177)
Software Spending	<b>-.185*</b> (2.592)		<b>-.048</b> (2.36)
% Population in Poverty		<b>.207**</b> (.133)	<b>.217*</b> (.172)
Gini Index Scores		<b>.049</b> (19.75)	<b>.047</b> (21.17)
% Population African American		<b>.683***</b> (.043)	<b>.718***</b> (.049)
Hispanic/White Dissimilarity Scores		<b>-.028</b> (.067)	<b>-.016</b> (.069)
% Population Divorced		<b>.081</b> (.337)	<b>.094</b> (.480)
Population Density (Nat.Log)		<b>.035</b> (1.03)	<b>.025</b> (1.08)
Population 5-Year Avg. (Nat.Log)		<b>-.024</b> (1.10)	<b>-.03</b> (1.16)
R <sup>2</sup>	<b>.408</b>	<b>.722</b>	<b>.726</b>
Adj. R <sup>2</sup>	<b>.389</b>	<b>.701</b>	<b>.696</b>
F	<b>22.044</b>	<b>34.09</b>	<b>23.61</b>

\* p < .05, \*\*p < .01, \*\*\* p < .001. Standard errors are reported in parentheses.

Now finally, Model 3 will present the coup de grâce<sup>1</sup> on the idea that video games have anything to do with real violence in the real world, at least in this dataset. What significance hardware sales once had in this analysis swiftly disappears ( $\beta = .074$ ) when paired with the traditional sociological and criminological explanations for violent crime. In fact, percentage of

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1. coup de grâce: a decisive finishing blow, act, or event

the population in poverty ( $\beta = .217$ ) and percentage of the population that is African American ( $\beta = .718$ ) *grow* in explanatory power when paired with the video game variables. The adjusted  $R^2$  also went down when all of the variables were added together ( $R^2 = .696$ ,  $F = 23.61$ ), which implies that the introduction of the video game related variables *reduced* the explanatory power of the model, even though the reduction was miniscule. Not let's see how aggravated assaults fair.

### *Aggravated Assault*

Model 1 looks very much the same with aggravated assaults as it did with homicides. The Model shows decent promise with an adjusted  $R^2$  of .353 ( $F = 19.03$ ). Though the weight is mostly carried by hardware spending, which shows itself as immensely significant ( $\beta = -.477$ ,  $p < .001$ ) in the negative direction, where software spending is also significant in the negative direction ( $\beta = -.183$ ,  $p < .05$ ) but to a lesser degree. Once more, the percentage of the population who prefer video games over other forms of entertainment ( $\beta = .116$ ) is wholly irrelevant in this analysis.

Model 2, on the other hand, falls in line once again with our expected outcomes. Though the adjusted  $R^2$  is noticeably lower than its homicide counterpart ( $R^2 = .499$ ,  $F = 15.07$ ), it remains more significant than Model 1. The same variables play the largest role as well, poverty ( $\beta = .298$ ,  $p < .01$ ) and African American population ( $\beta = .394$ ,  $p < .001$ ). There is one peculiarity with aggravated assaults, however. One variable rises to significance here where it did not with homicide rates: percentage of the population that is divorced ( $\beta = .176$ ,  $p < .05$ ). Though of lowly significance, the emergence of this variable points to the well-known

connections between rates of domestic abuse and divorces discussed earlier in the paper (Gruber, 2004; Stevenson & Wolfers, 2006; Stolzenberg & D'Alessio, 2007; Ca'ceres-Delpiano & Giolito, 2012).

**Table 10.** OLS Regressions - Aggravated Assault (N = 100)

	Aggravated Assault		
	Model 1	Model 2	Model 3
	$\beta$	$\beta$	$\beta$
Video Games as Main Source of Entertainment	<b>.116</b> (20.23)		<b>.072</b> (19.18)
Hardware Spending 5-Year Avg.	<b>-.477***</b> (3.34)		<b>.036</b> (5.619)
Software Spending 5-Year Avg.	<b>-.183*</b> (65.69)		<b>-.126</b> (74.85)
% Population in Poverty		<b>.298**</b> (4.25)	<b>.249*</b> (5.44)
Gini Index Scores		<b>-.022</b> (629.50)	<b>-.037</b> (670.72)
% Population African American		<b>.394***</b> (1.38)	<b>.385**</b> (1.55)
Hispanic/White Dissimilarity Scores		<b>.186</b> (2.12)	<b>.221*</b> (2.19)
% Population Divorced		<b>.176*</b> (10.74)	<b>.147</b> (15.2)
Population Density (Nat.Log)		<b>-.132</b> (32.98)	<b>-.172</b> (34.23)
Population 5-Year Avg. (Nat.Log)		<b>.027</b> (35.153)	<b>.022</b> (35.35)
R <sup>2</sup>	<b>.373</b>	<b>.534</b>	<b>.547</b>
Adj. R <sup>2</sup>	<b>.353</b>	<b>.499</b>	<b>.496</b>
F	<b>19.03</b>	<b>15.07</b>	<b>10.75</b>

\* p < .05, \*\*p < .01, \*\*\* p < .001. Standard errors in parentheses



Model 3 produces the same style of results that it did with homicide rates. With the combination of all the predictor variables, the adjusted  $R^2$  fell subtly from .499 in Model 2 to .496 in Model 3 ( $F = 10.75$ ). All three video game related variables are reduced to irrelevance in the presence of the structural covariates, while poverty ( $\beta = .249, p < .05$ ) and percent African American ( $\beta = .385, p < .001$ ) remain the most significant variables. Another peculiarity emerges, however. Divorce percentages fall out of significance in Model 3, where Hispanic/White Dissimilarity scores emerge into the light of significance ( $\beta = .221, p < .05$ ). It turns out that Hispanic household are significantly more likely than other racial demographics to experience domestic violence of one form or another (DeCasas, 2003; Cummings et al. 2013), particularly in lower income households (Frias & Angel, 2005). In any case, all three video game variables proved ineffectual when compared to the tried and true predictions of criminology and sociology at explaining violence in the 100 most populous cities in the United States, just as predicted.

## CHAPTER 5: DISCUSSION AND CONCLUSIONS

### *Discussion and Limitations*

With both homicide and aggravated assaults, all three video game variables were reduced to irrelevance when paired with the structural covariates of violent crime. In fact, two variables, percentage of the population in poverty and percentage of the population that is African American, were the only variables that achieved significance in the final models for both homicide and aggravated assaults. Income inequality, divorce, population density, and population seemed to have no relationship whatsoever to the violent crime rates within this sample of cities. This of course does not mean that they are not significant elsewhere, nor does it mean that poverty and race play the same role under different circumstances.

What these results do show is supportive of the previous research done thus far on the societal impact video games have on violence: they seem to do nothing at all. When compared to other more potent pieces on the chess board of violence, video games seem to be merely pawns against the queens and rooks of poverty and racial segregation. An important caveat needs to be made regarding the specific variables that were chosen to represent video games in these cities. Video game related spending already proved itself in direct conflict with basic opinions about video game related habits in this analysis. Recall that video game spending was powerfully correlated, in the negative direction, to both homicide and aggravated assault rates. However, opinions about video games as a main source of entertainment were positively correlated with both violent crime rates. Further still, video game related spending was negatively correlated

with the opinions themselves. Meaning that higher video game related sales were negatively associated with positive opinions about video games, which makes no sense.

This basic contradiction cannot be overlooked and quite frankly casts doubt on the basic variables that were chosen to represent video games in this analysis. There does exist a variable that could cut through this complication with ease: time spent playing video games. On a city or county wide level, basic measurements for time spent playing video games would be a godsend for this type of analysis and would likely have much more explanatory power. Time spent playing is a direct measurement. Recall that all four variables used in this analysis are proxy measures for video game popularity in our big cities, not direct measurements. Parents buy their children video games, yet the children do not answer these survey questions nor do the parents necessarily play the video games they buy. Parent may buy their kids (or themselves) video game consoles and extra controllers, only to have them go unused. People buy video games as gifts, regardless of the fact that they might not be played. Even more, people buy and play video games, yet still prefer TV, movies or music over them.

Spending and entertainment preferences do not share a one-to-one relationship in the slightest. More importantly, video game spending may be more closely related to financial freedom and stability, than the habit of playing video games regularly. In the correlations, video game related spending was negatively correlated to percentage of the population in poverty to a very high degree. This means that video game spending goes down the more people are in poverty. If it were more apparent it would rival the sun in obviousness. And the fact that poverty was one our most significant variables connected to violent crime could explain video game

spending's' strong negative relationship to violent crime. Again, it would be far better if time spent playing video games was a variable in this analysis.

Despite this glaring issue, this analysis still holds nuggets of light that may yet still be shown in the direction of truth. Although video game related hardware spending cannot be trusted, percentage of the population that prefers video games to all other forms of entertainment points in an uncomfortable direction, but one that should not be ignored. Percentage of the population that agreed to the question: "Would you consider video games your main source of entertainment?" was positively correlated to both homicide rates and assault rates, as well as our most potent variables associated with violent crime: percentage of the population that is black and percentage of the population that is in poverty. Although our regressions show that these two variables dwarf preference for video games as an entertainment source, this strange relationship deserves a bit of discussion. It is incredibly difficult for one to avert their eyes from this peculiarity. Our one variable that is closest to measuring amount of video game play within a community, be it very large communities, is positively correlated to violent crime and violent crimes most potent predictors. What does this mean?

It could mean a great deal of things that this analysis is not prepared to answer but can be enlightening to future research on the topic. Let us play a bit of speculation. But first, let's dispense with one detail that will allow us to zero in on the main issue. It is no secret that on average across the United States Black Americans have higher poverty rates than all other demographics besides Native Americans (U.S. Census Bureau, 2018). The results found in this analysis reflect this basic fact, where the correlation between percentage African American and percentage of the population in poverty is a whopping .511. As discussed previously this

situation is a direct result of the political environment in the United States for the past hundred years, and this likely has the most to do with the high violent crime rates in these communities. Therefore, poverty has everything to do with crime, where skin color has nothing to do with it. With this in mind, why would impoverished people be playing more video games?

Interestingly, preference for video games over other forms of entertainment was significantly correlated with African American populations and other research seems to confirm this. The Kaiser Family Foundation in 2002 found that black Americans spend more time playing video games compared to other racial demographics (KFF, 2002) and two 2015 Pew surveys found that black Americans are more likely than other racial groups to rank video games as positive influences and are more likely to describe themselves as gamers compared to their white counterparts (Anderson 2015; Duggan, 2015). But why? This is a research question for the future, but we will beg the question none the less.

It is entirely possible that the inhospitable environments that high violent crime rates foster lends itself to self-seclusion behaviors. If going outside is dangerous, staying inside is an intelligent risk assessment. What to do while you are inside? One can read books, watch TV, do homework, sell contraband, or of course play video games. The price of video game consoles can run between less than \$100 for older game consoles to upwards of \$1000 for high end desktops. Video games themselves can range from a few cents on older game consoles to upwards of \$100 for collectors' editions. On top of this, it is known that in high violent crime rate areas, burglary rates are also high, begging the question of whether or not many games or game systems are stolen and sold on the illegal retail market. What does a \$400 game console sell for on these markets? That is a question for future research to take aim at. Unemployment may also play a

role, as unemployed men may likely be sinking more time into video games compared to their employed counterparts. Again, this angle should be addressed for this line of research to hold significance.

In between these extremes lie many possibilities that do not necessarily exclude people in poverty. Another research question for the future is to ask if more people in impoverished areas are playing older games that cost less to acquire or are earning more money to afford newer games and newer game consoles that release every five to ten years. More importantly, we found that poor internet access is highly associated with violent crime rates, though the association again is likely explained by poor economic standing. With no internet, what games are people in impoverished neighborhoods playing? Who are they playing with? What games are they playing? Do these behaviors differ significantly from higher income gamers? There are many guesses that can be ventured here, but only future research can answer these questions for sure. Despite all of this speculation, there is an important take-away on offer with this analysis. These measures for video game environment and play are nowhere near perfect, but they still seem to suggest that poverty is far more important in explaining violent crime in large cities.

A few other important elements in this analysis deserve acknowledgement for future work. For starters, aggravated assaults can be measured differently in every city, and every state, even going by different names (i.e. battery). Also, COVID-19 did have a marginal impact on the statistical fidelity of this analysis, as it restricted access to computer labs with the appropriate statistical programs.

From the vantage point of statistics, a few important issues need to be pointed out. For starters, the standard errors for both models, but particularly for the aggravated assault model, are insanely high. In one place, the Gini index, the standard error is 670, which is absurd. In other places, software spending and population average, the standard error gets up to 74 and 35, respectively. There are a few important reasons for this. The first important reason is that with both homicides and aggravated assaults in large, cities, there are around ten to 15 cities that represent outliers. Recall that the mean homicide rate for the dataset is 10.73 per 100,000. St. Louis had an average homicide rate of 54 per 100,000, Baltimore sits at 46 per 100,000, and Birmingham sits at 38 per 100,000. Again only 14 cities had homicide rates above 20 per 100,000 and more than 40 cities had homicide rates below 10 per 100,000. Seventy cities were below the national average for aggravated assaults, 414 per 100,000, where only thirteen cities ranged between 750 per 100,000 and 1,519.6 per 100,000. This was not accounted for statistically in this analysis. To address the influence of the outliers on the results, particularly the standard errors, the Cook's D needs to be estimated and evaluated. Then, depending on the outcome, the outliers that significantly affect the results will be excluded from the measurement of the impacted variable(s). Free from outlier influence, the regression analysis can then be rerun with lower standard errors expected.

## *Conclusion*

Let's take a step back here and ask the question that brought us here. Which explains violent crime rates in large U.S. cities more, traditional sociological explanations or the violent video game hypothesis? Based on these analyses, the answer is clear. Poverty and histories of racial segregation and neglect share the largest portion of responsibility for the current state of violence in the United States' largest and most populous cities. Video games, or more precisely, video game spending and opinion trends, do not seem to have any important impact on American violence where it counts most. What does this mean for the conversations surrounding the true effects of video games on society?

Video games have been a part of civilization now for a few decades now, about as long as cell phones and Civil Rights. They have infiltrated many of our daily lives and the hearts and minds of our children. Entire economies have emerged, employing thousands of people from retail store operators to top of the line designers. Video games have opened new frontiers of in storytelling, education, empathy, experience, and freedom. At the pace of current technological change and innovation, these experiences are only going to get larger, more expensive, more impressive and more realistic. The sheer range of potential that video games possess is staggering. From military training to anxiety prescriptions, video games are going to become an increasingly larger part of our future as a species. With the profound and influential impact that video games have and will continue to have on the daily lives of millions of people and society itself, it is paramount to take the technology seriously.



The potentially negative side effects of video games is a topic that cannot be ignored. To disregard video games as a simple pass-time with no other influences is irresponsible and unsupported by the evidence accumulated thus far. In the span of this thesis, many differing pieces of testimony have been presented that detail not just the negative, but the positive influences that video games can have on human behavior and experience. It is not out of the question that video games, particularly violent video games, have a role to play in the aggressive behavior of certain members of the population. Spending hours upon hours killing humanoid shapes and hearing the sounds of human-like anguish has to have some effect on the mind, and the research we have discussed shows that it does. But to what degree should we be worried about this effect? We have already discussed the fact that our ancestors were accompanied to death in ways that most modern humans are not. From bringing your children to public executions to watching people eaten alive by hungry animals, violence has always been a part of the human experience. The question now is, should violence continue to be a part of daily life?

We worry greatly about the corrupting nature that violent media has on our children. This instinct that outside influences will corrupt our young is an old one. What else is capable of corruption? Who defines what corrupts and what inspires? The written chronicles of Alexander the Great influenced the legendary Caesar and Napoleon to conquer and kill hundreds of thousands of people in less than a lifetime. The writings of Karl Marx ignited the Russian and Chinese Revolutions of the 20th century, which killed millions upon millions of people. The most recognizable piece of literature in the world, the Bible, has inspired countless people to put aside their selfish desires and lift up the poor and unfortunate people in the world. While it has also inspired countless people to kill and judge others in the name of God. Supposedly, Catcher

in the Rye inspired Mark David Chapman to kill John Lennon. When we look at the history of these texts, do we not see the same trends? *Catcher in the Rye* was put on the restricted books list in public school because of its potential to corrupt the minds of children. The entire Cold War was flavored with the fear of the Communist Manifesto and its potential to kill Western Democracy. Wars have been waged over holy books for the past 2000 years. If simple words on pages can influence so much and inspire so much fear, what are video games capable of? What will video games be capable of in the future? When will the first video game influence geopolitics and the tides of history itself? Only time will tell.

Video games are just barely emerging from their infancy and have already reached as many or more people than Shakespeare and Orwell. Recall that video games, from *Call of Duty* to *Candy Crush*, are being played by upwards of 2.5 billion people: one-third of the earth's population. It has been a mere three decades since the debut of proper First-Person Shooters, the Sauron of video game controversies. With the emergence of Virtual Reality (VR) on the horizon and the growing hunger for escape from the mundane, video games may in fact sow the seeds of the future. Which future will be reaped is another question entirely.

This thesis has gone to show that video games may not impact violent crime as much as conservative pundits would like to put forward. However, this thesis does not inoculate video games from blame of any sort. More research needs to be done on the topic to truly understand its potential, and we are quite a distance from reaching that point. As technology evolves so to will video games, and the finish line of full understanding will ever retreat beyond our reach. Panic is not the answer to this uncertainty. Frantic finger pointing and scapegoating will not solve the problems that surround this new and powerful technology. What will help is solid

research, the types of which this thesis hopes to inspire. As of the completion of this thesis, video games do not seem to be a part of the causal chain that leads to most of the violent crime we know of.

Scapegoating is often a simple way to solve a complex problem. In the face of terror and anxiety, humans are all too ready to place the blame on their fellow travelers. For time immemorial plagues, war, and general misfortune could be explained because some unsavory sect of society angered the gods or cursed the fortunes of a once great and proud tribe. Most times this instinct has been wrong, and it has cost the lives of countless innocents who drew the ire of their fellows at the wrong time and the wrong place. It seems that in the 21<sup>st</sup> century the virtual world itself has been singled out by many as the cause of the modern horror that is public mass killings. However, this pixelated scapegoat finds its defenders in research and modern science in the hopes that our cherished violent virtual worlds can be spared the fate that so many sacrificial lambs of antiquity were not lucky enough to evade.

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