The Connection Between Animal Abuse and Human Violence.
Addendum: Causes and Correlations of Violence

For centuries philosophers, academic scholars, psychologists, and social experts have been debating and investigating the causes of violence. Humans are a war-like species, and war appears to be a natural condition throughout history. Apparently there have only been 268 years without a war somewhere on Earth in the last 3,400 years [1], and there have only been 15 years of peace in the history of the United States [2]. The causes of warfare: political, religious, genocidal, conquest, colonialism, imperialism, are well documented.

The causes of violence in everyday life are another matter. In fact, identifying the causes of violent crime with a high degree of certainty is almost impossible. Different factors may be involved in different cases: poverty in one case, drugs in another, domestic violence in a third [3 - 8], and some analyses suggest that multiple factors are often present at the same time [5 - 6].

While the causes of crime and domestic abuse may be difficult to determine, the correlation of crime with various factors is much easier to determine, and probably just as valuable as determining causes. If crime is highly correlated with some factor, then we can work on that factor to reduce crime. In correlation analysis, one variable is compared with another to determine how strong the association is between the two. An example is the comparison of smoking with medical consequences such as mortality; another is the association of highway driving speeds with crash rates. Finding the highest correlations among a group of alternatives is useful in identifying which alternatives are best to focus prevention efforts on.

Violent crime is officially categorized as homicide, aggravated assault, rape, and robbery, but should also include domestic violence (Interpersonal Violence: IPV), child abuse, and elder abuse. Property crimes include burglary and arson, among others. Potential factors (variables) that have been suggested that could potentially be correlated with these crime areas include:
- poverty
- drug abuse
- alcohol abuse
- violent media and violent video games
- access to weapons, particularly guns
- poor education
- low IQ
- bullying
- single parent families
- poor, harsh parenting (child abuse)
- gang involvement
- hatred, racism
- feeling disrespected
- feeling hopeless
- environmental factors
  - exposure to toxic chemicals
  - head injury
  - poor diet

Some of these variables are difficult to quantify for correlation purposes, such as feelings of hopelessness or disrespect, while others such as exposure to toxic chemicals such as lead may take

place over many years. For others, there is a wealth of data available from government and professional organizations such as the Center for Disease Control and Prevention (CDC), the FBI's Uniform Crime Reports (UCR), the National Crime Victimization Survey (NCVIS), the Department of Justice (DOJ), the Department of Health and Human Services, and non-government sources such as the American Psychological Association (APA), the National Coalition Against Domestic Violence, and websites like Statista.com. There are also many journal articles from academic sources that study individual causes and effects.

It is particularly useful that statistics are available separately for all 50 States, usually given by rates per 100,000 population, for example, poverty rate, violent crime rate, domestic violence rate, child abuse rate, etc., all per 100,000 population in each State. This allows correlations to be examined and compared State by State to identify which factors are the most significant to investigate and remediate. If one factor such as poverty is more closely associated with crime or domestic violence than drug use, for example, it suggests that more resources would be usefully applied to alleviating poverty than drug use, though both of course are important.

There are two types of diagrams that make correlations easy to observe visually by graphing one variable against the other. The higher the correlation is, the more the points will fall along a straight line, as shown in Figure 1. A positive correlation slopes upward, a negative one slopes downward. The degree of correlation between any two variables is given by the correlation coefficient [9], a mathematical formula that describes the extent of the relationship between the variables.
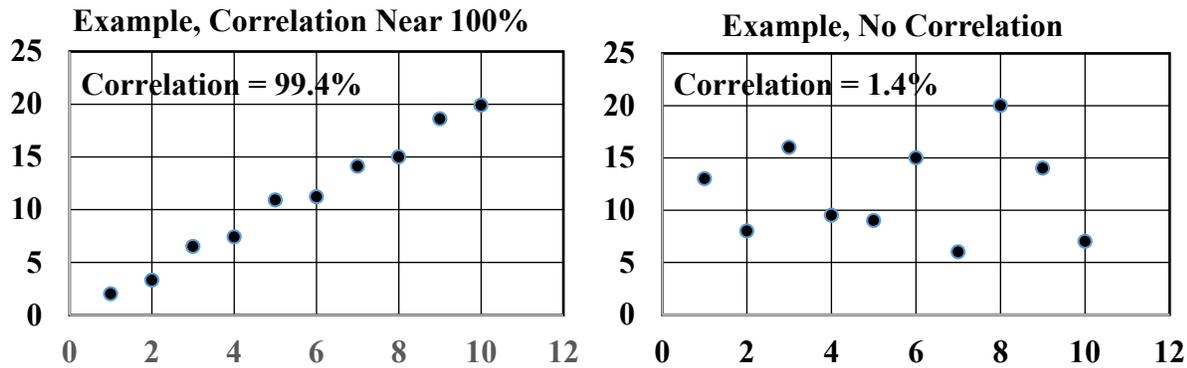

Figure 1. Correlation diagram examples

Figure 2 shows another type of correlation diagram most often found in scholarly journal articles where correlations are shown on a bar graph. Perfect correlation would be 100% and no correlation would be given as 0%, as represented by the bar height. Each bar represents a different study and the vertical axis represents the correlation result of that study. For example, bar #4 represents a group of prisoners convicted of rape; 57% of them were alcoholics.
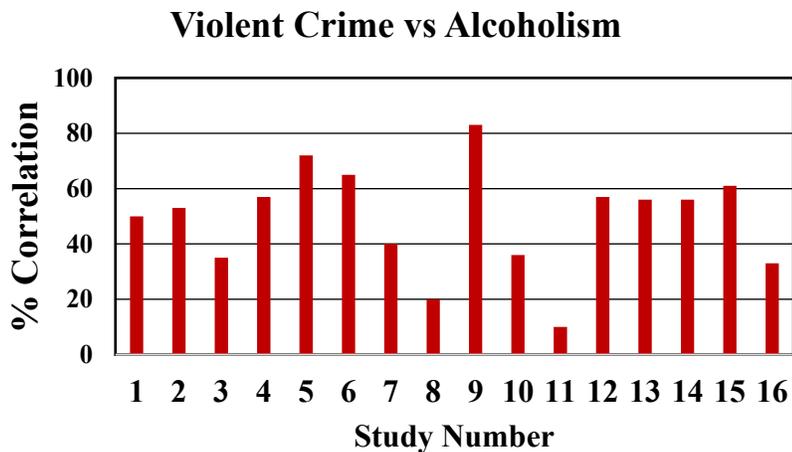
Violent Crime vs Alcoholism

Figure 2. Typical bar chart correlation diagram (ref. 26).

One phenomenon not included in the list of factors shown earlier is animal cruelty, something which is usually and unfortunately ignored in most of the studies of violent crime. It will be shown by correlation analysis that animal cruelty is as much or more associated with violent crime and domestic violence than many of the factors usually mentioned, and fighting animal cruelty can have as big or bigger payoff than many of the other potential factors.

A Word on Data Sources

In any correlation analysis, a difficulty arises in obtaining sufficient, reliable, and timely data for the variables of interest. Statistics on the factors listed earlier are found in many different places. Governmental and private agencies exist that compile such data periodically. Almost all of them work using surveys, telephone interviews with tens to hundreds of thousands of households. The NISVS (National Intimate Partner and Sexual Violence Survey) and NCAND (National Child Abuse and Neglect Data System) work in this way. Data on child maltreatment is also obtained from thousands of child welfare agencies such as Child Protective Services. Data concerning violent and nonviolent crime is available from the FBI's Uniform Crime Report up to 2019; for subsequent years this data will be reported in NIBRS (National Incidence-Based Reporting System). The FBI obtains this information by voluntary submissions from over 18,000 local law enforcement precincts across the country (city, county, state, federal, tribal, and university).

Ideally, surveys would encompass interviews with millions of individuals for better statistics, but the cost and time involved would be prohibitive. Mathematical methods are used to make the analysis as accurate as possible in spite of lower source numbers, and data is reported with "confidence levels" to account for this. For example, the NISVS survey reports that the lifetime Interpersonal Violence to women in the United States is 37.3%, with 95% confidence levels at 36.3% and 38.3% [9A].

Data on homicides and suicides are available both from the NIBRS and UCR sites and from the CDC (Center for Disease Control and Prevention). Occasionally, multiple sources exist for the same information but differ somewhat in the numbers, which might be a result of asking different questions in the surveys or different criteria when compiling the data. Homicide and injury data for a given year and for each State can be obtained from the CDC's WISQARS (Web-based Injury Statistics Query and Reporting System) and WONDER (Wide-ranging On-Line Data for

Epidemiologic Research). The data from the two sites are often slightly different, though not enough to be problematic.

Ideally, both variables in a correlation analysis cover the same time period. For many factors such as poverty, violent crime, child abuse, drug usage, data is available on an annual basis. In some cases where annual data aren't available, data can be used from an adjacent time period as long as the variable changes slowly from year to year. In other cases the variables change so fast that meaningful correlations would be doubtful. Unemployment, for example, changes month to month and attempts to correlate with another variable which is only available annually would be meaningless.

Fortunately, many variables are relatively stable and change slowly from year to year. However, the COVID pandemic starting in 2020 caused rapid changes in many of them, faster than some of them could be accurately tabulated. For that reason, correlations derived for this addendum use data from 2019 or prior years, with exceptions where *both* variables were available for 2020 or more recent years.

The FBI's recognition in 2016 that animal cruelty is an important statistical factor in violent crime rates has resulted in the inclusion of animal crimes in the NIBRS; however, many States are still not reporting animal cruelty data for inclusion in the statistics [9B]. In future years as the recognition of its importance and its close connection with human violence become more widespread, it's likely that better statistics from government sources will be available.

Poverty.

Poverty is a state or condition in which a person or family lacks the finances and essentials for a minimum standard of living. Poverty-stricken people and families might go without proper housing, clean water, healthy food, or health care [9C]. Poverty is frequently mentioned as a significant cause of crime [6, 10 - 12], especially the abuse or neglect of children. Figure 3 shows the relationship between poverty as a percentage of the population versus the violent crime rate per 100,000 people for year 2018, using data from the FBI's UCR and the U.S. Census Bureau's American Community Survey [13]. (In these and subsequent diagrams each dot represents a different State.)
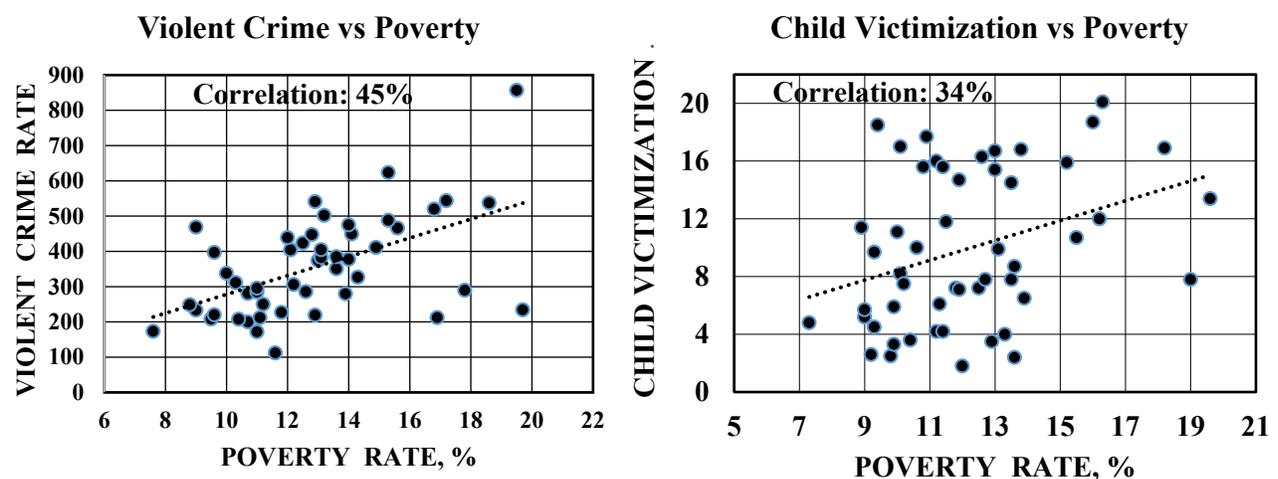

Figure 3. Correlation diagrams between poverty and violent crime and poverty and child abuse.

The correlation of 45% indicates a significant association between violent crime and poverty. In 2019 the correlation was 42%. These results are somewhat contrary to other suggestions that poverty and violent crime are not strongly related [12].

Figure 3 also shows the association between child abuse and poverty. Many studies have indicated that child abuse occurs disproportionally among poor families [10 - 11]. The correlations between poverty and fatal child abuse (33%) and domestic violence against women (32%) are shown in Figure 4. The correlation between property crime and poverty is even higher, 47%, and the correlation of poverty with homicide is 62%.

The conclusion is that somewhere between 1/3 and 1/2 of perpetrators of violent crime, child abuse, and domestic violence came from a background of poverty.
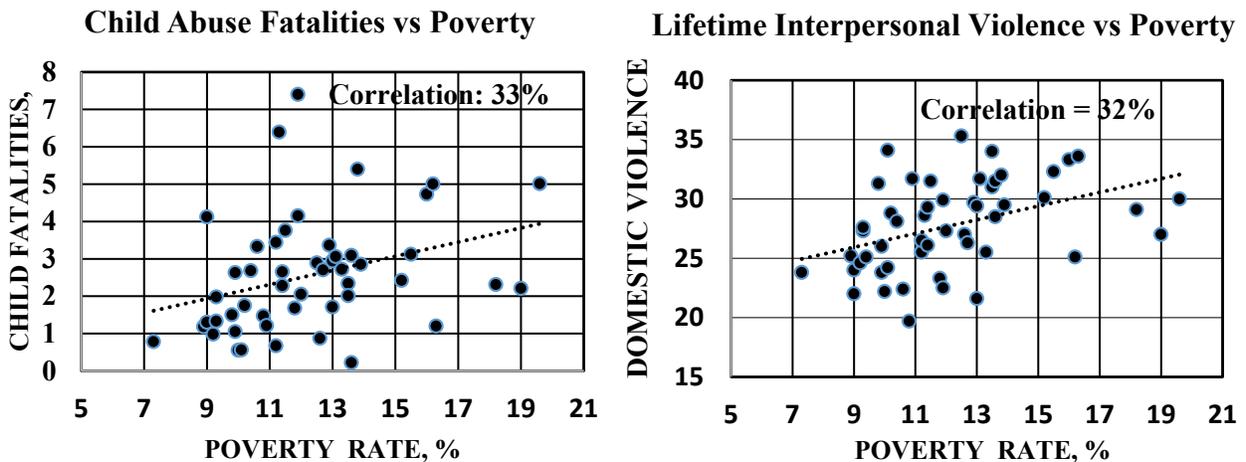

Figure 4. Correlation diagrams between fatal child abuse, lifetime domestic violence, and poverty.

Drug Abuse.
Drug use has long been implicated as associated with violent crime [7 - 8, 11, 14 - 16], including youth violence [7, 27]. In one 12 month study in 1989, 60% of arrestees for violent crime tested positive for at least 1 drug [27]. In another study, substance abuse tests were positive in 37 to 59% of male perpetrators arrested for violent crimes [8]. Drug "pushers" may defend their territory violently; drug users may steal or assault others to gain funds to feed their habit. A person high on drugs may be less inhibited from violent acts. Expectant mothers who use drugs may cause harm to the fetus, which can suffer brain damage and may later grow into a violent individual. Drugs, like other substances, may also be involved in domestic situations including IPV and child abuse.

Drugs are also involved in many accidental deaths. There were over 100,000 deaths from overdoses in the 12 months ending in April, 2021 [18], a number which is more than double the death rates due to gun shot fatalities and car crashes.

The National Institutes of Health has conducted a survey of illegal drug use by persons 18 years of age and older in each State, averaged by percentages for 2019 and 2020, drugs which include marijuana, cocaine (including crack), heroin, hallucinogens, inhalants, and methamphetamine [17]. Another investigation by SAMHSA (Substance Abuse and Mental Health Services Administration) looks at where drug abuse is most pronounced by giving each State (and D.C.) a "score" consisting of 21 separate metrics including 1) drug use and addiction and opioid prescriptions, 2) law

enforcement involvement in drug abuse cases, and 3) drug health issues and rehab capability [18]. The higher the score is for a State, the greater is its drug problem.

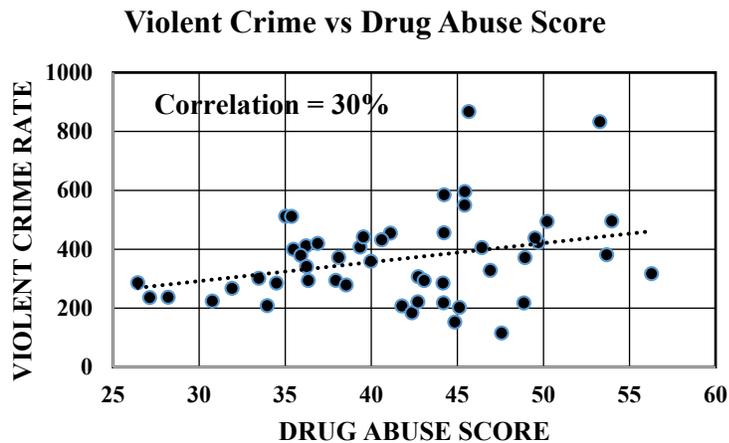**Violent Crime vs Drug Abuse Score**

Figure 5. Violent crime rate per 100,000 population versus drug abuse score

Figure 5 shows a correlation diagram between violent crime and the drug abuse "score" for all 50 States in 2019. As mentioned earlier, previous studies put the correlation at 37 – 59% [8]. Figure 6 shows the correlations between domestic violence experienced by a woman in her lifetime and child victimization versus the drug abuse score. The correlation between domestic physical violence and the drug score is even higher at 45%. It is clear that drug abuse plays a significant role in violent crime, domestic violence, and child abuse.
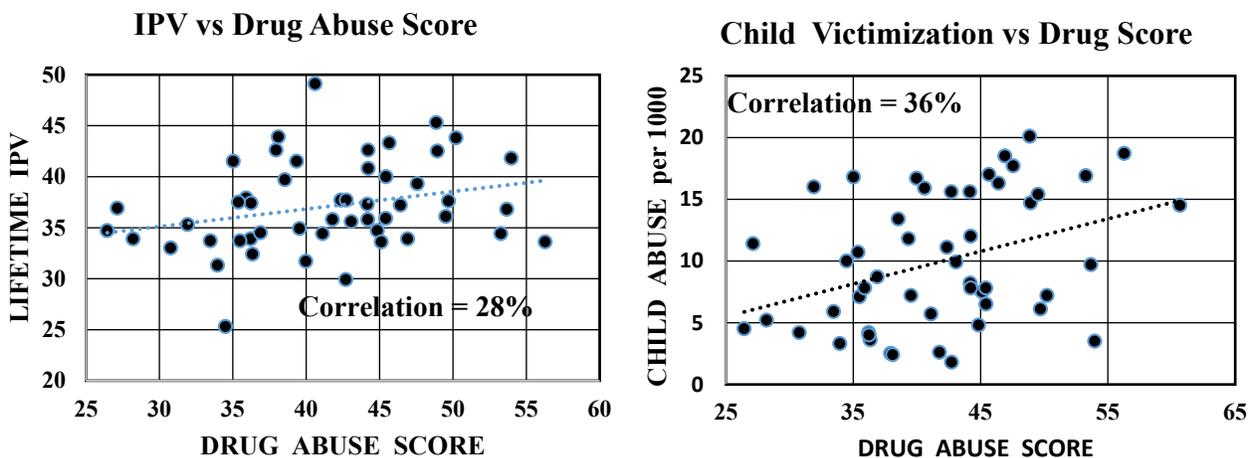

Figure 6. Lifetime IPV (women) and child victimization versus drug abuse score.

Alcohol Abuse.
One problem investigating correlations with alcoholism is in defining what it is and who suffers from it. Excessive alcohol use is described by the CDC as *binge* drinking (5 or more drinks by men and 4 or more by women on a single occasion), heavy drinking (15 or more drinks per week for men and 8 or more for women), and any alcohol use by people under 21 or pregnant women [19]. Besides binge drinking, other studies give statistics on the number of adults "drinking excessively" [20 - 21] and the gallons of alcohol consumed per year per capita [22]. The Mayo Clinic defines

alcoholism as a pattern of alcohol use that involves problems controlling drinking, being preoccupied with alcohol, continuing to use alcohol even when it causes problems, having to drink more to get the same effect, or having withdrawal symptoms when drinking is stopped [23]. Binge and heavy drinkers may or may not fit this description of alcoholism.

Alcohol abuse has long been suspected of association with violent and non-violent crime and domestic violence [3 - 4, 6 - 8, 10 - 11, 14, 21, 24 - 29]. According to the Law Library, "alcohol has also been shown to promote violence. In studies of alcohol and domestic violence, alcohol use typically is implicated in more than half of all incidents. Similarly, *both* homicide victims and perpetrators are likely to have elevated blood alcohol levels" [6]. Estimates of alcoholism range from 18 to 38% among child abusive parents and 25% to 85% in domestic violence situations [11, 25]. In one study, 59% of males and 53% of females arrested for violent crimes reported alcohol use before the event, while alcoholism was indicated in 20% to 40% of convicted murderers, 20% to 30% of convicted robbers, and 30% to 40% of aggravated assault cases [27]. According to the Dept. of Health and Human Services [26], "alcohol is associated with at least half of all murders, rapes, sexual violence such as incestuous offenses, family violence, and felonies."

Some reports suggest that results on alcohol use and crime are contradictory, finding little support for an association between alcoholism and child abuse for example [10 - 11]. However, Figure 2 clearly showed a strong correlation between alcoholism and violent crime of all types. Figure 7 shows a recent compilation of correlations between alcohol use and various violent crimes, data which are consistent with the figures reported in the paragraph above. One study of adolescent offenders found that "in comparison to marijuana and heroin, alcohol use is more strongly and consistently associated with both violent and nonviolent offenses" [30].
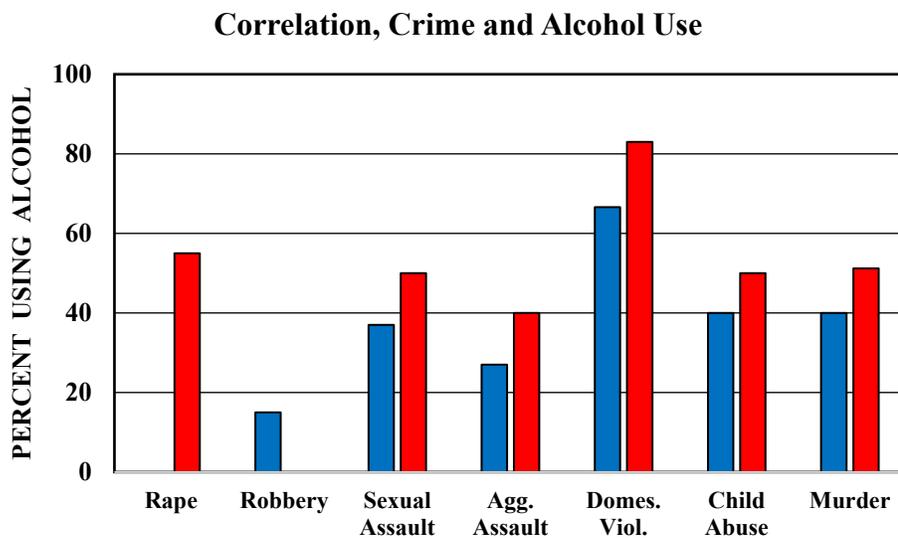

Figure 7. Correlations of violent crimes with alcohol use [ref. 26 (red), 31 (blue)].

Combining the data of Figures 2 and 7, it appears that, on average, alcohol use is associated in about 47% - 59% of violent crimes of all types, and likely higher for domestic violence.

Violent Media.
The rise of video games some years ago and the increasingly graphic violence shown in films and television have long given worry that people were being desensitized, and were perhaps indoctronating young people especially that violence is an acceptable and inevitable part of life.

"Research with children has clearly demonstrated a correlation with exposure to media violence and aggressive behavior. Children who watch more violent movies and television are more likely to engage in similar behaviors both as children and adults. Long-term exposure to media violence fosters later violence through several mechanisms. In addition to teaching aggressive attitudes and behaviors, it also seems to desensitize viewers to violence, making it more acceptable" [6].

Many studies suggest that violent media is possiblty related to violent crime [3, 5 - 7, 14 - 15, 25, 32 - 35]. A meta analysis of 188 studies found a strong association between television violence and antisocial and aggressive behavior, including violence against women [25]. "Research on youth violence indicates that violence in the media influences teens and can cause them to act aggressively. Studies have shown that playing violent video games increases aggressive thoughts and behaviors. Violent media includes the internet, television, magazines, movies, music, advertising, social media, and more. Basically, *media* consists of anything a teen sees, hears, or interacts with" [7]. By the time the average child is eighteen years old, they will have witnessed 200,000 acts of violence and 16,000 murders [36 - 37].

However, there is some doubt that media violence, despite its known effect on increasing the tendency toward aggression, may not be strongly associated with subsequent violent crime [38 - 41]. "When integrated with other long-term studies on the development of crime, it is concluded that the link between media violence and crime is weak after other environmental factors are taken into account" [38]. Weak, however, does not mean non-existent. Studies of over 51,000 adolescents found correlations of 17 to 23% between aggression and violent media overall, and 22 to 27% for violent video games specifically [41A]. The conclusion is that correlations do exist but they are moderate, 27% or less, and may be as low as 8% [41].

Guns.
The presence of firearms and other weapons makes the danger of serious or fatal injury much higher compared to households where guns are absent. Data from the CDC show that States with the highest firearm deaths are those with weak gun violence prevention laws and higher rates of gun ownership, while States with the lowest gun death rates have lower gun ownership and stronger gun laws [42].
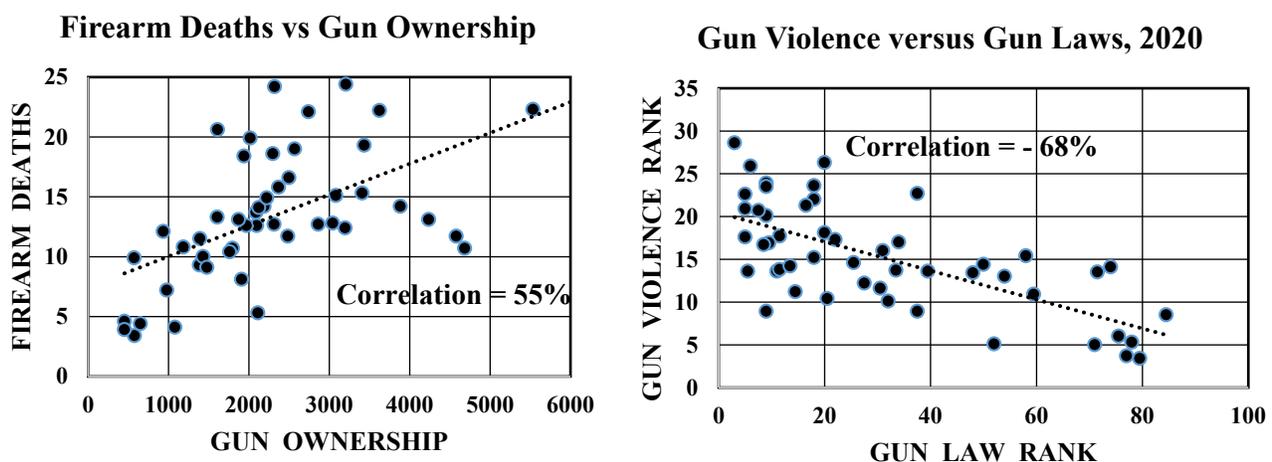

Figure 8. Firearm death rate vs registered gun ownership per 100,000 in 2019 and gun violence vs gun law "rank" for 2020. Deaths include homicides and suicides.

More people die from suicide using firearms than from gun homicides [42]. The number of people killed by firearms in recent years ranged from 39,000 to 45,000, with about 54% being suicides and

43% homicides. Firearms make suicides easier to carry out and harder to survive if the victim changes their mind. Mass shootings and school shootings receive by far the most publicity but are a small fraction of the total deaths [43].

According to the Gifford Law Center, victims of domestic violence are 5 times more likely to be killed when their abuser has a gun, and 25 million US adults have been threatened or non-fatally injured by an intimate partner with a firearm [44]. Women in the U.S. are 21 times more likely to be killed with a gun than women in other high-income countries. In addition, guns are the leading cause of death for children under the age of 18. In a given year, more U.S. children will die from gun violence than will die from cancer, pneumonia, influenza, asthma, HIV/AIDS, and opioids combined [36]. Shootings of children and teens under 18 amounted to 3,771 in 2019 [45]. Roughly 5.4% of school children, 3 million, have carried a weapon (gun, knife, club) to school for a variety of reasons [46], and about 1 in 18 high school students go to school armed with a gun [47].

Correlation diagrams between *registered* gun ownership, firearm fatalities, and the violent crime rate for 2019 are shown in Figure 8 [47A, 47B]. It's not surprising that firearm fatalities are closely related to the number of guns in each State, with 55% correlation. (Firearm non-fatal injury rates are 3 to 4 times higher than shooting fatalities [48] and it is likely that a similar correlation would be observed for non-fatal injuries, but such data are not as available.)

Everytown for Gun Safety [48A] has compared gun laws and gun issues in each state, including background checks, carry permit requirements, assault weapons prevalence along with high capacity magazines, minimum age to purchase, and other metrics and ranked each State accordingly. The higher the ranking, the stronger are the gun laws for that State. The second plot in Figure 8 shows
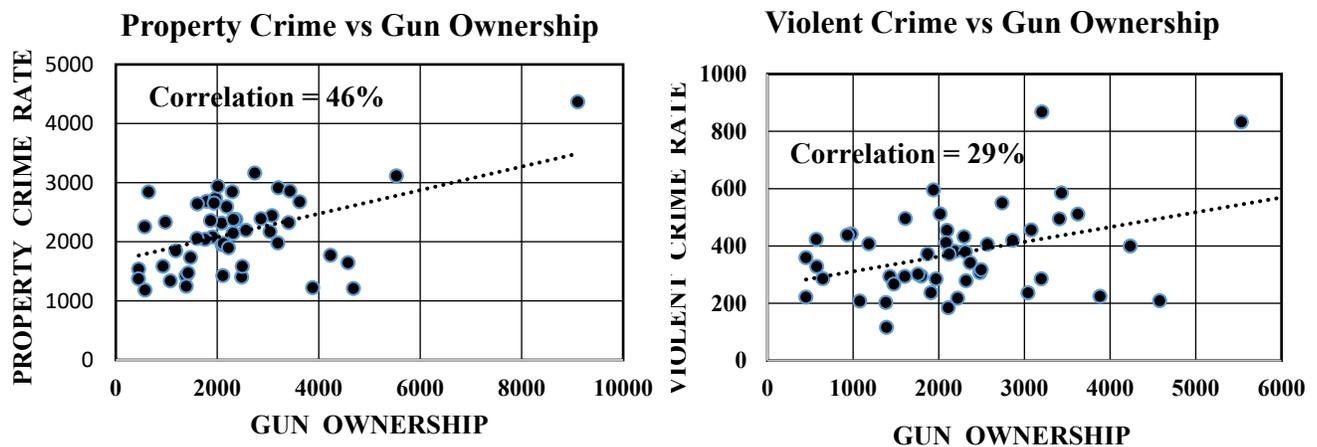

Figure 9. Relation between property crime and violent crime and registered gun ownership per 100,000 population.

the gun violence rate (defined by Everytown as firearm fatalities) versus the gun law rank, indicating a - 68% correlation. It's clear that States with the strongest gun laws have the lowest rate of gun violence and firearm fatalities.

Figure 9 shows the connection between property crime, violent crime, and gun ownership for 2019. Roughly half of property crimes are carried out with firearms, and almost 30% of violent crimes (rape, robbery, aggravated assault, and homicide). Since there are many *illegal* handguns in circulation, these correlation numbers are probably understated, for both types of crime.

Figure 10 shows the relationship between suicides by firearm and both gun ownership per 100,000 population and the State gun law ranking. As can be expected, the more guns there are and the weaker the gun laws are, the greater is the suicide rate, with correlations of 64 to - 75%.
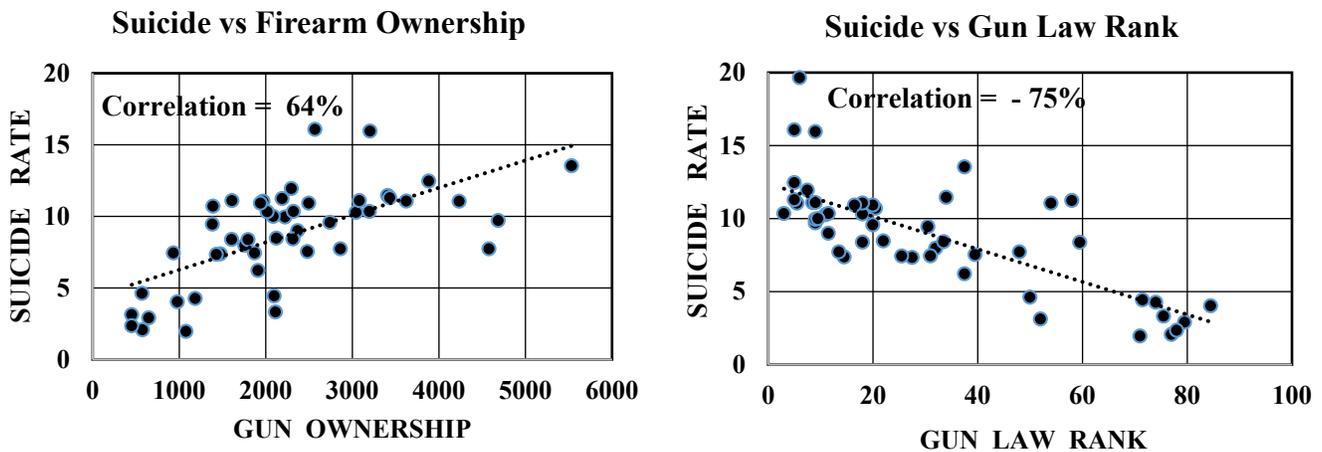

Figure 10. Suicide rate versus gun ownership and gun law rank.

In terms of total suicides, states with stronger gun laws had a lower proportion of death by firearm compared to suicides by other means. For example, California with the highest gun law rank had a firearm suicide rate of 4 per 100,000 but 7.2 by other methods. Mississippi with the weakest gun laws had a firearm suicide rate of 10.3 per 100,000 and 7.5 by other means (data from the CDC [48B]).

Education.
Education can influence crime for several reasons. A good education is a means to a better future, enhancing career opportunities, reducing unemployment, increasing earnings potential, and providing prosocial interactions. It reduces poverty which we have seen is significantly correlated with crime. People with better education and higher paying jobs are less likely to be envious of those who have "more" than they do. Education reduces income inequality. The higher the level of education and the better the education quality, the more these benefits are likely to ensue. In fact, school performance is closely related to future crime. "School performance is by far the most significant predictor of delinquency and future criminality, more accurate than race, economic level, or social class" [49]. "When someone receives more education, they are less likely to commit a crime and are more likely to earn a living wage" [50].

Wallethub has compared the quality of education and the educational attainment in each State using metrics such as "the share of adults over 25 years old with a high school diploma/some college/at least a Bachelor's degree/etc., quality of public school systems, public high school graduation rate, enrolled students in top universities, public college graduation rate, and more" [51- 52], 20 metrics in all.

Each State then received a "rank" from 0 to 100 in education excellence. Higher ranking States have lower crime rates and lower domestic violence rates as seen in Figure11. These correlations are fairly strong, and the correlation between education and homicide is even stronger as shown in Figure 12. Evidently, education quality has a strong effect on violence of all kinds.
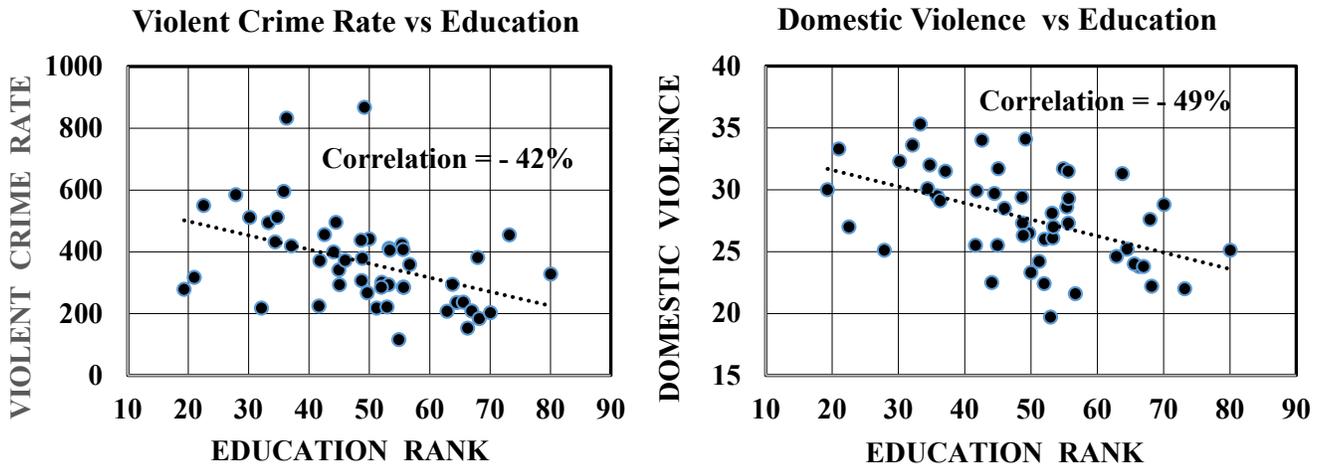
Figure 11. Violent crime rate per 100,000 and IPV rate (lifetime, women) versus education rank.
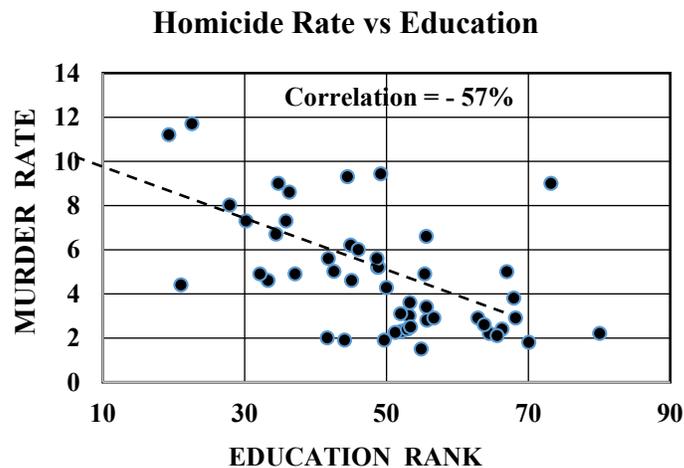
Figure 12. Homicide rate per 100,000 population versus quality of education.

IQ Level.
The average intelligence quotient of a population is likely to be a (somewhat indirect) corrolary of the education level in that population, with the reasonable assumption that people with higher IQ would seek higher levels of education. Studies have shown that lower IQ is a predictive factor of crime and increased severity of violent offenses including assault, arson, and murder [53 - 54]. Research also indicates that sex offenders have lower IQ levels than non-sex offerders [54].

Rankings of each State's average IQ level have been carried out, using prior IQ test results, SAT (Scholastic Aptitude Test) and ACT (American College Test) scores, the percentage of the

population who graduated from college, and even on-line IQ tests [55]. Correlations can then be made between crime and other factors versus IQ scores. The average IQ of a large population is normalized to a value of 100 world-wide. The average IQ in the United State overall is 98 [55].

Figure 13 shows that violent crime and domestic violence are significantly influenced by IQ level consistent with previous studies mentioned above. Aggravated assault is also highly correlated and property crime has an even higher association (Figure 14). Somewhat surprisingly, child abuse and child fatal abuse have lower correlations with IQ levels at -9% and -22%, respectively.
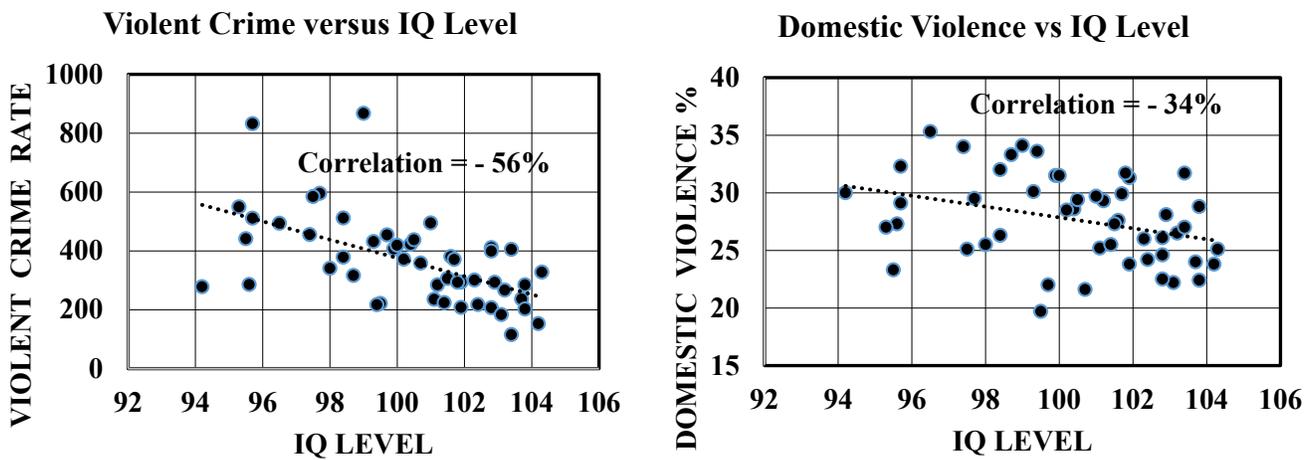

Figure 13 Violent crime and domestic violence versus IQ level.
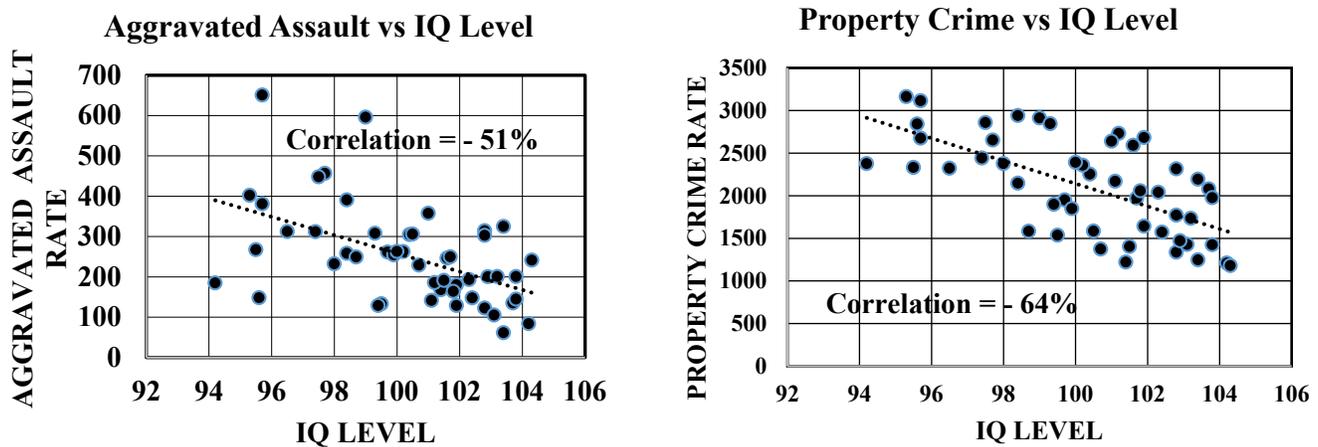
Figure 14. Aggravated assault rate and property crime rate per 100,000 population versus IQ level.

Research shows that "individuals with lower IQ levels are more likely to commit more severe (and violent) offences" [53]. Figure 15 show the relation between IQ level and homicide, with a high correlation coefficient of -70%, one of the highest in all the correlations. It seems likely that IQ involvement with crime is indirect, related to poverty, lack of education, drug use, troubled home life, or dangerous neighborhoods, for example. Studies show that changes occur during the teenage years which can affect an individual's IQ through changes in the brain structure [53A]. Even diet and nutrition can affect IQ level as they impact the developing brain in young children [53B].

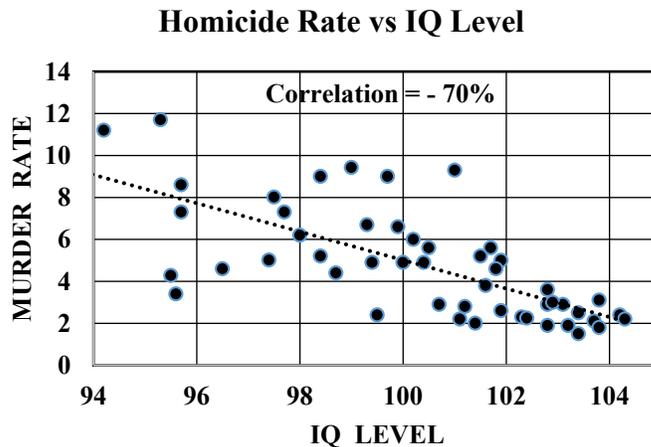**Homicide Rate vs IQ Level**

Figure 15. Homicide rate per 100,000 versus IQ level.

Bullying.

Bullying has been a constant problem in schools [4, 14] and seems to be an insoluble problem for teachers, parents, school boards, and state education departments. It has gotten worse with the rise of social media and the accompanying cyberbullying. Hundreds of thousands of students skip school every day because of fear [56]. Physical bullying is highest in middle school (28%), then high school (16%), but cyberbullying is even higher, 33% in middle school and 30% in high school [57 - 58]. Female students are as likely or even more likely than males to be bullied, especially cyberbullied, and gay students are bullied at nearly twice the rate of straight students [57].

According to the Secret Service's National Threat Assessment Center, reporting on school violence that occurred over a 10 year period, most school attackers were victims of bullying, and "for over half of the attackers the bullying appeared to be of a persistent pattern which lasted for weeks, months, or years" [58A]. Bullies themselves are more likely to graduate to criminal activity than non-bullies, with a higher chance of having a criminal record by age 30 than non-bullies [59]. Bullies are also more likely to have been abused at home than children who are not bullies [59].

An even bigger problem is the increased likelihood of bullying victims to consider suicide and attempt suicide [59 - 60]. It is incredibly sad that many of them succeed. The CDC has compiled data for the fraction of students ages 15 to 18 who were bullied at school and either considered or actually attempted suicide [61] as shown in Figure 16. (The bullying rate is the fraction of students who were bullied). Nearly 20% of high school students who were bullied considered committing suicide and 10% actually attempted it. Since this suicide connection with bullying has been known for many years, it is all the more puzzling why more effort isn't put into curtailing such a major cause of adolescent deaths. The CDC data also shows that in general, females were bullied more than males, and in nearly all cases, females considered or attempted suicide in a greater fraction than males, sometimes by a factor of 2, much of it due to social media and cyberbullying.

Students Considering Suicide vs Bullying

Correlation = 50%

(Chart: y-axis "CONTEMPLATED SICIDE, %" from 10 to 28, x-axis "BULLYING RATE, %" from 12 to 26)

Attempted Suicide vs Bullying

Correlation = 25%

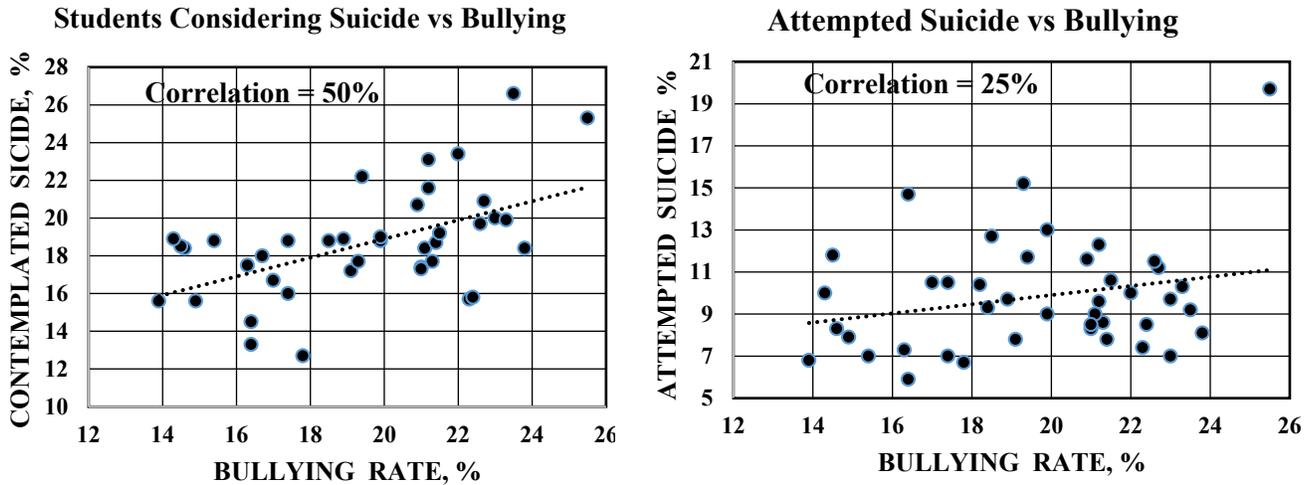*(Chart: y-axis "ATTEMPTED SUICIDE %" from 5 to 21, x-axis "BULLYING RATE, %" from 12 to 26)*

Figure 16. Fraction of bullied high school students considering or attempting suicide

There is significant evidence relating bullying and school shootings. In fact, many adolescent school shooters were either bullies or the victims of bullying, with correlations ranging up to 90% in some studies [62 - 65]. News coverage of the tragic, all-too-frequent school shootings often mention mental health, radicalization, racism, or hatred, but only mention bullying almost in passing. Columbine, Santana, Red Lake, Santa Fe, Uvalde: 53 dead, 70 injured, all were carried out by victims of bullying. (Another fact seldom mentioned in the media is that many school shooters were torturing animals before their school shooting sprees, and both fellow students and adults usually knew about it.) If society wants to save lives and curtail suicides, and prevent many children from living in fear, much more effort must be placed on stopping bullying in schools. This really can't be overemphasized.

Gangs.

The FBI's National Gang Threat Assessment prepared by the National Drug Intelligence Center (NDIC) examines the involvement of gangs in both violent and non-violent crime [66]. Data is available for years prior to 2011 concerning 4 types of gangs: street gangs, organized crime gangs, outlaw motorcycle gangs, and prison gangs. The number of gangs in any one State ranges from as few as 4 in North Dakota to 390 in Florida and 490 in Missouri [66]. Gang membership likely runs from a handful of members to what amounts to a small army. As of 2011, there were an estimated 33,000 gangs in the U.S. with 1.4 million members, an increase of 40% over 2009 [66].

"Gangs are responsible for an average of 48% of violent crime in most jurisdictions and up to 90 percent in several others," according to NDIC analysis [35, 66]. A reported 13% of all murders are associated with gangs and 43% of property crime [67]. 40% of drug trafficking is attributed to gangs [67]. Gangs are also increasingly involved in non-traditional gang-related crimes such as alien smuggling, human trafficking, and prostitution, and gangs have *significantly penetrated the military* [66]. Violence is almost required for gang membership, a form of initiation. Gang violence also includes intra-gang warfare as gangs vie for territory, especially in the drug trade. Peer pressure can influence teens to join gangs and then might then engage in aggressive behavior that they normally wouldn't on their own [6 - 7].

Single Parent Households.

The absence of two parents in a household has been described as a major possible cause of crime. According to the Heritage Foundation, the real root of violent crime is the breakdown of marriage, family, and community [70]. "Children from single-parent families are more prone than children from two-parent families to use drugs, be gang members, be expelled from school, be committed to reform institutions, and become juvenile murderers" [68]. "The Journal of Research in Crime and Delinquency reports that the most reliable indicator of violent crime in a community is the proportion of fatherless families. Fathers typically offer economic stability, a role model for boys, greater household security, and reduced stress for mothers" [68].
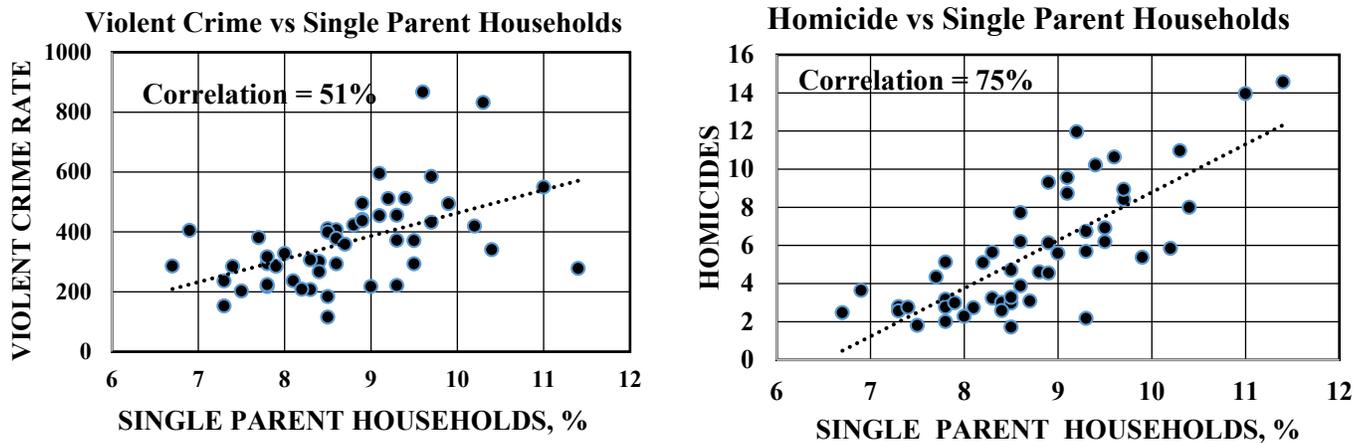

Figure 17. Violent crime and homicides per 100,000 versus single parent households [data:71A, 72].

Single parent households are more likely to struggle financially and leave the remaining parent with less time to nurture and guide the children. However, even in a single parent household, a safe, stable, loving atmosphere can guard against possible delinquency, an important role for both the mother and father. A father as an authority figure and his involvement in raising his children can go far to buffer against a descent into crime [68 - 70]. Unfortunately, about 2/3 of single parent households are only moms.
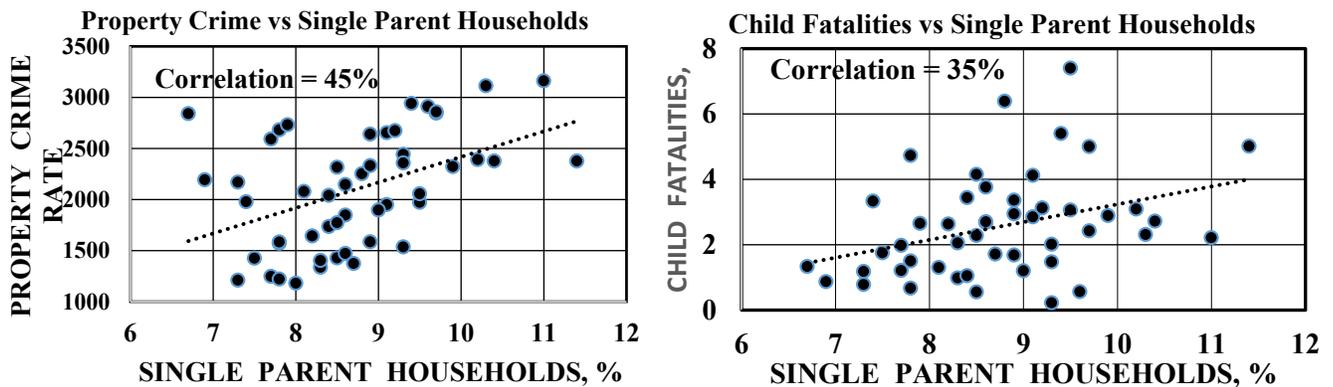

Figure 18. Property crime and child abuse fatalities per 100,000 versus single parent households.

Figure 17 shows that there is indeed a high correlation between households with only one parent and murder and violent crime in general, in agreement with many past studies. A correlation of 75% between homicides and single parent households is astonishing. Society pays a high price for the

breakdown of the family. The correlation between child abuse and single parent households is not as strong, 10%, and likewise the correlation with child neglect is low, 18%, but as Figure 18 shows, the correlation with child *fatalities* is much higher, around 35%, and with property crime is 45%.

The high rates of crime associated with one parent households may be partly due to financial stress as the single parent struggles to pay the bills; we have already seen a close association between poverty and crime. Perhaps the child is more prone to peer pressure and gang involvement as he or she tries to replace the missing parent's emotional and physical support. It isn't clear what can be done to fill the void, but society and most importantly the children themselves would benefit from some sort of solution.

Parental Treatment.
A close corollary to the *absence* of a father or mother in the child's life is the *treatment* of the children in the family environment. Of all the possible *causes* of violence, *child abuse very likely holds the top position.* Even witnessing violence in the household, as in spouse battering, IPV, can predispose children to delinquency and future violent behavior as children learn from experience that violence and aggression must be the way the world works. Harsh parenting, the absence of warmth and support, and neglect are blueprints for creating violent juveniles and adults and perpetuating the continuing, never-ending cycle of violence in society [4 - 7, 10, 14, 24 - 25, 35, 49, 65, 69, 73].

"If we review the past sixty years of research on child-rearing, the most solidly confirmed and consistent finding is that the more severely children are punished, the more violent they become both during childhood and after they become adults" [65, pg 115].

"One third of children who have been abused or exposed to parental violence become violent adults" [25, pg 62].

"Research on parenting styles has identified two with relevance to abuse: 1) a neglect / disengaged style involving low involvement, nurturance, warmth, control, and monitoring; 2) an authoritarian style involving punitiveness, coercion, restrictiveness, and low warmth and support" [10, pg 118]. "Several studies suggest that a child witnessing violence toward siblings or parents may be as harmful as the experience of victimization itself" [10, pg 216].

Child abuse and interpersonal violence at home is a strong source of the <u>continuing cycle</u> of abuse. "One third of victims of child abuse grow up to continue the pattern of inept, neglectful, or abusive rearing as parents" [8].

"The frequent and prolonged history of physical and sexual abuse committed by a parent has been pervasive and extreme among the 150 murderers studied. It has been the life experience of 94% of all the murderers examined" [75].

"Nearly every inmate interviewed had been brutally beaten as a child by his father or step father or other power figure. No factor correlates as much with crime and delinquency as having been the victim of child abuse and neglect" [49].

Although there is wide variation between the percentages of neglect and physical abuse (ranging from 92% neglect in South Dakota to 88% combined physical and sexual abuse in Pennsylvania), nationally child maltreatment was 75% neglect and 27% combined physical and sexual abuse [90].

Figure 19 shows correlations described in 17 studies of child abuse and harsh, punitive parenting, and children who turn to subsequent violent crime as adults [76, pg. 56–58]. The studies ranged from only 6 individuals to 900 individuals. The weighted, average correlation for the homicides was 77% and for violent crime is 64%. Nearly 8 out of 10 murderers were abused as children and over 6 out of 10 abused children turned to violent crime according to these studies. And it bears repeating that witnessing violence toward a child's parent is nearly as bad as children being abused themselves.
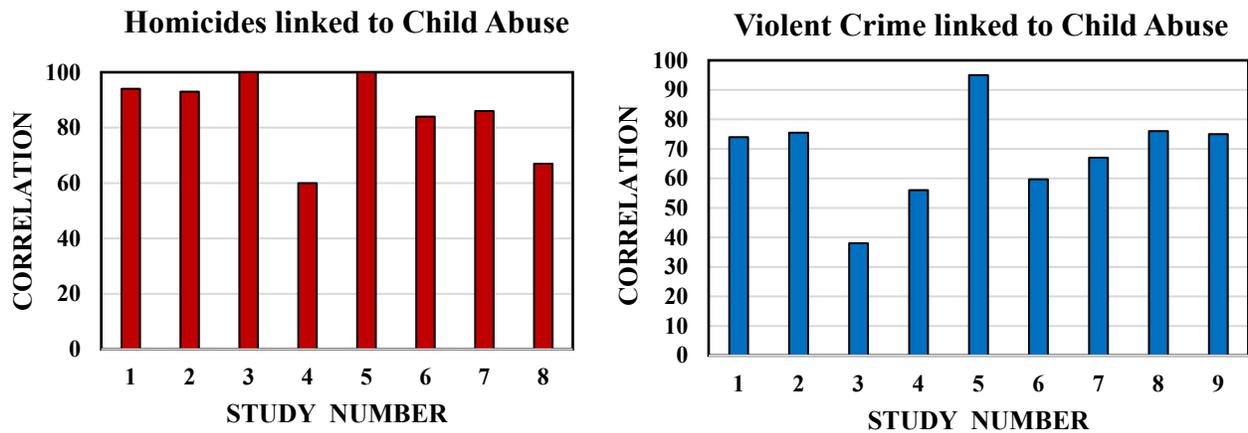

Figure 19. Correlations between homicides, violent crime, and harsh parenting.

Similar correlation studies are not presently available on non-violent (property) crime but it is likely the numbers would be similar or worse.

It seems abundantly clear that domestic violence, in its inclusive definition of child abuse and spouse battering, is the single biggest cause of the perpetuating cycle of violence and until more emphasis is placed on reducing domestic violence, this cycle will continue to repeat ad infinitum.

School Shootings
School shootings hold a special place of horror in the public mind. Children are sent to school to learn and to be safe while away from their parents. Children are innocent of any wrongdoing in our society and for them to be injured or killed before their lives have hardly even begun is literally an atrocity. The Secret Service National Threat Assessment describes children who bring weapons to school: guns, knives, clubs, staffs, and stated that "nearly every attacker experienced negative home life factors, including parental separation or divorce, drug use or criminal charges among family members, and domestic abuse" [58A]. The Journal of Pediatric Health Care reported that 76% of male school shooters posted threatening messages online, 72% had a negative home experience (neglect, abuse, or witnessing domestic violence), and 60% were bullied [76B]. A study by the U.S. Secret Service reported that 80% of school shooters were bullied and 37% of these were bullies themselves as well [58A].

While not all school attacks are carried out with guns, most of them are, and not all school shootings are carried out by students. Everytown for Gun Safety [76C] has compiled a list of any shootings either on or into school grounds by any individual. Besides children reacting to bullying, romantic disappointment, violent media influence, and social isolation, significant numbers of shootings at schools have been carried out by adults: former students, disaffected former employees, drive-byes, angered teacher's spouses, or gangs. Shootings have taken place in elementary, middle, and high

schools, and universities. In 2021 alone, there were 201 incidences, with 40 taking place at colleges and universities.

In order to obtain meaningful statistics, the school shootings between 2017 and 2021 were compiled and the populations in each State in these years were used to obtain the number of school shootings per 100,000 population. Figure 20 shows the correlation between school shootings and the number of registered guns in each State and the correlation with the gun law strength (rankings as described earlier in the section on guns, [48A]). As expected, the higher the percentage of households with guns in a given State, the greater is the number of shootings, and similarly, the stronger the State's gun laws are, the less shootings there are.
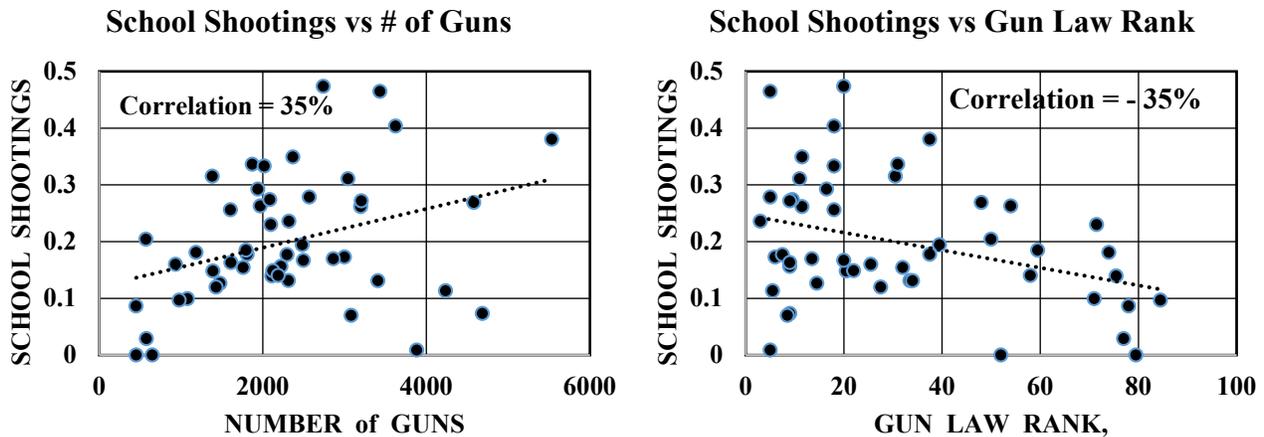
School Shootings vs # of Guns   **School Shootings vs Gun Law Rank**

Figure 20. School shootings from 2017 to 2021 per 100,000 population versus the number of registered guns and the gun law rank [48A, 76C].

Mass Shootings

Most studies of mass shootings begin with the statement that there is no universally recognized definition of what a mass shooting is. Many of them use a definition of 4 or more <u>fatalities</u> at one time, excluding the shooter. This discounts many incidents where people were injured but not killed, and excludes incidents of only 2 or 3 casualties. The Gun Violence Archive uses a more comprehensive definition of 4 or more <u>casualties</u>, whether injuries or fatalities; this would seem to capture the prevalence of these events more completely [76D]. They also point out that mass shootings account for just a small fraction of the total shootings in any one year. "Relative to the 13,958 homicides and 39,740 overall gun deaths reported by the Centers for Disease Control (CDC) in 2018, mass shootings deaths cause 2.7% of homicides and just under 1% of overall gun deaths. Although this comparison might make mass shootings seem statistically insignificant, the numbers reflect the magnitude of America's gun violence crisis" [76D]. The number of mass shootings and gun deaths have risen considerably in the last several years.

From 2013 to 2019, there were 2,341 mass shootings in which 4 or more individuals were shot, and annual average of 334 mass shootings, 377 deaths, and 1395 injuries. Less than 1% of these were school shootings; the rest were workplace, home invasion, spree shooting, domestic violence, murder-suicide, gang related, and drive-byes.

GVPedia [76D] has tabulated the number of mass shootings by state and given each state a "score" based on the strength of their gun laws (similar to previous gun law ranking by Everytown for Gun Safety [48A] except here low scores refer to strong laws and high scores to weak laws). Data was

compiled for a 7 year period, from 2013 to 2019. Figure 21 shows that there is virtually no correlation between the number of mass shooting incidents and the gun law score but a slight correlation exists between mass shooting fatalities and the score. "In short, the results of the statistical analysis confirm that States with weaker laws have significantly more mass shooting fatalities than States with stronger laws, while there was no statistically significant difference in the number of incidents" [76D].
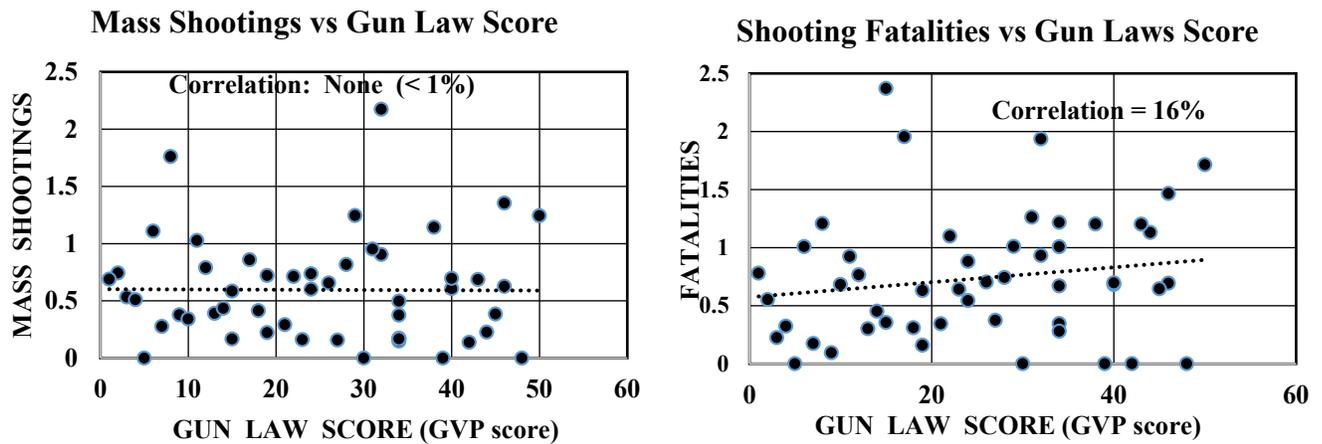

Figure 21. Mass shooting incidents and fatalities versus gun law score.

While school shootings and mass shootings receive a great deal of media attention and public horror, the number of shooting deaths that occur every day and go mostly unnoticed are at least 100 times higher (in 2019 there were 38,300 gun deaths, 33 deaths by school shootings, and 160 deaths by mass shootings). In any case, all the data on homicides, school shootings, and mass shootings shows that strong gun laws can prevent many incidences and save many lives.

Animal Abuse.
Animal cruelty is seldom mentioned in discussions of violent crime. Until a few decades ago, animal cruelty wasn't considered a major crime; most State laws considered it to be a misdemeanor with mild penalties even for egregious cruelty cases. The mounting evidence that animal cruelty is associated with human violence has only recently resulted in stiffer State laws including elevating some cruelties to felonies, and the FBI only separated cruelty into its own category as a "crime against society" in the UCR or NIBRS in 2016, which puts it on the same level of offenses as murder, drug trafficking, arson, and assault for purposes of statistical collection and analysis.

"Animal abuse can serve as an indicator of child abuse, family violence, or violent criminal behavior." "Generally, violent criminals have histories of animal abuse at some stage in their lives more often than non-violent criminals. Identifying cruelty against pets is a red flag for domestic violence or violence against children" [77].

"Animal cruelty has been shown to be a component of the behavioral history of psychopaths and serial killers who began their criminal lives with acts of animal abuse as children or adolescents, since callous-unemotional traits and lack of emotional reactivity [empathy] are considered the precursors of psychopathy development" [77]. Animal cruelty along with witnessing or experiencing domestic violence, in desensitizing children to the development of empathy, can alter brain structure and brain chemistry and habituate children to violence in their adult lives [35, 77].

Judges and prosecutors seem to lag behind the FBI when it comes to understanding the importance of fighting against animal cruelty. "A major component of the [animal welfare/rights] campaign is outreach to judges and prosecutors to educate them about the connection between violence to humans and violence to animals. We find a lot of resistance to enforcement of cruelty laws from both groups. Prosecutors have complained that they have rapes and murders to handle and do not have time to deal with cruelty. Judges are equally resistant," incensed that their time is taken up by the trivia of a cruelty case. "Too often, judges hand out unreasonably light sentences for crimes that caused terrible pain and suffering" [78, pg 298].

These judges and prosecutors seem to be missing the crucial point. If prosecutors had taken the cruelty seriously earlier, those rapes or murders may never have happened. If judges had handed out appropriate stiff sentences for cruelty crimes, future human violence may have been prevented.

The FBI started keeping track of animal cruelty crimes in 2016, as has been mentioned. Local precincts within each State submit figures to the NIBRS and the FBI publishes them each year. However, only about 20% of law enforcement agencies submitted figures in 2019, 15% in 2018, and 10% in 2017. In addition, many cases of animal cruelty are investigated by peace officers acting on behalf of humane societies and these aren't included in the data. For these reasons, correlation diagrams like Figures 17 and 18 which plot data from each State aren't possible yet. Fortunately, for correlation purposes, many independent scholarly studies and correlations of animal cruelty and crime have been carried out and are available.

The correlation between violent criminals and those who committed animal cruelty before, during, or after their criminal activity is shown in Figure 22, including rape, assault, robbery, arson, and homicide. (Data for this figure were reported in [76]. Most data are from the United States; several foreign studies are also included). The weighted average correlation obtained by averaging the number of perpetrators in the study multiplied by the study correlation is 68%. Other correlations of 70% in Canada, 63% from South Africa, and 95% from Australia have also been reported, for both violent and non-violent perpetrators. It is clear that about 7 out of every 10 violent (and non-violent) criminals have been involved in animal cruelty at some point in their lives.

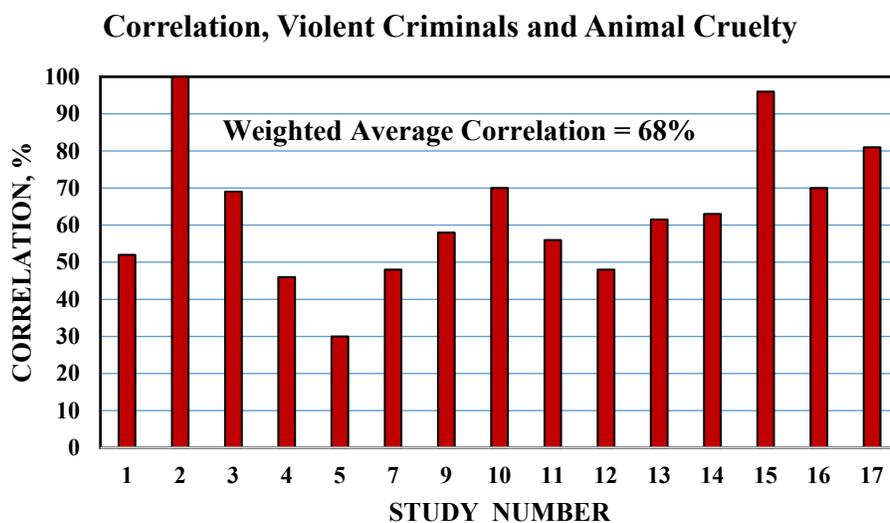**Correlation, Violent Criminals and Animal Cruelty**

Figure 22. Correlations between violent criminals and animal cruelty, in 17 separate studies.

Figure 23 shows the results of 14 studies [76 - 77] demonstrating close connection between domestic violence against women and animal cruelty. It's well known that many battered women delay leaving a violent home life out of fear about what will happen to their pets left behind (shelters take in women and their children but most refuse to allow them to bring their pets).

Law enforcement is well aware that child abuse and animal abuse very often occur in the same home at the same time, so much so that reports of animal abuse often trigger investigations of child abuse. Figure 24 shows that correlations of 60 to 80% are found in studies of co-occurring child and animal abuse. The weighted average correlation of 70% is higher than any of the other factors (poverty, drugs, single parent households, etc.) associated with child abuse.
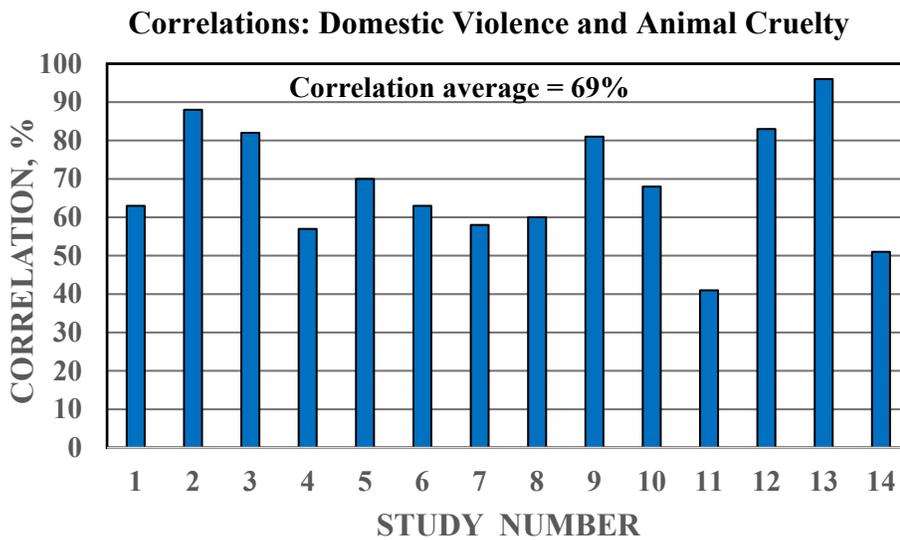
Correlations: Domestic Violence and Animal Cruelty

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Figure 23. Correlations between domestic violence and animal cruelty, 14 separate studies.

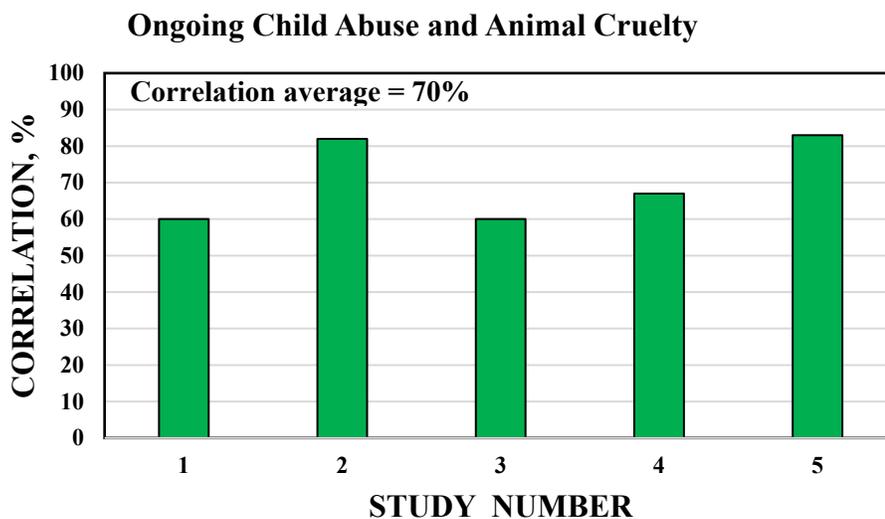**Ongoing Child Abuse and Animal Cruelty**

Figure 24. Correlations between child abuse and animal cruelty in 5 separate studies.

Many anecdotal reports exist that describe a connection between homicide and animal cruelty. Descriptions of school shooters, serial killers, and mass murderers who have committed cruelty are common; a few of the many are listed here [76, 80 - 82]. According to the HSUS, "the research shows that most mass murderers and serial killers are likely to have animal cruelty in their background" [82].

In spite of the anecdotal reports, however, there is much less data available that can be used for statistical purposes. For school shooters connected to cruelty, figures range from 43% to 50% [62, 84 -85] (these studies involve only a few percent of all known school shooters). Ressler et al [86] found that 43% of sexual murderers had committed animal cruelty, while other studies mention that 100% of sexual homicide perpetrators had a history of animal cruelty [82 - 83]. Tingle et al [87] state that "more than half of the serial murderers admitted to hurting or torturing animals as children or adolescents." Joel Norris states that in a survey of 300 serial killers, extraordinary cruelty to animals was one of the common traits [88]. Other studies place the correlation somewhat lower but still significant [89].

Based on so much anecdotal evidence and other studies, it seems reasonable to say that the correlation of animal cruelty with homicide is in the range of 40 to 50%. It's unfortunate that more data isn't available for the 20,000-24,000 less publicized and less analyzed homicides that occur annually.

Since domestic violence (children experiencing or witnessing violence at home) appears likely to be the major cause of future violence, and animal cruelty is tightly connected to domestic violence, it is logical to conclude that fighting (investigating, prosecuting, punishing) animal cruelty would have a significant impact on fighting against both domestic violence and crime in general. Animal cruelty is also involved in the "cycle of violence." One third of children exposed to domestic violence and animal cruelty learn to abuse animals as well, then run the risk of evolving into crime as well as becoming future family abusers themselves [79].

Summary: Correlation data tabulation.
It was stated at the beginning that the value of studying correlations like these is to determine where to focus efforts and resources in order to reduce and even prevent violent crime, domestic violence, child abuse, and homicides. In most cases, data were available from all 50 States from multiple sources that allowed such correlations to be made. For others, individual studies were available that already contained correlations as part of the study. For some, like violent TV, movies, and video games, data were unavailable and conclusions rely on opinions. For factors like low IQ, better education may be an antidote for the high degree of correlation with crime.

Table 1 shows a summary of the correlations presented in this addendum. Several items stand out. One is that harsh parenting has a high correlation with violent crime, and homicide in particular, followed by single parent households. (While it is certainly true that not all abused children grow up to become violent, a large fraction of violent individuals suffered abuse as children.) Poverty, education, and IQ level also play a strong role.

Another observation is that animal cruelty, virtually ignored in all the scholarly works on the causes and correlations with violence, has as high or higher correlation with violent crime, child abuse, and domestic violence as poverty, drugs, alcohol, guns, and the other factors that receive so much attention. To be sure, it is important to understand and overcome these problems as means of lessening crime, but it appears to be equally important to fight animal cruelty, as counterintuitive as

it might seem. Fighting animal cruelty leads to three important benefits: preventing future crime, intervening with young people who may be on a destructive personal path, and identifying possible suspects of crimes that have been committed. As to why animal cruelty should be so associated with human crime, if may be that cruelty serves as a gateway act, the way violent offenders start out on their careers, building "courage" before evolving into human violence, desensitizing the offender against empathy or sympathy.

FACTOR	Violent Crime	Homicide	Property Crime	Child Abuse	Child Fatalities	IPV (Women)
Poverty	45	62	47	34	33	32
Drugs	30	25	2	36	20	28
Alcohol	47 - 59	20 - 40	45	40 - 50		50 - 80
Media Violence	17 - 27					
Guns	29	21	46	-8	-2	38
Education	- 42	- 57	- 46	- 23	- 39	- 49
IQ Level	- 56	- 70	- 64	- 9	- 22	- 34
Bullying	19	25	14	16		
Single Parent	51	75	45	10	35	- 32
Harsh Parenting	64	77		75		
Gangs	40 - 48	13 - 22	16 - 43			
Animal Abuse	68	40 - 50		70		69

Table 1. Correlation results (in percentage) for several potential associations with crime.

It is important to remember what these correlations mean. For example, 6 out of 10 alcoholics do not commit violent crime, but 6 out of 10 violent criminals were abusing alcohol; 6 out of 10 abused children don't become criminals, but 6 out of 10 criminals were abused as children; 7 out of 10 animal abusers don't become criminals, but 7 out of 10 criminals abused animals, and so forth. As more data become available, further insights into correlations will be possible and efforts can be directed even more effectively into ways to protect children and reduce domestic violence and violent crime.

There are several cautions to keep in mind when considering correlation results. 1) The data may (but not usually) involve small numbers of subjects ranging from dozens to thousands, especially in surveys. 2) There may be wide scatter in the data, so that the average is accompanied by a significant standard deviation. 3) Data is updated yearly and correlations may vary slightly from year to year. 4) Correlation doesn't establish causation, though it may suggest it. Correlations do establish an expected connection between two variables however, and are useful in suggesting the most important factors to consider when prioritizing what to focus on.

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