

# 16-Questions to Find Mass-Murderers, Spree-Shooters, Domestic-Terrorists, and a Study-1 of 232-School-Shooters with Controls and a Study-2 of 6-Teen-Shooters With 11-Homicidal and 12-Control Youth Rated with Ask Standard Predictor (ASP) of Violence Potential-Youth Version and the MMPI-A: Implications: Use Computer-Tests and Machine-Learning-Equations to Lower Insurance-Premiums and Prevent Church-Bankruptcy from Violent Offenses

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## Abstract

630 Domestic-Terrorist-Mass-Murdering-Spree-Shooters are compared with 623-controls and separated by *16-Questions with significant a=.846, p<.01, AUC=.704, p<.01* that are: (1) homicidal? (2) suicidal? (3) stressful-life-event? (4) handgun-many-weapons-access? (5) violence-planning-preparing? (6) revenge-motive? (7) eliciting-others-concern? (8) intent-leakage? (9) criminal-misconduct-history? (10) personal-grievance? (11) random-violent-behavior? (12) threatening-victims? (13) dead-male-victim? (14) targeting-person-school-or-work? (15) student-professional-work-relationship? and (16) student? Before the killing, terrorists come twice to courts, doctors, schools and human resources and are not diagnosed as dangerous. In *Study-1*: [from 1936-2019] 232-school-shooters are contrasted with 232-controls resulting in 414-dead, 832-injured, and 68-suicides (29%) which are analyzed with logistic-regression,  $F=227.14, p<.01, df=8/455, R=.894, p<.01, R^2=.8, p<.01$ , and separated with *8-Questions*: (1) student? (2) suicidal? (3) stressful-life-event? (4) homicidal? (5) violence-planning-preparing? (6) personal-grievance? (7) handgun-access? and (8) targeting-person(s)? In *Study-2*: 6-teen-shooters with 11-homicidal and 12-controls are contrasted with the Ask-Standard-Predictor [ASP] Violence-Potential, Youth-Version (54-questions,  $a=.61, p<.01, AUC=.91, p<.01, r_{test-retest}=.75, p<.01, F=123.09, p<.01$ , and the Minnesota Multiphasic Personality Inventory Adolescent Version [MMPI-A (468-questions):], ANOVA- $F=17.22, p<.01$ , Lie,  $F=33.91$ , Depression,  $F=26.18, p<.01$ , Psychopathic-Deviate,  $F=57.45, p<.01$ , Paranoia,  $F=23.92, p<.01$ , Schizophrenia,  $F=21.69, p<.01$ , MacAndrews Alcohol,  $F=16.84, p<.01$ , Addiction Admission,  $F=38.88, p<.01$ , resulting in a "7-point-violence-profile," found over 95 yrs. in 212-studies (N=320,051). The expense side includes 2 examples. 1<sup>st</sup>, *School-shooter insurance-industry higher-premiums* from (1936-2019) resulted in [414-dead @ \$3,834,988.08=\$1,587,685,065.12] + [832-injured @ \$33,773.52=\$28,099,568.64]+[232-shooters@\$3,834,988.08=\$889,717,234.60]+[\$2,505,501,868.32x1.3= \$3,257,152,428.82] =a high cost of \$5,762,654,297.14]. With no-computer-tests-equations from 2020-2106, (\$5,762,654,297.14x2= [the expense will double to] \$11,525,308,594.27, 828-dead, 1,664-injured. The 2<sup>nd</sup> violence

example is the *U.S-Catholic-Church-pedophilia-loss*, (1936-2107) [payouts, \$17,435,353,000] + [lost-donations =1.3 x payouts=] 22,665,958,900=\$40,101,511,900(1986-2107), with 5,679 victims increasing (1936-2107) to 39,753-victims.

**Keywords:** computer-tests, machine-learning-equations, 16-questions-finding-terrorists, homicidal, suicide, stressful-life, handgun- multiple-weapons, planning-preparation, revenge, eliciting-others-concern, intent-leakage, criminal-misconduct, grievance, random-violence, threatening-victims, dead-male-victim, targeted-person-school-work, student-work-relationship, school-location

## Introduction

Sixteen-year-old Thomas B. is a mediocre, junior Community High School student. He's had two issues for truancy and causing a cafeteria riot. Thomas complained to the school counselor that the "jocks" or "athletes" were teasing him in the locker room before and after physical education class. After the counselor talks to the gym teacher, the matter is dismissed as unimportant or "boys being boys." The school counselor relays the gym teacher's response to Thomas. Thomas B. stomps out of the office, yelling, "Yeah right." What should be done? Is Thomas at risk for becoming a school-shooter? Or is he just an angry disaffected high school student? This article will address the issue of school-shooters. Central will be the challenge of how to find domestic-terrorists, mass-murderers before the shooting occurs. These at-high-risk youth come before clinics-hospitals, courts-police, schools-universities, and human-resources twice before killing many. The only way to find them is by using computer-tests and machine-learning-equations because of the ways humans can deceive and the complex risk pattern. Columbine, Virginia Tech, Sandy Hook and Parkland school mass-murders are not a new phenomenon. In 1927, a Bath Michigan School shooting left 46 dead and 58 injured (Boissoneault, 2017). Thus, there has been and perhaps always will be a need for detailed, scientific inquiry, with objective research methods, and quasi-experimental design with controls, robust statistics, and strong cost-efficient, empirical, and practical solutions to address this issue of school mass-murder. The challenge and danger of school-focused mass-murder means that administrators need to use computer-tests and machine-learning-equations. Regardless of the setting, if professionals continue to use 39% accurate, less than chance biased and error-prone, interviews, judgment, medical exam data, and paper-and-pencil short questionnaires, school spree-shootings will only continue to rise every year. To save thousands of lives and tens of billions of dollars, computer-tests and machine-learning- equations solve this issue. Between Columbine, Colorado in 1999, and Sandy Hook, Newton, Connecticut in 2012, there were 31 U.S. school-shootings. The rest of the world generated only half that number during the same period, 14 (Wolfe-Wylie, 2012). Thus although this is a worldwide issue, it is a particularly an American challenge.

This paper has the following organization. First, there is an outline of the characteristics of school shooters. Second, there is dealing with the issues in finding school-shooters. Third, there is a review of prior approaches. Fourth, the researchers offer practical suggestions going forward. Fifth, we consider the null and the alternative hypotheses. Are school shooters different from controls? Are domestic-terrorists unique when compared with homicidal and controls. Sixth, there is a comparison of 630 shooters, 232 school-shooters, 370-workplace-shooters descriptive questions, 16-common-questions across these three data sets, and a comparison with the Ask Standard Predictor (ASP) Violence Potential Youth and Adult Versions (Zagar and Grove, 2010), a rating tool to measure homicide, arson, sex-offending, assault and violent-offending.

## School-shooter Characteristics

Previous efforts to find characteristics of school-shooters are hampered by small sample sizes. There is invalid and unreliable data collection. There is the fact that much information is often media based rather than official open source records. Recognizing that caveat, it appears that about 85% of school-shooters have firearms from their own or relative's homes. Also about 70% are under age 18-years of age (Woodrow-Cox, Steven, Chieu, Muyskens, and Ulmanu, 2018). Furthermore; 71% of school-shooters are bullied (Cullen, 2009) and 61% seek revenge for that bullying (FBI, 2021). Many school-shooters plan and prepare. Nearly 75% domestic-terrorist, school-shooters are depressed and suicidal (Vossekuil, Fein, Reddy, Borum, and Modrzeleski, 2002). Catalano, Haggerty, Fleming, and Hawkins (2004) found that smaller schools that have students, who bond, don't have school shootings. O'Toole (2000) suggests among school-shooters, behavior, family, personality traits, school, and social dynamics are crucial. These include despair, desperation, and hopelessness. Fox, Brook, Stratton and Hanlon (2016) discover that school-shooters have higher levels of premeditation, better cognitive abilities, and possess the capability to engage in preventative or rehabilitative efforts more often than previously reported. Among 23-mass-murderers, 91% have head trauma and handguns; 85% are alcohol-substance abusers; 61% have past violent behavior; 61% have previous psychiatric treatment; 43% have a conduct behavior disorder; 43% have criminal-misconduct, 34% have antisocial personality disorder, and 17% have psychosis. But with a lack of solid, empirical, data collection of hundreds of school-shooters, across a variety of locations, using multiple methods, and multiple traits, much of this research is speculative, and may be spurious with significant construct, external, internal and statistical conclusion validity issues. This is why there are a set of confusing,

contradictory, and unclear risks that make it a challenge for organizations. Few applied predictive regressions.

### **Organizational-Human Decision-Making as Barriers to Preventing School-Shootings**

Finding school-shooters before violence occurs is the main issue. As many as 68 school-shootings had police or security present. This is true even for four of the five school shootings with the highest death rates [Columbine, Colorado, Parkland, Marshall County High, Kentucky, and Santana High, California] (Terkel, 2013; Woodrow-Cox and Rich, 2018). An important fact is that 55% of American homes have one or more unlocked firearms (Aborn, 2013). Another crucial aspect is that the main targets are unarmed students and school staff. There is a “perceived grievance or revenge motive” (Woodrow-Cox and Rich, 2018). There are significant barriers to preventing school shootings that include the bias, error and flaws in human decision-making (Kahneman, 2011). Why? School-staff believe that background and credit checks, interviews, judgment, and medical exams are sufficient and better than a computer-test and equation. These compare the person against millions in the data base. People generally believe that they are capable of identifying individuals, who are high-risk. In most research studies, they are not. For half-a-century, the scientific evidence in human decision-making demonstrates that persons cannot find “dangerous” persons reliably, sensitively, specifically, and validly. In 128 of 136 empirical studies, comparing clinical judgment versus actuarial assessment, Meehl (1954) and Grove and Meehl (1996) show the superiority of statistical decision making with machine-learning-equations and computer-tests. In 200 studies comparing human-decision making or clinical judgement with machine-learning equations and computer-tests, Kahneman (2011) established 60% significantly better accuracy for machine-learning equations and computer-tests (Hoffman, Slovic, and Rorer, 1968), Dawes, (1979), Stanteau (1988). Other comparisons do not reveal this superiority, but because computer-tests and machine-learning-equations are cheaper, they prevail (Kahneman, 2011). Other school leaders speculate that such a school-shooter rare event will not happen in their particular school. In finding dangerous persons, computer-tests and machine-learning-equations are empirically validated, inexpensive, objective, and 97% reliable, sensitive, and specific, in comparison with 39% currently dominant approaches (background-credit checks, interviews-judgment, medical exams, paper-and-pencil tests) [Zagar, Zagar, Arbit, Bartkowski, and Busch, 2009; Zagar and Grove, 2010; Zagar, Kovach, Basile, Grove, Hughes, Busch, *et al.*, 2013; Zagar, Zagar, Zagar, Busch, Garbarino, Ferrari, *et al.*, 2016]. An example of the bias and error in human-judgment is the Oxford Michigan school-shooting of 4 dead and many injured with attorneys suing the superintendent, principal, teacher and counselor each for \$100,000,000 due to alleged negligence. Computer tests and machine learning equations are available but not used in this case.

### **Why Are Increasing Numbers of School-Spree-Shooters So Difficult to Find and Prevent**

Part of the issue besides the inability of humans to admit that interviews-judgment is error-prone, is the rarity of these events. In Figure 1, the rates of homicide, mass-murder-serial-murder, overdosing, sex-offending and suicide-completion (Zagar, Kovach, Basile, Grove, Hughes, Busch, *et al.*, 2013; Zagar, Zagar, Zagar, Busch, Garbarino, Ferrari, *et al.*, 2016; Zagar, Varela, Busch, Garbarino, Zagar, Kovach, *et al.*, 2019) with sex-offending at 1/100, psychosis at 1/100 and homicide, overdosing, and suicide-completion at 1/1000, and mass-murder-serial-murder at 1/10,000,000. One out of 100 of the population is a sex offender or 1/100 is psychopathic, psychotic or schizophrenic. All other high risk persons (homicidal, overdosing, suicide-completers) are a fraction of a percent (1/1000). No human judgment can find these without a computer-test and equation. In Figure 2, the Kaplan-Maier 20-year survival rate of reoffending gives a picture of the how often these high risk persons repeat these violent events (50-97%). This is complicated by the 39% sensitivity-specificity of current methods, the fact that there are 40,300,000 deceptive self-presentations of neurological-psychiatric illnesses and the consistent finding of less than 50% successful diversion, intervention or treatment. This demonstrates why only computer-tests and equations can find school domestic-terrorist, mass-murdering, spree-shooters (Rice and Harris, 1997; Dutta, Boydell, Kennedy, Vanos, Fearon, and Murray, 2007, Bekken, Ojlert, *et al.*, 2008; Soothill, Francis, and Liu, 2008; DeLisi, Ruelas, and Kruse, 2019; Binswanger, Nguyen, Morenoff, Xu, and Harding, 2020; Miller, Swedler, Lawrence, Bina, Ian, Rocket, *et al.*, 2020; Tammes, 2022). If a professional insists that interviews-judgment and current ways that are 39% accurate trump 97% precise computer-tests and machine-learning-equations, perhaps the professional needs some retraining, recertification, relicensing, or serious medical attention and treatment for being subjective and error-prone, causing churchgoers, citizens and taxpayers a combined \$40,000,000 loss and tens of thousands of abused and dead over the past 85+ years. Insurers should use their power to give insurance policies to only those organizations that use computer-tests and equations (MMPI-2/A, Ask Standard Predictor (ASP)-Violence Potential, Mass-Murder-Potential, and Abuse Potential Inventory (CAPI). The same computer-tests and equations should be imposed upon military-police at intake, post-crisis, promotion and retirement, in order for the military-police to have casualty, liability, personal injury, workers compensation and other insurance forms. In the court-prisons insurance executives can insist that in releasing offenders, judges and parole boards as part of the sentencing and releasing computer-tests and equations be used to measure psychosis, sex offending and violence potential given the cost to taxpayers and insurance purchaser. The other option is using risk management education on

using computer tests and equations to those in schools-universities and human resources that do not want to use computer-tests and equations when high risk individuals approach for mental health, special education, employee assistance, etc. This way, insurance executives can lower the violence victim rates and expense to taxpayers. Insurance purchasers can save money when insurance leaders impose computer-tests and equations and improve the company bottom line or profit and safeguard society. The U.S. Supreme Court, 50 state supreme courts, federal and state appellate and circuit courts can cooperate with military-police to expedite psychiatric hearings and brief hospital commitments to use computer-tests and equations on suspected psychotic and sex-offending and then determine based on the 97% objective, reliable, sensitive, specific, valid measurement, not the 39% subjective, error-prone, current ways of background-credit checks, interview-judgment, medical exams, paper tests. In Illinois there is a procedure where the “high-risk person” is brought before a group of judges or hearing officers and a short 1-2 week psychiatric hospitalization occurs. But instead of the current warehousing of the patient without computer-tests and equations, the abovementioned computer-tests and equations can be used to diagnose and treat with empirical diversions. Then the judges or hearing officers can determine the future options empirically not based on bias and error. Einstein said, “Doing the same thing over and expecting different results is insanity.” The coauthors retort is that “*Doing the same over and over again results in biweekly US and monthly global spree shootings and other violence.*”

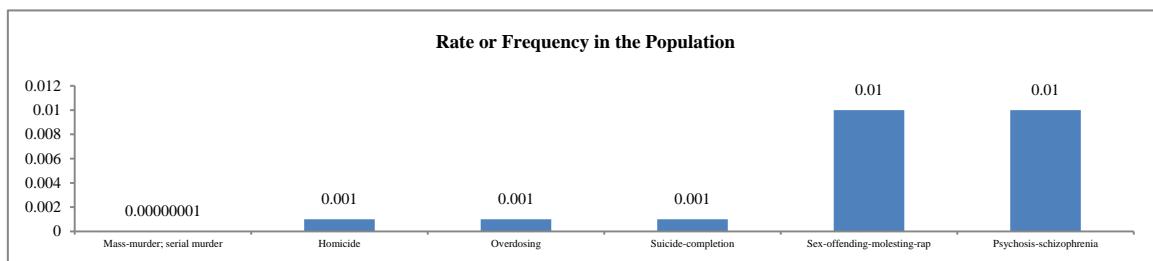


Figure 1. Rate of Mass-murder, Homicide, Overdosing, Psychosis, Sex-offending, and Suicide-completion

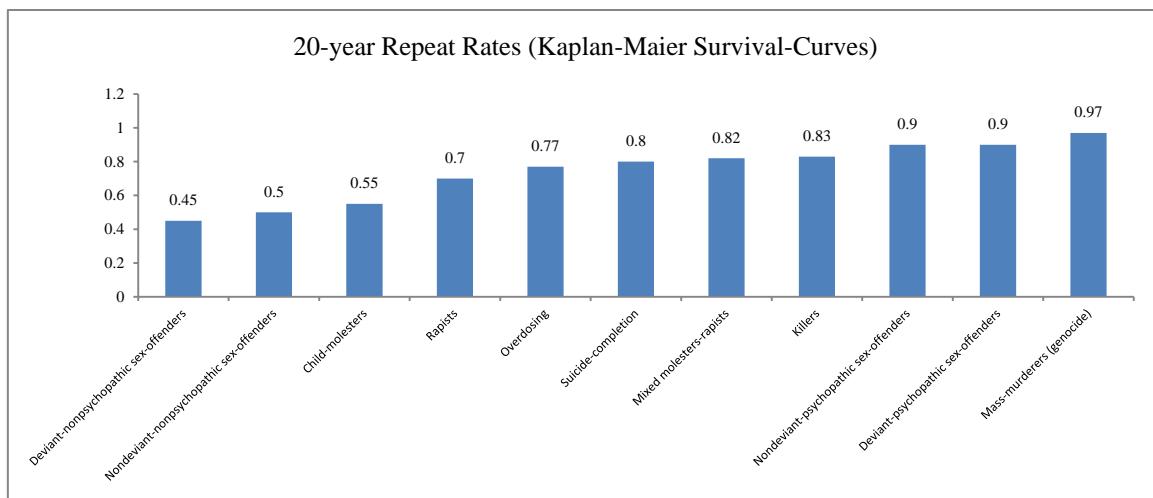


Figure 2. 20-year Repeat Rates: Molesters, Rapists, Overdosing, Suicide-completers, Mass-murderers

### Why Human Judgment, Decision-Making Are Less Effective than Chance

Pope, Butcher and Seelan (2006) prove that on the Minnesota Multiphasic Personality Inventory Second and Adolescent Editions (MMPI-2/A), there are seven reliable, valid scales or tests of deceptive self-presentation. These are infrequency, lying, defensiveness, faking-at-the-back-of-the-test, true-or-false-inconsistency, and superlative-self-presentation). If one takes these seven scales into a Poisson's distribution of  $7 \times 6 \times 5 \times 4 \times 3 \times 2$ , there are 40,300 ways to deceive a school professional trying to find violence risk. This compounds with the 1,000 neurological and psychiatric illnesses that youth and adults have (International Classification of Diseases Tenth Edition, World Health Organization, 2013 and Diagnostic Statistical Manual Fifth Edition, American Psychiatric Association, 2013). Multiply 40,300 x 1,000 and the result is 40,300,000, neurological, psychiatric, deceptive self-presentations. Individuals deceive and lie to cover up their intentions. In a case example of a California teen (who was similar to the opening case of this paper,), the bullied adolescent self-reported few risks. However, upon medical, prison, and school record review and rating the same person on Ask Standard Predictor (ASP) of Violence Potential Adult Version (in prison until an adult), the low risk went to 98%

probability of committing a future violent act, when the behavior-rating was contrasted with the “less than honest” self-report. The German Poet Goethe wrote, “What is most difficult is that which you think is easiest, to see what is before your eyes.” No school personnel can match computer-tests and machine-learning-equations in comparing the violent person against millions in data bases and recalling thousands of equations simultaneously (Siegel, 2016 Zagar, Zagar, Busch, Garbarino, Ferrari, Hughes, *et al.*, 2016). Over a 95-year period, considering 320,051 persons, within 212 studies, there is a “seven-point-violence-profile” on personality computer-tests and a machine learning equation of violence potential (Zagar, Varela, Busch, Garbarino, Zagar, Kovach, *et al.*, 2019). A “seven-point violence-profile” consistently helps find homicidal, overdosing-substance-abusing, sex-offending, and suicide completers (Zagar, Zagar, Busch, Garbarino, Ferrari, Hughes, *et al.*, 2016), because unlike, interviews or judgment, it is data driven and actuarial/statistical. The “seven-point-violence-profile” has a cross validation among 136 female and male, adolescent and adult, controls, homicidal, overdosing, sex-offending, suicidal-completers and controls (Zagar, Varela, Busch, Garbarino, Zagar, Kovach, *et al.*, 2019; Butcher, 1996; Butcher, Ellertsen, Bubb, Lucio, Lim, J. *et al.*, 2000; Pope, Butcher and Seelan, 2006, Zagar, Varela, Busch, Garbarino, Zagar, Kovach, *et al.*, 2019).

### Past Efforts to Prevent School Violence

With regards to past efforts to prevent school-shootings, Catalano, Haggerty, Fleming, and Hawkins, J.D. (2004) describe the Seattle Social Development Project from 1981 that promotes prosocial behaviors, school bonding, and social competence, resulting in participants vs. nonparticipants constructively engaging in school or work and self-efficiency, graduating from high school with two or more years of college, job responsibility with years at work and school integration. Strong and Cornell (2008) in Memphis, Tennessee examine 209 school cases with 110 threats to kill, shoot or stab someone, resulting in 71% retained at least one year, 39% in special education services, 39% in alternative schooling, 18% in mental health services, 7% in psychiatric treatment, and 1% incarcerated. Van Dyke, Ryan-Arredondo, Rakowitz, and Torres (2004) and Van Dyke and Schroeder (2006) have a Dallas Threat of Violence Risk Assessment with 19 characteristics (academic issues, aggression, discipline violations) with no reliability or validity data.

### Practical Solutions Going Forward

Michael Angus Crawford wrote *Nutrition and Evolution* (1995) to help explain the rising addiction-alcoholism, criminal behavior, deception, mental illness, and violence. He posited a biochemical explanation of an imbalance between fats, proteins and sugars, which make up the brain. Humans are growing taller over centuries. In comparing delinquents from 1900 to 1980, Zagar, Busch, Hughes, and Arbit (2009) confirmed that addiction-alcoholism criminal behavior and delinquency, deception, mental illness, and violence are increasing. Modern criminals and delinquents have more family risks, greater rates of neurological and psychiatric illnesses, more cognitive impairment, hyperactivity, and learning disorders. This has resulted in more assaults and homicides by youthful offenders than at the beginning of the century, thus confirming Crawford’s hypothesis. To prevent school-shootings, there is the obvious need for fingerprint scanning identification systems and wider use of metal detectors. School programs for developing attachment, anger management, breaking the code of silence, increasing communication between parents, professionals and teachers, mentor and jobs will also lower violence. Since 2008, a model program in Chicago obtains jobs (35% diversion), mentors (33% improvement) and anger management (30% effectiveness) for 147,253 high risk youth in 256 high schools that saved 640 lives @ \$3,833,280 (Zagar, *et al.*, 2019, Table 5). There are diversions and successful cooperative ventures between business, insurance, police, and schools. It is in the interest of insurance executives to lower disability, errors-and-omission, liability, life, personal injury, and workers compensation costs of violence, including school-shooters. Without computer-tests and machine- learning-equations, school personnel cannot proactively locate and cost-beneficially, cost-effectively divert high risk youth. Zagar, Kovach, Ferrari, Grove, Busch, Hughes, and Zagar, (2013) review not only the triple cross validation of the Ask Standard Predictor (ASP) of Violence Potential, but summarize Wilson and Lipsey (2007) school-based interventions for aggressive and disruptive behaviors, with jobs (35%) diversion, social skills (33%), anger management and multimodal therapy (mentoring)[30% each]. Targeting these interventions by using a regression equation like Chicago did for a decade, is cost-beneficial, cost-effective, and saves lives and money. Without computer-tests and machine-learning-equations and persisting in preventing school-shooters by targeting treatments to the highest risk, there will only be thousands of more dead and dozens of billions lost. What follows is a detailed empirical exploration of our claims.

### First and Second Null and Alternative Hypotheses

Null hypothesis is that there are no significant differences between school-shooters and controls. The alternative hypothesis is that there are significant differences between school-shooters and controls. The second null hypothesis is that there are no differences when controls, homicidal and teen spree-shooters are compared on the Ask Standard Predictor (ASP) of Violence Potential and Minnesota Multiphasic Personality Inventory Adolescent Version. The alternative hypothesis is that there is a “seven-point- violence-profile” that differentiates controls, homicidal and teen

spree-shooters.

### Methods: Study 1.Definitions

“Domestic-terrorist, mass-murdering, school-spree-shooters” is broadly defined in contrast with “active- shooters.” The U.S. Departments of Education, Federal Emergency Management, Justice, and Homeland Security, F.B.I and White House definition is “an individual actively engaged in killing or attempting to kill people in a confined, populated area.” An expanded definition is “a person, or team of individuals of common and/or specific operational purpose indulging their pre-meditated or spontaneous desire(s) to either plan to kill others, attempt to kill, or kill people using any weapon, equipment, tool or device in a confined and populated space, regardless of the level of success/failure ultimately achieved. It excludes gangs and bombings.” A school-shooter is someone who fits the operational definition within an academic site. Locations include the alternative program, college, university, homeschooled, magnet, and online program, private excluding religious, religious or religious based, special education programs, and trade or technical school.

### Statistics

There are the school-shooters and controls, frequencies, percentages,  $X^2$ 's, independent sample, two-tailed, *t*-tests, one-way analysis of variance (*ANOVA-F*), degrees of freedom (*df*), and a logistic regression. A  $X^2$  goodness of fit test determines if sample data matches a population. A  $X^2$  for independence compares two variables is a contingency table to see if they are related. A *t*-test and one-way *ANOVA* is an inferential statistic to determine if there is a significant difference between the means of two groups. Two groups are compared with parametric tests to study differences on the dependent variables, the characteristics of school spree-shooters and controls. Assumptions of normality and homogeneity of data are met for *t*-tests and *ANOVA* (Bock, 1975). The independent variable is group, school-shooters or controls. Logistic regression is a statistical model that in its basic form uses a logistic function to model a binary dependent variable, although many more complex extensions exist. In regression analysis, logistic regression (or logit regression) is estimating the parameters of a logistic model (a form of binary regression). Thus, a smaller set of distinguishing characteristics or “predictors” can be found.

### Sample Selection School-Shooter Records: General Notes on Measures.

Thirteen investigators assessed thoroughly the medical, police, press, school and work records from June 4, 1936 to April 15, 2019 of shooters. These data are compiled on survey monkey. Nominal variables are demographics, health, mental health, and education, employment, warning signs, abuse and criminal history, crime scene, and crime method are listed. *Demographics* include: (1) age; (2) gender; (3) ethnicity/race; (4) family situation or living dynamics; and (5) social interactions and observations. *Health* contains: (1) medical history; (2) stressful life events; (3) substance abuse; (4) prescribed medication; and (5) prescribed medication types. *Mental health* is: (1) concerns and symptoms; (2) disorders; (3) treatment history; and (4) alleged, known, or suspected behaviors, experiences and/or performance within a professional setting. *Education* comprises: (1) degree or training specialization; (2) highest level of schooling completed; (3) behavior and performance in a school setting; and (4) types of programs or schooling attended or enrolled in. *Employment* consists of: (1) military service; and (2) vocational classification. *Warning signs* cover: (1) beliefs; (2) interests and fantasy; (3) cyber behaviors; (4) conflict indicators; and (5) operational behaviors. *Abuse and criminal history* incorporate: (1) experienced or witnessed abuse during childhood; (2) perpetrated abuse during childhood; (3) experienced or witnessed abuse during adulthood; (4) perpetrated abuse during adulthood; (5) the police interactions initiated by; (5) military misconduct; and (6) criminal misconduct. *Crime scene* has: (1) attacker's relationship to person (intended if foiled); (2) attacker's relationship to institution (intended if foiled); (3) attack location; (4) motive; (5) number of attackers; (6) outcome of attack; (7) type of attack; (8) characteristics of selected victim; (9) victim demographics (deceased victims only); (10) victim's institution (intended if foiled); and (11) threatened one or more targeted or actual victims. *Crime methods* constitute: (1) body armor and/or accessories; (2) chemicals, electronic weapons; (3) specialized weapon; (4) explosive material or detonator; (5) origin point of explosive; (6) firearm; (7) tactical equipment; (8) tactical training; (9) tactical response and situational analysis; (10) weaponized platforms such as a gun mount; and (11) weapons.

### Follow-up or Error Control

There is a collection instrument of 54 subcategories with 650 potential answers (since each question has between 2 and 10 possible answers). Only official documents are the sources for data collection, where possible. This is problematic because it means much data on many killers, and minimal data on others. In this study, intra-coder reliability is done to undertake a continuous coding and recoding process, as well as a repeated analysis of data. Two investigators code small data subsets. This ensures reliability over time and minimizes threats, including fatigue and stress impacting human error. Inter-coder reliability is acceptable, ensuring the validity of the information. Domestic data copy foreign terrorist threat assessment which results in lowering serious, mass military dead and injured. Military ways help police proactively identify domestic threats before they occur.

Table 1. U.S. Census Bureau (2019) Population with Controls on Age, Ethnicity/Race and Gender (%)

Demographics	Comparison of U.S	Population vs. Controls (%)	Statistics
	U.S Population	Controls	$\chi^2$
Gender			
Female	51	6	49.69* df=1
Male	49	94	
Age			
Birth – 17 years	24	2	44.8* df=4
18-24 years	9	43	
25-35 years	27	25	
36-50 years	21	13	
51+ years	19	11	
Ethnicity / Race			
African-American	13	16	5.87 df=7
Asian	5	13	
Caucasian	60	56	
Hispanic-American	18	12	
Middle Eastern	1	1	
Native American	1	2	
Native Hawaiian	2	1	

### Control Sample Selection

Controls are 232 survey monkey respondents answering questions online anonymously from February-March, 2021 during the virus pandemic. Questions are the same that were collected on school-shooters. Many respondents are U.S.-citizen gun owners, former military, and police.

### United States Population Comparison with Controls on Demographics

The U.S. population (U.S. Census Bureau, 2019) is compared with 232 controls on age, gender, ethnicity/race demographics to show they are similar. The control group is different from the U.S. population on gender and age but not on ethnicity and race on  $\chi^2$ . See Table 1.

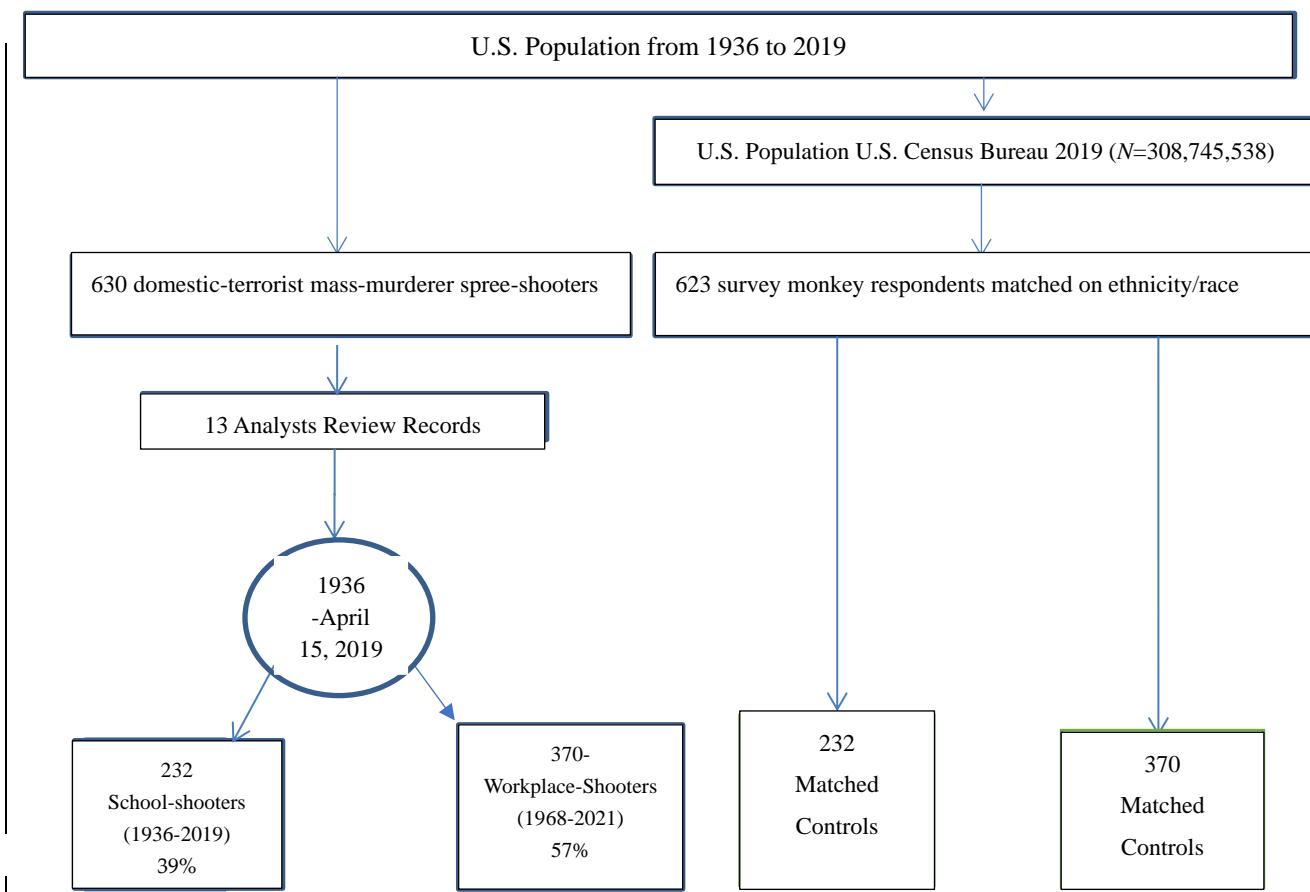


Figure 3. Sample Selection of School-Shooters



Figure 4. States in Which School-Shootings Resulted in Dead and Injured from 1936-2019

### U.S. Population and Sample Selection of School Shooters

There is the U.S. population from 1936-2021 with the U.S. population estimates from 2019 ( $N=308,745,538$ ), and from this population, there are the 630 domestic-terrorist, mass-murdering, spree-shooters, who were studied in medical, police, press, school and work records on 650 questions. There is the group of 623 survey monkey respondents matched on ethnicity and race. The spree-shooters are also matched on age and gender. There are two subgroups of economic interest, 232 school-shooters and 370 workplace shooters. School-shooters kill in alternative, elementary, high, home, private, religious, religious-based, special education, trade and technical schools, colleges, and universities. Workplace-shooters murder in government, manufacturing, production, or distribution (closed to the public), military base or facility, profession office excluding medical, religious institution, restaurant, retail or other commercial (open to the public), and other. See Figure 3.

### Demographics of School-Shooters and Controls

The 232 school-shooters and 232 controls characteristics are, gender, male [218 (94%) vs. 218 (94%), female [14 (6%) vs. 14 (6%)], age, birth–12 years [6 (3%) vs. 5 (2%)], 13–17 year [99 (43%) vs. 100 (43%)], 18–24 years [60 (26%) vs. 59 (25%)], 25–35 years [30 (13%) vs. 31 (13%)], 36–50 years [26 (11%) vs. 26 (11%)], 51+ years [11 (5%) vs. 11 (5%)], ethnicity/race, African-American [38 (16%) vs. 36 (16%)], Asian [17 (7%) vs. 18 (8%)], Caucasian [91 (39%) vs. 163 (70%)], Hispanic-American [11 (5%) vs. 8 (3%)], Middle Eastern [4 (2%) vs. 4 (2%)], and Native American [4 (2%) vs. 3 (1%)].

### States in Which School Shootings Occurred

See Figure 4, for the state in which the 232 school-shooters that resulted in dead and injured (1936 to 2019). Note that highly populated states, California (29), Colorado (8), Florida (13), Illinois (9), Missouri (6), New Jersey (12), New York (6), Ohio (13), Oregon (6), Pennsylvania (9), South Carolina (10) Tennessee (9), Texas (8), Virginia (8), and Washington (10) have five or more school-shooters.

Table 2. Annual Number, % and Cumulative % of 232 School-Shooters from 1936-2019

Year	Number	%	Cumulative %
1936	1	0.4	0.4
1940	1	0.4	0.9
1966	2	0.9	1.7
1970	1	0.4	2.2
1971	1	0.4	2.6
1974	1	0.4	3
1976	2	0.9	3.9
1979	2	0.9	4.7
1981	1	0.4	5.2
1982	3	1.3	6.5
1983	4	1.7	8.2
1984	1	0.4	8.6
1985	3	1.3	9.9
1986	8	3.4	13.4
1987	2	0.9	14.2
1988	10	4.3	18.5
1989	3	1.3	19.8
1991	1	0.4	20.3

1992	5	2.2	22.4
1993	6	2.6	25
1994	5	2.2	27.2
1995	3	1.3	28.4
1996	9	3.9	32.3
1997	5	2.2	34.5
1998	5	2.2	36.6
1999	6	2.6	39.2
2000	8	3.4	42.7
2001	9	3.9	46.6
2002	3	1.3	47.8
2003	5	2.2	50
2004	1	0.4	50.4
2005	3	1.3	51.7
2006	10	4.3	56
2007	6	2.6	58.6
2008	6	2.6	61.2
2009	7	3	64.2
2010	13	5.6	69.8
2011	8	3.4	73.3
2012	8	3.4	76.7
2013	5	2.2	78.9
2014	9	3.9	82.8
2015	4	1.7	84.5
2016	6	2.6	87.1
2017	8	3.4	90.5
2018	12	5.2	95.7
2019	10	4.3	100

### School-Shooters Sample Limitations

It is unknown whether this school-shooter sample of 232 is representative beyond the U.S. area, because random samples are better estimates. It is likely that some upper-, middle-, and even lower-class cases with knowledge and resources are able to avoid detection of multiple homicides and also avoid courts, hospitals, media, military, public safety, school, universities, and work records, so data may be incomplete. Differential attrition in selection due to exclusion of cases with incomplete data is also present. All limitations, nonrandom sampling, avoiding detection, evading being in records, and exclusions of incomplete cases, affect the generalizability of findings, including the distributions and the relationships of characteristics (dependent variables) to serious violence. These 232-school-shooter, complete records provided a more accurate and precise set of data across age, gender, ethnicity, location, and time warning corporate, government and school agencies and residences to predict and prevent the increasing loss of many lives and expense of billions of U.S. (2021) dollars by changing insurance contracts for clinics-hospitals, courts-police, human-resources, schools-universities.

### Number of School-Shooters from 1936-2019

There is an upward curve in the cumulative number of school-shooters, or an upward opening parabola third degree curve (adding an  $x^3$  term to the parabolic model in Table 2 and Figure 4).

### Cumulative (1936-2019) School-Shooters Cost (Assuming 1 Homicide = \$3,834,988.08)

In Figure 5, the estimate in 2019 US dollars per homicide is obtained by multiplying \$2,904,000 in 2006 US dollars (modified from Miller, Cohen, and Wiersma, 1996; Zagar, *et al.*, 2009) times 130% (Consumer Price Index Calculator, 2019 as of May 20) 2006 to 2019 1.30 or 130% x \$2,904,000 (inflation over 15 years) = \$3,834,988.08 cost per homicide incident with these cumulatively added (1936-2019). This is extended to 2105 as if no computer tests and machine-learning-equations are used to slow the increase in school-shooters.

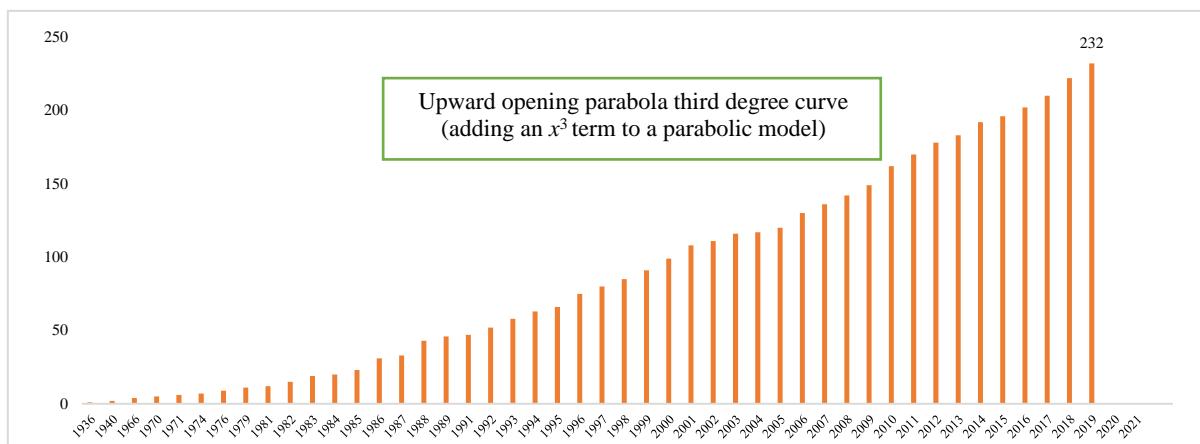


Figure 5. Cumulative (1936-2019) Number of Annual School-Shooters

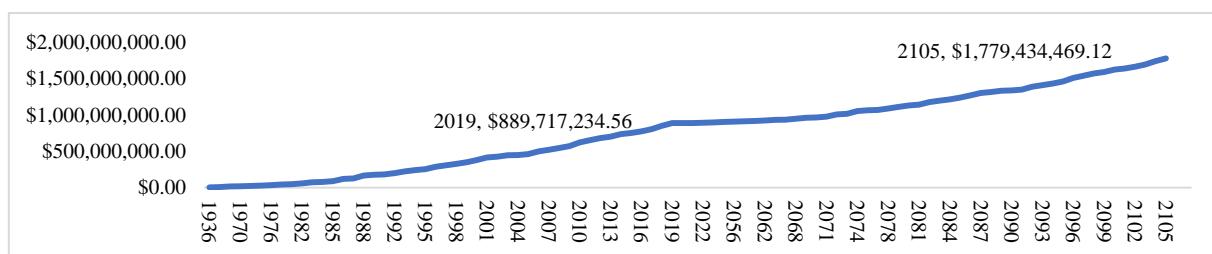


Figure 6. Cumulative (1936-2019) 232 School-Shooters Cost @ 3,834,988.08 in 20 May 2021 US Dollars

### 232 School-Shooter Cumulative Dead Expense

A cost in 2019 U.S. dollars per homicide victim is found by multiplying \$2,904,000 in 2006 U.S. dollars (modified from Miller, Cohen, and Wiersma, 1996; Zagar, *et al.*, 2009) times 130% (Consumer Price Index Calculator, 2019 as of May 20) 2006 to 2019 1.32 or 132% x \$2,904,000 (inflation over 15 years) = 3,834,988.08 per dead. From 1936-2019, the cumulative dead expense is presented in Figure 7. This is extended to 2105 as if no computer-tests and machine-learning equations are used to slow the increase in school-shooters without changes to insurance contracts.

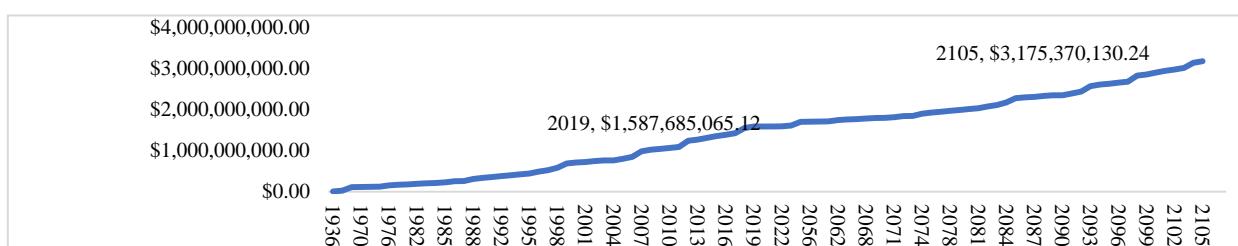


Figure 7. Cumulative (1936-2019) 232 School-Shooters 414 Dead @ 3,834,988.08 in 20 May 2021 US Dollars

### 232 School-Shooter Cumulative Injured Cost

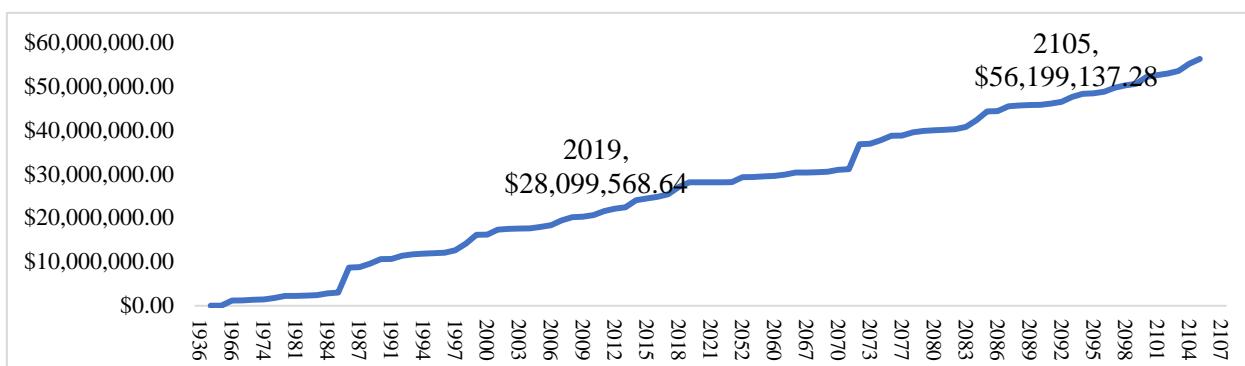


Figure 8. Cumulative (1936-2019) 232 School-Shooter 832 Injured @ 33,773.52 in 20 May 2021 US Dollars

In Figure 8, the cost per assault with injury is \$25,440 in 2006 U.S. dollars (modified from Miller, Cohen, and Wiersma, 1996; Table 4, Zagar, *et al.*, 2009) x 132% (Consumer Price Index Calculator, 2019 as of May 202006 to 2021, inflation over 15 years) =  $\$8,293.52 + \$25,440 = \$33,773.52$  the expense per school-shooter assault victim. This is extended to 2105 as if no computer-tests and machine-learning-equations are used by changing insurance contracts.

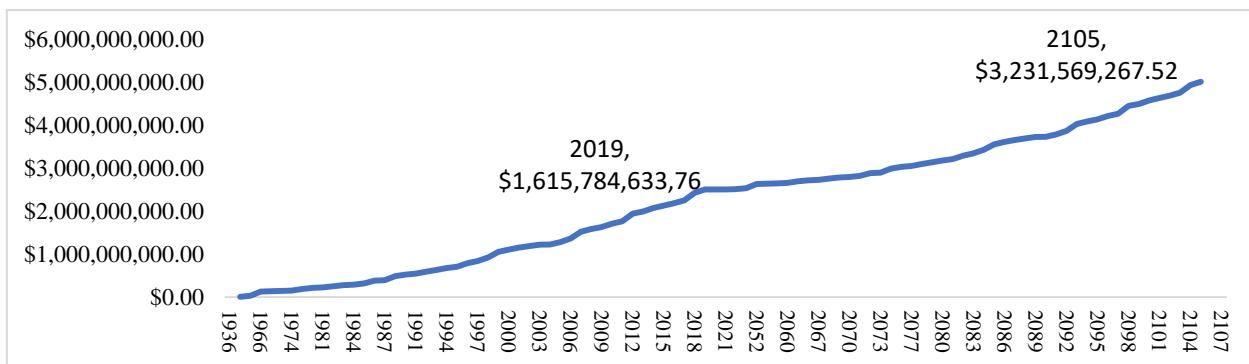


Figure 9. Cumulative 232 School-Shooters Combined Cost: 414 Dead + 832 Injured in 20 May 2021 US Dollars

In Figure 9, the estimate is cumulatively added from 1936-2019. It is 2,505,501,868.32. This is extended to 2105 as if no computer-tests and machine-learning-equations are used by changing insurance contracts. Placing a value on suffering from violent crime is impersonal, but without an objective measure one cannot assess and evaluate the losses from violence. It is important to have concrete information. Victimization costs are not well-documented. It is challenging to gather data on out-of-pocket expenses, with estimates at 20% of direct victimization costs and 35% of pain, suffering, and lost quality of life (Miller, *et al.*, 1996). Expenses are out-of-pocket expenses for medical bills, property loss, reduced productivity at work, home, and school, and nonmonetary losses (fear, pain, suffering, and lost quality of life). There is tangible loss per victimization, productivity, medical care and ambulance, police and fire services, mental health care, social victim service, and property loss and damage (Zagar, *et al.*, 2009).

### 232 School-Shooters Cumulative Shooters, Dead, Injured, Higher Insurance, and Taxes Cost

In Figure 10, the combined cost of school-shooters, dead, injured, higher insurance and taxes is computed by adding each year's school-shooter, dead, injured, higher insurance, taxes cost. This is extended to 2105 as if no computer-tests and machine-learning-equations are used by changing insurance contracts. For the dead and injured there is higher insurance premiums (including disability, errors and omission, health, life, liability, personal injury, workers compensation, etc.) and the cost of higher taxes to pay for the incarceration of the school-shooter. There is also the lost business, residents moving from a school-shooter location, and the direct and indirect health costs of the stress.

### 232 School-Shooters (1936-2019) vs. 277 FBI Active-Shooters (2000-2018)

In Figure 11, 232 school-shooters (1936-2019) are compared with 277 FBI active-shooters (2000-2018) with  $\chi^2=26.45$ ,  $p<.01$ , to see if the observed is as expected. These school-shooters are different from the FBI active-shooters. School-shooter data include more characteristics in nine categories (demographics, health, mental health, education, employment, warning signs, abuse and criminal history, crime scene, and crime method), fewer shooters, less injured, and decrease numbers of injured. There is also a more thorough record inclusion.

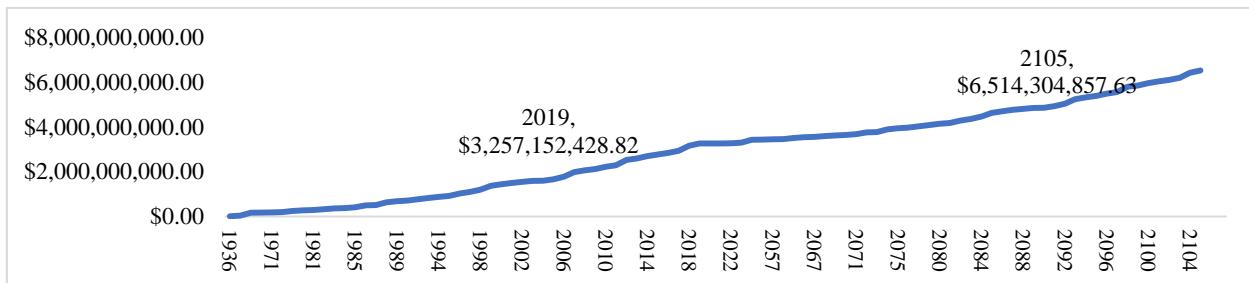


Figure 10. Cumulative 232 School-Shooters Cost: 414 Dead 832 Injured, Higher Insurance in 20 May 2021 US\$

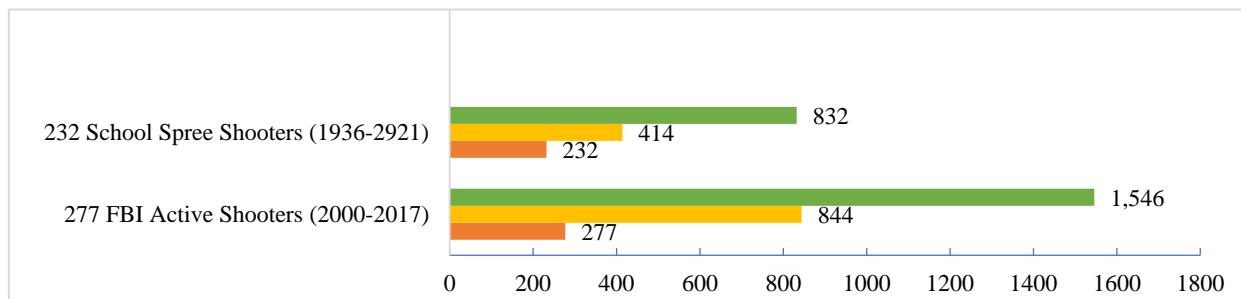


Figure 11. 232 School-Shooters Compared with 277 FBI Active-Shooters

### Locations of School Shootings

There is a comparison or control group allowing a robust statistical analysis of the school-shooter. Out of 630 shooters, 232 committed their crimes in schools (39%) and 370 in the workplace (59%). The FBI sample of 277 shooters (out of which 37% committed their crimes in schools and 66% at the workplace) cannot develop a model as it's much smaller and lacking a control group. Much of the spree- or school-shooter research has small sample sizes and contradictory characteristics. By using quasi-experimental design, comparing homogenous groups of school-shooters and controls, robust statistics, there is much greater statistical control of relevant variables, greater confidence, in addressing the conflicting and varying characteristics of shooters. There are demographics, environmental challenges, family, health, personality, school, work that impact upon shooters.

### Study 2.Computer-tests and Machine-learning-equations

After an exhaustive review of the research of actuarial evaluation, tests were chosen because of the high reliability, sensitivity, specificity, and validity. A brief description of the selected tests follows, along with the data collection, decision making algorithm, statistics, and experimental design.

#### Computer Test: Minnesota Multiphasic Personality Inventory Adolescent Edition (MMPI-A)

The MMPI Adolescent Edition (MMPI-A) is an evaluation of mental health, personality and deceptive self-presentation. Across the three editions, with item duplication, the computerized test takes less than 60 minutes to complete. The MMPI-A for adolescents, has 478 true-false questions. Computer administration allows for instantaneous scoring and report generation with a precision that exceeds 90%, in detecting mental illness. The MMPI alone is not sufficient in assessing violent-prone persons, because within the more than 100 scales, there is no reliable, sensitive-specific, valid measure of violence. This is why many court, hospital and human resource professionals, add a probation parole decision making risk test, like the Ask Standard Predictor of Violence Potential Youth Version to the MMPI-A. Over 19,000 empirical studies and 250 appellate court cases attest to the usefulness of the MMPI that originated in the 1930s.

#### Machine-learning-equations: Ask Standard Predictor (ASP) of Violence Potential

The Ask Standard Predictor (ASP) of Violence Potential Youth Version is a rating that has 40 questions with area under the curve ( $AUC$ ) = .91,  $p < .01$ . The test-retest reliability was .75-.76,  $p < .01$ , and Cronbach's alpha of .75-.78,  $p < .01$ , with sensitivity of 97% and specificity of 97%,  $p < .01$  (Zagar, et al., 2013). The ASP-Youth evaluates specific, historical self-descriptions and requires 15 minutes to complete. The ASP-Youth has no questions from any of the other tests and is a free-standing instrument with questions, distinct from the other tools because it is self-report and behavior-rating (from police, school, work records); test-retest  $r = .75$ ,  $p < .01$ , self-behavior  $r = .73$ ,  $p < .01$ . This measure was successful in discriminating randomly selected violent offenders (1,595 adults, 1,127 adolescents) from matched controls with  $AUC = .96$ ,  $p < .01$ , in a combined adult and adolescent version, based on a sample of 2,722 (Zagar and Grove, 2010). This  $AUC$  is noteworthy because most tests that predict criminal recidivism or "return to court" have  $AUC$ s from .7 to .8 (Moosman, 2013).

### Data Collection

By rating high risk persons with computer-tests and machine-learning-equations, one can assess current functioning but also offer interventions to divert the individual from violence. This is often done in the process of assessing fitness for duty, school screening, and/or medical or psychological treatment. The records for these individuals were obtained from court, industry, hospital, school, and/or universities. The records were checked and accepted as accurate, with regard to convictions and illnesses. Records were examined for previous court contacts for neglect, substance-dependency, physical and sexual abuse, delinquent and criminal oneness such as truancy, disorderly conduct,

solicitation, phone harassment, forgery, mob action, violating a court order, drug possession or sales, property damage, auto theft, theft, burglary, robbery, unlawful weapon possession [firearm(s)], arson, assault or battery, aggravated criminal sexual assault, and homicide and domestic terror, spree shooting (same procedure as used in Zagar, Busch, Grove, and Hughes, 2009; Zagar, Kovach, Basile, Hughes, *et al.*, 2013).

### **Computer Test and Equations**

According to the published test manual instructions, psychologists administered the MMPI-A and ASP Youth version. The order of test administration was randomized. All of the MMPI data were scored using the Pearson Assessment and University of Minnesota Press computerized Clinical Interpretative Report. The instruments had high test-retest reliability, large standardization samples, good internal consistency, and high concurrent and construct validity. When possible, the tests were administered on the internet.

### **Records**

After physical and psychological examinations, current medical and other records were coded using the International Classification of Diseases (ICD-9; World Health Organization, 1977) and the Diagnostic Statistical Manual V (American Psychiatric Association, 2013) and juvenile and adult court and school and industry records were reviewed by two independent psychologists, with coefficients of inter observer agreement of  $r=.92-.94$ ,  $p<.01$ .

### **Machine-learning-equations: Decision Making Algorithm**

For adolescents, using the record and test data, two independent psychologists' classified individuals with the following algorithm, to assess mental health including substance-abuse using test results: (a) The MMPI-A with significantly ( $p < .01$ ) elevated validity and/or basic clinical scales consistent with a  $t$  score of 65 or above. Finally, (b) the ASP Youth version cut-off was 82.9%, the lowest score of convicted adolescent violent offenders (Zagar and Grove, 2010). With this decision-making algorithm, for the two independent psychologists, Pearson product moment coefficients of inter-observer agreement were .92–.96 ( $p < .01$ ). The results of this algorithm were compared with records of the individuals' actual histories.

### **Statistics and Experimental Design**

For adolescents, the means and standard deviations were computed for age and years of education completed and the test scales. The test scales were normally distributed according to the Komolgorov-Smirnov Test and met the assumptions of homogeneity of variance on Bartlett's test. In simple terms, the data was normally distributed and homogenous, conditions for analysis of variance (ANOVAs). For the domains and tests employed, the sample size was sufficient (Kirk, 1982). The criterion for mental health including substance-abuse, abuse, and delinquency or crime was the individuals' actual records. These included court or health records of mental illness, substance-abuse, violence, and/or abuse. For example, if the records showed a finding of mental illness, it was assumed that the individual had mental illness, and so forth for the various criteria, substance-abuse, violence, and/or abuse. This carefully selected set of tests was administered over the internet with a total test time of 60-90 min for 548 questions for youth (MMPI-A, 468, ASP-Youth Version self-report, 54 questions, ASP-Youth Version, behavior rating, 54 questions). In the internet format, tests with automated reports cost 70 to 80% less than current paper-and-pencil version reports. First, the youth data were subject to ANOVAs. All of the psychometric measures or dependent measures met the assumptions of normality (Kolmogorov Smirnov Tests) and homogeneity of variance (Bartlett's Tests).

### **Results: Comparison of School-Shooters and Controls on Nine Categories**

There are 9-categories with 54-subcategories and 650-questions which include: (a) 47-demographic questions; (b) 105-health; (c) 62-mental health; (d) 45-education; (e) 51-employment; (f) 95-warning signs; (g) 23-abuse and criminal history; (h) 113-crime scene; and (i) 100-crime method questions.

### **Logistic Regression of 8-Questions**

There is a significant ( $p<.01$ ) logistic regression,  $F=227.14$ ,  $p<.01$ ,  $df = 8/455$  with the multiple  $R=.894$ ,  $p<.01$ ,  $R^2=.8$ ,  $p<.01$  and significant ( $p<.01$ )  $t$ -tests on the *beta* weights for 8 questions: (1) current-student? (2) suicidal? (3) stressful-life-event? (4) homicidal? (5) planning-preparation? (6) personal-grievance? (7) handgun-access? and (8) targeted-person? Logistic regression gives a linear equation showing which variables are most strongly associated with school-shooting. Therefore, in the common sense of the term, it is a classification of group membership (status). Analyses are not only statistical analyses predicting outcomes; since the data are longitudinal, the resulting equations are truly "predictive" in the common sense of the word. Prior risk factors are used to predict whether the individual would later commit school-shooting. In logistic regression, it is the area under the curve (*AUC*), the receiver operating characteristic (*ROC*), which captures the overall accuracy of prediction outcomes of interest such as school-shooting by comparing "hits" versus "misses."

The total group is treated as if it is a population, and samples are drawn without replacement from it, one after another, until 1,000 or more have been drawn. Logistic regressions are calculated for each sample and a corresponding *AUC* is estimated. The overall analysis yields an estimate of *AUC* that is the mean of all 1,000 samples' *AUCs*. The *AUC* is a desirable measure of prediction performance because it is not influenced by the base rate of the phenomenon being predicted and of the cutting scores on predictors used to make predictions. The *AUC*, or area under the binormal receiver operating characteristic (*ROC*) curve, is the proportion of the area to the range of the area index, plotted on linear probability scales, ranging from 0.5 to 1.0. This area under the curve is equal to the probability of a correct response in a two-alternative, forced-choice test (such as membership or non-membership in a group, namely school-shooting) that accounts for both the true positives and the false positives, i.e., sensitivity and specificity. Logistic regressions with resulting *AUCs* provide an easily understood, quantitative measure of the risk factors increase the probability of workplace-shooting. See Figures 12 and 13 and Tables 4 and 5.

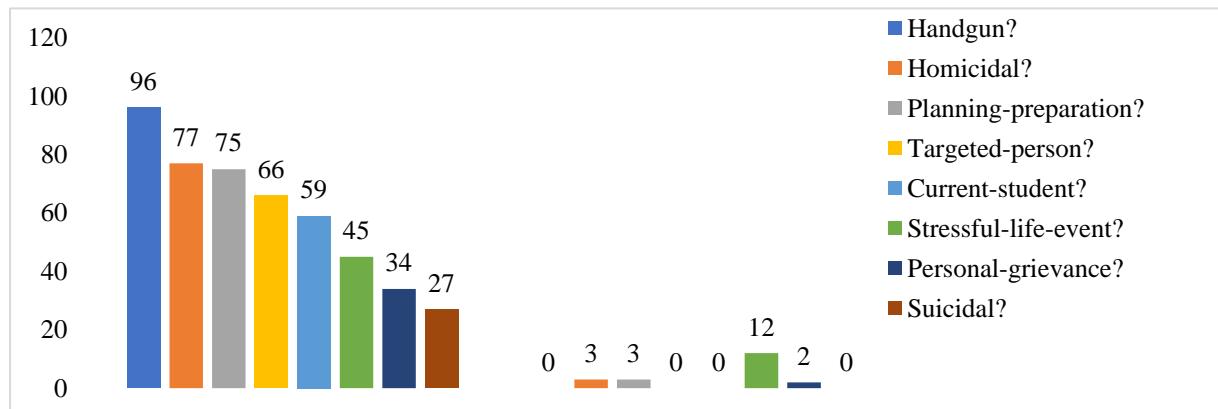


Figure 12. 232 School-Shooter Logistic Regression Eight Differentiating Characteristics or 8 Questions

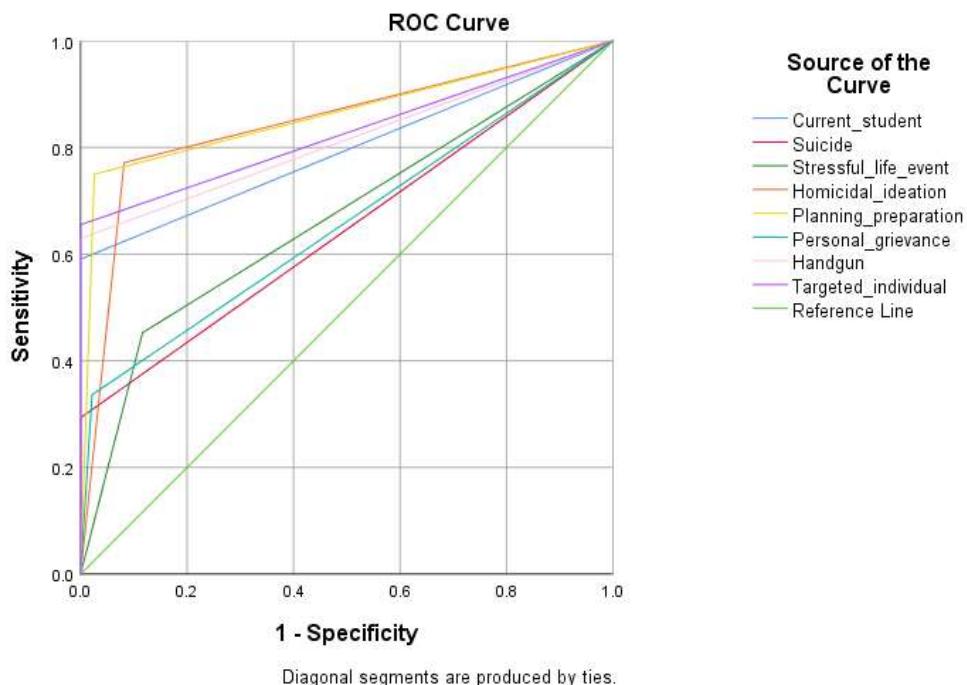


Figure 13. 232 School-Shooters Receiver Operating Characteristic Curve (ROC)

Table 4. 232 Significant ( $p < .01$ ) School-Shooters Characteristics with Area under the Curve (*AUC*)

School-Shooter * $p < .01$	Characteristics	<i>AUC</i>	Standard Error	Significance	95% Lower	95% Upper
Current-student?		.795*	.022	.01	.753	.838

Stressful-life-event?	.668*	.025	.01	.619	.718
Homicidal?	.845*	.019	.01	.807	.883
Planning-preparation?	.862*	.019	.01	.826	.898
Handgun-access?	.815*	.021	.01	.774	.856
Targeted-person?	.828*	.020	.01	.788	.867
Suicidal?	.828*	.020	.01	.788	.867
Average	.765*		.01		

Table 5. Logistic Regression Statistical Table 232 School-Shooters Compared with 232 Matched Controls

Logistic	Regression	Statistics			Significance	* <i>p</i> <.01	Correlations	
<i>R</i>	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	Standard Error of Estimate	<i>R</i> <sup>2</sup> change	<i>F</i> Change	<i>df</i> <sub>1</sub> / <i>df</i> <sub>2</sub>		
.894*	.800*	.796*	.22595	.800*	227.14*	8/455		
ANOVA Model	Sums of Squares	<i>df</i>	Mean Square	<i>F</i>				
Regression	92.771	8	11.596	227.14*	.01			
Residual	23.229	455	.051					
Total	116.000	463						
Characteristic	Unstandardized	Coefficients Standard Error	Standardized Coefficients Beta	<i>T</i>		0-order	Partial Correlation	Partial
Constant	+	+	+	62.194*	.01			
Student?	+	+	+	-9.942*	.01	-.647	-.422	-.209
Suicidal?	+	+	+	-3.364*	.01	-.414	-.156	-.071
Stressful-life-event?	+	+	+	-4.268*	.01	-.373	-.196	-.090
Homicidal?	+	+	+	-4.319*	.01	-.697	-.198	-.091
Planning-preparation?	+	+	+	-7.615*	.01	-.743	-.336	-.160
Personal-grievance?	+	+	+	3.081*	.01	-.411	-.143	.065
Handgun-access?	+	+	+	-8.461*	.01	-.678	-.369	-.178
Targeted-person?	+	+	+	-7.726*	.01	-.698	-.341	-.162

+ Beta coefficients are not provided to maintain test integrity and security.

#### Comparing Teen Average t-Scores and Percentiles

When the teen mass-murderers, homicidal, and controls average *t-scores* of the: ASP-Violence Potential and the MMPI-A infrequency, lie, depression, psychopathic-deviate, paranoia, schizophrenia, addiction acknowledgement scales were compared, there were significant (*p*< .01) differences. There is the "7-point violence profile" for teen mass-murderers and homicidal but not the controls, namely the Ask Standard Predictor(ASP) Violence Potential, the MMPI-2/A deception (infrequency, lie) depression, psychopathic deviate, paranoia, schizophrenia and alcohol-addiction acknowledgement. See teen *t*-scores and percentiles in Figures 14 and 15 and Table 6.

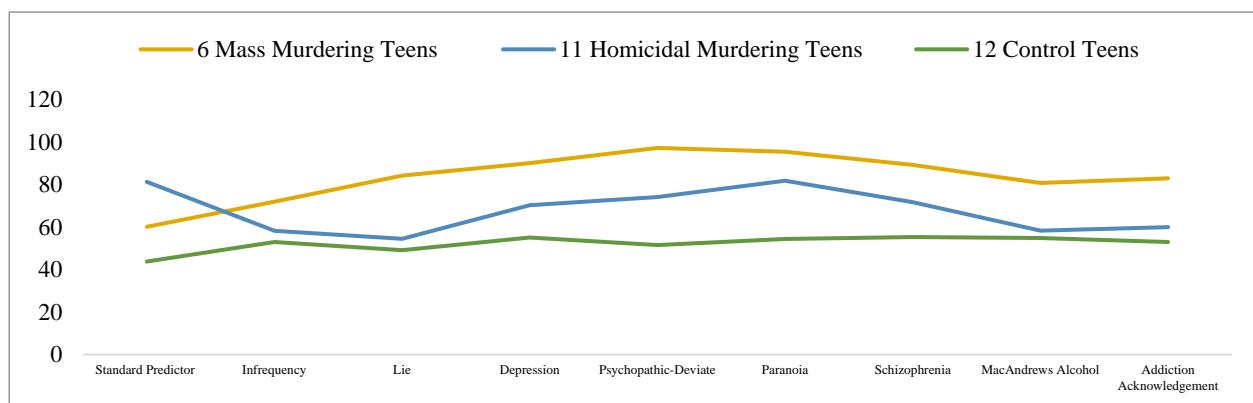
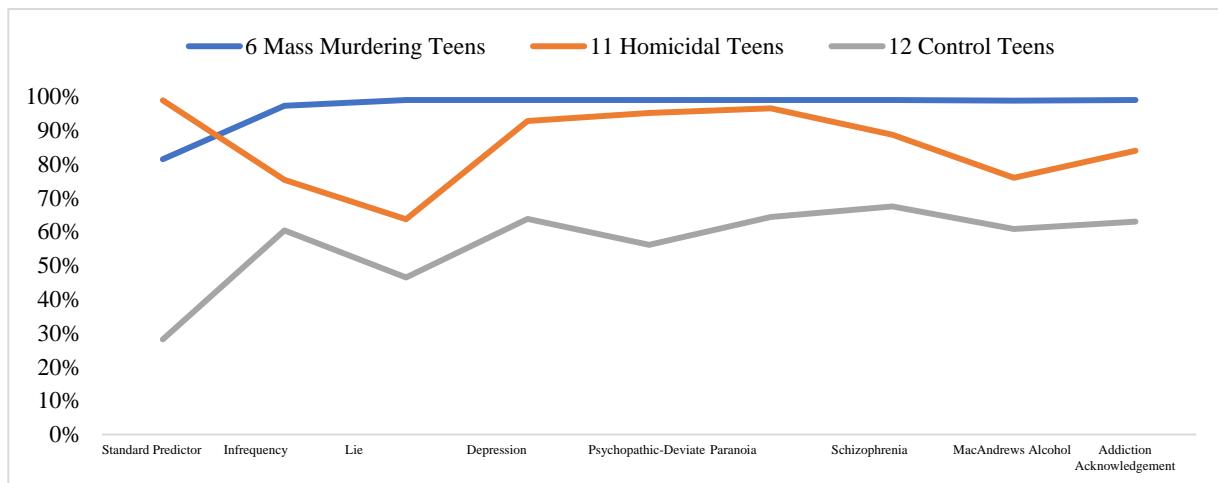
Figure 14. Mass-Murderers, Homicidal, Controls: Youth Version ASP, MMPI-At-Scores ( $M=50$ ,  $SD=10$ )

Figure 15. Mass-Murderers, Homicidal, Controls: Youth Version ASP, MMPI-Percentiles

Table 6. Ask Standard Predictor Violence Potential and MMPI-A Scales Same: 7-Point-Violence-Profile"ANOVAs

All: * $p < .01$	Youth			
	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>
Ask Standard Predictor	8096.13	2	4048.06	123.09*
	855.04	26	32.89	
	8951.17	28		
MMPI-A Infrequency	1451.68	2	725.84	17.22*
	1096.18	26	42.16	
	2547.86	28		
MMPI-A Lie	5221.51	2	2610.76	33.91*
	2001.73	26	76.99	
	7223.24	28		
MMPI-A Depression	4985.09	2	2492.55	26.18*
	2475.04	26	95.19	
	7460.14	28		
MMPI-A Psychopathic Deviate	8740.94	2	4370.47	57.45*
	1977.89	26	76.07	
	10718.83	28		
MMPI-A Paranoia	8051.23	2	4025.61	23.92*
	4375.33	26	168.28	
	12426.55	28		
MMPI-A Schizophrenia	4805.19	2	2402.60	21.69*
	2879.64	26	110.75	

	7684.83	28		
MMPI-A MacAndrews Alcohol	2870.74	2	1435.37	.16.84*
	2216.29	26	85.24	
	5087.03	28		
MMPI-Addiction Acknowledgement	3661.45	2	1830.72	.47.09*
	1011.00	26	38.88	
	3661.448	28		

**School-Shooters Ratings Same as “7-Point-Violence-Profile” (212 Studies of 320,051 Persons over 95 Yrs.)**

School-shooters have similar characteristics congruous with the “7-point-violence-profile” (deception, depression, psychopathic-deviance, paranoia, schizophrenia, alcoholism-addiction, violence potential) described in the 212 studies of 320,051 over 95-years with test descriptions of the MMPI-A/2 and Ask Standard Predictor of Violence Potential (Zagar, Varela, Busch, Garbarino, Zagar, Kovach, *et al.*, 2019; Butcher, 1996; Butcher, Ellertsen, Lucio, Lim, *et al.*, 2000, Pope, Butcher, and Seelan, 2006; Zagar and Grove, 2010). In the “7-point violence profile,” school shooters compare with the definition of *deception lie scale* with ambush tactical training and changing behavior, mood, and/or personality, *deception infrequency* with fixated or delusions, mental illness motive and psychosis, *depression* with suicide, suicidal ideation, attempted suicide outcome, and public suicide/suicide by cop, *psychopathic-deviance* with psychopathy, criminal and military misconduct, others noted strange or aberrant behavior, narcissistic, and significant family stressor, *paranoia* with concerns about being followed, harassed or persecuted, paranoid schizophrenia, revenge motive, and personal grievance, *schizophrenia* with psychosis or psychotic thinking, reported hearing voices, schizophrenia, schizotypal personality, incompetent to stand trial and/or psychiatric facility commitment, sexual fixation, and pedophilia and related interests, *alcohol-substance with substance abuse*, alcohol, and other substances and prescription drugs abuse, and violence potential with criminal misconduct, male, alcohol substance use, planning-preparation, creating possessing kill list, habitually making violent threats when angry, involved in physical fights, employment termination, below average grades, significant family stressor, and separated or divorced in Table 7.

Table 7. 650 Questions and MMPI-A and Ask Standard Predictor (ASP-Youth) “7Point-Violence-Profile”

232 School-Shooters 650 Questions	“7-Point-Violence-Profile” Youth	“7-Point-Violence-Profile” Adults
Ambush tactical training, Changed in behavior, mood and/or personality, Obsessive-compulsive	1A. MMPI-A Deception Lie Scale creating a favorable impression, denial, rigid, repression, response bias, conventional, moralistic	1A. MMPI-Deception Lie Scale attempts by individuals to present themselves in a favorable light, lack of insight
Psychosis or psychosis symptoms, Significant mental health issues, Mental illness motive	1B. MMPI-A Deception F Infrequency Scale random, exaggerated responses, acting out, psychopathology, resentment, inattention	1B. MMPI-2 Deception F Infrequency Scale trying to appear worse than one is severe distress, randomly answering
Suicide & ideation, Family member attempted, committed suicide, Getting things in order, Stressful life event, Inappropriate-ate affect, bullied, harassed, hopelessness, Self-harmed	2.MMPI-A Depression Scale, pessimism, worry, pessimism, worry, guilt feelings, tension, poor concentration, sad, somatic complaints	2.MMPI-2 Depression Scale , poor morale, hopelessness, helplessness, general dissatisfaction, life situation unhappiness
Psychopathy, criminal misconduct, others noted strange, aberrant behavior, family stressor elicited concern, criminal, hate, justice, peer pressure, power-control, profit, recognition, religion, sociopolitical motive, bullying, harassing stress, unprovoked outbursts	3.MMPI-A Psychopathic Deviate Scale low impulse control, extroverted, misidentification with societal standards authority marital and family conflicts, inconsiderate, parasitic	3.MMPI-2 Psychopathic Deviate Scale social deviation, amorality, externalizes blame on others, hostility, poor judgment, lack of acceptance of authority disregards morality
Concerns about being followed, harassed or persecuted, Paranoid	4.MMPI-A Paranoia Scale belligerent, overly sensitive,	4.MMPI-2 Paranoia Scale suspiciousness, rigidity, feeling

schizophrenia, Revenge motive, Personal grievance	vengeful, ideas of reference, delusions of persecution, grandiosity	persecuted, grandiose self-concepts, excessive sensitivity
Psychosis of thinking, Hearing voices, Schizophrenia, Schizotypal, Incompetent for trial, psy-chiatric facility commitment, Traumatized, Narcissistic, Sex-ual identity, confusion, masculine issue	5.MMPI-A Schizophrenia Scale immature, disorganized, reality testing breakdown schizoid, unreality feelings, insecurities, alienation, fantasizing, nonconforming, sexual difficulties preoccupations, narcissistic,	5.MMPI-2 Schizophrenia Scale bizarre thoughts, low impulse control, strange perceptions, social alienation, poor family relationships, inattentive, uninterested, poor self-worth, self-identity disturbing thoughts
Substance abuse, marijuana, alcohol, over-the-counter medication, unknown illicit drug abuse, stopped medications	6.MMPI-A Alcohol/Drug Problems Acknowledgement (ACK) Alcohol/Drug Problems Proneness (PRO, admissions, use attitudes, beliefs, problematic use, symptoms	6.MMPI-2, MacAndrews Alcoholism Revised (MAC-R), Addiction Potential Alcohol-Addiction (AAS) substance abuse, alcohol, drug problems
Homicidal, criminal misconduct, gang peer fringe group, bullying, harassing others, personal grievance, planning, preparing murder, brought weapon to school, acquired multiple weapons, access to 3 <sup>rd</sup> party weapons, animal cruelty, torture, developing, manifesto, previously attacked location, holding or planning hostages, surveilling target, possessing bomb diagrams, watching violent media, admiring prior murderers, random violence, hate crime, terrorism motive, making angry violent threats, witnessed abuse during childhood, male, fighting, intent leakage, formal job discipline, work termination, below average grades, developmental learning disorder, truancy, expulsion, frequently changed schools, alternative school program, family stressor, divorce or separation, removed from parental home, foster, group home, absent mother, talked of family problems, father resentment, absent father, romantic conflict, rejection, stress, Substance abuse, marijuana, alcohol, over-the-counter medication, unknown illicit drug type abuse, Juvenile/teen romantic interest victim	7. Ask Standard Predictor Violence Potential - Youth Version ( $N=1127$ ) Low executive function or poor decision making, Prior court contact, criminal or delinquent misconduct Male, Alcohol and substance use Violent family Underachievement Illnesses Single parent or orphan, step parent home Physically abused Truancy, suspension, expulsion Alcohol and substance abuse Epilepsy Low social maturity or adaptive behavior Alcohol abuse alone Substance abuse alone	7. Ask Standard Predictor Violence Potential-Adult Version ( $N=1595$ ) Poor decision making Prior court contact, criminal or delinquent misconduct Male Alcohol substance use Violent family Unemployment Underachievement Antisocial personality disorder Hyperactivity, Attention deficit, Learning Disorder Low socioeconomic status Illnesses

#### School Shooters Come Twice Before Killing to Health Special Education Courts-Police and Human Resources

As seen in Table 8, 127 of school shooters access school services, 101 access mental health, and 171 access special education, while 70 of 232 have human resource issues, and 202 have court or police contact, all before the shootings.

The total is 544 or twice the number of school-shooters. The bottom line is that domestic-terrorist, mass-murdering, school-shooters don't want to be discovered, diagnosed, or treated. They are homicidal, suicidal and have access to multiple weapons, and experiencing a stressful life event, they elicit other's concern with a personal grievance and revenge motive they target a current student in a school and commit suicide. Machine-learning-equations and computer-tests should be used in all sectors because *twice before killing school shooters reach out for help to mental health, school service, courts-police and human-resource providers.*

Table 8. 232 Twice School-Shooters Get Mental Health, School Services, Courts-Police & Human Resources

<b>Mental Health History:</b> Anti-Anxiety	3	1%
Anti-Depressant(S)	13	6%
Anti-Epileptic(S)	1	
Anti-Psychotic(S)	5	2%
Mood Stabilizer(S)	2	1%
Narcotic(S)	0	
Sedative(S)	2	1%
Unknown Psychiatric Medication or Type	12	5%
Mental Health Hospitalization	20	9%
Attended Counseling and/or Therapy	33	14%
Rec'd Inpatient Treatment for Alcoholism	2	1%
Seeking to Begin Treatment	8	3%
Subtotal	101	44%
<b>Education History:</b> Below Average Grades	36	16%
School Probation	1	
Acted Out and/or Caused Trouble in Class	27	12%
Decline in School Performance	16	7%
Did Not Graduate College/ University (If Enrolled)	16	7%
Did Not Graduate High School	1	
Expelled from College / University, Technical, Or Other	1	
Expelled from Middle or High School	6	3%
Suspended	24	10%
Truancy	9	4%
Special Education	13	6%
Homeschool	8	3%
Alternative School	13	6%
Subtotal	107	46%
<b>Employment History:</b> Formally Disciplined	17	7%
Disgruntled	0	
Employment Terminated	15	6%
Aggression, Sexual Harassment, Or Inappropriate Behaviors	12	5%
Below Average Performance	4	2%
Reported to Be a Problem Employee	4	2%
Knowledge or Suspicion of Impending Job Loss	3	1%
Placed on Mandatory Leave	2	1%
Decline in Work Performance	2	1%
History of Being Harassed by Supervisors	1	
History of Unstable Employment	10	4%
Subtotal	70	30%
<b>Abuse/Criminal History:</b> Interactions Initiated By: Police	50	22%
Experienced/Witnessed Abuse During Childhood: Yes	38	16%
Perpetrated Abuse During Childhood: Yes	11	5%
Experienced/Witnessed Abuse During Adulthood: Yes	1	
Perpetrated Abuse During Adulthood: Yes	14	6%
Military Misconduct: Yes	10	4%
Criminal Misconduct: Yes	78	34%
Subtotal	202	87%
<i>Total</i>	480	207%

### **Correlations of 630, 232, 370 and 630 Shooters (16-Questions):**

All three sets of questions to find 630 spree-shooters, 232 school-shooters, and 370 workplace-shooters have significant ( $p<.01$ ) Cronbach's  $\alpha$ 's, congruous with adequate internal consistency of the sets of questions. When added to the significant  $AUC_{630}=.765$ , ( $p<.01$ ),  $AUC_{232}=.704$ . ( $p<.01$ ), and  $AUC_{370}=.697$ , ( $p<.01$ ), there is a reliable, sensitive, specific and valid separation of the spree-shooters from controls. These questions are a great start to helping professionals find and divert high risk persons *before* deaths, injuries and related costs.

The significant correlations for *10 questions to find 630 spree-shooters* (\* $p<.01$ ), student? school location? homicidal? planning? stressful-life-event? revenge? many weapons access? elicited-concern? grievance? and suicidal? ranged from -.10 to .475 with Cronbach's alpha internal consistency = .813, and based on standardized 10 questions, .806. The item means were .241 with a minimum of .139 and a maximum of .382, range = .243 maximum/minimum = 2.753, variance = .007. The inter-item correlations mean = .294 with a minimum = .10, maximum = .766, minimum/maximum = -73.234, variance=.025. The scale statistics have a standard deviation of 2.56 with 10 questions.

The significant correlations for *8 questions to find 232 school-shooters* (\* $p<.01$ ), student? Suicidal, stressful-life-event? homicidal? planning? handgun-access? grievance? and person-target? ranged from .095 to .708 with Cronbach's alpha internal consistency = .836, and based on standardized 10 questions, .832. The item means were .295 with a minimum of .147 and a maximum of .427, range = .28 maximum/minimum = 2.912, variance = .009. The inter-item correlations mean = .294 with a minimum = .10, maximum = .766, minimum/maximum = -73.234, variance=.025. The scale statistics have mean=2.3621, variance=5.981, standard deviation = 2.45 with 8 questions.

The significant correlations for *13 questions to find 370 workplace-shooters* (\* $p<.01$ ), homicidal? intent-leakage? stressful-life? revenge? many-weapons-access? elicited-concern? threatened-victims? work-target? professional-work-relationship? suicidal? and dead-male victim? ranged from .028 to .683 with Cronbach's  $\alpha$  internal consistency = .846, and based on standardized 10 questions, .843. The item means were .240 with a minimum of .162 and a maximum of .370, range = .208 maximum/minimum = 2.283, variance = .003. The item variances mean = .180 with a minimum = .136, maximum = .233, range .097, minimum/maximum = 1.716, variance=.001 with 13 questions. The significant correlations for *16 questions to find 630 spree-shooters* (\* $p<.01$ ), current student? person, work or school target? homicidal? planning? stressful-life-event? revenge? handgun-multiple-weapons-access? elicited-concern? grievance? suicidal? criminal-misconduct? random-violence? student-professional-work-relationship? and intent-leakage? ranged from -.125 to .766 with Cronbach's  $\alpha$  internal consistency = .879, and based on standardized 16 questions, .873. The item means were .241 with a minimum of .089 and a maximum of .382, range = .094 maximum/minimum = 4.215, variance = .006.

### **630 Spree-Shooters 16 Questions**

See Figure 16 for the *ROC* of 630 spree-shooters compared with 623 controls on 16 questions and Table 9 for the *AUCs* and Table 10 for the logistic regression table with significant discriminating questions or predictors.

Table 9. 232 School-Shooters Differentiating Characteristics with Area under the Curve (*AUC*)

School-Spree-Shooter Questions * $p<.01$	<i>AUC</i>	Significance
Student?	.638	.01
Person-work-school-target?	.797	.01
Homicidal?	.850	.01
Planning-preparation?	.820	.01
Stressful-life-event?	.673	.01
Revenge-motive?	.710	.01
Handgun-many-weapons-access?	.746	.01
Elicited-concern?	.680	.01
Personal-grievance?	.654	.01
Suicidal?	.654	.01
Criminal-misconduct?	.649	.01
Random-violence?	.725	.01
Student-or-professional-work-relationship?	.588	.01
Intent-leakage?	.736	.01
Threatened-one-or-more-targets?	.624	.01
Dead-male-victim?	.725	.01
Average	.704	.01

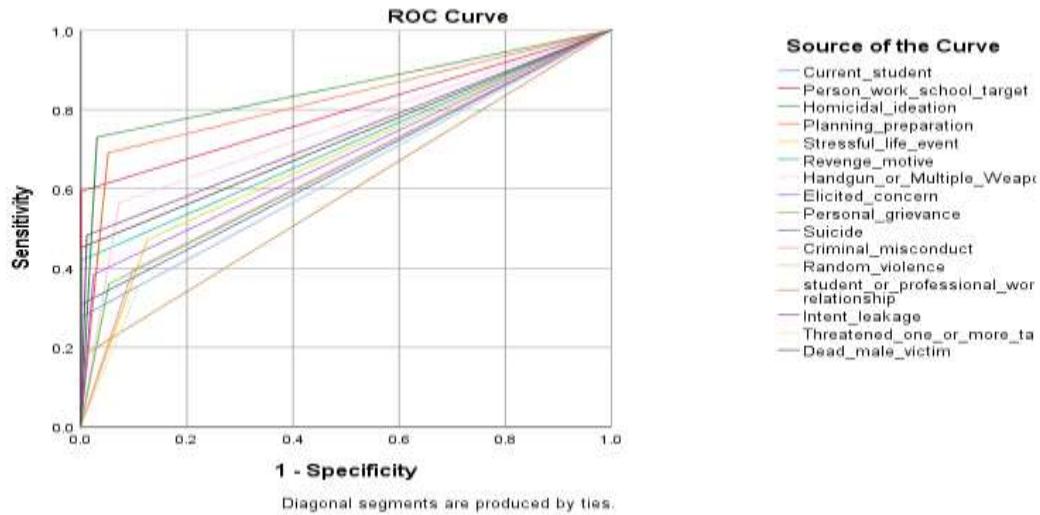


Figure 16. 630 Spree-Shooters Receiver Operating Characteristic Curve (ROC)

### Comparing Spree, School, Workplace-shooters, Violent Youth and Adults

When the characteristics of school-shooters, spree-shooters, and workplace-shooters are compared with violent-youth and adults, the sets of questions have significant alpha internal consistency reliability and sensitivity-specificity as measured by the area under the curve correlation. The mass-murderers differ from the violent youth and adults in the psychotic nature of the risk pattern along with the self-destructive tendency. The solution for the insurance industry and US Roman Catholic Church is to implement training in computer-tests and machine-learning-equations with the goal of using these objective, reliable, sensitive, specific, valid ways before the legal system and plaintiff attorneys extract even more cost given that a solution is available that takes a short amount of time and is inexpensive compared to the dinosaur approach of using background-credit checks, interviews-judgment, medical exams and paper-and-pencil tests to find high risk persons.

Table 10. Logistic Regression Statistics of 630 Spree-Shooters and 623 Matched Controls with 16 Questions

Logistic	Regression	Statistics		* p<.01	Significance	
R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard Error of Estimate	R <sup>2</sup> change	F Change	df <sub>1</sub> /df <sub>2</sub>
.870*	.756*	.753*	.24846	.756*	239.895*	16/12366
ANOVA Model	Sums of Squares	df	Mean Square	F		
Regression	236.941	16	14.809	239.895	.01 <sup>b</sup>	
Residual	76.299	1236	.062			
Total	313.240	1252				
Characteristic	Unstandardized B	Coefficients of Standard Error	Standardized Coefficients B	t		
Constant	+	+	+	62.194*	.01	
Student?	+	+	+	-9.942*	.01	
Person-work school-target?	+	+	+	-3.364*	.01	
Homicidal?	+	+	+	-4.268*	.01	
Planning?	+	+	+	-4.319*	.01	
Stressful-life?	+	+	+	-7.615*	.01	
Revenge?	+	+	+	3.081*	.01	
Handgun-many-weapons-access?	+	+	+	-8.461*	.01	
Elicited-concern?	+	+	+	-7.726*	.01	
Grievance?	+	+	+	11.220	.01	
Suicidal?	+	+	+	5.629	.01	
Criminal-misconduct?	+	+	+	10.282	.01	
Random-violence	+	+	+	7.444	.01	

Student-work-professional-relationship?	+	+	+	3.196	.01	
Intent-leakage?	+	+	+	-.203	.839	
Threatened-victims?	+	+	+	4.415	.01	
Dead-male-victim?	+	+	+	4.675	.01	

+ Beta coefficients are not provided to maintain test integrity and security.

Computer-tests and machine-learning-equations were first proposed in 1992 to US Roman Catholic Church, namely the Chicago Archdiocese and Gallagher Insurance in 2005. The solution today to this expensive and deadly challenge is a papal executive order to start training of bishops, cardinals, church, and insurance chief financial officers to be trained. This consists of credentialing the abovementioned for three 2-3 day weekend courses taught at three levels (beginner, intermediate, advanced) in preventing violence through training in math and analysis of case studies. This would demonstrate that changing church and insurance policies, specifically testing all church workers and making all future insurance policy renewals contingent upon using computer-tests and equations across all society sectors would help reduce costs and mortality. . & Mrs. Zagar invested \$26,000,000. It is suggested by 7 Northwestern University Kellogg business management and McCormick Engineering entrepreneurship classes to use a novel approach of training on computer-tests and equations to find risk. It is basically the same kind of risk management training that goes on among health, military, police, school, university professionals now to lower insurance premiums. The Church should invest ten times that (equal to \$260,000,000) to obtain a return on investment of 10-305 for every dollar spent to stem the continual yearly pedophilia losses. This could be remedied by setting up five training centers of diocesan workers at Loyola University- Chicago, of religious workers at Calumet College Saint Joseph or Loyola University Medical Center. In Europe, a center in Radgoszcz, Poland, modelled after the Chicago Loyola Lakeshore campus with a church, school, high-school, university on the extra parish farm land south of Saint Casmir purchased from Tarnow diocese, where professor Zagar lives during the summer and winter. In Latin America, a central and South American center at Lake Aitalan, Guatemala, where professor Garbarino resides during the winter, and a psychological institute, Gregorian university, Rome center, to monitor training and testing globally but also canonical lawyers visiting yearly every parish in every diocese with feedback to Rome on “high risk situations” needing “attention.” The timeline is 2023 Spring, Loyola, 2023 Summer, Radgoszcz Poland, 2023 Winter Guatemala, 2024 Spring Calumet College St. Joseph or Loyola Medical Center; 2024 Rome global center. By inviting insurance executives first, then the Church could expand to other sectors in need of the same approach, military, police, transportation, energy, courts, schools, universities, health, job diversion. Also part of this plan would be to model after Polish Primate Wyszyński’s (1984) *A Freedom Within: A Prison’s Notes of Stefan Cardinal Wyszyński* approach of renewing the Polish Church at its millennial celebration in 1966 by giving the seven sacraments, parish by parish, diocese by diocese to bring the faithful back to the renewed and cleansed Church. If Wyszyński and the future Saint John Paul II could end Polish communism, resulting in the Berlin Wall falling 10 years after the popes “Nine Days that Changed the World,” (Gingrich and Gingrich, 2010). and thirty years later, central European democracies, why cannot Pope Francis apply for the Nobel Peace Prize with the minutes from the 179 prelates meeting in February 2019, the minutes of the canonical law change and the textbooks and test manuals from the training proposed above.

Table 11. Questions for 232 School, 630-Spree, 370 Workplace-Shooters, 1,127 Violent-Youth, & 1,595-Violent-Adults

Significance* <i>p&lt;.01 Zagar et al., 2010, 2022.</i>	232-School- Shooters 232 Controls ( <i>n</i> =464)	630-Spree- Shooter 623 Controls ( <i>N</i> =1,253)	370-Workplace- Shooters vs. 370 Controls ( <i>n</i> =740)	630-Spree- Shooters vs. 623- Controls ( <i>N</i> =1,253)	Violent vs. Nonviolent Delinquent vs. Control Youth ( <i>N</i> =1,127)	Violent vs. Nonviolent Delinquent vs. Control Adults ( <i>N</i> =1595)
Area-Under-Curve <i>AUC</i>	.765*	.704*	.697*	.704*	.91*	.99*
Cronbach’s <i>a</i>	.832*	.836*	.843*	.879*	.61*	.62*
Test-retest <i>r</i> -				.73	.75*	.76*
Inter-observer Agreement <i>r</i>				.75	.73*	.75
<i>R</i>	.894*	.823*	.841*	.870*	.86 *	.66*
<i>R</i> <sup>2</sup>	.800*	.677*	.707*	.756*	.85*	.66*
Adjusted <i>R</i> <sup>2</sup>	.796*	.675*	.702*	.753*	.83*	.64*
Standard Error Estimate	.22595	.28537	.2733	.24846*	.21	.20

<i>R</i> Change	.800*	.677*	.707*	.756*	.85*	.66*
<i>F</i> Change	227.14 *	260.422 *	134.637 *	239.895*	429.10*	280.30*
<i>df<sub>1</sub>/df<sub>2</sub></i>	8/455	10/1242	13/726	16/1236	14/1112	11/1583
Descriptors	Homicidal?	Homicidal?	Homicidal?	Homicidal?	Poor-decisions?	Poor-decisions?
	Suicidal?	Suicidal?	Suicidal?	Suicidal?	Prior-court-contacts?	Prior-court-contacts?
	Stressful-life-event?	Stressful-life-event?	Stressful-life-event?	Stressful-life-event?	Male-gender?	Male-gender?
	Handgun?	Many weapons?	Many-weapons?	Handgun-many weapons?	Alcoholism-addiction?	Alcoholism-addiction?
		Elicited-concern?	Elicited-concern?	Elicited-concern?	Violent-family?	Violent-family?
		Intent-leakage?	Intent-leakage?	Intent-leakage?	Many illnesses 0-10+?	Unemployment?
		Revenge?	Revenge?	Revenge?	Underachievement?	Underachievement?
	Grievance?	Grievance?		Grievance?	Alcoholism?	Antisocial-personality?
	Planning?	Planning?		Planning?	Addiction?	Hyperactivity ADD/ADHD?
	Student?	Student?	Work-Relation?	Student?	Low-social-maturity?	Poverty (low SES)?
	Person-target?	School Target?	Work-target?	Person-school-work-target?	Truancy-suspension-expulsion?	Many-illnesses 0-10+?
			Criminal-misconduct?	Criminal-misconduct?	Orphan-single-or-Step-parent-family?	
			Threatened-victim?	Threatened-victim?	Physically-abused?	
			Dead-male-victim?	Dead-male-victim	Epilepsy?	
			Random-violence?	Random-violence		
Number of Questions in the ASP	8-Questions	11 Questions	13 Questions	<i>16-Questions Ask Standard Predictor (ASP-MM) Mass Murder potential</i>	<i>54-Questions Ask Standard Predictor Violence Potential ASP-VP-Youth</i>	<i>11-Questions Ask Standard-Predictor-Violence Potential (ASP-VP)-Adult</i>
Tests to use with questions to find the “7 point-violence profile: deception, mental illness, criminal behavior, alcoholism-addiction, violence or mass murder potential				MMPI-A/MMPI I-2 (deception, mental illness, criminal behavior, criminal behavior, alcoholism-addiction) + CAPI (abuse potential) + ASP-MM + ASP-VP Youth/Adult (violence-mass-murder potential)	MMPI-A (deception, mental illness, criminal behavior, alcoholism-addiction) + CAPI (abuse potential) + ASP-MM + ASP-VP-Youth	MMPI-2 (deception, mental illness, criminal behavior, alcoholism-addiction) + CAPI (abuse potential) + ASP-MM + ASP-VP-Adult
# questions				730-771	730-771	
Time to				1-2 hours	1-2 hours	1-2 hours

Answer questions						
Cost/person/report				\$200/person/report	\$200/person/ report	\$200/person/ report
Inaccuracy/ current methods	-.61%	-.61%	-.61%	-.61%	-.61%	-.61%
AUCs: precision	.697-.99	697-.99	697-.99	697-.99	697-.99	697-.99
Church/ Insurance Industry Loss	\$5M/\$20M/ week	\$5M/\$20M /week	\$5M/\$20M/week	\$5M/\$20M/wee k	\$5M/\$20M/week	\$5M/\$20M/week
ROI (return on investment)	\$10+/every \$1 spent training/testing	\$10+/every \$1 spent training/tes ting	\$10+/every \$1spent training/testing	\$10+/every \$1spent training/testing	\$10+/every \$1 spent training/testing	\$10+/every \$1spent training/testing
<i>This data is in the public domain now</i>	Judges, lawyers	Plaintiffs will sue	Payouts go 1-2 decimals	Higher from millions from church insurance	To billions from collection + premiums	

#### Discussion: First Null and Alternative Hypotheses

Null hypothesis on school-shooters and control differences is rejected. The alternative hypothesis is that school-shooters are different on: current-student, suicide, stressful-life-event, homicidal-ideation, planning-preparation, personal-grievance, handgun and targeted-person.

#### Second Null and Alternative Hypotheses

The second null hypothesis is that school-shooters don't differ from homicidal and controls is rejected and the alternative hypothesis that school-shooters tend to have higher scores on the seven point violence profile is accepted because they tend to be deceptive, depressed, psychopathic deviate, paranoid, confused in thinking processes (schizophrenia), alcohol-substance abusing, and violent is accepted. Many of the questions on the measures of the 7-point profile scales are consistent with school-shooter characteristics. But what are the costs of school-shooters? The answer will drive use of computer-tests and machine-learning-equations.

#### Bath School, Virginia Tech, Austin, Sandy Hook, Greencastle, Pennsylvania, Northern Illinois Costs

Bath School in Michigan, 1927, 46 dead @ 3,834,988.08 = 176409451.70 + 58 injured @ 33,773.52 = 1,958,864.16 = 177,368,315.76. Virginia Tech, Blacksburg, 2007, 34 dead @ 3,834,988.08 = 130,389,594.73 + 27 injured @ 33,773.52 = 1,187,595.14 = 131,577,189.87. University of Texas, Austin, 1966, 18 dead @ 3,834,988.08 = 1,242,536,138. + 31 injured @ 33,773.52 = 1,046,979.12 = 1,243,583,117.12. Sandy Hook, Newton, Connecticut, 2012, 28 dead @ 3,834,988.08 = 3,006,630,655 + 2 injured @ 67,547.04 = 3,006,708,202.04. Greencastle, Pennsylvania, 1764, 10 dead @ 3,834,988.08 = 38,349,880.80 + 2 injured @ 33,773.52 = 67,547,427.04 = 38,417,427.84. Northern Illinois, DeKalb, 2008, 5 dead @ 3,834,988. = 19,174,940.40 + 21 injured @ 33,773.52 = 19,884,184.32. All are predictable and preventable losses.

#### Action Plan: Practical Cost-Beneficial, Cost-Effective, Evidence-Based Solutions

There is a solution for, insurance chief financial officers and Roman Catholic Church leadership, must use computer-tests, machine-learning-equations and fingerprint scanners and metal detectors at all school locations.

#### School-Shooters Definitive Risks Discoverable with Computer-tests and Machine-learning-equations

There are 8 school-shooter risks or questions to find school-shooters. Given the complex profile, current ways are 39% reliable, sensitive, specific, valid compared with 97% computer-tests and machine-learning-equations. This dictates the need for insurance chief financial officer directives and incentives. Current estimates of 5% use of computer-tests and machine-learning-equations versus the universal, 39% unreliable, insensitive nonspecific, invalid human decision making is likely a reason for the increasing school-shooter victims and higher expense.

Figure 15. Bath School, Virginia Tech, Austin Texas, Sandy Hook, Greencastle, Northern Illinois Costs

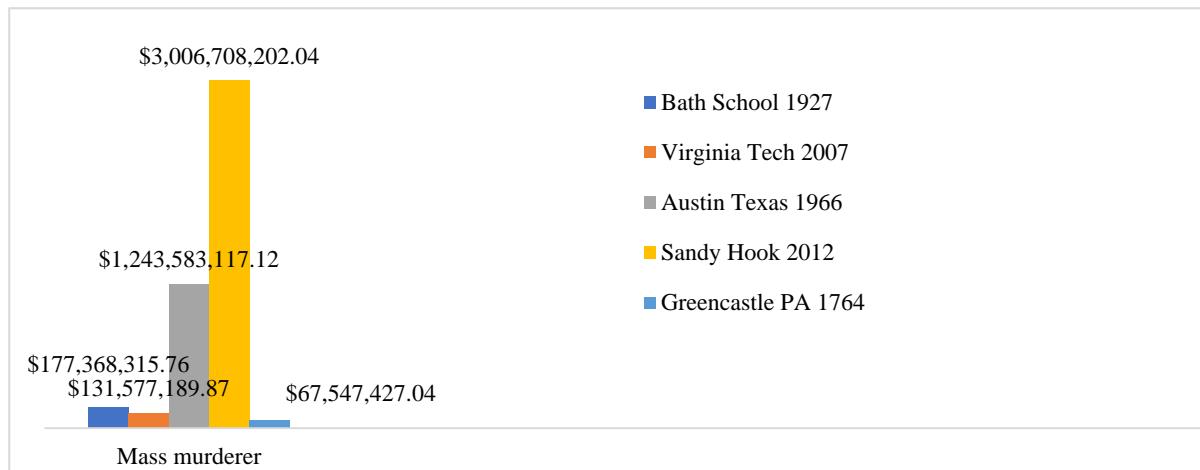
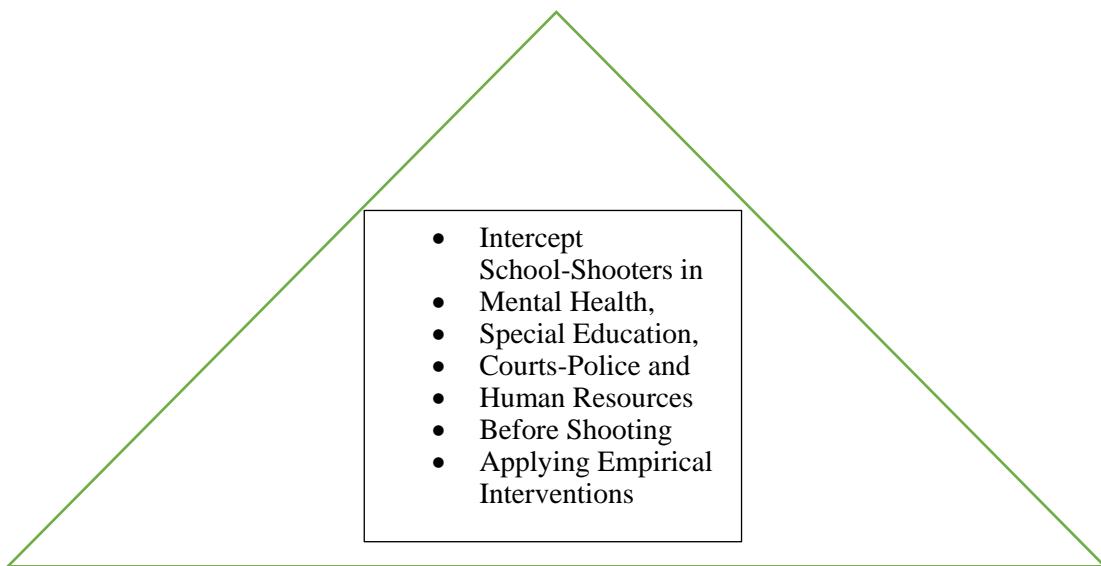


Figure 14. Machine Learning Equation and Computer-tests Intercept School-Shooters before Shooting

Computer-tests: Minnesota Multiphasic Personality Inventory Adolescent Version

Adult: Minnesota Multiphasic Personality Inventory Second Edition, Machine Learning Equation: Psyneelix Machine Learning Equation: ASP (Adult or Youth Versions)



#### **Professional Continuing Education and Licensing Requirements to Use Computer-tests and Equations**

There must be mandatory continuing education licensing requirements for use of computer-tests and machine-learning-equations. Texts on Zagar *et al.*'s 2009, 2013, 2016, 2019, and 2022 research articles in one, and cases using computer-tests and machine-learning-equations to identify homicidal, mass-murdering, overdosing, sex-offending, suicide-completers, are in preparation and when the texts are available training can begin.

#### **Impact on the Insurance industry**

Insurance industry determines rates based upon claims projections. Those projections are based upon actuarial calculations using past loss data and models to project experience into the future. If this were solely the case insurance premiums would be just a pass through of claims costs plus insurance company expenses and profits. However, in commercial insurance in particular, another important factor is considered – risk management. Firms that proactively take actions such as employee training, product design, etc. realize lower premiums because the insurance industry has quantified the impact of numerous risk management activities. Many of these activities fall under the broad rubric of pre-loss loss control. Activities taken before events occur to eliminate or reduce the impact of losses. The data presented here should be considered important and exciting for the insurance industry. In most cases, losses due to shootings are paid, to a large extent, by insurers. Taking the simple steps outlined herein can help make claims expenses lower and more predictable (high degrees of make insurance pricing much more difficult). Insurance firms that include this type of

testing and premium credits will be market leaders and be able to capture larger shares of business in many different lines of coverage. As the cases discussed here are consistent with, even if an insured entity ultimately is found not liable for the actions of a spree-shooter or pedophile, there are costs of defending businesses and billing owners from claims arising out of spree-shooter or pedophile incidents which have not been included in the expense (1936-2108). A time may come when institutional awareness, public policy and public perception converge to place greater duties and responsibilities on businesses, corporations, institutions and professionals to act affirmatively to intervene and prevent spree-shootings and pedophilia or violent offenses. Until then count on insurance industry to respond to insureds' concerns with new coverage and endorsements designed to help entities prepare and respond to active assailants regardless of a spree-shooting, pedophile, homicide or other violent offense.

### **Machine-learning-equations and Computer-tests**

Inexpensive reliable sensitive specific valid tools include the Pearson, PsychCorp, Behavior Assessment System for Children Third Edition (BASC-3) has 150 questions for parents, teachers, and infants, children, teens, and adults from birth to 25 years for \$5 US (2021 dollars) generating a 30-page report with diagnosis and treatment (Kamphaus and Reynolds, 2015a; 2015b). The Pearson MMPI-A has 468 questions giving a 30-page report comparing the teen or adult with millions including personal, interpersonal skills, diagnosis, treatment, and probability outcomes for \$50 US (2021 dollars) [Pope, Butcher, and Seelan, 2006]. The PAR Incorporated, Psytec, Child Abuse Potential Inventory is another test for adult violence risk with 150 questions for 18 to 99 years with an objective, reliable, sensitive, specific, valid rating scale for shooter (Milner, 1986) with a one-page report. The Ask Standard Predictor of Violence Potential and the MMPI-A have a *combined* specificity and sensitivity for deception, mental illness, substance abuse and violence of 0.97 (Zagar and Grove, 2010; Zagar, Kovach, Basile, Hughes, Grove, *et al.*, 2013). This applied to homicidal, overdosing-substance-abusing, sex-offending and suicide-completers. ASP for Youth has 54 questions with  $AUC = .91$ . The test-retest reliability was .75-.76 and Cronbach's  $\alpha = .75-.78$  with sensitivity of 97% and specificity of 97%. The ASP evaluates specific, historical self- descriptions and requires 15 minutes to complete. The ASP has no questions from any of the other tests and is a free-standing instrument with 96 or 116 independent questions, distinct from the other tests. This measure was successful in discriminating randomly selected violent offenders (1,595 adults and 1,127 adolescents) from matched controls with  $AUC = .96$  in a combined adult and adolescent version, based on a sample of 2,722 (Zagar and Grove, 2010). Psyneutix Laboratories is a developer of human behavioral analysis software and artificial intelligence designed to create better functioning business, finance, criminal and counter-terror human personality profiles. Psyneutix Laboratories also develops predictive software to identify "Students of Concern" who might become violent on campus. The company's human behavioral analysis software fuses advanced mathematical and technical knowledge from top research institutions, along with decades of police investigative and military special operations experience to provide an innovative and highly efficient behavioral analytics, deep-learning program with actionable insights, enabling law enforcement, national intelligence and national defense entities to instantly identify and disrupt dangerous behavioral patterns before criminals and terrorists act.

### **Summary and Conclusion: Choice of Persistent Belief of Superior Decision-Making: Entry Barrier: Computer-tests and Equations versus Costs: Tens of Billions US Dollars + Tens of Thousands of Deaths**

Kahneman (2011) discusses the persistence in bias and error in human decision-making despite concrete, evidence base scientific facts since Meehl in 1954 showed actuarial statistical methods are an improvement over clinical judgment. Given the 40,300,000 deceptive neurological-psychiatric self-presentations of high risk violence prone, the rarity of these events for 1/10,000,000 (terrorism) to 1/1000 (homicide, overdose, suicide, 1/100 for sex offending or psychopathology-psychosis-schizophrenia), and the 39% accuracy of interviews-judgment, medical exams, background-credit checks, paper tests, one wonders when tens of billions of US dollars lost and tens of thousands of deaths are enough to drive change. Shooters Come TWICE and are missed by mental-health, special education, courts-police and human resources. Perhaps the current liability suit against an Oxford Michigan school superintendent, principal, teacher and counselor is a future portent of ways to induce the system to use computer-tests and equations. *There are only 16-Questions, with a Cronbach's  $\alpha = .846$ ,  $p < .01$ , Area under the Curve or  $AUC = .704$ ,  $p < .01$ : (1) homicidal? (2) suicide-completer? (3) stressful-life-event? (4) handgun-many-weapons-access? (5) planning-preparing-violence? (6) revenge-motive? (7) eliciting-others-concern? (8) intent-leakage? (9) criminal-misconduct-history? (10) personal-grievance? (11) random-violent-behavior? (12) threatening-victims? (13) dead-male-victim? (14) targeting-person-school-work? (15) student-professional-work-relationship? and (15) student?* When these are used with the Minnesota Multiphasic Personality Inventory Second or Adolescent Versions, the Abuse Potential Inventory (CAPI) and the Ask Standard Predictor of Violence Potential Adult or Youth Versions for a cost of less than \$200 and 2 hours or less than 800 questions, one has an objective, reliable, sensitive, specific valid way of finding high risk person. *Over 85-years these Church and Insurance violence-prone expenses are borne by the churchgoers, citizens, premium purchasers and taxpayers who supported these corporations with \$20B twice and tens*

of thousands of lives either impacted by abuse or ended over 85+years. This will drive a new approach, computer-tests with equations perhaps by the Pope and Insurance Industry CFOs Either billions of dollars in expense and tens of thousands of victims or computer-tests and equations, is the binary choice. There is hope for safer world where humans need not be afraid when leaders are brave and make change to improve safety for families and communities.

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