Chapter 3: Science, Nonsense & Common Sense

> *More than 3500 research studies have examined the association between media violence and violent behavior; all but 18 have shown a positive relationship.*
>
> – "Media Violence." American Academy of Pediatrics Committee on Public Education, November 2001[1]
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> *It is not true, for example, that "more than 3500 research studies have examined the association between media violence and violent behavior [and] all but 18 have shown a positive relationship."… In fact, there are probably fewer than 300 empirical studies that try to measure the effects of violent media—with even and ambiguous results.*
>
> --National Coalition Against Censorship, December 2001[2]

Let's go from history to science for a bit. To understand the claims made by researchers, it's useful to know how scientists approach a complex problem like the causes of violence. Scientific research is like solving a jigsaw puzzle in which you don't know if you have all the pieces, the pieces that you do have can fit together in many different ways, and you're not sure what the finished picture will look like. If you're not a scientist or you don't have an interest in research, it might be tempting to skip this chapter. Some of it may be hard sledding. We urge you to bear with us. Don't let the technical terms or the details intimidate you.

Why should you, as a parent, care about the process of video game research? (Perhaps, as with sausage, you'd rather just consume the results than think about how it's made.) As you'll see in Chapter 8, academic studies turn into valuable ammunition in political battles on the local, state and national levels, with the fate of many tax dollars and careers at stake—not to mention policies designed to shape the behavior of game makers, game retailers, and your children.

Our goal for this chapter is not to bore you with an exhaustive analysis of research on media violence. It's to address one seemingly simple question that has some surprising answers:

Why Don't the "Experts" Agree?

You'd think that things would be clear-cut by now. After all, there are so many studies. Many of the conclusions bandied about sound pretty obvious. But that's not the case. Video game violence research is highly complex for a wide range of reasons. We'll

start to explore some of those in a few pages, but let's begin by examining a few of the conflicting claims.

> *These results clearly support the hypothesis that exposure to violent video games poses a public-health threat to children and youths [and] is positively associated with heightened levels of aggression in young adults and children, in experimental and nonexperimental designs, and in males and females.... In brief, every theoretical prediction derived from prior research and from GAM* [General Aggression Model] *was supported by the meta-analysis of currently available research on violent video games.*
>
> --Craig Anderson, Ph.D. and Brad Bushman, Ph.D.,
> Iowa State University[3]

> *I have read nearly all the published English-language research on electronic games, which includes video and computer games, CD-ROM and online games. Neither the quantity nor the quality of research on video games does much to inspire confidence in solid conclusions about their effects.*
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> *Nearly every study suffers from unclear definitions (of violence or aggression), ambiguous measurements (confusing aggressive play with aggressive behavior, or using questionable measures of aggression, such as blasts of noise or self-reports of prior aggression), and overgeneralizations from the data. Experiments that claim to study the effects of playing electronic games rarely study play at all.*
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> --Jeffrey Goldstein, Ph.D.,
> University of Utrecht (The Netherlands)[4]

> *If you scan the chronology of research, congressional debates and other documentation that has gone into attempting to deal with media violence since 1952, you should be outraged. How is it that millions of dollars and an uncountable number of hours and energy have been put to work against TV, movie, and video game violence for decades—and things have only gotten worse?*
>
> --Lt. Col. Dave Grossman and Gloria DeGaetano[5]

> *On balance, given that video game play is highly prevalent among children and adolescents in industrialized countries, there is little evidence that moderate frequency of play has serious acute adverse effects. Adverse effects, when they occur, tend to be relatively minor and temporary, resolving*

spontaneously with decreased frequency of play. More evidence is needed on excessive play and on defining what constitutes excess in the first place.

--Mark Griffiths, Ph.D.,

Nottingham Trent University (England)[6]

Those are pretty dramatic contrasts. How can these experts arrive at such different conclusions? Sometimes, it's a matter of timing. In 1999, when Grossman and DeGaetano published their book *Stop Teaching Our Kids to Kill: A Call to Action Against TV, Movie and Video Game Violence*, the available data on youth violence in America painted a grim picture. Keep in mind that government crime data are always a few years old. As we write this in mid-2007, the most recent data available are from 2004. When they were writing their book in the late 1990s, the most recent crime data available to them were from the early 1990s.

Using data supplied to the Federal Bureau of Investigation by local law enforcement agencies, the U.S. Office of Juvenile Justice and Delinquency Prevention reports that the rate of juvenile arrests increased in the late 1980s and peaked in 1994. This looked like an alarming trend. Media reports at the time were filled with speculation about a new breed of "super-predator" juvenile delinquents.

Meanwhile, in 1992, *Mortal Kombat* hit the video arcades with its over-the-top, blood-spewing "fatalities." According to Jeff Greeson, who manages a web site devoted to the game series, "*Mortal Kombat* not only stood out, it grabbed you by the shirt collar and demanded your attention. *Mortal Kombat* had the biggest and most realistic characters ever featured in a video game at that time. You were literally watching digitally animated photographs of people flying through the air and beating the living hell out of each other."[7]

By 1995, *Mortal Kombat 3* had invaded the home arena on multiple fronts, including the original Playstation, Sega Genesis, and Super Nintendo (SNES), along with other scary-sounding titles such as *Doom*. It seemed natural to connect the video game violence and the real-life violence.

But juvenile arrests declined in each of the next seven years. Between 1994 and 2001, arrests for murder, forcible rape, robbery and aggravated assaults fell 44%, resulting in the lowest juvenile arrest rate for violent crimes since 1983. Juvenile murder arrests reached a high of 3,790 in 1993. By 2004, arrests were down 71%, to 1,110.[8]

In retrospect, we can see what drove the increase in murders. We don't need to cast about for an explanation. In their 2006 report for the Office of Juvenile Justice and Delinquency Prevention, Howard N. Snyder and Melissa Sickmund of the National

Center for Juvenile Justice wrote, "Ninety percent of the overall increase was murders of nonfamily members committed by males with a firearm—generally a handgun.... Nearly three-quarters of the increase was the result of crimes committed by black and other minority males—and in two-thirds of these murders, the victims were minority males. The decline in murders by juveniles from 1994 to 2002 reversed the earlier increase."[9]

There's no evidence that black teens' use of violent media differed significantly from that of other young people, though there is ample evidence that *as a group*, they had and still have greater exposure to other risk factors for violence. For example, as of 2002, almost one-third of black Americans aged 17 and under were living in poverty.[10] African-American youth are also more likely to witness real-life violence.[11]

Changes in social priorities and ideas about crime also affected juvenile arrest rates in the early 1990s. Fears of youth violence led some communities to increase arrests for curfew violations; arrests for marijuana possession rose—although surveys did not show increased use. Acts of domestic violence were being redefined as criminal rather than family matters. Behavior once classified as a juvenile "status" offense might now lead to arrest for assault.[12]

For whatever reason, the various experts who cited the 1990s increase in crime as evidence of harm from media violence are not rushing to take back those statements in the face of reduced crime or the more direct explanations for the temporary rise. Nor are they addressing the dramatic growth in the popularity of video games, including violent video games, during the years when violent crime rates were plummeting.

Smoke and Mirrors

Some researchers have described what they call "instructive parallels" between the relationship of media violence to youth aggression and the relationship of smoking to lung cancer.[13] By using meta-analyses that pool the results of many different studies (more on that later), they conclude that the effect size (the strength of the relationship) of the violent media-aggression link is almost as big as the smoking-lung cancer link.

We agree that there are instructive parallels here. But they don't strengthen the case for media violence and aggression—they *undermine* it. Here's why:

- **Lung cancer was a rare disease** before cigarette smoking became common; now it's the leading cause of cancer deaths. Aggressive behavior was not rare before electronic media became popular.

- **Lung cancer rates increase as smoking rates go up**, and decrease as they go down. We can see this not only in the population as a whole, but among subgroups (men,

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women, rich, poor, East Coast, Midwest, and so forth). No matter how you look at the group, the more smoking, the more cancer. We see nothing like this relationship when we look at violent video games and such measures of real-world violence as violent crimes committed by minors.

- **There is a well-understood physiological mechanism** for how cigarette smoke triggers cancer. The process by which violence in media leads to real-life violence still inhabits the realm of speculation and ad-hoc theory.

- **There's a dose-response relationship** between smoking and lung cancer. Although it's mediated by genes and environmental factors (such as exposure to asbestos), in general the more a person smokes, the higher his or her risk of lung cancer. It's not clear whether greater exposure to violent video games (More hours of play? More years of play? Choosing games with more blood?) is related to greater effects on children. Our surveys of middle-school youth did find some interesting correlations, which we'll describe in the next chapter.

- **Lung cancer is a clearly defined set of diseases**; we know it when we see it, and experts pretty much agree on diagnostic methods and results. A pathologist looking at a cancer cell in Boston will almost always reach the same diagnosis as a pathologist looking at the same cell in Bangkok or in Barcelona. But experts definitely differ on how to define and "diagnose" aggressive or violent behavior, both in artificial (laboratory) settings, and by real kids on playgrounds or in classrooms.

- **The relationship of smoking to lung cancer is obviously a one-way street, with a clear direction of causality**. People who have cancer or a genetic predisposition for cancer are not more likely than other people to seek out cigarettes! But it's likely that children who are already more aggressive than their peers prefer and seek out violent media programs and games. It's possible that time spent with a violent game or movie could help shape or trigger aggressive impulses in aggressive children. Perhaps a high level of violent media consumption could be a marker for existing aggression.

- **Exposure to cigarette smoke is easy to observe, and can be measured in agreed-upon ways** (although it's tougher for second-hand smoke). "Exposure" to video game violence is subject to argument and difficult to measure. In some ways, measuring exposure to violent video games is easier than measuring exposure to TV violence; at least you know the child is paying attention when playing a video game. But in a television program or film, everyone who watches is exposed to the same

violence. In a video game, different players can be exposed to dramatically different amounts and types of violence even though they play the same number of hours.

- **The reliability (consistency) of measurement over time** is also different. Cancerous cells will still be present three hours later, while aggressive thoughts or behavior may have gone away.

- **We know that starting smoking at a young age increases the risk** of addiction, long-term use and cancer. We don't know if young people of a particular age are at higher risk from voluntary play of violent video games. For example, we might want to pay extra attention to the media use of young teens. Why? Because parents monitor them less closely than they watch younger children, just when their stage of emotional, social and brain development might make them more vulnerable to the influence of violent media.[14] [15]

My Way or the Highway

The wildly divergent opinions about video game violence may partially reflect professional training and background. Different researchers and theorists sometimes see things quite differently because of their experiences and perspectives. One of the challenges faced by our own highly diverse research team was keeping track of the different underlying assumptions our members had. We soon realized that when it comes to research design, psychologists think differently than public health people who think differently than biologists who think differently than psychiatrists. We had to get all of our assumptions and unconscious biases out on the table, argue a little, then draw on the best of our combined training to maximize the links between our research and the real world.

In 1995, Grossman wrote the book *On Killing: The Psychological Cost of Learning to Kill in War and Society*. It was based on his experience as an Army ranger and as a teacher at the U. S. Military Academy at West Point. He claimed direct connections between the training (in values and in methods of killing) that military recruits receive and what children experience through "shooter" video game play. He saw "point and shoot video games" as simulators for practicing murder. (We'll address the claim that children can literally learn to shoot from a video game in Chapter 8.)

Henry Jenkins, Ph.D., director of the Comparative Media Studies Program at the Massachusetts Institute of Technology, has published widely on the use of video games for education. He's skeptical of the assumptions that underlie the proposed link between playing violent video games and learning to become a killer:

Grossman's model only works if:

- *we remove training and education from a meaningful cultural context.*
- *we assume learners have no conscious goals and that they show no resistance to what they are being taught.*
- *we assume that they unwittingly apply what they learn in a fantasy environment to real world spaces.*

The military uses games as part of a specific curriculum, with clearly defined goals, in a context where students actively want to learn and have a need for the information being transmitted. There are consequences for not mastering those skills.[16]

Anderson and Bushman are experimental psychologists. In that role, they develop laboratory experiments that try to shed light on what's happening in the real world. When done well, such laboratory data can be extremely powerful, much as laboratory data using test tubes and Petri dishes can give us tremendous insights into biological processes that take place in living organisms. But for a laboratory experiment to provide useful information about the real world, the assumptions (model) the researchers use has to be clear, and has to make sense. Anderson and Bushman state:

It is important to note that real-world aggression measures (e.g., violent crime) share few surface features with laboratory aggression measures (e.g., delivery of electric shock). However, these aggression measures do share the conceptual features of delivering a noxious stimulus to a victim with the intent and expectation of harming the victim. [17]

That logic is highly strained. It doesn't differentiate between aggression and violence. It assumes that the subjects in these experiments—usually college students who participate to earn some spending money or to get extra credit for a class--cannot tell fantasy from reality, and don't know that "punishing" a person with a mild electric shock or a 9mm pistol will lead to different outcomes. Can someone who delivers a brief blast of noise really be said to have the same malicious intent as someone who shoots a convenience store clerk or stabs someone in a bar fight?

Consider the famous experiment[18] conducted in the early 1960s at Yale by Stanley Milgram, Ph.D. in which participants were duped into believing that they were delivering painful or even life-threatening electric shocks to a person they could hear but could not see. The participants typically showed symptoms of acute stress during these experiments—including profuse sweating, trembling and stuttering—things not seen in video game violence experimental research.

To understand other factors behind the standoff on video game violence effects, we need to take a closer look at the research process.

Designing A Video Game Violence Study: A Primer

In fairness, studying the influence of violent video games is much harder than it appears. What do researchers actually do to find out whether media violence makes kids aggressive? Let's walk step-by-step through some of the basic decisions and assumptions that scientists have to make when they design and carry out a study.

Whom will we study?

As we've seen, much of the fuss over video games has involved putative links to school shootings or other real-life violence. So, why don't researchers study teens or young adults who've committed or attempted murder? Here, we run into our first problem. Teenage murderers and rapists may have played Mature-rated video games but, as you'll see in Chapter 4, so have most of the law-abiding boys on your local middle-school soccer team.

Violent video game play is extremely common, and violent crime is relatively rare. This makes it tough to document whether and how violent video and computer games contribute to serious violence, such as criminal assault or murder. Criminals are also much more likely to have past exposure to other factors, such as poverty, alcoholism, family violence or parental neglect, that are known contributors to violent behavior.

There are also practical and ethical barriers. Most research conducted today that involves people must be approved by institutional review boards (IRBs), also called human subjects committees. To IRBs, prisoners are a "vulnerable population" because they are subject to coercion and control. Because of past research abuses, research subjects must be fully informed about the nature of the research and must feel free to decline to participate without fear of reprisal or loss of benefits. (In the best-known case of abuse, the Tuskegee Syphilis Study, participants were so shockingly exploited that the survivors received a Presidential apology in 1997.[19]) While studying felons is not impossible, getting a large and representative group to sign on would be very difficult.

What about just studying teenagers? There are lots of them around. The question then becomes, what kinds of kids do we include, and whom do we exclude? Do we want children who are at highest risk for aggression? If so, how will we identify them: A questionnaire? Interviews with teachers? Or, is there an age when children might be

most vulnerable to the effects of video game violence, so that we care most about studying that group's game play?

If we want the results of this study to help kids, and want that help to be effective and cost-efficient, it's important to focus on those children who are at the greatest risk. Violent games might be a bigger influence on children who lack the protection of a nurturing relationship with a caring adult, don't feel connected to a community, or are falling behind in school.

If we want to look at the effects of violent video games on young teenagers, does it makes sense to study a representative group of children under 17? Or, could we accurately extrapolate from results of studies on high-risk kids, or even studies of college students enrolled in Psychology 101? The latter group is a popular choice, because children under 18 are also considered a "vulnerable population" for research purposes.

Often, researchers are required to obtain a signed parent consent form for each participating child, plus a signed "assent" from the child. If you've ever helped round up signed permission forms for a class trip to the museum, you can imagine how much harder it is to get detailed research consent forms returned![*]

Since school is a primary gathering place for children, researchers often try to use schools as sources of research subjects. Principals and teachers can be less enthusiastic. With increased government mandates and testing, there is very little discretionary time in which to hand out questionnaires. They also dislike the disruption of routines, especially when there is no clear benefit to the school. In areas with many colleges and universities (such as the Boston area, where we work), many schools are overwhelmed with requests and are fed up.

Let's say that we successfully woo a principal, and gain access to a school. We send out the consent forms, and even with follow-up mailings or phone calls, only 40% come back with parent signatures. (That's not unusual.) How do we know whether the group of signed-up children is similar to the group whose parents declined or didn't bother to fill in the form? Is their video game use the same? What about their household

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[*]Because we conducted our research under the auspices of the IRB at Massachusetts General Hospital, we were required to use the hospital's standard "informed consent" form, which covers all of its highly diverse research—most of which involves drug trials or new medical and surgical procedures. Consequently, even though we were only talking to people in an office, we were obligated to tell the participants in our focus groups that if they suffered any side effects from our conversations, they should immediately go to the nearest hospital emergency room!

income, their cultural or ethnic background, their academic achievement, parental supervision of their game play, or any number of other factors that might affect the link between violent video games and aggressive behavior? This creates a problem with "generalizing" the results of our study to the overall population of children.

Another problem with studying children is: they're kids. They don't read and write as well as adults do. They get bored and make things up. They have trouble remembering or estimating potentially important things, such as how many hours they play video games during a typical week. At what age can kids be expected to fill out questionnaires, or give accurate responses? Can older kids accurately recall what they did not only last week, but what they did a few years earlier?

As you can see, there are many possible answers just to the question of whom to study. Researchers make different choices based on what they want to find out (their "research question")—and frankly, on whom they can get to sign up. In the real world, time and resources are limited, and we sometimes have to make the best of things. However, researchers who study different populations may end up with divergent or even contradictory results. Studies that try to combine the results of many small studies on very diverse groups (e.g., 10-year-olds in Belgium, college undergraduates in Minnesota, and urban 16-year-olds who played arcade games in 1987) should be taken with a grain—make that a lump—of salt.

What type of study? It depends on the question

The design of a research study has a profound effect on what its findings can (and cannot) demonstrate. Here are three of the most common designs for research on the effects of violent media:

1. **A cross-sectional study**. This involves looking at behaviors at a particular point in time, or during a relatively short period of time. We might find, for example, that children who report playing a particular type of violent video game, or who play for significantly more hours per day than their peers, are more likely to have lower grades in school. One problem with these studies is that the data only show correlations; we can't say that violent video game play *causes* poor grades, that frustration at school leads to more violent game play, or that a third factor causes them both. We simply don't know.

2. **A longitudinal study**. This type of study measures children's video game play multiple times, over a long period of time. Some longitudinal studies in other fields have gone on for a half-century or longer. As you can imagine,

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these are extremely expensive to run. They also tend to involve smaller samples of participants, some of whom will probably drop out or move away before the study ends. Also, by the time you finish your study, social or technological changes may make your findings irrelevant. The graphics and plotlines of 1980s arcade-based games as *Pac-Man* and the original *Mortal Kombat* bear little resemblance to the home-based violent video games of today. In a few years, games with holographic images and full-body interactivity could make today's studies less relevant.

3. **Laboratory experiments**, such as pre/post experimental studies. This is the most common type of study done in this field. Participants play a game in a controlled situation, which can range from a spare room in an after-school program to inside an fMRI machine at a neuroimaging center. After being exposed to the video games, researchers measure some sort of behavior or physiological response, either immediately or after a delay. They look for relationships between the exposure (say, to a violent game versus a nonviolent game) and the behavior or response.

Because laboratory experiments are, by definition, carried out in controlled environments, one has to be careful about making the leap not only from correlation to causation (e.g., exposure to video games cause participants to feel more aggressive), but from the laboratory to the real world (e.g., that a 0.1-second difference in the length of an air horn blast immediately after playing means that this person is more likely to behave violently after playing a violent video game at home).

Video game violence: How much, and what kind?

Now that we've chosen a group to study, how will we measure whether, and how much, our group is exposed to video game violence? Suppose we've settled on a cross-sectional study of real children or adolescents. We might ask them (or their parents) about games they play a lot, or their favorite games. We could give them diaries and ask them to record what they play, and how long, every day for a week. We could watch them play (live or on videotape) and count how many murders of human-like characters they see per hour of game play. We could go to kids' homes, and look at the number or proportion of game cartridges and disks that are rated Teen or Mature.

Each method has pros and cons, and requires a set of additional decisions. For example, if we count game cartridges: Do we only include those played within the last month? Six months? At least once a week, or for at least an hour per week? What about rented games, or games played at friends' houses?

Another complication is that, unlike movies, video game play is nonlinear; each child who plays follows a somewhat different sequence. And the more flexible play a game allows, the more variation in exposure to violence there will be. For example, in *Grand Theft Auto: Vice City*, you can make Tommy Vercetti rampage through the city in ugly plaid golf pants, literally chainsawing through everyone in his path; or, he can peacefully deliver pizzas. In this case, a child's game play would need to be observed for hours to get a sense of how much vicarious violence he or she was experiencing.

One might use ESRB ratings or content descriptors to assess levels of game violence. (Our surveys used a variation of this method.) But there is some debate about the accuracy of ESRB ratings, including how violence is defined and labeled. In a study of violent content in E-rated games,[20] researchers Kimberly Thompson, Sc.D. and Kevin Haninger, Ph.D. chose not to count routine aggressive behavior in sports games—such as tackling in football or checking in hockey—as violent, because there is no real intent to harm. As you'll see in Chapter 7, parents in our focus groups shared this view. They also would probably agree with the researchers' definition of violence as "acts in which the aggressor causes or attempts to cause physical injury or death to another character."

Interestingly, the definition of "characters" is where these researchers and our parents of preteens part company. The parents were bothered by violence against realistic human or at least humanoid characters. Thompson and Haninger "defined characters broadly, including personified objects that attacked either the player or other characters." Using this definition, one of the study's most violent games, in terms of percentage of screen time (72%), was *Kirby 64: The Crystal Shards*. Kirby is a smiling pink

puffball who inhabits a number of Nintendo games. We have a hard time picturing Kirby as a violent role model.

Of course, parents of young children may be more concerned about animated violence, and researchers have every right to define terms as they see fit. Sources of honest disagreement would be easier to spot if all researchers explained their assumptions and methods as clearly as in this study.

Also, how much violence is too much? If we assume that any and all exposure to violent games is harmful, we end up treating the majority of preteens and teens as abnormal. This doesn't make sense. As Griffiths noted above, "More evidence is needed on excessive play—and on defining what constitutes excess in the first place."[21] We need to know what "normal" is so that we can meaningfully measure behaviors against it.

Finally, as you'll see in Chapter 5, not all violence appears to have equal effects on game players' thoughts, feelings and behaviors.

A Rose by Any Other Name?

A key part of any research design is establishing what's known as "validity." In other words, are you really measuring what you think you're measuring? This can be tricky.

Let's begin by looking at some famous longitudinal studies. Because video games are a relatively new medium, researchers looking for evidence about their long-term effects often point to well-known studies of TV violence. One such study[22] followed children from northern New York state for 17 years, and found that young teens (and young adults) who watched three or more hours of television a day were later involved in more fights, robbery, and aggressive acts in general.

However, the researchers didn't bother to measure what these children watched on TV. They assumed all content was basically the same. After all, as they pointed out, "violent acts are depicted frequently on television."

They also noted that "childhood neglect, growing up in an unsafe neighborhood, low family income, low parental education, and psychiatric disorders were significantly associated with time spent watching television at mean age 14 and aggressive acts at mean age 16 or 22." Even though researchers tried to account for these factors in their analyses, it's not at all obvious that more time with television causes more aggressive behavior. It's just as plausible that heavy TV-watching represents a poverty of options— no safe places to play outside, poorer social skills, or no access to social, intellectual or artistic activities that support healthy development.

A study of Chicago grade-schoolers[23] found that watching violent shows and identifying with aggressive characters was linked to aggressive behavior 15 years later. Researchers asked children to choose their favorites from lists of popular programs, and whether they watched these shows "every time it's on", "a lot but not always," or "once in a while."

Two raters coded the amount of physical violence in each show on a five-point scale from "no violence" to "very violent," based on "visually depicted, interpersonal acts that were intended to harm." Nature-show violence was excluded. The examples of "very violent" programs listed by the researchers were *Starsky & Hutch*, *The Six Million Dollar Man*, and *Road Runner* cartoons. (This is a great example of how changing social standards make longitudinal studies so chancy. When we describe this study in presentations, it always gets a laugh.)

Children were also asked about how much they acted like particular male or female "aggressive characters" such as *The Bionic Woman* or *The Six-Million-Dollar Man*. It's unclear why kids were not supposed to identify with these heroic figures: a tennis pro and an astronaut who overcome catastrophic injuries and pursue assorted bad guys and spies.

Measuring exposure to game violence in laboratory studies has a completely different set of challenges. If the study will compare reactions to a violent game versus a nonviolent game, how do we choose appropriate games for our tests? In some studies, an action-packed violent game goes head-to-head against a tranquil nonviolent game. In one case, researchers compared *Wolfenstein 3D* (which involves killing Nazis in the corridors of a fortress prison) to *Myst* (a surreal puzzle-solving and exploration game) on the basis that both involved a "3-D walk-through format."[24] For these comparisons to make sense, games need comparable levels of emotional excitement and physiological arousal.

In this study of college students, as in many similar studies, play times were extremely short. Participants were seated at a computer, read an instruction sheet, played for 15 minutes—then completed a questionnaire on how they were feeling. As those of us who've struggled to survive even a few minutes in an unfamiliar game can attest, any increase in hostility or anger could easily be due to frustration over trying to learn a new game so quickly! Also, this experience is far removed from that of a typical child who plays self-selected games in a familiar environment, perhaps with friends,

over a long period of time. There's also the issue of whether we can accurately extrapolate from college students to young teenagers.

What is this thing called "aggression"—and how do we measure it?

If we're going to study aggression, we need to know it when we see it. "Violence" is somewhat easier: a person or thing gets physically attacked with the intent to injure or break it. But the definition of aggression can be surprisingly slippery, and is another factor behind the warring interpretations of video game research.

Some researchers use "aggression" and "violence" almost interchangeably, implying that one inevitably leads to the other. That's simply not true. A common definition of aggression as used by psychologists is, "behavior leading to self-assertion; it may arise from innate drives and/or a response to frustration, and may be manifested by destructive and attacking behavior, by hostility and obstructionism, or by self-expressive drive to mastery."[25] As you can see, some behaviors can be aggressive but not violent.

For most media violence studies, some aspect of aggression is the "outcome" that's measured. A classic example is the 1960s experimental studies by Albert Bandura, Ph.D. of Stanford University on young children's imitation of aggression.[26] He used what are known as Bobo dolls—inflatable plastic clowns several feet tall that have a weighted round bottom. If you hit or push the top, the doll topples over and then springs back up.

Children watched an adult (on film) either attacking a Bobo doll (punching it or hitting it with a mallet) or playing quietly with other toys while ignoring the Bobo doll. Children were more likely to attack the doll when they saw that behavior modeled by an adult. (One problem with this study is that there's not much you can do with a big inflatable Bobo doll other than punch it and watch it bounce back!)

Some of the most-publicized experimental studies done by other researchers use a "noise blast" as a stand-in for aggressive behavior. As one study[27] describes it, "The participant's goal is to push a button faster than his or her [nonexistent] opponent. If participants lose this race, they receive a noise blast at a level supposedly set by the opponent (actually set by the computer)." The study participants, in turn, are told to set a loudness level for the noise that their opponent will hear if he or she loses. "Aggression is operationally defined as the intensity and duration of noise blasts the participant chooses to the deliver to the opponent." This is basically white noise, the "whishing" sound you hear between channels when tuning a radio. The test is an adaptation of an earlier measure that used electric shocks instead of sound.

Christopher J. Ferguson, Ph.D., at the Department of Behavioral, Applied Sciences and Criminal Justice at Texas A&M International University, takes issue with the noise blast test:

> *Most people outside of research associate aggression with physically trying to hurt someone. Whether the noise blast corresponds with anything like that is very debatable. My guess is that it's actually a better measure of competitiveness, which is right in the name: the Taylor Competitive Reaction Time test. In my opinion, it's a far cry from beating someone to death, or even spanking or slapping someone, because it's not that aversive.*

In science, new measures are supposed to be "validated," or proven to represent something in the real world. For example, if we developed a new questionnaire or physical test to screen for depression, we would need to show that the test scores of people who'd been formally diagnosed with depression were different from the scores of people known not to be depressed. At minimum, we'd need to compare our test results to some existing validated questionnaire. But the "noise blast" test has never been validated as a measure of aggression. Without such validation, we are simply asked to accept someone else's belief that the test means what is being claimed.

As Ferguson points out,

> *The test ranges from zero to ten. But it's not, "If you score above seven you're a violent individual, below seven you're in the normal range, and below three you're a pacifist." Say that study Group A gets a 5, and Group B gets a 5.4. Does that mean that Group B is ready to go out and riot? No. Nobody knows what* any *of these scores mean. I think the noise blast test could be salvageable if put into a standardized, reliable format and subjected to rigorous testing.*

As we write this, Ferguson is undertaking studies to try to validate the noise blast test.

Some real-world studies, especially of younger children, look at aggressive behavior on the playground after exposure to violent games or cartoons. But is this really unhealthy, potentially dangerous aggression, or is it normal rough-and-tumble play?

Michael Jellinek, M.D., is a professor of pediatrics and psychiatry at Harvard Medical School, the chief of child and adolescent psychiatry at Massachusetts General Hospital, and the president of Newton-Wellesley Hospital. He points out:

> *A normal kid in the playground who's playing army or spaceman, and pushing his friend or trying to vaporize him but never hurting him—that's*

normal, healthy fantasy play. It's totally consistent with the biological nature of 10-year-old boys.

Another problem is that today's aggressive first-grader may be tomorrow's thoughtful teen. According to the Surgeon General's 2001 report on youth violence,[28] most children who are aggressive or engage in antisocial behavior *do not* grow up to be violent adolescents or adults—and most violent adolescents were not notably aggressive as children.

Finally, how do we know whether kids with different personalities or behavioral styles respond differently to the same video games? What about how they're feeling just before they start to play? Several Australian researchers looked at those issues with respect to anger, which they saw as related to aggression and violent behavior:

The results demonstrated that some people increase, some decrease and the majority saw no change in anger ratings. Unlike past research, we also demonstrate that these changes are mediated by the player's feelings immediately prior to game play and a labile temperament—one predisposed to aggression….[29]

Do the results matter?

So, we've measured changes in aggressive behavior, mood, or attitudes. How do we decide whether exposure to media violence has made a difference? Also, what's the effect size? That is, how much of a difference does what you're measuring really make?

For Ferguson, this is a sore point when he sees experimental results described on television and in newspaper stories:

When these things get reported to the general public, there's no discussion of what an effect size is and what it means. It's "Study A shows a relationship between video games and aggression." And people think that's a very conclusive, important finding. But when you look at the effect size, sometimes it's near zero.

For example, twin studies of antisocial or violent behavior find that about 50% of the variation [the R-squared effect size] is due to genetics. That's a pretty powerful effect. By comparison, the R-squared effect size for media violence—including television—ranges anywhere from one percent to nine percent. So you're getting anywhere from one fifth to one fiftieth the bang for the buck you'd get from a genetic effect.

If you were four percent more aggressive today than yesterday, could anybody tell the difference?

Most important: Does the new study help parents recognize whether their child is at risk of, or already has, problems related to violent video games? Academic research on video game effects is not geared to the needs of parents. You can't scan your child's brain at home, even if anything meaningful could be found that way. Parents need markers that they can observe, and specific things they can do to prevent problems or catch them early.

One could make the argument, as Anderson does, that small effect sizes can be significant because of the overall, long-term exposure:

> If youths spent only a little time playing violent video games (e.g., less than 30 minutes per week), or if only a few youths spent a lot of time playing such games (e.g., 1 in 10,000), then the overall cost to society would likely be fairly small. But…a lot of youths are playing violent video games for many hours per week. When large numbers of youths (including young adults) are exposed to many hours of media violence (including violent video games), even a small effect can have extremely large societal consequences.[30]

It's absolutely true that across a population, small things can add up to a big difference. Consider salt intake and cardiovascular disease, for example. But we don't assume that all people are equally affected by a medical risk, and that the same remedy is good for all. Some people are not salt sensitive, and would give up better-tasting food for no benefit; others might be healthier with a little extra salt. One glaring problem with most studies of violent game effects is their failure to consider which groups are at most risk and should therefore lower or monitor their time spent playing games, which groups are probably at little or no risk (at least with moderate use), and whether any groups might even benefit from a little downtime with a joystick.

Violent Video Games and the History of the Bathtub

Now there's an odd juxtaposition! But it's relevant as a cautionary tale when you hear published research results being bandied about. One of the most important skills you can use as both a scientist and as a parent is skepticism.

During World War I, the eminent journalist H. L. Mencken wrote an article in the *New York Evening Mail* that purported to give a history of the bathtub. It was a joke, designed to provide his readers with some respite from the awful news of the day. Mencken later described his article as "a tissue of absurdities, all of them deliberate and most of them

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obvious."[31] These included descriptions of physicians calling the bathtub dangerous, and laws passed against it in Massachusetts and Pennsylvania.

His essay struck a chord. It was reprinted in newspapers across the country. Then Mencken started noticing something strange. His intentionally absurd claims were being quoted in reputable publications as undisputed facts. "They began to be cited by medical men as proof of the progress of public hygiene. They got into learned journals. They were alluded to on the floor of Congress…. Finally, I began to find them in standard works of reference. Today, I believe, they are accepted as gospel everywhere on earth. To question them becomes as hazardous as to question the Norman invasion."[32]

Take another look at the quote at the beginning of this chapter, the one about the "3500 published research studies." It doesn't make any sense. But it's cited all the time. Where did that number come from? We decided to trace it back as far as we could.

The list of citations at the end of the American Academy of Pediatrics policy statement gives the book *Stop Teaching Our Kids to Kill* as the source. That book, in turn, lists a 1998 article published in Sweden by the United Nations Educational, Scientific and Cultural Organization (UNESCO), which states, "Over the past forty plus years more than 3,500 research studies on the effects of television violence on viewers have been conducted in the United States…."[33] There is no information given about how the authors arrived at that number.

In all fairness, we should point out that the media researchers in the next quote who claim that "there are probably fewer than 300 empirical studies that try to measure the effects of violent media," don't demonstrate how they came up with that number, either. But it sounds much more logical.

Not All Studies Are Created Equal

There are even fewer studies about the effects of violent video games on aggression. In a 2001 review, John L. Sherry, Ph.D. of Purdue University found "32 independent studies in which violent video game play was the independent variable and some measure of aggression was the dependent variable."[34] He concluded that

"There is a small effect of video game play on aggression, and the effect is smaller than [that of] violent television."

In a separate review published the same year, Anderson and Bushman found 35 reports (some with multiple studies) in a psychology research database.[35] Their analysis included many of the same studies used by Sherry. Yet their conclusion was different: "These results clearly support the hypothesis that exposure to violent video games poses a public health threat to children and youths."

We decided to take a closer look at the studies reviewed by Anderson and Bushman. Unusually, there is no listing of these studies in their paper; instead, the reader is directed to a Web site. We reviewed the list, and tracked down full-text copies of as many of those studies as we could.

Of the 21 experimental and 13 correlational studies included, about one-third are dissertations or other unpublished research, making descriptions difficult to obtain. Across the peer-reviewed correlational studies, subjects and measures varied widely. Many focused on time spent playing games and did not ask about content; those few that did ask about content used vague measures such as a stated preference for aggressive games. Outcomes had little to do with real-world aggressive behavior (perhaps the closest being teacher observations of free play). Some studies were from the 1980s, when children still primarily played video games in arcades. Study samples were small. (The largest is a survey of 278 Dutch children.) There is little or no information on response rates or other means to assess the characteristics or the representativeness of the samples. (One sample included students at a high school for "disturbed young people.") The study that came closest to looking at effects of violent games on children's aggressive behavior (a British study of 204 students aged 12 to 14) found that "aggression scores were not related to the number of games with aggressive content [children] named among three favourite games." [36]

As we said at the start of this chapter, this is not an exhaustive review of research on video game violence, but an attempt to examine why experts disagree about its effects. However, it seems clear that despite the worrisome conclusions that appear in the popular press, there are very few studies involving current violent video games and real children.

Statistical Significance vs. Real-World Significance

The term "statistical significance" refers to the odds against something occurring simply by chance. Let's say that you claim that you have supernatural powers and can use them to blindly select an ace from a full deck of cards. You know this because you tried it once, and picked an ace.

How could we decide whether your supernatural powers are real? Let's leave aside issues of research design such as making sure that you agree on what an ace is, the cards are adequately and randomly shuffled, and you're guaranteeing that no one is cheating, and focus on interpreting the results.

In a standard deck, four of the 52 cards (1 in 13) are aces. That means that you'd choose an ace, on average, one out of every 13 tries simply as a matter of chance. But what if you were able to select two aces in a row? Would that prove that you have supernatural powers? What if you did it twice, then failed the next 28 times, and you then were successful again?

Statisticians can look at those different success rates and calculate the odds that the results are occurring simply by chance. That's what a test of statistical significance is. It's usually expressed as a probability or "p value." If the difference between your actual performance (you selected 3 aces out of 31 tries) and your expected performance that's attributable to chance or dumb luck (you select 3 aces out of 39 tries—1 in 13) is described as significant at the $p<.05$ level, that means that there's less than a five percent chance that you've simply been lucky. If it's significant at the $p<.01$ level, then the odds that it's a fluke are less than 1 in 100.

There are two technical things to keep in mind here. The first is that the more people you're dealing with—that is, the larger the sample size—the more you should be looking for higher levels of significance. For example, in our survey of over 1200 teenagers, we didn't focus on findings at the $p<.05$ level; we looked for findings at the $p<.01$ or $p<.001$ levels before we paid serious attention to them.

> Also, some statistically significant differences may be mathematically sound, but irrelevant to the real world. For example, an experimental study may find small but consistent differences in the heart rates of game players exposed to violent vs. nonviolent games. The findings may be significant at the p<.05 or even the p<.01 levels. But that doesn't mean that those differences actually make a difference in predicting a person's future or even immediate behavior.

Meta-analyses and the "file drawer problem"

The two research reviews mentioned above used a statistical method called "meta-analysis." It is a very powerful and respected technique when used as intended, gleaning important information through synthesizing studies that are too small or otherwise problematic to rely on individually (such as studies of the best drug treatment for a particular heart problem, or among people of a certain age group). But as one how-to article on meta-analysis puts it, "Even though the statistics used in meta-analysis are quite sophisticated, the end product will never be better than the individual studies that make up the meta-analysis."[37] In other words: garbage in, garbage out.

Goldstein raises another important issue that affects meta-analyses: the "file drawer problem:"

> *Published research in scholarly journals does not represent all the research on electronic games. Studies that fail to find statistically significant results are less likely to be accepted for publication. So the published record is an unknown fraction of all research, and it tends to consist of those studies with statistically significant results. This is known as the "file drawer problem" because studies that do not find any effects of video games remain unpublished, locked away in the researcher's files.*[38]

The file drawer problem is an open secret among academic researchers. The editors of academic journals generally think that positive results are more interesting, and more likely to be cited by future researchers, which is one measure of a journal's influence and prestige. They're more likely to publish research that finds a relationship or a significant difference between two things than a study that shows no relationship. If findings don't fit the hypothesized results, researchers may assume their study was somehow flawed in methods or analyses, and keep trying for a more acceptable outcome. Or they may simply decide to bury undesired or embarrassing results.

The existence or extent of publication bias in a given body of research can be estimated using advanced statistical methods. In a recent meta-analysis,[39] Ferguson found a pattern of missing studies, particularly for experimental studies of aggressive behavior, and non-experimental studies of aggressive behavior and thoughts.

> *The problem is this focus on statistical significance testing—this sort of black-and-white, either-you-have-it-or-you-don't kind of thing. You get these tiny, tiny little effects that become statistically significant the bigger your sample size is. But how meaningful are those results?*

Our point is simply this: Be skeptical of claims about violent video games. You don't need a degree in statistics to judge research for yourself. When you hear about a new study that "proves" the link between video games and aggressive or violent kids, ask yourself:

- Whom did they actually study?
- How did they define "violence" in video games or television programs?
- How did they measure exposure to video game violence?
- How did they define "aggression"? What did they use as a measure of aggression? How do they justify the relationship of this measure to real-world aggression or violence?
- Does that measure pass the common sense test?

In the next chapter, we'll describe some findings from our own research, and what they mean to you as a parent. We urge you to apply these questions to our research as well.

Justified Violence

Imagine the following gruesome plot: A mob rapes and beats a concubine all night. They leave her bloodied corpse on a doorstep to be discovered in the morning. Her master takes her home, carves her body into 12 pieces, and incites another mob to seek revenge. They do, killing tens of thousands of men, women, children and animals, and destroying a city.

It sounds a bit like a violent video game. It's not; it's a story from an obscure passage in the Bible (*Book of Judges, Chapters 19-21*) that was used in two interesting studies of the influence of religious beliefs and attributions on responses to violent media. Half the participants who read the passage were told of its Biblical origins. The other participants were

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told that the text was from an ancient scroll. In each group, half were given a version that included two sentences from the original text in which God commands the mob to undertake the violent retaliation; the version that the other half read did not include the commands from God.

In the first study, the participants were students at Brigham Young University, of whom 99 percent said that they believed in God and in the Bible (the religious group). In the second study, they were students at Vrije Universiteit in Amsterdam, of whom 50 percent said that they believed in God, and 27 percent said that they believed in the Bible (the non-religious group).

The researchers measured differences in the intensities of noise blasts on a competitive test conducted immediately after reading the material. (Note that this design suffers from the same weaknesses as other research using these noise blasts as stand-ins for violent behavior, as we described above. It also only measured immediate effects, not long-term effects.)

They summarize their research results: "We found compelling evidence that exposure to a scriptural depiction of violence or to violence authorized by deity can cause readers to behave more aggressively…. Aggressive responses were greater when a violent depiction was attributed to a scriptural source than when it was attributed to an ancient scroll and were also greater when the violence was said to be sanctioned by God than when God was not mentioned…. Even among our participants who were not religiously devout, exposure to God-sanctioned violence increased subsequent aggression. That the effect was found in such a sample may attest to the insidious power of exposure to literary scriptural violence." [40]

We should note that the lead author of this research article, Brad Bushman, Ph.D., is well known for his research on the potentially harmful effects of video games, and we commend him for exploring this "politically incorrect" topic. But we also note that in their conclusion, the researchers offer advice that is quite different from that offered by many video game researchers, including Bushman, who found less-compelling results when measuring the effects of that medium.

"Does this ultimately mean that one should avoid reading religious canon for fear that the violent episodes contained therein will

cause one to become more aggressive, or that individuals who read the scriptures will become aggressive? Not necessarily. Violent stories that teach moral lessons or that are balanced with descriptions of victims' suffering or the aggressor's remorse can teach important lessons and have legitimate artistic merit."[41]

Unfortunately, the story they used in their experiments does not teach any moral lessons. (To the contrary, the full text describes murder, capturing women as slaves, and ways to get around promises that you've made.) There is very little description of the victims' suffering aside from the insult felt by the master of the concubine. Nor is there much remorse for their acts of genocide. So it's difficult to see what important pro-social lessons are being taught.

The authors tie this finding to the behavior of contemporary terrorists who are religious fundamentalists, stating that reading selected violent scriptures might partially account for their behaviors. In essence, they say that this type of violent religious story will have a good effect on most people, but a bad effect on a population that's at greater risk of violent behavior due to other causes. But video game opponents argue the opposite when it comes to that technology: the games are dangerous because their influence over real-world aggression and violence extends to a broad range of people.

What's sauce for the goose should be sauce for the gander.

For more on the book, go to <http://www.grandtheftchildhood.com>

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