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Desensitization

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Media use and violent media effects

With the rise of instant access to media and the media industry as a whole continuing to grow, questions surrounding its impact on our mental health and behavior have become even more pertinent as media have continued to become one of the most dominant forces in our lives. The average American adult spends around 11 hours per day on media consumption (this is including simultaneous usage, such as looking at your phone while watching TV or listening to music while working out [Nielsen, 2018]), and the advent of personal computers, cell phones, and the expansion of media as a consumer market has allowed media use and consumption to become more internalized and personal. This pervasiveness of media in our lives cannot be overstated and has been a major focus of behavioral research for some time.

With this prevalence of media also comes a trend in violent media creation and consumption. Even accounting for age rating and type of content, analyses indicate that violence is one of the most common themes in media directed at (and consumed by) all ages, from early childhood throughout adulthood. One study found that for the TV shows most commonly watched at the time, there are about 42–43 acts of aggression depicted per hour, and further research in video games shows that at least 98% of games with “M” ratings (equivalent to an “R” rating for film) contain violence, while 97% of “T” (teen = PG–13) and 64% of “E” (everyone = G) games do as well (Busching, Allen, & Anderson, 2016).

The history of research into violent media effects is long and contentious (Busching et al., 2016), mainly because of resistance to the established scientific findings. A clear picture has emerged from over six decades of research that exposure to violent media

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affects numerous psychological variables including increased aggression and impulsivity, increased aggressive thinking and feeling, as well as decreased attention skills, empathy, academic performance, and prosocial behavior (American Psychological Association [APA], 2015; Anderson et al., 2010; Busching et al., 2016; Krahe, Möller, Huesmann, Kirwil, Felber, & Berger, 2011).

When we talk about media violence, the standard definition researchers work with is, “any media depiction of intentional attempts by individuals to inflict harm on others” (Busching et al., 2016, p. 2). Therefore, violent depictions in media are not limited to human interactions, but any intentional interaction between characters who can be nonhuman as well. With this in mind, anything from *Die Hard* (dir. John McTiernan, 1988) to Super Mario Brothers (Nintendo, 1985) can, and does, depict violent and aggressive behaviors, and how much blood and gore depicted does not relate in any way to this definition of media violence.

Studies of violent media effects on aggression define perhaps one of the most robust fields of research on media effects on humans. Researchers have concluded numerous times that violent media exposure does increase aggressive behavior and other aggression-related outcomes (for a listing of, and links to, statements by major scientific societies on this topic see Anderson, n.d.). Numerous hypotheses have been tested to explain this effect. The bio-social-cognitive model known as the general aggression model (Anderson & Bushman, 2018) is perhaps the most frequently used model in recent years, especially for discussion of how media violence increases aggressive behavior. However, other models are useful adjuncts for other specific psychological effects of electronic media, for example structural properties of media such as sound, lighting, use of special effects, the ability to fix attention/causing ADHD behaviors to other effects such as individual disposition, social cognitive theory, and transportation theory (Busching et al., 2016).

Moreover, when we discuss these effects on aggressive cognition, there are a couple of primary pathways to address when we look at just how media affect aggressive behavior. For short-term aggressive effects (i.e., immediate responses to a violent media stimuli) the three central pathways are: (i) priming (thoughts, feelings, and memories are tied together by associated networks, and once activated, these networks are more readily available [Anderson & Bushman, 2018]), (ii) mimicry (mimicking behaviors we observe), and (iii) arousal (violent depictions often elicit increased heart rate, blood pressure, and releases of testosterone [Anderson & Bushman, 2018]). For long-term effects (which warrant more experimental research, especially for making casual interpretations to things like criminal behavior [APA, 2015]) these paths are: (i) observational learning (we pick up behaviors by observing others) and (ii) desensitization (exposure leads to diminished reactions to stimuli).

Desensitization

What do we mean?

When discussing the effects of desensitization through media, it is important to note the different ways in which different people discuss this topic. There are a couple of

different definitions that people use when they talk about “desensitization.” The term, as Carnagey and colleagues (2007) wrote, has been used to refer to: (i) increases in aggressive behavior, (ii) reducing the physiological arousal to real-life violence, (iii) the “flattening of affective reactions to violence,” (iv) decreasing the sense of responsibility to help a victim of violence, (v) decreased feelings of sympathy and empathy for victims of violence (including judgment of a victim’s injuries), and (vi) a reduction in the perceived guilt of a violence perpetrator (including reduction in a sentence or suggested sentence for a convicted violent offender).

For this discussion, we will use the definition outlined by Carnagey and colleagues (2007) that desensitization to violence is “a reduction in emotion-related physiological reactivity to violence” (p. 490). This fits well with the definition given at the beginning of this entry and lends itself well to the definitions used by other fields. Carnagey and colleagues (2007) proposed a model in which we can view how desensitization occurs, and the effects that it has, as well as two potential outcomes (decreased helping and increased aggression).

Origins

As mentioned earlier, desensitization research began in the clinical psychology field by looking into procedures intended to reduce unwanted overreactions to fear or anxiety-provoking stimuli (Carnagey et al., 2007), a process sometimes known as *systematic desensitization*. This has been used to successfully treat fear of such things as spiders, snakes, and blood. Additionally, exposure therapies have been used to treat other anxiety-based disorders such as PTSD, rape trauma, and nightmares. There is also evidence that the U.S. military has used video games as a tool for desensitizing soldiers to violence. Additionally, armies have been giving soldiers virtual environments to train with and by constructing realistic environments using hardware and software commercially available from the major video game companies. The same sort of training has been used for doctors and surgeons, not only to train them in giving specific procedures, but to get them used to the visuals of performing surgery and working in a hospital.

Figure 1 illustrates key distinctions among several commonly confused concepts, including procedures used to accomplish desensitization, versus the desensitization effect itself, versus the cognitive and affective consequences of the desensitization effect, and finally the behavioral outcomes that eventually result from the cognitive and affective outcomes. Figure 1 does this in the context of media violence, though the same critical distinctions exist in all domains of desensitization. In snake phobics, for example, successful application of systematic desensitization procedures (such as those that use Bandura’s observational modeling with mastery experiences) reduce automatic fear/anxiety reactions to snakes and to environments in which snakes may be found (e.g., grass lawns, parks, woods). This leads to a number of cognitive and affective outcomes which in turn enable the person to enjoy picnics, walks in the woods, and so on.

Desensitization in this sense can be adaptive, and most likely is an evolutionary mechanism to help us deal with anxiety-producing stimuli that are repeatedly-encountered (Carnagey et al., 2007). For soldiers, surgeons, or merely those suffering

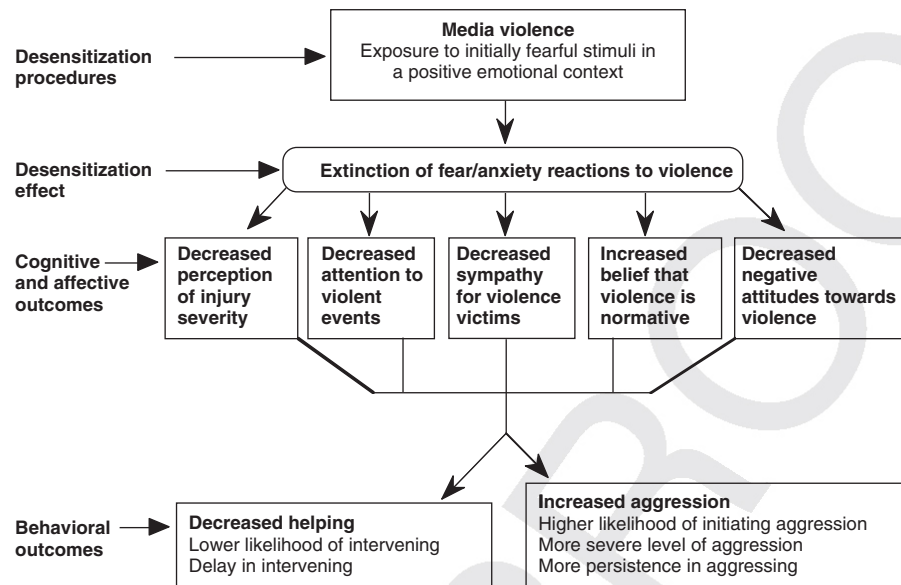


Figure 1 Media violence desensitization processes: Integration of systematic desensitization, helping, and aggression models. Source: adapted from Carnagey et al. (2007) and Bushman and Anderson (2009) with permission of Elsevier.

from general anxiety, various types of exposure therapy can be very useful tools that help people adapt to and overcome those fears. This can either help them become effective in their work (such as being a soldier or a surgeon) or function as a member of society (if you are suffering from a severe anxiety disorder or various incapacitating phobias).

Being desensitized is maladaptive when certain stimuli that should be provocative and jarring fail to have these desired protective effects. If one becomes desensitized to images or depictions of violence, they may be more willing to engage in violent acts, not recognize violent acts, or fail to intervene when such acts occur. Additionally, they may have less empathy for those who suffer from violent acts.

Physiological effects

Early research on exposure to violent media found that exposure to violent media content can cause participants to have strong negative emotional reactions such as fear and disgust (Carnagey et al., 2007). Thus, early hypotheses about desensitization were that these responses, and the underlying physiological effects, would diminish due to certain types of exposure.

We know that some of the brain regions that activate responses to violent content include (but are not limited to) the amygdala, hippocampus, thalamus, and cingulate gyrus (see for a more detailed review on some of these effects and others from desensitization Bartholow & Hummer, 2014). For instance, the amygdala is related to the processing of fear-related responses and one study (Weber, Ritterfeld, & Mathiak, 2006)

showed that committing violent acts in a video game (such as shooting other characters) yielded lower levels of amygdala activity (Bartholow & Hummer, 2014).

Lazarus, Speisman, Mordkov, Davison, and Munn (1962) published one of the first studies to examine the potential of desensitization through violent media. They found that as participants watched a documentary about a tribal ceremony where they made incisions on the human body, their galvanic skin response (GSR: measured changes in the electrical properties of one's skin, the higher the score the more aroused the individual is) would be lower at the end of the documentary than it was at the beginning. They suggested that the exposure to scenes of gore at the beginning of the documentary resulted in less physiological arousal to similar depictions later on. Additional research has found that both children and adults have lower GSR in response to a staged violent crime scene (acted out before them) if they watched a violent clip beforehand, relative to those who initially watched nonviolent clips (see Bartholow & Hummer, 2014 for a review of this and similar effects).

Another study examined participants' heart rates while watching horror films (Linz, Donnerstein, & Adams, 1989). The study had participants watch either video clips from "slasher" films, or nonviolent clips. Following the first film clips, they would view additional clips from violent movies. The study showed that the participants who initially watched the scene from the horror film had lower heart rates when watching the later violent clips than those who were initially exposed to the nonviolent videos. Another study looked at college students who were agitated by another participant and then given an opportunity to apply electric shocks to the person who provoked them (Thomas, 1982). This study found that those participants who had watched a violent clip before shocking their provoker had lower heart rates than those who watched nonviolent clips.

With the advent of newer neuroimaging techniques, a deeper understanding of the brain's physiological functions to desensitizing has begun to emerge. Bartholow, Bushman, & Sestir (2006) looked at desensitization through change in a person's P3 amplitudes—a posterior event-related potential (i.e., brain wave) (ERP); large P3 amplitudes can reveal the activation of aversive motivational systems (Bartholow & Hummer, 2014). Bartholow and colleagues (2006) found that there were decreased P3 amplitudes in response to violent images by participants who play violent video games regularly, relative to participants who did not play video games. Bailey, West, and Anderson (2011) found that "transient" modulations of a different set of ERPs that are related to attentional orienting, and "sustained" modulations of the ERPs related to evaluative processing, were both sensitive to violent video game exposure.

Carnagey and colleagues (2007) looked at how brief exposure to violent video games affected the autonomic nervous system by randomly assigning participants to play a violent or nonviolent video game for about 15 minutes, then having them view a video depicting real-world violence (stabbings, shootings, beatings); autonomic reactivity to the real-world violence was assessed by changes in heart rate and skin conductance. Consistent with other research, while watching the violent real-world video those participants who had just played a violent game displayed relatively lower heart rates and less skin conductivity than those who played the nonviolent game.

Psychological effects

Researchers have not only been interested in what physiological effects occur from electronic media-inspired desensitization procedures, but also have been concerned about the psychological effects of physiological desensitization, effects such as lower empathy, lower positive affect, decreases in prosocial behavior, and poorer recognition of victims of violence and violent acts. As shown in Figure 1, it is important to keep in mind the distinctions between procedures that can lead to true desensitization (top level), actual desensitization (2nd level), cognitive and affective consequences of actual desensitization (3rd level), and behavioral consequences of the cognitive and affective consequences of actual desensitization (4th level).

The effect of exposure to violent video games (procedure, Level 1) on empathy (cognitive and affective consequence, Level 3) is especially concerning. Empathy involves imagining others' perspectives and feelings of care and concern for them. Empathy is especially important when it comes to promoting prosocial behaviors, such as helping, cooperating, and sharing. Although viewers of violent television and film have the choice of taking the perspective of the killer or the victim, very often the "hero" of the story enacts many violent behaviors. Viewers usually identify with the hero. However, players of violent video games are typically forced to take the perspective of a hero-killer/criminal who takes out the bad guys. Players have the same visual perspective as the killer in first-person shooter games, for example. The player controls the actions of the violent character from a more distant visual perspective in third-person games but still tends to identify with their game character, whether that character is a hero or a criminal. Experimental research on violent versus nonviolent games has shown that people are more likely to behave aggressively themselves when they identify with their violent video game character.

There have been numerous studies looking at the effect of desensitization on positive affect as well as evidence which indicates that exposure to violent media can alter positive emotion (Bartholow & Hummer, 2014). Kirsh, Mounts, and Olczak (2006) found that participants who typically used a lot of violent media were faster in recognizing a neutral emoted face turn into an angry face than when the neutral face turned into a happy face. The opposite was true of individuals who were typically low on exposure to violent media. Additionally, in an experimental study, Kirsh and Mounts (2007) conceptually replicated this finding by randomly assigning participants to play either a violent or nonviolent video game, and then doing the face changing task. Because this latter study was experimental, it allows a much stronger causal statement that exposure to violent media can cause people to become biased perceivers of other people: biased toward "seeing" anger rather than happiness.

When considering how desensitization based on exposure to media violence can decrease prosocial behavior and produce worse recognition of victims of violence, two experimental studies by Bushman and Anderson (2009) are especially intriguing. In Experiment 1, participants were randomly assigned to play either a violent or a nonviolent video game in a lab for 20 minutes. All participants then were asked to complete a lengthy set of questionnaires while the researcher stepped out of the lab, supposedly to check on something. Shortly after the researcher stepped out, a fight was staged

just outside of the lab room. Those participants who had previously played a violent video game were less likely to report recognizing that a fight took place, and if they did, interpreted the fight as less serious and were slower in responses to offer help relative to participants who had previously played an equally interesting and fun but nonviolent video game. One additional key point to note about Experiment 1 concerns the validity of the video game manipulation procedure. The four violent and four nonviolent games used in this study had been previously used in an experiment with the same participant pool (introductory psychology students at a large Midwest university) that demonstrated actual physiological desensitization to scenes of real violence a year earlier (Carnagey et al., 2007). Thus, even though actual desensitization was not measured in the 2009 Bushman and Anderson Experiment 1, there is excellent evidence that the video game procedure does cause such desensitization to occur. Thus, it is reasonable to conclude that the reduced behavioral helping reactions to the staged fight were the result of a true desensitization effect of the violent games.

In Experiment 2 by Bushman and Anderson (2009), violent and nonviolent movie attendees witnessed a young woman with an injured ankle struggle to pick up her crutches outside the theater either before or after the movie. Participants who had just watched a violent movie took longer to help than participants who had either just seen a nonviolent movie or were yet to see any movie. In other words, seeing a violent movie decreased helping behavior relative to seeing a nonviolent movie or not seeing either movie (yet).

One longitudinal study of over 3000 Singaporean school children (Prot et al., 2015) studied the long-term effects of both violent video games and prosocial video games on empathy and prosocial behavior. Figure 2 displays the main results of this study. It shows that over two years violent video game play led to a decrease in empathy, which in turn led to a decrease in prosocial behavior. Interestingly, prosocial video game play had the opposite long-term effects, increasing empathy and subsequently increasing prosocial behavior. This study strongly suggests that playing violent games can serve as a desensitization to violence procedure, whereas playing prosocial games might serve as a sensitization procedure.

Conclusions

When considering these and many other effects that we have not space to review, it is essential to keep several points in mind. First, the research literature shows that violent media consumption is a causal risk factor for increased aggressive behavior. There are many known risk factors for aggressive and violent behavior, including genetic, socioeconomic, life history, and so on. Second, there is a much smaller research literature linking violent media exposure to lowered prosocial and helping behavior. However, that literature also is pretty consistent across research methods (experimental, cross-sectional, and longitudinal).

Third, the research literature that specifically tests whether emotion-based physiological desensitization leads to lowered prosocial behavior is much smaller and has some gaps. This entry covers much of that research. Existing research clearly shows that:

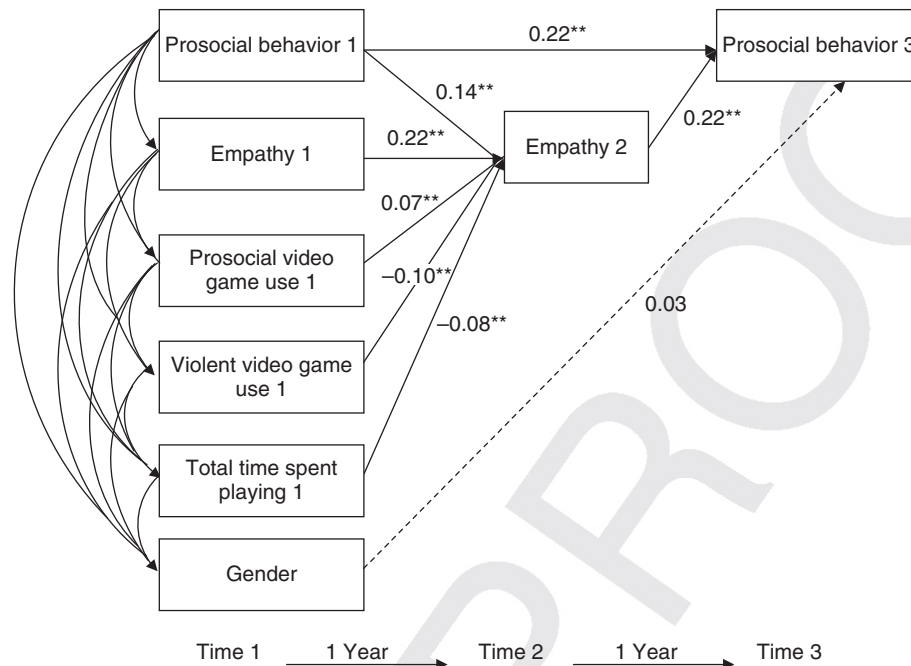


Figure 2 Results from a latent growth curve model of prosocial video game use, violent video game use, empathy, and prosocial behavior over two years. Gender and amount of play at Time 1 are included as covariates. Standardized coefficients are shown (* $p < .05$, ** $p < .01$). Solid lines represent significant effects, and dashed lines represent nonsignificant effects. Source: Prot et al. (2014), Study 2. Reproduced with permission of American Psychological Association.

(i) brief exposure to media violence causes at least brief actual physiological desensitization to real violence, (ii) brief exposure to media violence causes at least brief declines in empathy, (iii) brief exposure to media violence causes at least brief declines in prosocial/helping behavior, (iv) long-term or repeated exposure to media violence leads to declines in empathy, and (v) long-term or repeated exposure to media violence leads to declines in prosocial/helping behavior. It would be useful for the media effects field to have both experimental and longitudinal media violence studies that assess, within the same study, actual desensitization, cognitive and affective consequences of actual desensitization, and prosocial and antisocial behaviors.

Fourth, most media scholars believe that any specific type of media can, and should, affect different people in different ways. To date, media violence researchers have conducted lots of tests looking for moderators of media effects. The search has been mostly unsuccessful, so far. For example, many scholars expected that violent video game effects on aggressive behavior would be more significant for males than females. Indeed, the research shows reliable main effects of sex on both the amount of violent video game play and on aggressive behavior. However, the moderation question actually asks an interaction question, that is, does a given amount of violent video game (e.g., 20 minutes in a lab experiment, or 5 hours a week in a cross-sectional or longitudinal study) increase aggressive behavior (or aggressive cognition, aggressive affect,

prosocial behavior, empathy/desensitization) more in males than in females. To date, the answer is *no*, violent video game exposure *by sex* of participant interactions are rare, rarely replicate, and sometimes go in the opposite direction (Anderson et al., 2010).

Finally, the recognition that there are real, adverse electronic media effects on consumers should not be seen as disparaging to media itself. Many people (judging from internet missives), including a tiny but vocal minority of media researchers, believe that most media researchers only want to tear down or discredit media (especially certain modes such as video games), this simply is not true. Many of the top media violence scholars enjoy various types of electronic media, including violent media. Indeed, two of the key research teams associated with finding harmful effects of violent video games are the same two teams that published the first significant studies showing positive effects of prosocial video games (Gentile et al., 2009). The time, energy, and cognitive effort put into thinking about these things show how much respect these researchers have for media, and their recognition of its socialization power and potential.

In conclusion, from the research it is clear that there are real media violence exposure effects on a wide range of outcomes, including on desensitization and its effects. Although some aspects of media-induced desensitization can be adaptive for some populations in some contexts, for other populations in other contexts it is harmful. More research into this field is required, especially as new technologies (such as virtual and augmented reality and better and cheaper neuroscience methods) continue to develop. It would be nice to see media scholars stop focusing on a false debate about whether or not harmful effects exist, and instead focus on how to reduce harmful effects and how to enhance positive and prosocial effects.

SEE ALSO: Effects of Media Use on Social Aggression in Childhood and Adolescence; General Aggression Model; Media Use and the Development of Moral Reasoning; Moral Disengagement; Problematic Media Use: Games, Phones, and Internet; Psychophysiological Effects of Media Use

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Developmental Changes in Attention to Video

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Research shows that children and adults alike are active television viewers who look at and away from the screen frequently and strategically in ways that reflect higher order cognitive processes, such as comprehension of the television content and integration with preexisting knowledge and experience. That is, attending to (and comprehending) television content involves the coordination of several complementary cognitive processes. This entry begins with a conceptual framework for evaluating attention to media, followed by a description of research on selective and sustained attention to media. The entry reflects a developmental perspective throughout, considering both similarities and differences in attention to media among infants, children, and adults. Most of the research on attention to media is limited to television. However, it is likely that much of