

Applying Risk and Resilience Models to Predicting the Effects of Media Violence on Development

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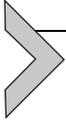
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Abstract

Although the effects of media violence on children and adolescents have been studied for over 50 years, they remain controversial. Much of this controversy is driven by a misunderstanding of causality that seeks *the* cause of atrocities such as school shootings. Luckily, several recent developments in risk and resilience theories offer a way out of this controversy. Four risk and resilience models are described, including the cascade model, dose–response gradients, pathway models, and turning-point models. Each is described and applied to the existing media effects literature. Recommendations for future research are discussed with regard to each model. In addition, we examine current developments in theorizing that stressors have sensitizing versus stealing effects and recent interest in biological and gene by environment interactions. We also discuss several of the cultural aspects that have supported the polarization and misunderstanding of the literature, and argue that applying risk and resilience models to the theories and data offers a more balanced way to understand the subtle effects of media violence on aggression within a multicausal perspective.



1. INTRODUCTION

The topic of the effects of media violence on children and adolescents is one of the most-studied phenomena in psychology, with hundreds of high-quality studies published over the past 50 years. It has also been one of the most controversial. This may seem surprising given that the preponderance of evidence has been coherent and consistent, as evidenced by meta-analyses and major scientific organizations' reviews (e.g., American Medical Association, American Psychological Association, American Academy of Pediatrics, and National Institutes of Health). Perhaps, however, this controversy is to be expected, given the increasing polarization of American society (Dandekar, Goel, & Lee, 2013). Even the scientific dialogue appears polarized, with some scientists claiming that the debate should be "over" (Anderson et al., 2003) and others claiming that the researchers are trying to incite a "moral panic" (Ferguson, 2010). Our view is that the public debate is partly fueled by a misunderstanding of modern multicausal theories. Recent advances in risk and resilience theories, measurement, and statistical approaches may provide an approach that allows for a more balanced understanding of media violence effects on aggression.

Almost from the beginning of this area of research, the scientific literature has been obscured by the political forces that surround the dissemination and discussion of it. After Bandura's seminal studies in the 1960s that demonstrated learning from and imitation of aggressive models on television (e.g., Bandura, 1965; Bandura, Ross, & Ross, 1961, 1963), the U.S. Surgeon General convened an Advisory Committee on Television and Social Behavior, but political forces blacklisted the experts who had done most of the relevant work (including Bandura) from the committee (Boffey & Walsh, 1970). Political forces have pushed and pulled ever since this time about how to interpret the research and what actions should be taken. For example, political forces were successful in getting ratings to be applied to movies, music, video games, and television (Gentile, 2008), with opposing forces causing them to be generally useless for parents (Gentile, Maier, Hasson, & de Bonetti, 2011).

Furthermore, several aspects of modern mass media have led to an increased lack of public understanding of the research. These aspects include (but are not limited to) the following: (1) As the public become desensitized to violent images, and the television market fragments into hundreds of channels, there are pressures to increase the violence in order to compete

for eyeballs and advertising dollars. (2) There is an increased need for arousing content with multiple 24-h news channels (which could potentially be beneficial in getting the scientific information out to the public). (3) Yet, journalists are still trained to “get both sides of every story,” which is an appropriate strategy for issues of opinion but is more questionable for issues of science, where the quality of the data, preponderance of the evidence, and general consensus of the scientific community need to be considered (but most journalists are not trained how to evaluate these aspects). Once we have determined scientifically that the world is round, it would be inappropriate to find a source that will deny the evidence and claim that it is flat. Of course, one of the greatest benefits of science is that new data can change the consensus, but that is different from presenting opposing opinions as if they have equal data behind them. (4) The for-profit news organizations are owned by the same corporations that produce and distribute media violence. (5) Media violence effects are rarely discussed in the media, but when media violence is discussed, it is usually only in response to tragedies, such as school shootings. This last factor is particularly damaging to public understanding because it results in a culprit mentality—we seek *the* cause of the tragedy. This is an inappropriate way to understand most human behavior. Human behavior is notoriously and amazingly multicausal; there is almost never one single cause for any behavior. This simplistic approach to thinking about causality is misleading for both scientists and the public.

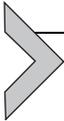
Other disciplines suffer from similar difficulties in describing complex multicausal systems, but overcome them by focusing on the overall pattern of risk and protective factors. This macro-level theoretical approach is sometimes called a risk and resilience approach, or a risk and protective factor approach. In the past decade, there has been some movement to consider aggression within a risk factor approach (Browne & Hamilton-Giachritsis, 2005; Centers for Disease Control & Prevention, 2008; Dodge & Pettit, 2003; Gentile & Sesma, 2003; U.S. Surgeon General, 2001). The U.S. Surgeon General’s report on youth violence (2001) defines risk factors as “. . . personal characteristics or environmental conditions that predict the onset, continuity, or escalation of violence” (p. 58). One problem with this definition is that it only focuses on violence rather than aggression more broadly (aggression is typically defined as any behavior, physical, verbal, or relational, that is intended to harm, whereas violence is typically defined as an extreme subtype of physical aggression that is likely to result in severe bodily harm or death). This allows critics to correctly say that there are almost no studies demonstrating that media violence predicts violent crime.

Yet this focus on only the most extreme outcome is similar to stating that no one should be worried about eating a diet high in fat because there are no studies showing that fat kills you. That diet can be bad for you in many ways other than the most extreme way (i.e., killing you). Similarly, media violence can have many effects that we might not desire other than the most extreme (i.e., violent or criminal behavior). The Surgeon General noted, however, that “the bulk of research that has been done on risk factors identifies and measures their predictive value separately, without taking into account the influence of other risk factors. More important than any individual factor, however, is the accumulation of risk factors” (p. 59).

This is a very valuable framework within which to understand the effects of media violence on the risk of aggression. Note that it requires a change in how we understand causes of behavior. Rather than relying on the overly simplistic “necessary and sufficient” views of causality, modern science has moved to a more stochastic understanding of causality, particularly for understanding multicausal issues. For example, many people who smoke do not get lung cancer, so smoking is not a sufficient cause. Furthermore, some people who get lung cancer have never smoked, so it is not a necessary cause. Therefore, smoking is neither necessary nor sufficient. Medical science does not dismiss smoking as unimportant, however, because it is clear that the odds of lung cancer go up significantly if one smokes, which means that smoking is causally related to cancer even if it is neither necessary nor sufficient. Similarly, many people who are aggressive do not view media violence, and most people who do view media violence are never seriously aggressive. Many critics use this information to dismiss media violence as unimportant and do not seem to consider whether this view of causality is really the most valid approach to predicting aggression.

We do not mean to imply that there is no disagreement over whether this approach is appropriate. One critic of the media violence literature, for example, has made a strong claim that this approach is akin to “pseudoscience” because it is “unfalsifiable” (Ferguson, 2009, p. 118). We take the opposite view; the very benefit of this approach is that it provides several testable hypotheses. In fact, in the past decade, a great deal of theoretical work has been conducted that expands the range of testable hypotheses. Early cumulative models often had an assumption of equifinality, that is, any combination of risk factors can coalesce to achieve the same outcome (Dodge & Pettit, 2003). These could be contrasted with interactive models, which assume that some combinations of risk factors may be more potent than others. More recent work has gone beyond this initial approach and hypothesized four types of risk and resilience models: cascade effects,

dose–response gradients, pathway models, and turning–point models. In addition, recent work has also examined steeling versus sensitizing effects as well as biological factors. Each of these approaches is presented below with a discussion of how it can be or has been applied in media violence research, along with recommendations for future research.



2. TYPES OF RISK AND RESILIENCE MODELS

2.1. Cascade Effects

In recent years, there has been increased research interest in cascade effects, also known as transactional effects, snowball effects, chain reactions, or contagion effects (Masten & Cicchetti, 2010; Pine, Costello, & Masten, 2005). Dynamic systems theory posits that small changes in one area of functioning can trigger a chain of consequences that have large developmental effects (Damon & Lerner, 2008; Sameroff, 2000). Cascade effects can spread over time, across domains, levels, persons, and generations (Masten & Narayan, 2012). Such effects can be direct or indirect, unidirectional or bidirectional. Through developmental cascades, experiences can have lasting, widespread consequences that alter the course of development (Masten & Cicchetti, 2010). Developmental cascades can bring about either positive or negative changes. Disruptions in adaptive behavior are expected to spread and exert negative consequences in multiple domains, whereas competence can act as scaffolding on which competence in other domains develops (Masten, Burt, & Coatsworth, 2006). Advances in structural equation modeling have made it possible to test models of cascade effects more easily, leading to growing empirical support for cascade models (e.g., Masten et al., 2005; Masten & Tellegen, 2012; Obradović, Burt, & Masten, 2010). Negative effects of certain risk factors have been shown to spread across domains, levels of analysis, persons, and generations (Burt, Obradović, Long, & Masten, 2008; Cicchetti & Gunnar, 2008; Dodge et al., 2009). For example, children’s externalizing problems undermine academic achievement, social functioning, and well-being over time (Masten & Tellegen, 2012). Conversely, protective effects and resilience can also have cascade effects (e.g., competence in one period of life can become a basis for developing competence in other domains later in life; Masten & Cicchetti, 2010).

2.1.1 Applications in the Media Violence Domain

A number of existing findings in the media violence literature can be conceptualized in terms of cascade effects. Three lines of research that show especially persuasive evidence that media violence can trigger cascading

consequences in different domains over time are (1) studies testing the downward spiral model (Slater, Henry, Swaim, & Anderson, 2003); (2) studies exploring crossover effects (e.g., Coyne et al., 2008; Gentile, Coyne, & Walsh, 2011); and (3) studies exploring media effects on executive functioning (e.g., Bailey, West, & Anderson, 2010).

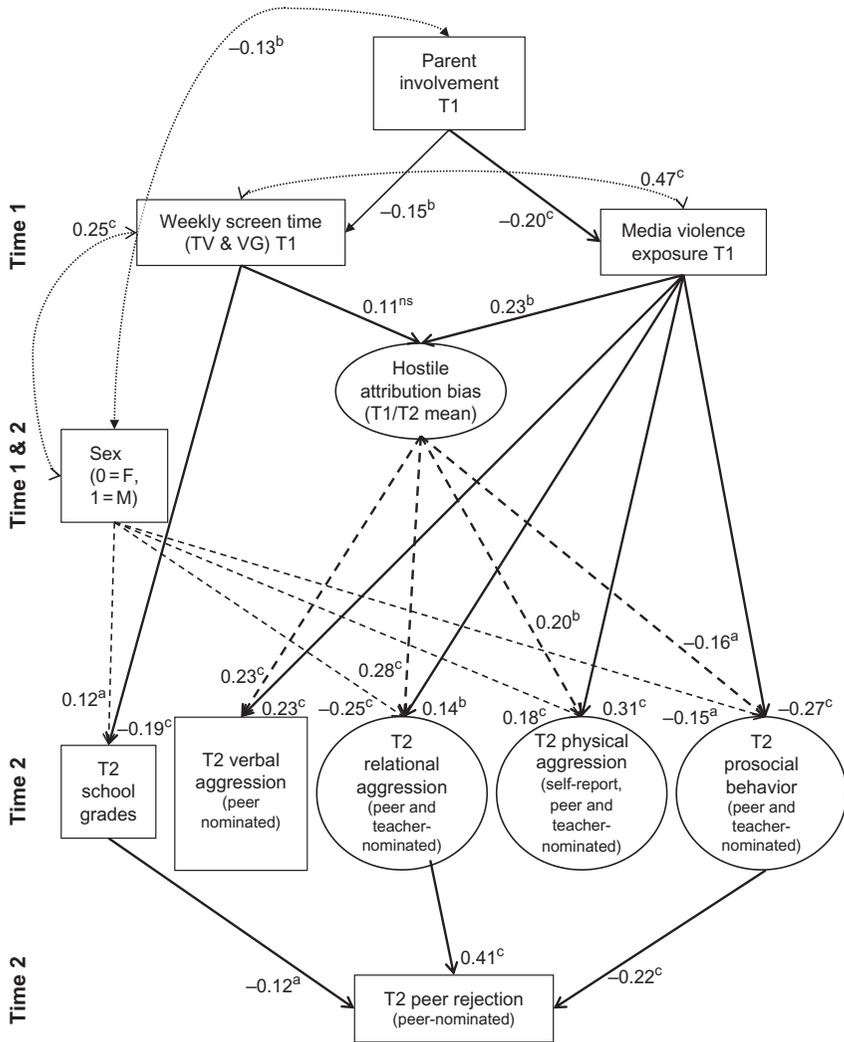
The downward spiral model (Slater et al., 2003) proposes the existence of a reciprocal relationship between personality and selective media use. Aggressive individuals are expected to seek out violent media content (the selection hypothesis). Exposure to violent media content, in turn, leads to increases in viewers' aggression through social learning (the socialization hypothesis). These effects are mutually reinforcing and are expected to lead to cascading increases in aggressive behavior. Several studies support the downward spiral model. A large number of experimental, cross-sectional correlational, and longitudinal studies demonstrate socialization effects of violent media on aggressive behavior (Anderson et al., 2003; Bushman & Huesmann, 2012). In both the short term and the long term, exposure to violent media content has been shown to increase aggression over time. In support of the selection hypothesis, several studies demonstrate relations between aggressiveness and attraction to violent media. For example, individuals high in trait aggression are more likely to choose to watch a violent movie over a nonviolent movie (Bushman, 1995). A longitudinal study of elementary school children demonstrated reciprocal causal relationships of violent video game play with physical and verbal aggression over time, providing evidence for both socialization and selection (Anderson, Gentile, & Buckley, 2007). It is important to note, however, that several methodologically rigorous longitudinal studies have shown support for socialization effects, but failed to find selection effects (Krahé & Möller, 2010; Möller & Krahé, 2009; Willoughby, Adachi, & Good, 2012). These findings suggest that socialization effects of violent media on later aggressiveness may be stronger than reciprocal selection effects.

A second line of media violence research that may be understood in terms of cascade effects involves crossover effects. Several studies have demonstrated crossover effects in which viewing one form of aggression in the media leads to increases in other forms of aggression in real life (Coyne et al., 2008). For example, children who view more physical violence on television subsequently display more relational aggression (Ostrov, Gentile, & Crick, 2006) and grow up to be more indirectly aggressive adults (Huesmann, Moise, Podolski, & Eron, 2003). Even though there is evidence of specificity in media violence effects on subtypes of aggressive behavior

(e.g., [Martins, 2013](#)), it seems that specific forms of aggression in the media also exert general effects on real-life aggressive behavior ([Linder & Gentile, 2009](#)). Crossover effects can be understood within the framework of the General Aggression Model ([Anderson & Bushman, 2002](#); [DeWall, Anderson, & Bushman, 2011](#)). Repeated activation of aggressive constructs leads to aggressive scripts and schemas becoming accessible and easily activated. Through this process, media violence use leads to a wide range of long-term consequences such as developing more positive beliefs about aggression ([Funk, Baldacci, Pasold, & Baumgardner, 2004](#)), more hostile expectations ([Anderson et al., 2007](#)), and decreased empathy ([Bartholow, Sestir, & Davis, 2005](#)). Over time, habitual media violence use contributes to the development of a more aggressive personality ([Bushman & Huesmann, 2006](#)). These same mechanisms also lead to reductions in prosocial behavior over time (e.g., [Anderson et al., 2010](#)). That is, watching specific acts of aggression in the media can influence general attitudes, beliefs, schemas, and scripts. These, in turn, can generalize to novel situations. The aggressive behaviors that result may therefore not share any specific features with the original stimuli. This generalization hypothesis is not specific to the General Aggression Model, but is a feature of almost every learning theory from classical conditioning onward (e.g., Little Albert cries when seeing the brown rabbit).

Research on developmental cascades suggests that media violence effects on aggression may be expected to spread to other domains of functioning beyond aggressive behavior. For example, dual failure models predict that externalizing problems exert harmful effects on academic achievement and relationships with peers ([Masten & Tellegen, 2012](#)). These decreases in academic and social functioning, in turn, lead to an increased risk of internalizing problems and lower well-being ([Masten et al., 2005](#)). Based on these findings, it is plausible to expect that increased trait aggressiveness resulting from media violence use may also lead to peer rejection, lower academic achievement, and lower well-being. There is some evidence that this occurs. In a longitudinal study of third through fifth graders, children who consumed more media violence early in the school year became more physically aggressive, more relationally aggressive, more verbally aggressive, and less prosocial ([Gentile, Coyne et al., 2011](#)). Greater amount of screen time at the beginning of the year also predicted poorer grades later in the year. These outcomes together predicted peer rejection (see [Fig. 8.1](#)).

Finally, a recent line of research that may be explained well by the cascade effects model explores media effects on attention. A growing number of



Model fit: $\chi^2 = 531.0$, $df = 234$, $p < 0.001$; CFI = 0.95, TLI = 0.94, RMSEA = 0.05, SRMR = 0.06

Notes: Time 2 grades, aggression subtypes, and prosocial behavior are allowed to correlate (and all correlations are significant—only PA and RA are shown here); $+p < 0.10$, $^ap < 0.05$, $^bp < 0.01$, $^cp < 0.001$.

Figure 8.1 Generalizing and cascading longitudinal outcomes of screen time and media violence. Exposure. Reprinted from *Gentile, Coyne, et al. (2011)*, Copyright (2011), with permission of John Wiley & Sons Inc.

studies suggest that excessive media use may exacerbate attention problems and harm executive functioning (e.g., Bailey et al., 2010; Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004; Gentile, Swing, Lim, & Khoo, 2012). For example, television viewing and video game playing

are associated with greater attention problems in childhood (Bioulac, Arfi, & Bouvard, 2008; Mistry, Minkovitz, Strobino, & Borzekowski, 2007). A smaller number of studies demonstrate associations between screen media use and poorer performance in certain types of executive functioning (Bailey, West, & Anderson, 2011a, 2011b; Hummer et al., 2010; Matthews et al., 2005). Television and video game use are related to later attention problems and impulsiveness in longitudinal studies, even when earlier attention problems are controlled, suggesting that the effect may be causal (Gentile et al., 2012; Swing, Gentile, Anderson, & Walsh, 2010). It seems that exposure to fast-paced, exciting screen media (which often contain violence) can disrupt attention and cognitive control. These effects on attention and executive functioning can be expected to spread to other domains. Executive functioning plays a key role in developing and maintaining competence in a number of domains, such as emotion regulation, impulse control, inhibition of aggression, and academic achievement (Baumeister, Schmeichel, & Vohs, 2007). Future research is needed to determine if negative effects of fast-paced media use on executive control spread and cause decrements in emotion regulation, social functioning, and academic achievement.

2.1.2 Recommendations for Future Research in the Media Violence Domain

Research on cascade effects within a risk and resilience framework suggests several fruitful avenues for future research on media violence effects. Recent advances in structural equation modeling have enabled researchers to test developmental cascades more easily. To demonstrate the existence of a developmental cascade, one needs to show a causal effect over time while controlling for within-time covariance as well as continuity within domains over time (Masten et al., 2005; Obradović et al., 2010). A growing number of quality longitudinal studies have employed such methodology and clearly demonstrate long-term effects of media violence on increased aggression and decreased prosocial behavior over time (Bushman & Huesmann, 2012). Studies within the risk and resilience framework that explored cascading effects of externalizing problems suggest that such harmful effects may spread to other domains, such as peer relationships and academic functioning (Masten & Tellegen, 2012). More research is needed to show if long-term media violence use triggers consequences in domains other than aggression and helping. Another possible source of developmental cascades may involve effects of fast-paced media on attention problems and executive

control. A growing number of studies support the existence of causal effects of fast-paced media use on decrements in attention and cognitive control (e.g., [Gentile et al., 2012](#); [Hummer et al., 2010](#)). However, more longitudinal studies are needed to demonstrate whether such effects damage adaptive functioning in other domains. This may be challenging, given that studies are usually designed to focus on very specific issues, both for practical and for theoretical reasons. Finally, although several researchers have hypothesized the existence of reciprocal causality between trait aggression and media violence use (e.g., [Slater et al., 2003](#)), clear empirical support is available only for socialization effects but not for selection effects. More longitudinal research is needed to clarify under what conditions selection effects occur and trigger a negative spiral.

2.2. Dose–Response Gradients

Risk gradients illustrate how levels of problems increase as risk level rises. Such relations can not only be linear but also include nonlinear threshold models, asymptotic patterns, and inverted-U models ([Luthar, Cicchetti, & Becker, 2000](#); [Masten, 2012](#)). A number of studies have demonstrated dose-related effects. People generally show greater signs of disturbance in response to greater exposure and more severe levels of risk factors (e.g., [Catani et al., 2010](#)). There is also growing research interest in nonlinear threshold effects. For example, exposure to atrocity among child soldiers in Uganda is so extreme that they have all passed a threshold expected to overwhelm normal adaptive capacity. Because of that, additional traumatic experiences do not predict mental health and resilience ([Klasen et al., 2010](#)). Other nonlinear trends are also possible. For example, depletion models predict deficits in functioning only when adverse experiences accumulate and the child's capacity for adaptation is exceeded ([Masten & Narayan, 2012](#)). Finally, adversity can sometimes have mobilizing effects and predict increased functioning ([Quota, Punamäki, & Sarraj, 2008](#); [Rutter, 2012](#)).

2.2.1 Applications in the Media Violence Domain

A methodologically challenging aspect of media violence research is that media effects are expected to be subtle (because they work through learning and generalization processes) and cumulative across time. Advertising can exert a subtle influence on consumers without their awareness ([Gentile & Sesma, 2003](#)). Likewise, a single instance of exposure to media violence usually has small and transient effects (e.g., [Barlett, Branch, Rodeheffer, & Harris, 2009](#)). Nonetheless, such subtle effects can accumulate over time

and exert a noticeable influence on behavior. Researchers sometimes use a cigarette smoking analogy to illustrate probabilistic causal effects of media violence (Bushman & Anderson, 2001). Even though short-term effects of smoking are fairly brief and harmless, long-term cumulative effects of this risk are lasting and severe. Similarly, although the effects of watching a single violent movie or television show dissipate quickly, long-term violent media use leads to the development of proviolence attitudes (Funk et al., 2004), hostile attribution biases (Möller & Krahé, 2009), chronic desensitization to violence (Bartholow, Bushman, & Sestir, 2005), as well as stable increases in aggressive personality traits and behavior (Huesmann et al., 2003; Robertson, McAnally, & Hancox, 2013).

A large number of experimental studies demonstrate several processes through which media violence influences behavior in the short term (Anderson et al., 2003; Bushman & Huesmann, 2012). There is much less empirical evidence, however, concerning how such short-term effects accumulate to produce lasting changes in cognitions, affect, and behavior. A growing number of methodologically sound longitudinal studies have begun to shed light on this question (e.g., Boxer, Huesmann, Bushman, O'Brien, & Mocerri, 2009; Huesmann et al., 2003; Krahé, Busching, & Möller, 2012; Robertson et al., 2013; Willoughby et al., 2012). Most longitudinal studies include only two waves of measurement and are able to examine only linear trends. However, it is plausible to expect nonlinear risk gradients in some cases. For example, once chronic desensitization to violence has occurred, a single exposure to violent media content no longer produces further desensitization (Bartholow, Sestir et al., 2005). On the other hand, a depletion effect may be expected when examining violent behavior as an outcome. The risk of violent behavior increases substantially only when multiple risk factors are present (DeLisi, Vaughn, Gentile, Anderson, & Shook, 2013; Gentile & Sesma, 2003).

Researchers in the media violence domain rarely examine results in terms of dose–response gradients. A destructive testing approach has sometimes been employed to examine the strength of the relations between media violence and outcomes of interest (Anderson & Anderson, 1996; Prot & Anderson, 2013). First, the predicted link between variables is established. Next, one attempts to break the link by adding other theoretically relevant competitor variables and confounds to the model. If the inclusion of a number of relevant covariates fails to break the relation, this gives strong support to the validity of the target link. By statistically controlling prior levels of the outcome as well as potential confounds, this analytic

approach can provide some evidence for causality. In contrast, dose–response gradients can provide a clearer illustration of cumulative developmental risk as a function of multiple relevant risk and protective factors. Because aggression, prosocial behavior, and other outcomes of interest to media violence researchers are multiply determined, much can be gained from examining joint effects of multiple risk and protective factors. Instead of examining separate effects of each predictor, cumulative risk totals can be calculated (Boxer et al., 2009; Gentile & Bushman, 2012). For example, Gentile and Bushman (2012) examined the cumulative effects of six different risk and protective factors on children’s aggressive behavior over a 6-month period. Predictors included media violence use, physical victimization, participant sex, hostile attribution bias, parental monitoring, and prior aggression. Each risk factor at Time 1 predicted an increased risk of physical aggression at Time 2, whereas each protective factor predicted a decreased risk of physical aggression at Time 2. The combination of risk factors was found to be a more reliable predictor of aggression than any of the individual risk factors (Fig. 8.2). Furthermore, evidence was found in support of both linear and multiplicative effects of cumulative risk factors. This research highlights the importance of examining media violence effects along with the effects of other key risk and protective factors and illustrates the usefulness of risk gradients in media violence research.

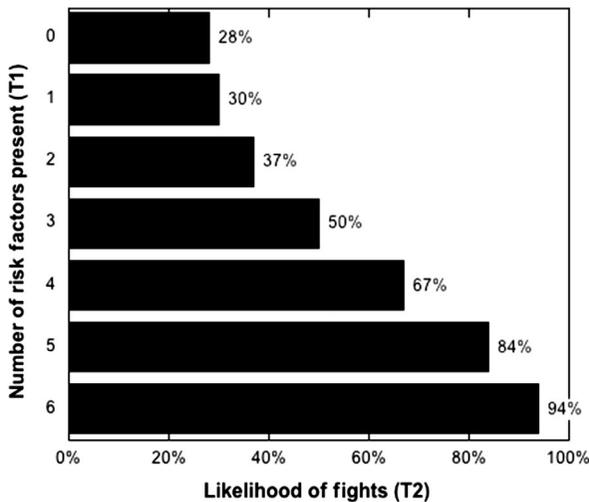


Figure 8.2 Predicted likelihood of Time 2 fights from number of risk factors present at Time 1, demonstrating nonlinear cumulative risk. Reprinted from Gentile et al. (2012), Copyright (2012), with permission of American Psychological Association.

2.2.2 Recommendations for Future Research in the Media Violence Domain

More longitudinal research is needed to examine dose-related effects of media violence on aggression and other relevant outcomes. Including three or more waves of measurement is especially useful because it makes it possible to examine nonlinear trends. Second, although it is sometimes useful to isolate media violence effects by statistically controlling other covariates, aggression is better understood in terms of influences of multiple risk and protective factors (Anderson et al., 2007). Cumulative risk totals are likely to be better predictors of aggressive behavior than any single risk factor (Boxer et al., 2009).

A focus on cumulative risk gradients and cumulative risk totals rather than on effect sizes of single predictors may help reduce the disagreement in current debates about violent media effects. Media effects research usually yields small to moderate effect sizes, leading critics to question whether such effects are of any practical importance (e.g., Ferguson & Kilburn, 2010). In contrast, research within a risk and resilience perspective suggests that effects of media violence are similar to those of other risk factors for aggression, deserving neither special acclaim nor dismissal (Gentile & Bushman, 2012). In fact, effect sizes of media violence effects on aggression are similar in magnitude to effects of substance use, abusive parents, and poverty (U.S. Department of Health and Human Services, 2001). None of these effects should be dismissed as unimportant just because they are “small” effects. When a large proportion of the population is exposed to a risk factor and its effects accumulate across time, even small effects can have significant practical consequences (Abelson, 1985; Anderson et al., 2003; Prentice & Miller, 1992).

In addition to cumulative risk totals, there is a newer statistical technique that can be employed to examine the relative contribution to total risk of each individual risk factor. One difficulty in aggression research is that most of the risk factors are correlated with each other. If we use a standard statistical approach such as regression to test the effect of media violence on aggression, we usually control for other relevant variables. Because the variables are likely reciprocal in their effects, however, this approach is extremely conservative. Furthermore, examining beta coefficients to try to determine the relative importance of each predictor is not appropriate because risk factors are collinear (Johnson, 2001, 2004). Johnson’s relative weights analysis allows for testing the contribution of each risk factor, considering both the unique and combined contributions of each (Johnson, 2001; Johnson & LeBreton, 2004). This analysis estimates the proportionate

contribution each risk factor makes to the overall R^2 while considering both its unique contribution and its contribution when combined with other predictors, thus partitioning the variance accounted for by each predictor. Using this analysis on longitudinal data found that media violence exposure appears much more relevant to overall risk than is found with standard regression analyses (8.1% of the variance explained compared to 2.6%, respectively; [Gentile & Bushman, 2012](#)). The more interesting aspect from our standpoint, however, is how the six risk factors measured in this study combined to explain 53% of the variance in future physical aggression. Cumulative risk models appear to hold great value for the study of aggressive behavior.

2.3. Pathway Models

Pathway models demonstrate hypothesized patterns of adaptive functioning before, during, and after a period of adversity ([Masten, 2011](#)). Resilience pathways can be used to examine the course of adaptation in response to acute or chronic exposure to stressors. Such models are based on diathesis–stress pathway models ([Gottesman, 1974](#)). Visual pathway models can be used to illustrate different paths of adaptation. [Figure 8.3](#) shows examples of hypothetical pathways of resilience in response to adversity. Path A shows

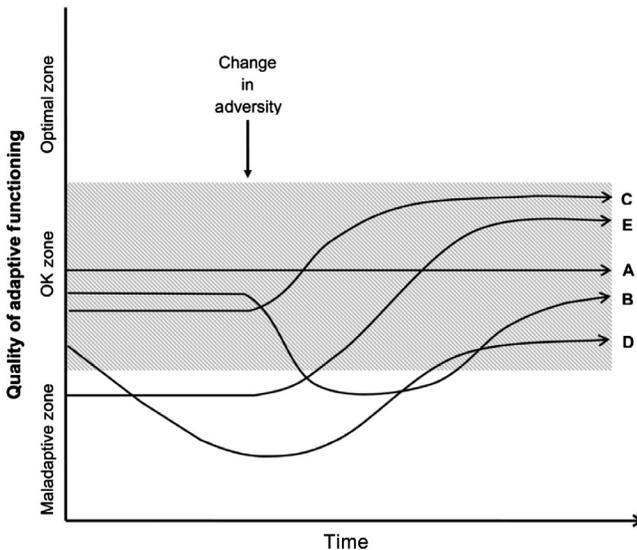


Figure 8.3 Models of resilience pathways. *Reproduced from [Masten and Tellegen \(2012\)](#) with permission of Cambridge University Press.*

a stress-resistant path in which adaptive functioning is not disrupted by adversity (Masten & Tellegen, 2012). Path B illustrates a disturbance-with-recovery pathway which would be expected in the case of acute trauma. Path C shows posttraumatic growth in response to adversity. Path D shows recovery after the cessation of chronic adversity. Finally, path E shows return to normal functioning after improvement in conditions. Pathway models have been difficult to document empirically because they require longitudinal data. The development of growth curve modeling and trajectory analysis, however, has made it possible to test such models more easily (e.g., Bonanno, 2004). Surprisingly, resilience pathway models found in behavioral sciences show high similarity to those that emerged in ecology, suggesting fundamental similarities in the meaning of resilience across domains (e.g., Tugel et al., 2005). The generalizability of pathway models across disciplines represents evidence of a general meaning of resilience in dynamic systems.

2.3.1 Applications in the Media Violence Domain

Several studies have explored adaptation in response to both short-term and long-term media violence exposure. Short-term media violence effects on aggression mainly occur through priming and are therefore of short duration. For example, aggressive affect, cognitions, behavior, and physiological arousal in response to a 15-min episode of violent video game play tend to dissipate within 10 min (Barlett et al., 2009). Desensitization to violence in response to short-term exposure to violent media also seems to be reversible. In one study, participants who viewed three sexually violent films showed physiological and emotional desensitization to violence (Mullin & Linz, 1995). However, resensitization occurred within 5 days of exposure. In contrast, long-term media violence use can lead to lasting consequences. For example, habitual video gamers display a reduced brain response while viewing violence, indicating chronic desensitization to violence (Bartholow, Bushman et al., 2005; Gentile, Swing, Anderson, Rinker, & Thomas, *in press*). Violent television viewing in childhood and adolescence predicts aggressive personality traits in adulthood and a higher likelihood of developing antisocial personality disorder (Robertson et al., 2013).

There is also a large body of research by Cantor and her colleagues demonstrating that a single exposure to violent or scary media can alter thoughts, feelings, and behaviors for long periods of time, stretching into years! Most of these reactions are fearful reactions, often influencing sleep and eating habits (Cantor, 1998, 2003). This research is replete with firsthand accounts

of media-induced traumas. For example, she describes a college student's report of watching the movie *Jaws* as a child: "After the movie, I had nightmares for a week straight. . . . Occasionally I'll still have that exact same dream. The movie didn't just affect me at night. To this day I'm afraid to go into the ocean, sometimes even a lake. I'm afraid there will be a shark even if I know deep down that's impossible" (Cantor, 2003, p. 188). With repeated exposure to violent and scary media content, such fearful reactions are reduced. Desensitization processes result in a reduction in emotional and physiological responsiveness to media violence (Krahé et al., 2011; Mullin & Linz, 1995).

Can such long-term media violence effects be reversed? A recent intervention study by Möller et al. (2012) shows evidence that a 5-week intervention can lead to a reduction in media violence use, aggressive norms, and behaviors. In this study, a large sample of adolescents participated in five weekly educational sessions promoting restricted consumption and critical consumption of violent media. To reduce media violence consumption, participants engaged in several activities such as keeping a diary of one's media habits, discussing strategies that help people self-regulate their media habits and observing a "media-free weekend" without television, video games, or other electronic media. To promote critical consuming of violent media, participants practiced identifying violent portrayals in television shows, learned about media violence effects on aggression through demonstrations and exercises and rehearsed their knowledge about media effects through role-playing. Additionally, two meetings for parents were held aimed at promoting parental involvement in media use. Adolescents who participated in the intervention demonstrated decreases in their violent media use lasting 7 months after the intervention was completed. Furthermore, a significant decrease in aggressive behaviors was found among participants who initially displayed high levels of aggression. These encouraging results suggest that the effects of chronic media violence use can be ameliorated, at least among adolescents.

A clear example of the use of pathway models to examine patterns of adaptive functioning before and after a period of adversity comes from a related literature on pathological gaming or video game addiction. This research literature is relevant to understanding violent media effects because individuals who show symptoms of pathological video gaming may spend especially large amounts of time playing violent video games (although the amount of consumption does not necessarily indicate video game addiction if it does not damage functioning in different areas; e.g., Sim, Gentile,

Bricolo, Serpelloni, & Gulamoydeen, 2012). In a large longitudinal study examining video game addiction, Gentile, Choo et al. (2011) tracked 3034 Singaporean children over a period of 2 years. Gamers were classified into four groups by latent growth analyses: those who never were pathological across the 2 years, those who became pathological gamers, those who were pathological at the start but stopped being pathological, and those who were and stayed pathological gamers. Children who became pathological gamers showed increased levels of depression, anxiety, and social phobia compared to children who never became pathological. On the other hand, children who stopped being pathological gamers showed decreased levels of depression, anxiety, and social phobia compared to children who remained pathological gamers. These findings indicate that changes in pathological video game use led to changes in adaptive functioning and mental health over time.

2.3.2 Recommendations for Future Research in the Media Violence Domain

Most longitudinal studies of media violence effects include only two measurement waves and are not able to explore how media use affects patterns of functioning over time. Nonetheless, several high-quality longitudinal studies do provide data that could be used to examine pathway models (Gentile, Choo et al., 2011; Huesmann et al., 2003; Willoughby et al., 2012). More longitudinal studies are needed to explore pathways of adaptation after short-term and long-term media violence use. Whereas effects of short-term exposure seem to dissipate quickly, long-term media violence use has been shown to exert lasting consequences on personality traits and behavior. Research concerning pathways of adaptive functioning after long-term periods of media violence exposure may be especially useful to investigators attempting to develop effective intervention programs designed to influence media habits and reduce negative media violence effects.

2.4. Turning Point Models

In spite of considerable stability in competence and resilience, several studies have found “turnaround” cases—individuals who shifted from maladaptation to resilience (e.g., Masten et al., 2004; Obradović et al., 2010). Such cases may be especially likely to be found during the transition from emerging adulthood to young adulthood. It seems that emerging adulthood may provide an opportunity for change as new opportunities, motivations, and executive function skills become available (Burt & Masten, 2010; Burt &

Paysnick, 2012; Masten & Tellegen, 2012). For example, Shiner and Masten (2012) found a group of late-bloomers who changed status from being maladaptive in emerging adulthood (e.g., experienced adversity and demonstrated low competence in social functioning, rule-abiding conduct, and academic achievement), but became competent in young adulthood. The challenge for researchers and theory is to find the variables or experiences that predict these abrupt changes in developmental trajectories. Shiner and Masten (2012) found that, as children, these turnaround cases were higher on neuroticism compared to people who were never maladapted, but were also higher on conscientiousness than people who remained maladapted in young adulthood. These findings suggest that early maladaptation occurred in this group because of high negative emotionality in childhood. However, late-bloomers were able to change their developmental paths once mature executive functions developed in early adulthood (Shiner & Masten, 2012).

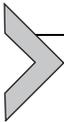
2.4.1 Applications in the Media Violence Domain

The aforementioned longitudinal study on pathological video gaming found 36 turnaround cases—children who stopped being pathological gamers (Gentile, Choo et al., 2011). These turnaround cases were found to have higher goal-setting scores at wave 1 than children who remained pathological video gamers. This result is consistent with other findings concerning turning-point effects in the risk and resilience literature (e.g., Burt & Masten, 2010) and suggests that goal-setting ability may represent a valuable resource that can allow individuals to overcome video game/Internet addiction. A longitudinal study by Krahe et al. (2012) examined developmental trajectories of media violence use and aggression among adolescents. Latent growth mixture modeling revealed a group of what they called, “desisters,” or adolescents who reduced media violence use over a 2-year period and showed steeper decreases in aggressive behavior than did stable high users. Both of these studies suggest the existence of turning-point effects in the media effects domain, although very little research has been designed to focus on turning points.

2.4.2 Recommendations for Future Research in the Media Violence Domain

Research on turnaround cases points to the importance of performing person-focused analyses in addition to variable-focused analyses which have been more common in the media violence literature. Using statistical

techniques such as latent growth mixture modeling (as did [Gentile, Choo et al., 2011](#); [Krahé et al., 2012](#)) may reveal the existence of distinct subpopulations of participants that demonstrate different growth trajectories. Additionally, findings from turnaround cases point to the importance of measuring hypothesized protective factors that may provide resources needed for change. From the limited existing evidence, it seems that such positive changes may become especially evident in emerging adulthood and young adulthood ([Shiner & Masten, 2012](#)). This may not necessarily hold for violent media effects, however. Although many researchers in this area believe that younger children should be more susceptible to violent media effects than adolescents and young adults, most longitudinal studies show no significant moderating effects of age (e.g., [Anderson et al., 2010](#); [Johnson, Cohen, Smailes, Kasen, & Brook, 2002](#)). Contrary to expectations, consistent media violence effects on aggression are found across age groups. It is therefore an open question whether turnaround effects might be most likely at specific transition points. Current theories also do not yet make specific predictions about what types of variables would either support or trigger turning points, and therefore theory will need to be developed.



3. CURRENT DEVELOPMENTS

As researchers have begun elaborating the four types of risk and resilience models discussed earlier, some questions have arisen about processes, such as whether a risk variable that is usually thought to be harmful can sometimes have beneficial effects (at least for some children). This has also led to examining biological and genetic factors that may help to explain individual differences in response to risk factors.

3.1. Stealing Effects Versus Sensitizing Effects

Surprisingly, prior negative experiences have been linked to both improved subsequent responding and poorer subsequent responding ([Bonanno, Brewin, Kaniasty, & La Greca, 2010](#)). Exposure to negative experiences and stress may either increase vulnerability (sensitizing effects) or decrease it (inoculation or “stealing effects”; [Rutter, 2006, 2012](#)). Moderate degrees of challenge are expected to exert positive effects by preparing the organism for future challenges ([Seery, Holman, & Silver, 2010](#)). On the other hand, exposure to overwhelming levels of adversity is more likely to increase vulnerability instead of build immunity ([Masten & Narayan, 2012](#)). For example, child maltreatment can lead to sensitizing effects, manifested

as increased vulnerability to stressful life events (Harkness, Bruce, & Lumley, 2006). In contrast, exposure to brief periods of stress has been shown to increase resilience to later stresses (Lyons, Parker, Katz, & Schatzberg, 2009; Rutter, 2012). When stressful experiences are challenging rather than overwhelming, coping with stress can enhance resilience. In line with this reasoning, people who experienced prior adversity in their life have demonstrated less disruption from recent adverse events (Seery et al., 2010).

3.1.1 Applications in the Media Violence Domain

Desensitization to violence could be reconceptualized as a “steeling effect.” Most children’s initial reactions to media violence include high arousal, anxiety, fear, and disgust (Cantor, 1998). However, such reactions slowly disappear with repeated viewing. Desensitization to violence can be viewed as adaptive in certain contexts (e.g., soldiers preparing for battle, medical school students becoming used to the sight of blood and gore). Desensitization to violence can also trigger a range of negative consequences, however, including decreased empathy for violence victims (Mullin & Linz, 1995), increased aggressive thoughts and disinhibition of aggressive behaviors (Bartholow, Sestir et al., 2005; Engelhardt, Bartholow, Kerr, & Bushman, 2011; Krahé et al., 2011).

Could media violence also cause sensitizing effects? Many lines of past research show evidence of desensitization rather than sensitization in response to violent media content (Krahé et al., 2011; Mullin & Linz, 1995). In contrast, exposure to prosocial media has been linked to increased empathy (e.g., Greitemeyer, Osswald, & Brauer, 2010). It is possible that smaller desensitization effects (or perhaps even sensitizing effects) might occur in response to media that emphasize victims’ suffering rather than diminishing negative consequences of violence. For example, Japanese television tends to clearly portray consequences of violent actions and emphasize the distress of the victims (Kodaira, 1998). This may be one reason why effects of televised violence on aggression seem to be smaller in Japan than in the United States (Anderson et al., 2010). The way in which violence is portrayed in the media can therefore change the effect it has. For example, sanitizing, trivializing, or glamorizing the violent portrayal increases the risk, whereas portraying suffering and an antiviolence theme decreases the risk or perhaps increases sensitization (Strasburger & Wilson, 2003).

This issue of whether viewing media violence can lead to lessening aggression (the aggression catharsis hypothesis) can be understood within the framework of desensitizing or inoculating effects. Some authors

(Ferguson & Olson, 2014; Feshbach, 1984) have argued that viewing media violence can reduce aggressive behaviors, at least for some types of viewers. The preponderance of evidence over the past 50 years has failed to support this hypothesis (Anderson et al., 2003, 2007; Geen & Quanty, 1977). Furthermore, the catharsis hypothesis has been disputed on theoretical grounds as it is inconsistent both with Aristotle's initial conceptualization of catharsis and with predictions of contemporary social learning theories of aggression (Gentile, 2013). Nonetheless, psychological studies tend to focus on group means, and these studies predominantly show that media violence increases the risk for desensitization and aggressive behavior for the group overall. It is still possible, however, that more sensitive developmental studies may find that certain individual difference variables could moderate this effect (such as empathy, perspective taking, or trait hostility).

3.2. Increased Interest in Biological Factors

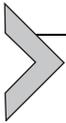
There is growing empirical evidence for gene \times environment ($G \times E$) interactions that affect different areas of adaptive functioning (Caspi, Hariri, Holmes, Uher, & Moffitt, 2010; Caspi et al., 2003; Uher & McGuffin, 2010). Interestingly, findings from several studies indicate that the same genetic polymorphisms that are associated with increased vulnerability to negative experiences may also be associated with greater sensitivity to positive experiences (Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011; Rutter, 2012). There has also been increasing research interest in neural and hormonal changes related to resilience (Rutter, 2012).

3.2.1 Applications in the Media Violence Domain

To our knowledge, there have been no behavioral genetics studies that have examined media violence effects and tested $G \times E$ interactions. However, there is increasing research concerning the effects of media use on brain function, including violent media use (Bailey et al., 2011a; Hummer et al., 2010; van Muijden, Band, & Hommel, 2012). Neurocognitive bases of media effects are explored through techniques such as event-related brain potentials (ERPs) and functional magnetic resonance imaging (fMRI). For example, Bailey et al. (2010, 2011a, 2011b) combined ERPs, Stroop tasks, and photo-rating tasks to measure executive control and emotional reactions to violence among high and low action gamers. Across studies, high action gamers demonstrated reduced proactive control and brain activation patterns indicating desensitization to violent images. Kronenberger and

colleagues (2005) demonstrated comparable differences in fMRI measures and Stroop performance in high violent gamers.

One hallmark of many $G \times E$ studies is that the same stressor can have very different effects based on both the genetic risk and the broader picture of environmental risk. That is, a given environmental risk factor may have little effect if (a) the person does not have a corresponding genetic risk or (b) the person does have a genetic risk, but not sufficient other environmental risk factors. Therefore, cumulative environmental risk factors may interact not only with each other but also with genetic risk factors, and these processes can change developmentally. The challenges for future research to understand these detailed processes are apparent.



4. CONCLUSION

Modern risk and resilience theories provide many novel and testable hypotheses about the multiple effects that media violence can have. Furthermore, they provide a valuable framework for comprehending and explaining the effects. Several aspects of the ongoing “debate” about media violence effects have been detrimental to science, in our opinion. First, the tone of the debate has typically been dichotomous and polarized, focused on adopting a stance that media violence either *is* or *is not* harmful to children. This appears to us to be the wrong question (and it has largely been answered; Anderson et al., 2003). By focusing on the broader picture of risk and protective factors, the issue is not whether it has an effect, but whether the effect is likely to be enhanced or mitigated by other factors and whether it will escalate to a level that will be of concern. Gentile and Bushman (2012) demonstrated this with their metaphorical “aggression thermometer” (Fig. 8.4). Given that most risk factors for aggression (including media violence) tend to be relatively small, no one of them can “heat” things up to the top end of the thermometer (i.e., visible serious aggression, such as physical fights). In this conception, media violence is likely to heat it up for most children, but only one or two notches. Is that of concern? Answering this question partly depends how many other risk and protective factors are ascribed to the child. It is much more likely to concern parents if their child is already near the top of the thermometer and much less likely if the child is near the bottom.

Second, the debate has been largely hijacked by the mass media in response to tragedies such as school shootings. This is not where the effect is likely to be. Extreme or criminal-level violence is extremely rare, and



Figure 8.4 The metaphorical aggression thermometer. Reprinted from *Gentile et al. (2012)*, Copyright (2012), with permission of American Psychological Association.

people who commit this level of offense have multiple risk factors and very few protective factors. It is entirely possible that media violence exposure adds almost no risk once someone has reached that level. It is also possible that it interacts with the other risk factors to increase risk exponentially. This may be an unanswerable question, however, for the practical reason that finding samples of people who have not yet attempted murder but who are likely to may be impossible. The effect (as suggested by Fig. 8.4) is much more likely to be seen at low levels of aggression, both in terms of aggressive thoughts and psychological constructs and in terms of aggressive behaviors (such as verbal or relational aggression). Nonetheless, these are important and serious aggressive behaviors, as any child who has had negative rumors spread about her can tell you. Unfortunately, we have not focused the public debate at this level by allowing it to be driven by reports of criminal acts.

Third, by allowing the debate to be driven by extreme acts, it has come to be portrayed as being an issue of *values*. These values may be whether media violence is “good” or “bad,” it may be about whether parents are “good” or “bad” for not monitoring their children, or whether a given researcher is careful or conducting “junk” science. We argue that these are the wrong issues. Instead, the issue of media violence (broadly defined) is a *public health* issue more than a values issue. Developmental risk and resilience models, therefore, can contribute to the public debate by framing the

issue more clearly. This may be one of the most beneficial aspects of using this approach (at least in the short term)—it may allow the rhetoric around media violence to cool down. As shown in the U.S. Surgeon General's report on youth violence (2001), media violence is neither the largest nor the smallest risk factor among scores of known risk factors. It acts just like the others and therefore should be included in developmental models predicting healthy or unhealthy outcomes.

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