

## Examining Media Effects

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### *The General Aggression and General Learning Models*

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#### **ABSTRACT**

The study of screen media effects is becoming especially important because people spend increasing amounts of time on visually realistic entertainment media. This chapter applies two related theoretical frameworks to the study of media effects: the general aggression model (GAM) and the general learning model (GLM). Both theories posit relations between media exposure and internal processes, behavior, and the development of long-term knowledge structures and attitudes. GAM focuses on the development of aggressive knowledge structures and attitudes derived from exposure to violent media depictions (amongst other aggression-related stimuli), and their relation to aggressive behavior. GLM, a broad extension of GAM, posits how long-term attitudes and knowledge structures are formed with continued exposure to any type of media (violent or nonviolent), and how “media-trained behavior” can ensue. How these processes operate, the role of individual differences, and short- and long-term consequences of media exposure are discussed.

#### **Lessons Learned from Media**

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Mass media are powerful teachers. As we, and many others, have noted, the contents of mass media determines what they teach (e.g., Anderson et al., 2008; Gentile et al.,

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2009). For instance, Swing and Anderson (2007) noted that electronic media have been used in the classroom to teach topics ranging from photography to flying airplanes. Gentile and Gentile (2008) showed that well-designed mass media, videogames in particular, have all of the key features of excellent teaching. The question remains: What behaviors are viewers learning from the mass media?

This chapter describes two theoretical models that predict when, why, and for whom media exposure is related to behavior. The primary focus of this chapter is to describe the general aggression model, which posits how media violence exposure is related to aggressive behavior. Then we discuss the tenets of the general learning model. This model was more recently developed from the postulates of the general aggression model, and, thus, less text will be devoted to its description. The general learning model can predict how exposure to any type of media content may be related to “media-trained behavior.” In describing these models, we discuss earlier theoretical models that led to the derivation of the general aggression and general learning models, describe the relevant research testing these theories, and describe the role that certain individual differences play in these relations. Finally, future directions and conclusions are offered.

## **The General Aggression Model**

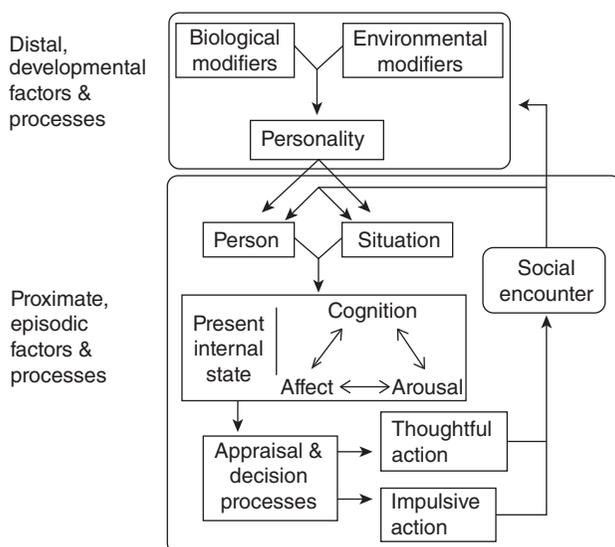
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The general aggression model (GAM; Anderson & Bushman, 2002) is a dynamic, developmental, and social-cognitive integrative model of human aggression (see Anderson & Carnagey, 2004). GAM has the explanatory power to predict how exposure to any aggression-related stimulus (including media violence) is related to subsequent aggressive behavior. The full GAM can be dissected into two highly related sets of processes that operate in the immediate situation (proximate) or more distally. Proximate processes are those that are directly related to current aggressive behavior. Distal processes are those that tie immediate short-term effects of a given stimulus to the development of long-term aggressive behavioral tendencies.

### **Proximate GAM**

The proximate GAM (see the lower part of Figure 4.1) begins with two types of input factors: Situation and person factors. Situational variables are those factors that the individual is currently interacting with that are related to the probability of engaging in aggressive behavior in the immediate situation. These may include exposure to media violence (Anderson et al., 2003), provocation (Bettencourt & Kernahan, 1997), heat (Anderson, 1989), and a host of other factors (Anderson & Huesmann, 2003).

Person factors are those individual difference variables that may be related directly to aggressive behavior (e.g., trait aggression, mood), or that may moderate the effects of situational variables. Research has shown that a variety of person variables



**Figure 4.1** The general aggression model: a bio-social model of human aggression. From C. A. Anderson, & N. L. Carnagey (2004). *Violent evil and the general aggression model*. In A. Miller (Ed.), *The social psychology of good and evil*. Copyright Guilford Press. Reprinted with permission of The Guilford Press.

moderate the relation between media violence exposure and aggression. For instance, Bushman (1995) found that videotaped violence was more likely to increase aggression in high trait aggressive individuals than in low trait aggressive individuals. Markey and Scherer (2009) found that violent videogame exposure was related to more aggressive cognitions and aggressive affect for participants high in the psychoticism trait compared to participants with low levels of psychoticism. (See also Kirsch, Olczak, & Mounts, 2005 for the moderating role of trait hostility.)

One single episodic cycle through GAM's proximate processes focuses on how these input factors influence one's present internal state, consisting of aggressive cognitions, aggressive affect, and physiological arousal. All of these internal state variables have been predicted to be correlated with one another. For example, if one feels hostile or frustrated (aggressive affect) then those feelings may trigger aggressive thoughts. It is important to note that GAM does not state how many or which internal state variables are necessary for aggressive behavior to occur. Any one or combination of internal state variables is able to increase the likelihood of aggressive behavior. For instance, the relation between media violence exposure and aggressive behavior appears to be primarily influenced by the aggressive cognition route, although increases in aggressive affect or physiological arousal may also play a role in some cases (Anderson & Dill, 2000).

GAM further posits that the active contents of one's present internal state both influence and are influenced by a complex appraisal and decision process

(see Anderson & Carnagey, 2004). Borrowed from the attribution literature (e.g., Anderson, Krull, & Weiner, 1996), after experiencing a significant event an individual will make an initial attribution as to why it occurred. This initial appraisal can occur quickly and without conscious awareness, and may include behavioral response options. If the observer does not have the time, motivation, and cognitive resources to evaluate his or her initial attribution, then an impulsive behavior is likely to occur. However, if the person does have the time, motivation, and cognitive resources to reassess the initial attribution, then the observer must decide if the initial attribution is important and unsatisfying. If the outcome of the initial attribution is unimportant or satisfactory, then an impulsive behavior is likely to occur. If the outcome of the initial attribution is important and unsatisfying, then an individual may engage in a number of reappraisals of the event. This process iterates until the observer is satisfied with his or her attribution or until a response is required; then a thoughtful behavior is likely to occur. A thoughtful or impulsive action can be either aggressive or non-aggressive, and reappraisal does not guarantee that an initially hostile attribution will be altered. Knowledge of the input factor(s), the present internal state, and other constraints allow one to predict whether the behavioral outcome is likely to be impulsive or thoughtful, aggressive or non-aggressive.

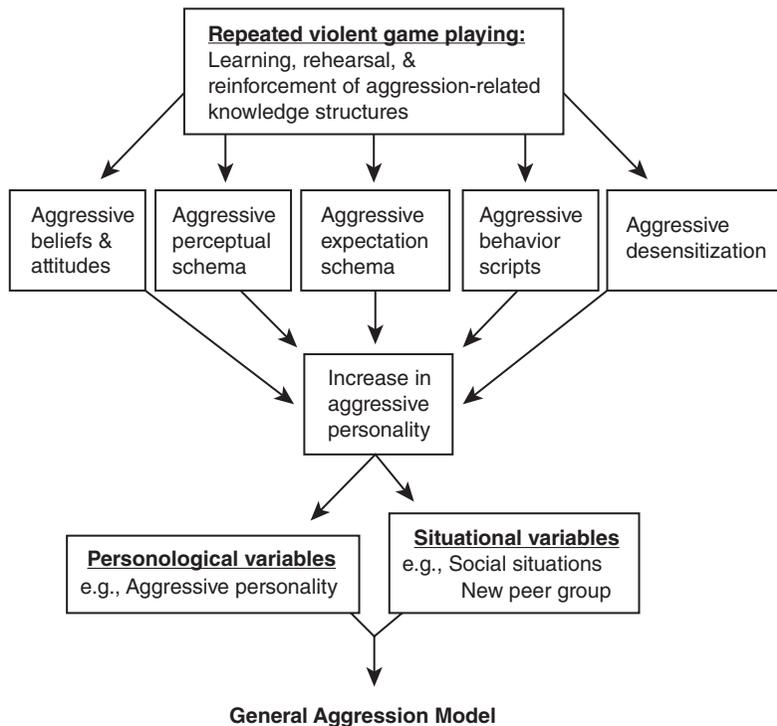
Whether thoughtful or impulsive, aggressive or non-aggressive, the ensuing behavior influences the ongoing social encounter. This social encounter will feed back into the situational input factor. Thus, GAM posits a feedback loop that can lead to a violence escalation cycle. Anderson, Buckley, and Carnagey (2008) argued that aggressive behavior can involve any dyadic units that come into conflict with one another (e.g., two people, two nations). An event that triggers a hostile interpretation is coined as a triggering event that starts the violence escalation processes. This event can range from relatively minor perceived provocation (e.g., hearing a rumor) to a major perceived provocation (e.g., getting punched). After this initial provocation, the victim is likely to retaliate in a manner more severe than the initial provocation warranted. Next, the original aggressor is likely to retaliate with a more severe retaliatory response. This cycle tends to continue. At the person-to-person level, media violence (along with other situational and personological risk factors) is predicted to influence the knowledge structures retrieved, the extent to which the triggering event is perceived as hostile, and the specific behavioral response. Anderson et al. (2008) showed that high trait aggressiveness, paired with a minor triggering event, can initiate the violence escalation cycle.

## Distal GAM

GAM incorporates a developmental cycle into its theorizing on aggression via the distal processes. Distal processes predict how continued exposure to aggression-related stimuli influences the development of one's aggressive personality (see upper part of Figure 4.1). Two types of modifiers are likely to influence the extent to which

an aggressive personality is developed. The first are biological modifiers that can influence the probability of aggressive behavior (see Raine, Brennan, Farrington, & Mednick, 1997). Anderson and Carnagey (2004) argued that such biological predispositions interact with the second type of modifier, environmental modifiers, to influence aggressive personality.

At its heart, GAM is a social learning model of aggression. Each time that an individual interacts with aggression-related situational variables serves as one learning trial. This can include the learning, rehearsal, and reinforcement of aggression-related knowledge structures (Anderson & Carnagey, 2004). Continued exposure to stimuli and situations that evoke aggressive thoughts, feelings, and behaviors will eventually lead to the development of well-practiced knowledge structures that are used to interpret events, make decisions, and ultimately increase the likelihood of aggressive behavior. Media violence provides one such exposure to aggression. Figure 4.2 illustrates a number of ways that violent media exposure can influence the development of aggressive personality. Prior to discussing the different knowledge structures, it should be noted that this is not an exhaustive list related to such development.



**Figure 4.2** Effects of repeated media violence viewing. Reprinted, with permission, from the *Annual Review of Psychology*, Volume 53 © 2002 by Annual Reviews ([www.annualreviews.org](http://www.annualreviews.org)).

One process involves desensitization, defined as the “reduction in emotion-related physiological reactivity to real violence” (Carnagey, Anderson, & Bushman, 2007, p. 490; Chapter 18, this volume). Here, physiological reactivity refers to the magnitude of change in several indices of arousal (e.g., heart rate, skin conductance) when being exposed to real violence. It has been argued that desensitization is related to aggressive behavior because individuals will have less of a negative emotional and physiological reaction to seeing, thinking about, or planning real-life violence. Research has shown that exposure to violence in the media is related to desensitization (Bushman & Anderson, 2009; Carnagey et al., 2007). Therefore, continued violent media exposure is likely to be related to aggressive behavior because viewers may not be as emotionally or physiologically affected by real-life violence.

To test the desensitization hypothesis, Carnagey et al. (2007) had participants play either a violent or nonviolent videogame and measured their physiological arousal at baseline, after game play, and then after being exposed to film clips of real-life violence. The media violence/desensitization hypothesis predicts that participants who played the violent videogame should show less physiological reactivity to the film violence than those who had played a nonviolent game. This is exactly what was found (Carnagey et al., 2007). In a pair of follow-up experiments, Bushman and Anderson (2009) tested the relation between media violence exposure and the likelihood of helping a person in distress. Participants who had recently played a violent videogame or watched a violent movie were less helpful than those who had just played a nonviolent videogame or watched a nonviolent movie.

Other studies have examined how desensitization is related to aggressive behavior. For example, Bartholow, Benjamin, and Sestir (2006) found that the relation between media violence exposure and aggressive behavior was mediated by physiological desensitization, suggesting that desensitization is one process by which media violence is related to aggressive behavior.

Another long-term process involves the development of aggressive attitudes and beliefs. GAM predicts that positive attitudes and beliefs towards violence should be related to the development of one’s aggressive personality. GAM argues that these positive attitudes and beliefs regarding aggressive behavior are formed when an aggressive behavior is positively reinforced (see Bandura, 1965). There are numerous studies showing such effects. In the videogame domain, Anderson et al. (2004) found that videogame violence exposure was positively related to positive attitudes towards violence, and that the relation between violent videogame exposure and aggressive behavior decreased substantially (sometimes to nonsignificance) when positive attitudes towards violence were entered into the model. Longitudinal evidence found that exposure to violent videogames significantly predicted normative beliefs about aggression 30 months later, and that these aggressive beliefs were significantly related to subsequent physical aggression (Moller & Krahe, 2009). This provides support for the hypothesis that positive attitudes towards violence at least partially mediate the relation between violent videogame exposure and aggressive behavior.

Another process is formation of aggressive behavioral scripts (see next section for a discussion of script theory). Behavioral scripts are a specific type of knowledge structure represented in one's memory. Scripts are defined as mental representations of how the flow of events should occur in a given social situation (Abelson, 1981). Behavioral scripts guide behavior because they help cognitively map how one is to act. Related to aggression, behavioral scripts help dictate when and how one should aggress in certain social situations. In which situations these aggressive behavioral scripts may be utilized depends partially on the individual and what scripts are encoded. At a theoretical level, individuals who are continually exposed to real-life or media violence should have readily accessible aggressive behavioral scripts that are automatic and fairly retrievable, while those who have viewed less violence should have fewer aggressive behavioral scripts accessible, and the scripts that exist may not be as automatically retrieved. Indeed, research shows that short-term exposure to violent videogames increases the accessibility of aggressive scripts (e.g., Bushman & Anderson, 2002), and long-term exposure is related to hostile attribution biases (Anderson, Gentile, & Buckley, 2007).

Another long-term process is the development of aggressive perceptual schema. Perceptual schema are a type of knowledge structure that can be used to identify simple everyday objects, such as a computer, but also complex social events, such as a provocation (Anderson & Carnagey, 2004). These types of knowledge structures contain nodes, or concepts in semantic memory. Adapted from cognitive neo-associative theory (see next section), aggressive concepts with similar meanings (e.g., kill, murder) and concepts that are repeatedly paired with one another (e.g., knife, stab) become strongly linked in semantic memory. Priming one node of a well-developed associative network increases the likelihood that other nodes of that network will be activated. Research by Anderson, Benjamin, and Bartholow (1998) showed that after being primed with pictures of aggression-related items (e.g., guns), participants had faster response times to similar aggressive words, such as "injure," compared to control words, such as "survey," and compared to trials with nonaggression related picture-primers (e.g., plants).

Anderson et al. (2004) more directly tested the hypothesis that brief exposure to a violent videogame primes aggressive thoughts. In Experiment 1, participants played either a violent or a nonviolent videogame, then did a word completion task that involved making words from word fragments. As expected, those who had just played a violent game were more likely to create aggression-related words than those who had played a nonviolent game. These studies show that brief exposure to violent media images (e.g., guns) prime aggressive perceptual schema.

Distal evidence for the relation between media violence exposure and aggressive perceptual schema was found by Anderson et al.'s longitudinal study (2007, Study 3). Violent videogame exposure and hostile attribution bias (the tendency to perceive ambiguous acts as hostile; see Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002) of elementary school children were assessed at two points during

a school year separated by about six months. Repeated exposure to violent games predicted increases in hostile attribution bias, a type of aggressive perceptual schema.

Using a very different paradigm, Uhlmann and Swanson (2004) showed proximate evidence for the relation between media violence exposure (i.e., violent videogame exposure) and aggressive perceptual schema. Uhlmann and Swanson (2004) showed that high exposure to violent videogames among college students was associated with highly accessible aggressive self-images. Thus, violent videogames appear to create aggression-related knowledge structures of various types developmentally (distally; Anderson et al., 2007), and such games activate these knowledge structures when they are played (proximally; Uhlmann & Swanson, 2004).

## **GAM is Integrative**

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A strength of GAM is its ability to explain how myriad short- and long-term variables and processes are related to aggressive behavior. GAM has such explanatory power because it was derived from a number of other, more specific, aggression theories. Thus, GAM is an integrative model of aggression theories. Several of the theories that were influential to GAM will be discussed.

### **Cognitive Neo-Associative Theory**

Berkowitz's (1984, 1993) cognitive neo-associative theory posits that specific emotional states and memories are represented as nodes in semantic memory (see Chapter 10, this volume). Once any node becomes activated, other related nodes become activated forming an associative network through a process called spreading activation. Berkowitz's model posits that after a provocation, for example, individuals experience negative affect, which activates at least two associative networks. The first network is the aggression-related tendencies network, in which aggressive thoughts and memories become activated, along with expressive motor responses related to aggression, and physiological arousal. After activation of this network, the aggressive thoughts and memories will activate feelings of anger. The second network is the escape-related tendencies network, which consists of thoughts and memories related to feeling fear, along with the strong physiological reaction to fear, and gross motor responses to being afraid. Once these networks are active, the result is the affective consequence of fear. Both of these routes then proceed to the next step of analysis, which consists of higher-order processing. The end result is a behavior that is either anger-related (for the aggression route) or fear-related (for the escape route).

## Excitation Transfer Theory

Zillmann's (1971) excitation transfer theory posits that aggressive behavior can be explained by the arousal produced from any stimuli, including the media. The physiological arousal experienced from the media may carry over to another task, because such arousal may not decay quickly. Therefore, the physiological arousal present at the second task is a composite of any physiological arousal created by the second task and the residual arousal experienced by the first task (Zillmann, 1971). If the first and second tasks are close in time, and the second task is related to anger (e.g., a provocation), then that anger may be exaggerated and aggressive behavior may be more likely to occur (Zillmann, 1983). Research has shown that violent media exposure is related to more of a physiological arousal response than nonviolent media exposure (see Bushman & Huesmann, 2006), and excitation transfer theory would predict that the arousal produced by violent media will increase the probability of aggressive behavior during a subsequent interaction, especially if the second interaction or task involves an individual being provoked.

## Social Learning Theory

Another important theory that influenced GAM is Bandura's social learning theory and the later version known as social cognitive theory (Bandura, 1978; Chapter 10, this volume). This theory discusses the development of an aggressive personality via myriad methods of learning that can account for individual differences in aggressive personalities. Social learning theory posits that observational learning and reinforced performance form the origins of aggression. Bandura (1978) argued that media violence exposure is related to aggressive behavior, because children are taught aggressive styles, the media shape images of and beliefs about reality, the media desensitize, and the media alter restraint over behavior. Continued observation and learning of aggressive behaviors may also be related to the development of aggressive beliefs that are likely to influence how one interprets social situations.

## Script Theory

Huesmann's (1986) script theory posits that people decide to behave aggressively due to their programs of behavior (behavioral scripts) that are stored in memory. Huesmann (1988) argued that both observational learning and enactive learning are two processes by which scripts are encoded in memory. During learning, individuals will often pay attention to the salient cues and scenes in the environment. The information from these scenes, along with one's current mood and memory, help to evaluate the appropriateness of the behavior just observed. If the observed behavior

is positively reinforced (Bandura, 1965), then that behavior is likely to be evaluated as appropriate, and encoded in memory for later retrieval and used as a guide. If a behavioral script gets retrieved from memory, it is evaluated in terms of how socially appropriate the behavior is and how desirable the individual's goals are. If the evaluation of the behavioral script is deemed appropriate, that script gets retrieved and enacted. If the behavior is deemed inappropriate, then memory is searched for a more appropriate script. The mass media is one method by which individuals can observationally learn behavioral scripts, and determine what situations are acceptable for the use of these scripts.

## Social Information Processing

Crick and Dodge's (1994) social information processing theory (SIP) posits that all individuals enter a social situation with a database of memories, schema, knowledge about other situations, and social norms regarding appropriate behavior. SIP posits that individuals will encode and then interpret the social situation. Once the cues are interpreted, goals are clarified regarding possible behavior. Appropriate behavior is then accessed from memory, often relying on behavioral scripts from the database. This response is then evaluated in terms of the appropriateness of the behavior (see Fontaine & Dodge, 2006 for specific factors that are important at this step). If the behavior is deemed appropriate, then behavior is enacted. If the behavior is evaluated as inappropriate, another response is generated and evaluated.

## Role of Individual Differences

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Individual differences, or factors related to the personality, have been shown to be related to aggressive behavior. GAM incorporates these individual differences into its theorizing in short-term and long-term processes. Examples of three individual difference variables will be discussed: hostile attribution bias, age, and sex.

### Hostile Attribution Bias

A hostile attribution bias is the tendency to perceive ambiguous acts as hostile (see Orobio de Castro et al., 2002). This type of bias may influence attributions of intent in another's behavior in the short-term, and may influence the ease and development of accessibility of aggression-related knowledge structures in more distal processes. In longitudinal media violence research, Anderson and his colleagues (Anderson et al., 2007, 2008) found that hostile attribution bias acts as a partial mediator between violent media exposure and aggressive behavior four to five months later. Violent

acts in the media are often portrayed as an acceptable method of conflict resolution. Exposure to this type of content is a learning trial and continued exposure is likely to be related to the development of aggressive behavioral scripts through learning processes. For violent media viewers, the default response to another's ambiguous but harmful behavior (e.g., getting bumped in the lunch line) may be to attribute it as having hostile intent. This often increases the likelihood of aggressive behavior.

## Age

Positive relations between media violence exposure and aggressive behavior have been found for adult (e.g., Bartholow, Sestir, & Davis, 2005) and child (e.g., Hoph, Huber, & Weib, 2008) samples. There is theoretical reason to expect age differences in the processes governing aggressive responding after viewing violent media. Bushman and Huesmann (2006) argued that after media violence exposure, adults are likely to act aggressively because of the activation and retrieval of very well-developed aggressive behavioral scripts. Children, on the other hand, are less likely to have these aggressive scripts readily available to guide behavior, because children should have been exposed to less violence. They argued that children will respond aggressively after viewing violent media because of imitation processes. Early research from Bandura (1965) found that children behaved more aggressively after viewing an aggressive model that was positively reinforced for his/her behavior. This suggests that both children and adults are likely to behave aggressively after exposure to violent media; however, the processes that delineate why this relation exists might differ. More likely, both types of process operate on both children and adults, with priming processes being relatively more predominant among adults, and imitative processes more predominant among young children.

## Sex

Meta-analytic reviews have found that males are more physically aggressive than females (e.g., Card, Stucky, Sawalani, & Little et al., 2008). Therefore, sex may moderate the relation between violent media exposure and aggression. In their review, Anderson et al. (2003) cited evidence to suggest that males and females tend to have similar effect sizes in the relation between media violence exposure and aggressive behavior. Some empirical evidence suggests that males who played a violent videogame tend to be more aggressive than females who played the same game (Bartholow & Anderson, 2002). One possible explanation for sex differences is that male media characters tend to be more physically violent than female media characters (Anderson et al., 2003). Another explanation is that males tend to seek out media violence more than females, and research has shown that, on average, males play more violent videogames than females (Moller & Krahe, 2009). Whatever the reason, when effect

sizes from the videogame violence and aggression literature were synthesized, results showed no significant differences in effect size estimates between males and females after exposure to videogame violence, a result recently confirmed in a new meta-analysis of the violent videogame literature (Anderson et al., 2010).

## General Learning Model

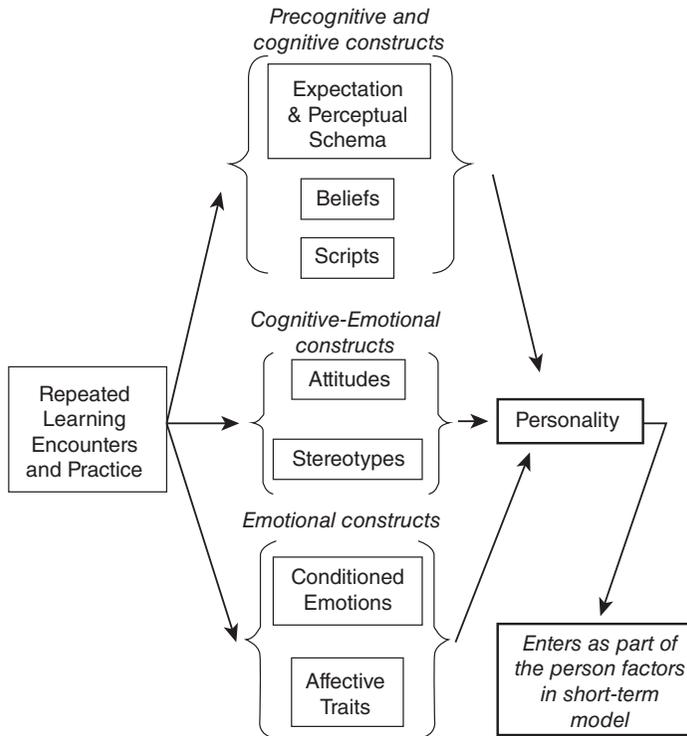
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Not all mass media depict violent behavior. Depending on their content, the media can also teach audiences about gender roles, aggressive behavior, prosocial behavior, and a host of other social relations. Broader theories have been posited to predict when exposure to any media content will be related to its behavioral depiction. The general learning model (GLM; Buckley & Anderson, 2006; Gentile et al., 2009, Swing & Anderson, 2008) is a recent attempt to broaden the relevance of the social-cognitive and developmental insights of GAM beyond the domain of aggression. If the postulations of GAM are correct, then certain media effects can also be explained by a more general learning theory. The overlap between GLM's and GAM's predictions on the relation between media violence exposure and aggressive behavior provide substantial support for GLM. However, there is a paucity of evidence that can uniquely explain the postulates of GLM. One area of research that can be predicted from GLM, but not GAM, is the relation between prosocial media viewing and prosocial behavior.

Like GAM, there are distal and proximate processes within GLM. The processes involved in the proximate GLM are similar to GAM. Situational and personality input factors predict one's internal state (consisting of interrelated cognitions, affect, and physiological arousal). These internal state variables influence one's appraisal and decision processes, which influence behavior. The behavioral response feeds back into the dynamic situational input factor at the start of GLM.

The distal GLM (see Figure 4.3) posits that repeated learning and practice with any media is a learning trial that is related to the formation of three different, but highly related, processes. One process is the development of precognitive and cognitive constructs. Examples of such constructs include expectation and perceptual schema, beliefs, and behavioral scripts. Another process is the development of cognitive-emotional constructs, which include attitudes and stereotypes. A third process is the development of emotional constructs, which may include conditioned emotions and affective traits. These constructs have been predicted to be related to the development of or changes in one's personality (Gentile et al., 2009).

GLM can predict how any media portrayal can be related to "media-trained behavior," including aggression. However, the majority of work *uniquely* testing GLM has come from research examining the relation between prosocial media exposure and prosocial behavior. Indeed, the theoretical foundations for GLM were derived from early research testing the postulates of GAM as well as research testing the relations



**Figure 4.3** The general learning model. From D. A. Gentile, C. A. Anderson, S. Yukawa, N. Ihori, M. Saleem, L. K. Ming, et al. (2009). The effects of prosocial video games on prosocial behaviors: International evidence from correlational, experimental, and longitudinal studies. *Personality and Social Psychology Bulletin*, 35, 752–763.

between prosocial media exposure and prosocial behavior. Although much empirical work has tested such relations, early research on prosocial game effects has been mixed. For instance, Chambers and Ascione (1987) found that prosocial videogame exposure was unrelated to prosocial behavior; however, the prosocial videogame used in their study did not depict many prosocial acts. Conversely, Liss, Reinhardt, and Fredriksen (1983) found that children exposed to a prosocial cartoon helped a fictitious partner significantly more than children who viewed either an aggressive cartoon or a cartoon that depicted aggressive behaviors to accomplish a prosocial goal. Despite the wealth of research in this area, there are apparent inconsistencies in the early literature, but recent empirical work has shed light on both the distal and proximate processes in GLM.

Support for distal processes in GLM would show that continued exposure to prosocial media is related to variables associated with prosocial personality tendencies, such as the likelihood of prosocial behavior, empathy, and cooperation. These

predictions were supported by a series of studies conducted by Gentile and his colleagues (2009). First, correlational findings showed significant relations between prosocial videogame exposure and helping behavior, cooperation, sharing, and empathy (Study 1). Second, a longitudinal study showed that prosocial videogame exposure significantly predicted prosocial behavior four to five months later, even after statistically controlling for other relevant variables (Study 2).

Support for the proximate processes in GLM would show that viewing prosocial media would predict the likelihood of prosocial behavior compared to viewing other (e.g., non-prosocial) media in the short-term. Support for this hypothesis was found by Gentile et al. (2009, Study 3) who had college-aged participants play either prosocial videogames, neutral videogames, or violent videogames and then complete a behavioral measure that afforded participants the ability to engage in prosocial and/or aggressive behavior. Results showed that playing prosocial videogames was related to more prosocial behavior compared to the other two game types. Also, playing the violent videogame was related to more aggressive behavior compared to the other two game types. Additional evidence from the videogame domain found a decreased number of aggressive cognitions after playing a prosocial videogame compared to a neutral videogame (Greitemeyer & Osswald, 2009).

Prosocial musical lyrics have also been found to be related to prosocial behavior, supporting the short-term processes in GLM. Greitemeyer (2009a) found that participants who listened to prosocial song lyrics had significantly higher accessibility to prosocial thoughts, higher levels of state empathy, and behaved more prosocially (donating money to a charity) compared to participants who listened to neutral song lyrics. Furthermore, Greitemeyer (2009b) found that participants who listened to prosocial song lyrics (compared to neutral song lyrics) had higher levels of prosocial behavior (picking up pencils and assisting in future laboratory studies), which was mediated by empathy, rather than prosocial thought accessibility. This supports GLM but also suggests that the affective processing route may be the most influential route in predicting short-term prosocial media effects on prosocial behavior; however, more work and replication is needed to support this claim.

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## Overall Conclusions

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In this chapter we have discussed research on the relation between exposure to mass media content and behavior. In doing so, we have elaborated on the general aggression model, and we have elucidated how, why, and for whom media violence exposure is likely to be related to aggressive behavior. Second, we briefly discussed the general learning model, which is, in itself, a direct generalization of GAM. GLM has the power to predict many of the behavioral effects that the mass media shape, including aggressive and prosocial behaviors. Both of these models were discussed in terms of their proximate, short-term relations between the mass media exposure

and behavior, but also their longer, distal processes regarding the learning, development, and retrieval of several highly related knowledge structures that result from continued media exposure and that are instrumental in understanding long-term media effects.

Despite the wealth of evidence for the relation between mass media exposure and behavior, we believe that more work is needed. For instance, more high-quality longitudinal research is needed to test the relation between media violence exposure, various mediating variables, and aggressive behavior. Although accruing longitudinal evidence has become available (Anderson et al., 2007; Anderson et al., 2008, Hoph et al., 2008; Moller & Krahe, 2009), more work and replication are needed to determine more precisely how media violence exposure is related to aggressive behaviors years later. Also, we believe that focus on the effects of prosocial media exposure deserves increased empirical attention. Although recent evidence suggests that prosocial media exposure is related to prosocial behavior (Gentile et al., 2009; Greitemeyer, 2009a; Greitemeyer & Osswald, 2009), more work is needed to test for additional moderators and mediators in this relationship.

One research area that needs continued empirical attention, and that would test the postulates of both GAM and GLM, is the relation between exposure to relationally aggressive media depictions and relational aggression, defined as “harming others through purposeful manipulation and damage of their relationships” (Crick & Grotpeter, 1995, p. 711). Relational aggression is important to study because it may capture gender-related aggression tendencies. Research has shown that exposure to relationally aggressive media is related to subsequent relational aggression, but also to subsequent physical aggression (Coyne et al., 2008). Coyne et al. (2008) suggested that this provides support for GAM (and thus GLM), but also supports a crossover effect, such that viewing one type of aggressive behaviors in the media may generalize to other forms of aggressive behaviors.

Mass media are not inherently good or bad, but people learn and content matters (Gentile et al., 2009). What the media portray and teach is likely to determine what attitudes, beliefs, and behavior(s) get learned. Research has shown, and theoretical models predict, that violent content is related to aggressive behavior and prosocial content is related to prosocial behavior through such learning processes.

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