Summary and Keywords

This chapter reviews the history of modern psychological inquiry into human aggression and the development of aggression theory over time. Definitions of aggression-related phenomena are provided along with taxonomies of aggression that are frequently considered by psychological scientists. Modern, domain specific theories of aggression are detailed with emphasis placed on integrative theories of aggression. Special focus is paid to the scientific benefits and recent discoveries that are attributable to the use of integrative theories of aggression. Success in domains that serve as exemplars of systematically examining all known aggressive processes are identified as leaders in the productive future of aggression research.

Keywords: aggression, violence, suicide, climate change, GAM, aggression theory, media violence

Introduction

It is unsurprising that the contemplation of human aggression—its antecedents, processes, and consequences—is among the world’s oldest psychological puzzles that has attracted the attention of great thinkers throughout history. After all, human aggression is matched in its destructive potential to human life only by cataclysmic events such as plagues and natural disasters. There are few constructs in psychology that have such a rich history of assessment and have made so much theoretical progress over time.

Our goal for this entry is to present theoretical accounts of human aggression and their development over time. We begin with an overview of aggression-related terms and definitions. We then describe major theoretical advancements over time, including the application of modern theories to contexts ranging from suicide to entertainment media to climate change and war. Finally, we emphasize theoretical approaches that can be applied to a variety of domains that may advance scientific understanding of this ubiquitous human behavior.
Definitions and Terms

Aggression, as defined by social psychologists, is any behavior that is intended to harm another person who is motivated to avoid such harm. This definition does not include aggressive emotions such as anger, nor does it refer to related thoughts such as aggressive fantasies (Anderson & Bushman, 2002; DeWall, Anderson, & Bushman, 2011). Commonly used taxonomies of aggression in research are based on either manifestation or motivation. Physical aggression requires physical contact between the two parties or the use of an object or body part (e.g., knife, noose, candlestick, revolver, poison) to cause bodily harm. Verbal aggression involves (often derogatory) spoken or written language directed at the target, whereas relational aggression involves intentionally harming a target’s social relationships. A less commonly considered form of aggression (at least in basic research) is property aggression, such as damage to or withholding of a target person’s property. Researchers also commonly consider somewhat broader categories such as direct (physical and verbal) and indirect (relational and property) aggression.

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<tr>
<th>Type</th>
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<tr>
<td>Physical</td>
<td>Fighting, hitting, kicking, throwing objects at the person</td>
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<td>Verbal</td>
<td>Cursing at, insulting the person</td>
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<td>Relational</td>
<td>Spreading rumors, complaining about the person to their friends and/or family members</td>
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<tr>
<td>Property</td>
<td>Breaking, stealing, or hiding items belonging to the person</td>
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Motivational taxonomies consider the proximate and distal intentions of the aggressor. Instrumental aggression (commonly referred to as proactive aggression) is affectively “cold” and is characterized by non-aggressive distal goals (e.g., money, status). This includes behaviors such as contract killings, which are not primarily motivated by intention to harm the target, but by intention to obtain a secondary goal (e.g., money). This ultimate goal of obtaining a non-harmful reward does not absolve the proximate goals of harm, and thus such acts meet the definitional criteria of aggression. A dentist conducting a painful procedure has the ultimate goal of helping the target person, but also incidentally produces harm (i.e., pain). However, in such cases the target is motivated to accept the harm as a necessary condition of receiving the benefits of the dental procedure, thus freeing the good doctor from label as aggressive.

Hostile aggression (also commonly referred to as reactive aggression) is affectively “hot” and involves the ultimate goal of harming another (e.g., insulting a family member during a heated political debate). It is worth noting that defining these terms does not indicate
that they are discrete forms of aggression that occur in an either/or fashion. Mixed motivations commonly underlie the same behavior, and many of the near-infinite variety of aggressive incidents contain elements of both hostile and instrumental aggression (Bushman & Anderson, 2002).

Violence is an extreme form of aggression in which intent to cause serious physical harm requiring medical attention or potentially death is either a proximate or ultimate goal (Krug, Mercy, Dahlberg, & Zwi, 2002). Importantly, the behavior does not have to result in serious harm to be considered violent. A person who shoots a gun at others, but misses, still meets the definition of having behaved violently. Violence thus refers to a subset of aggression; that is, all violence is aggressive but not all aggression is violent.

Aggressive cognition is an umbrella term that refers to a variety of both explicit and implicit aggression-related thought processes. Aggressive fantasizing, on the one hand, is a good example of an explicit process in which the individual is aware of the thoughts, has some degree of control over them, and the process requires attentional resources to be allocated. Aggressive priming, on the other hand, occurs without awareness, requires little or no effort to occur, and does not require attentional resources (Bargh, 1992). Related to priming are aggression-related scripts (Huesmann, 1988), which are a specific type of well-rehearsed knowledge structures about common situations that frequently lead to aggressive behavior under the appropriate (or apparently appropriate) social conditions (e.g., when provoked, verbally aggress). For example, when going out for dinner, the typical (nonaggressive) script requires that patrons wait to be seated, order drinks, then order food, eat, pay, and leave. Similarly, when a person is insulted, they may have learned that it is in their best interest (e.g., maintaining “face”) to retaliate verbally or physically.

Aggressive attitudes and beliefs fall under the broad heading of aggressive cognition, though they are typically referenced by their more specific labels in the research literature. Some aggression-related biases can also be seen as types of aggressive cognitions. Perhaps the most heavily studied example is the hostile attribution bias (Crick & Dodge, 1994), which is a tendency to interpret ambiguous social encounters in hostile terms (e.g., interpreting being bumped in the hallway as intentional; Anderson & Bushman, 2002; De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002; Kirsh, 1998).

Aggressive affect refers to a group of emotion-based aggressive-related emotional states, the obvious example being anger. Hostility differs slightly from anger in that it is characterized by resentment and suspicion (Buss & Durkee, 1957) and is typically considered a more stable personality trait, rather than a momentary state. Desensitization refers to a reduced physical and emotional reactivity to the viewing of aggressive and violent acts (Carnagey, Anderson, & Bushman, 2007). Desensitization fosters aggression by reducing the natural emotion-based aversive reaction to the notion of causing harm to others, and by reducing the judged severity of injuries or emotional harm sustained by a victim of aggression. This latter path by which desensitization can
increase aggression is often operationalized as a lack of empathy; it also leads to reduced helping or prosocial behavior directed at victims of aggression and violence.

Theories of Aggression

Frustration-Aggression Hypothesis

In some early theoretical work in the scientific study of aggression, Dollard, Miller, Doob, Mowrer, and Sears (1939) developed the frustration-aggression hypothesis. Put simply, this hypothesis posits that aggression is the result of the experience of frustration: “people are driven to attack others when they are frustrated: when they are unable to reach their goals, or they do not obtain the rewards they expect” (Berkowitz, 1993, p. 30).

Frustration can be defined in many ways but tends to refer to one of two phenomena. First, the older behaviorist tradition frustration refers to an external barrier to a goal, and the subsequent aggressive response is seen as an attempt to overcome that barrier. This approach differs from a second definition, which refers to frustration as an internal state generated by the thwarting of a goal. In the original frustration-aggression hypothesis, the former definition is adopted, with emphasis placed on the barrier preventing the attainment of an expected goal.

The adoption of this definition allows theorists to make more nuanced predictions regarding when aggression is likely to occur. For instance, poverty is a well-known risk factor for aggression (e.g., Guerra et al., 1995; Tremblay et al., 2004; Wolff, Santiago, & Wadsworth, 2009; though there is evidence that the relation is bi-directional; Serbin et al., 2011). Poverty certainly limits the accessibility of a variety of desired goals (e.g., financial security, nice living conditions, opportunities available to children and spouses, etc.), but the frustration-aggression hypothesis predicts that the effect of poverty on aggressiveness should be limited as a function of how much individuals expect to obtain those rewards.

It is worth noting that the original frustration-aggression hypothesis explicitly stated that all aggression results from some degree of frustration. Certainly, this perspective led to valuable insights into better understanding the antecedents of aggression (e.g., Cohen, 1955). The approach, however, had difficulty explaining a number of known predictors of aggressive behavior. The theory, for example, has difficulty explaining instrumental forms of aggressive behavior (e.g., contract killings), in which there is no clear agent of frustration. The frustration-aggression hypothesis defines aggression in large part as a reactive process (i.e., a consequence of a goal being thwarted, a frustration), whereas instrumental aggression is more proactive—that is, the behavior preemptively addresses potential frustrations (e.g., not having money).

Other limitations of this theoretical approach are evident when examining the nature of frustrating events. When a frustrating event is perceived as unjustified, arbitrary, or illegitimate, for example, aggression is much more likely to ensue (Cohen, 1955;
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Kregarman & Worchel, 1961; Pastore, 1952; Rothaus & Worchel, 1960). It is difficult to determine, however, whether the underlying mechanism behind these types of frustrations is the violation of expectations, rather than other characteristics (e.g., the unjustified nature of the frustration). In response to this criticism, theorists argued that non-arbitrary frustrations, for example, prevent an award from being expected in the first place (Berkowitz, 1993).

The theory falters most clearly when considering some of the more subtle influences on aggression. Aggression-related priming effects, for example, demonstrate increases in aggressiveness after simply exposing individuals to imagery related to aggression (Bartholow, Anderson, Carnagey, & Benjamin, 2005). Well-known examples include the weapons effect (Berkowitz & LePage, 1967; Parke, 1975) or violent media content effects aggression (Anderson et al., 2010). In such studies, there is no clear source of frustration to which aggressive behavior can be attributed. In response, theorists have developed more nuanced approaches to understanding aggression that incorporate a better understanding of memory-related processes that drive aggressive behavior.

Cognitive Neoassociation Theory

Cognitive neoassociation theory differs from the frustration-aggression hypothesis by incorporating the roles played by internal states to drive aggression. In this theory, Berkowitz (1989) argues that aggression is best understood by considering the degree of negative affect that is generated by an aggression-eliciting event. In this theory, aggressive behavior is the result of a multi-stage process that begins with an event that generates negative affect. This negative affect, in turn, automatically triggers a fight-or-flight response that (when not producing avoidance) drives aggressive action. This approach better handles explanations of less obvious sources of aggression that are difficult to attribute to frustration. Poor sleep, for example, produces negative affect through its persistent negative influence on bodily comfort, alertness, etc. It is unclear whether poor sleep directly induces frustrations (e.g., through one’s reduced ability to manage their surroundings) and certainly this is not always the case. Given the well-known effect of sleep deprivation on aggressiveness (e.g., Kamphuis, Meerlo, Koolhaas, & Lancel, 2012; O’Reilly, 1995), it is unlikely that this effect is entirely due to sleep deprivation’s effect on the likelihood of generating frustrations. Cognitive neoassociation theory, however, easily handles some of these issues. (See Hisler & Krizan, 2017; Krizan & Herlache, 2016, for recent advances in sleep and aggression.)

In addition to the focus on negative affect, this theory also addresses the more subtle aggression-inducing effects, such as priming. As an associative model, the theory leverages the well-studied structure of semantic memory (Collins & Loftus, 1975) to explain both subtle priming effects, and to better understand the more direct negative affect-aggressive relation. In short, the model posits that aggression-related concepts (thoughts, actions, emotions) are intimately linked to negative emotional experience in memory and that such negative experiences automatically trigger the activation of these concepts in memory. In other words, negative affect generates “a variety of expressive-
motor reactions, feelings, thoughts, and memories that are associated with both flight and fight tendencies” (Berkowitz, 1989, p. 69).

Cognitive neoassociation theory also allows for the incorporation of life experiences, genetic predispositions, and situational characteristics that create, develop, and activate aggression-related knowledge structures that drive aggression. Other theorists have furthered our understanding of the complex cognitive operations that drive aggression following the experience of negative affect. Attribution processes, for example, are critical for making judgments about the nature of an event that are relevant to determining the appropriateness of aggressive responding (e.g., having a drink spilled on you being attributed to a mere accident vs. intentional harm; Anderson, Krull, & Weiner, 1996). Self-efficacy expectations involve beliefs about whether oneself is capable of effectively carrying out an aggressive action (Bandura, 1977). The likelihood of “winning” a physical fight with someone who is taller and stronger than oneself is lower, and therefore actions likely to lead to a physical confrontation are less likely to be selected as viable responses to a situation. Understanding the likely outcomes of a given behavior (i.e., outcome expectancies; Bandura, 1986) also drives the decision making process. If the target is believed to be likely to “back down” from a confrontation, for instance, aggressive actions are more likely. Each of these (and other) processes interacts during any given potentially aggression-eliciting event to produce the rich variety of potential responses—aggressive and non-aggressive—to a situation.

Excitation Transfer Theory

A more basic (relatively speaking) psychological process that drives aggression is described by excitation transfer theory (Zillmann, 1971). In short, the theory posits that stimulation derived from a previous situation can serve to trigger or enhance aggressive responding in a subsequent situation. The theory rests upon an understanding of the interactive nature of arousal and attribution processes.

To understand excitation transfer theory, one must first understand that the mind uses physiological sensation to make sense of emotional experiences. In classic work by Schachter and Singer (1962), participants were randomly assigned to be injected with an experimental drug (“Suproxin”) adrenaline or a placebo. In addition, half of the participants were told that they should expect side effects of the drug that include shaking hands, heart pounding, feeling flushed, and similar symptoms characteristic of sympathetic nervous system activation. The remaining participants were left ignorant of the potential outcomes of the injection. Next, participants interacted with a confederate who behaved as if they were either in a good mood or angry. Participants who were given a clear source to attribute their internal state (aroused due to the drug) were less affected by the presence of the confederate. When no clear attribution was available (e.g., they were not informed of the effects of the drug), their emotional ratings were more influenced by the confederate. In other words, they attributed their internal state to the current situation, rather than correctly attributing it to the previous situation (i.e., the injection). Importantly, this process is not necessarily limited to negative behaviors. In a
classic study by Dutton and Aron (1974), participants were asked to cross one of two possible bridges, a rickety suspension bridge, or a sturdy bridge. The fear-eliciting effect of the suspension bridge induced male participants to be more likely to call a female research assistant following the end of the experimental session. That is, they misattributed the arousal that was caused by fear from crossing an apparently dangerous bridge to the attractiveness of the research assistant. Importantly, this effect was diminished when participants were allowed time for their arousal to dissipate before encountering the research assistant.

A similar process can occur that can drive aggressive behavior. When encountering an arousal-inducing event (including brief exercise), attributions made during a subsequent event, in which an aggressive response is potentially appropriate, are informed by the initially derived arousal. This is one of the theoretical processes that likely gives rise to violent media effects, for example (Groves, Prot, & Anderson, 2016). Violent content is naturally excitatory. When individuals engage with violent content and are subsequently provided with an opportunity to aggress toward another individual, they may be more likely to decide to aggress (e.g., the arousal is interpreted as anger) or their aggressive response may be amplified (e.g., their anger response is strengthened). This type of misattribution of arousal has been demonstrated in the aggression domain using a bike riding manipulation. Participants who had to ride a bike (to induce arousal) prior to playing a Battleship-type game gave more aversive blasts of noise as feedback for opponent’s misses (Zillmann & Bryant, 1974).

Social Learning and Social Cognitive Theories

Social learning and social cognitive theories (e.g., Bandura, 1978, 2001; Mischel & Shoda, 1995) emphasize the role of learning processes in the generation of habitual aggressive responding. Social learning theory posits that individuals learn to be aggressive in much the same way that they learn other complex behaviors: through direct experience or observational learning. The theory provides a framework for incorporating basic learning processes such as operant and classical conditioning (e.g., receiving rewards for aggression, developing positive associations with aggression). Additional emphasis is placed on the role of observational learning (as in the classic Bobo doll experiments; Bandura, Ross, & Ross, 1961). Put simply, individuals learn to aggress by observing others engage in a behavior and associating the behavior with its observed outcomes, or vicariously experiencing the subsequent rewards and punishments.

Social Interaction Theory

Social interaction theory (Tedeschi & Felson, 1994) considers aggression as a form of coercive action that is driven by expected rewards and costs of the behavior. This theory emphasizes that aggression is enacted with specific goals such as to obtain something of value such as money, sex, services, influence, or safety (among many other potential rewards). Particular importance is placed on the rational, cognitive assessment of rewards, costs, and the probabilities that these outcomes are to occur as a result of the
coercive act. Certainly, the theory does not (nor is necessarily designed to) fully explain hostile forms of aggression in which aggressive responding is relatively automatic (e.g., striking a significant other who was caught cheating). Even these instances of behavior, however, often contain elements of rational acting (e.g., teaching the target “a lesson,” deterring future undesirable actions by the target).

Integrative Theories and the General Aggression Model

The theories described thus far constitute some of the most powerful tools for understanding and predicting aggressive behavior, but when described in isolation, only pieces of the full picture emerge. For this reason, integrative theories of aggression, such as I$^3$ theory (pronounced I cubed) attempt to consider the full gambit of processes that occur within any given aggression episode. I$^3$ theory specifically posits that aggressive episodes consist of Instigating triggers, Impelling forces, and Inhibiting forces that drive the episode. Domain-specific theories of aggression are evoked when considering which processes operate to drive each of these forces (Slotter & Finkel, 2011). Relative to much theorizing in aggression research, this theoretical orientation emphasizes the role of inhibiting factors in the production of aggression.

The most comprehensive modern theoretical framework of aggression is the bio-social-cognitive general aggression model (GAM; Anderson & Bushman, 2018). This model certainly considers inhibiting factors in aggression, but its emphasis is on the structural relations between all domain-specific theories of aggression. The primary purpose for developing GAM was to organize current theoretical knowledge from multiple subdisciplines into a more useful and general framework. As Jules Henri Poincaré noted, “Science is built up with fact, as a house is with stone. But a collection of fact is no more a science than a heap of stones is a house” (Poincaré, as cited in Anderson & Bushman, 2002). In short, GAM is a model of aggression that incorporates domain-specific theories of aggression into a general framework that describes both short- and long-term aggression-related processes.

Short-Term Processes

In the immediate situation, there are two sources of input: the person and the situation. The person variable includes all long-term propensities of the individual: their personality characteristics, learning histories, genetic propensities, values, beliefs, and so on. It also includes less trait-like aspects of the person, such as current mood state. The situation includes any and all characteristics of the immediate situation ranging from the experience of a provocation to the ambient temperature of the room.

These two inputs interact to influence the present internal states of the individual. There are three main categories of internal states described by GAM. They include cognition, affect, and arousal. Importantly, these internal states are mutually interactive. For example, experiencing a provocation may induce cognitive evaluations such as rumination about the unjustified nature of the provocation. This, in turn, may increase anger, which then influences the individual’s arousal. In addition to the transfer of
excitation between situations, arousal can have direct effects on aggression as it tends to enhance the dominant response to a situation (Zajonc & Sales, 1966). It may also serve as an aversive state, at least to some, thus inducing aggression through the processes described by cognitive neoassociation theory (Anderson & Bushman, 2002), though this possibility requires additional testing in the literature. These possibilities only begin to illustrate the deeply interactive nature of these internal states and how complicated these relationships can become when considering the full battery of psychological processes that operate simultaneously (Strack & Deutsch, 2004).

Next, the individual’s internal states inform decision-making processes. During this step, the individual generates a potential response to the situation using predefined scripts and/or other knowledge structures. This initial appraisal process occurs automatically and with little or no awareness. If the individual does not possess the cognitive resources required (e.g., attentional capacity, time) to reevaluate the initially primed action, an impulsive action is enacted. When cognitive resources are available, the individual assesses whether the expected outcome of the initially primed action is both important and unsatisfying. If both of these two criteria are met, then reappraisal occurs. This process, as initially described by attribution theory (e.g., Anderson et al., 1996) and adapted for GAM, involves the repeated generation and assessment of behavioral options until a response that meets satisfactory criteria is selected. When the

Figure 1. Appraisal and decision making processes in GAM. Reprinted with permission from Anderson and Bushman (2002).

Figure 2. General aggression model short-term cycle. Adapted from Anderson and Bushman (2002). Reprinted with permission.
satisfactory behavior is selected and executed following the reappraisal process, the result is considered a thoughtful action. It should be noted that a thoughtful action is not necessarily less aggressive than an impulsive action, though it often is. For instance, upon reappraisal (or rumination; see Bushman, 2002) an individual may consider the history of similar provocations they were subjected to by the target and, as a result, decide to engage in aggression, or enhance the initial aggressive response.

Once the chosen behavior is enacted, the new “current” situation is influenced by that behavior and a new cycle begins with a new set of situational stimuli. Understanding aggressive episodes in these terms provides a natural framework for understanding multi-cycle social interactions, such as the violence escalation cycle (Anderson, Buckley, & Carnagey, 2008). In this common social phenomenon, a perceived or actual provocation is experienced, which influences internal states and subsequent decision-making processes in which the individual engages in an aggressive act. The target, believing their initial action was justified, and the retaliation unjustified, engages in an enhanced aggressive response, triggering another aggressive cycle. This process repeats until (a) the parties are separated, (b) beliefs about the intent or justification of the party becomes benign (e.g., new information is encountered) or (c) underlying knowledge structures that promote peaceful interaction are developed (Anderson & Carnagey, 2004; Barlett & Anderson, 2011). Importantly, it should be noted that this process is not limited solely to individuals but can be generalized to social groups ranging in size from towns (e.g., football rivalries) to nations (e.g., international conflict).

Long-Term Processes

Long-term processes are those that determine the nature of the “person” input variable across short-term cycles. Five primary long-term process/content domains were illustrated by early versions of GAM; a sixth has been added recently. The first is aggression-related beliefs and attitudes. Individuals who come to believe that aggression is normal, have a positive attitude toward aggression, or believe that aggressive responding will produce positive outcomes, are much more likely to engage in aggression (e.g., Möller & Krahé, 2009). The second, aggressive perceptual schemata, describe processes that increase (or decrease) the likelihood that individuals interpret environmental stimuli in a way that promotes aggressive responding (e.g., hostile attribution biases). Aggressive expectation schemata refer to expected outcomes of aggressive responding (e.g., the aggressive act will successfully coerce the target). Aggressive scripts, as previously described, detail the arsenal of behavioral options that are available to the actor. Desensitization to aggression and violence increases aggressiveness in the long term by making aggressive responding less naturally aversive and reduces the degree and likelihood that the victim of aggression is perceived as harmed. The newest addition to this list involves changes to brain structure and function, especially as applied to executive functions and impulse control. Briefly, some factors that influence the development of aggressive personality appear to do so by reducing the person’s ability to inhibit impulsive actions or to exercise sufficient executive control.
These relatively stable characteristics serve as core components of the aggressive personality. Critically, these traits do not operate independently of the situation but, as noted previously, interact with the situation. For example, aggressive individuals may be more likely to develop friendships with other children who are aggressive, increasing the likelihood that they find themselves in situations that will elicit aggression.

According to GAM, these traits are each viewed as a specific organization of knowledge structures. That is, knowledge structures are a flexible organization of cognitive and affective information that facilitates successful interaction with the world. For example, desensitized individuals have reduced associations between concepts of aggression and harm or perceived negativity (aversion) of the act. In contrast, individuals with high aggressive expectation schemata have strong associations between aggressive responding and positive outcomes. Therefore, GAM views personality, in a very real sense, as “the sum of a person’s knowledge structures, constructed from countless experiences throughout the life span, influenced by biological factors as well as situational ones. At any given point in time, how a person construes and responds to the social world depends on the situational factors in his or her world and on the knowledge structures he or she has acquired and uses habitually” (Anderson & Carnagey, 2004, p. 178; Anderson & Huesmann, 2003; Mischel & Shoda, 1995; Sedikides & Skowronski, 1990).

An excellent illustration of this approach to understanding personality comes from work by Bartholow et al. (2005). In this study, participants were selected based on whether they identified themselves as hunters or non-hunters. They were subsequently presented with images of hunting-related guns (e.g., a hunting rifle) or non-hunting related guns (e.g., an assault rifle).

Experimental work indicated that hunters associated assault rifle imagery with aggression, but did not have such an association with hunting rifles, whereas the reverse was true for non-hunters. This life experience (hunter/non-hunter) by type of gun (hunting/assault) interaction was also found in the elicitation of aggressive behavior. In short, hunters were more likely to automatically associate assault rifles with violence, relative to hunting rifles, and therefore were also more likely to behave aggressively when in the presence of an assault rifle image than a hunting rifle image; non-hunters showed the opposite pattern for both aggressive cognitions and behaviors. This work
provides a rich example of the interaction between learning histories, knowledge structure development, and the present situation.

Applications

As we have illustrated throughout our coverage of theories of aggression, aggression-related behavior is exceedingly complex and much of the theoretical effort conducted over the last two decades has focused on organizing these complex processes into manageable frameworks. Indeed, there have been significant advancements in a number of fields. Next, we discuss some (but certainly not all) of the domains that modern social-cognitive approaches to understanding aggression have been applied, with topics selected in an attempt to illustrate the breadth of their application.

Violent Media Effects

Research on the effect of violent media use on aggression is over half of a century old and is among the best-studied social psychological phenomena in the aggression domain. Nearly all of the processes that have been described have been demonstrated as playing a role in violent content effects (Groves et al., 2016). Violent media is often dichotomized into two categories: passive (TV, movies) and active (video games). Certainly, there are some important differences but the vast majority of aggression-related processes are similar between these two forms of media and, therefore, this distinction will not be discussed here.

Among the most basic effects of violent content is its increasing of arousal. The effects can be demonstrated not just between violent and non-violent content, but within different demonstrations of violent content. In one study, turning the display of blood on in a video game increased participants’ arousal as measured by heart rate (Barlett, Harris, & Bruey, 2008). Other experimental work has found that violent content exposure increased the accessibility of aggressive thoughts (as predicted by cognitive neoassociation theory and GAM; Anderson & Dill, 2000). Increases in desensitization to real-life violence due to violent content exposure have also been observed in the lab (Carnagey et al., 2007) and field (Bushman & Anderson, 2009; Prot et al., 2014). Individuals who habitually engage with violent content also demonstrate beliefs that aggression is normal and appropriate, as well as demonstrate a tendency to interpret ambiguous stimuli in hostile terms (Anderson, Gentile, & Buckley, 2007; Krahé & Möller, 2004; Möller & Krahé, 2009). Consuming violent media in which aggression is rewarded also increases subsequent aggression in an unrelated context, while punishment of aggression in the media reduced aggressive responding (Carnagey & Anderson, 2005). The culmination of these effects leads to significant increases in aggressive behavior both in the short and long term (Anderson et al., 2010; Bushman & Huesmann, 2006; Huesmann, Moise-Titus, Podolski, & Eron, 2003).
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Temperature and Aggression

People naturally associate hot temperatures with aggressiveness. So much so that it is built into everyday language (“hot headed,” a “heated debate”). In early tests of GAM, Anderson, Deuser, and DeNeve (1995) demonstrated effects of temperature across three studies on all three internal states as described by GAM. Individuals in these studies reported experiencing increases in aggressive thoughts, feelings, and arousal when the temperature of the room was set to 95 degrees Fahrenheit, relative to a comfortable 72 degrees. These findings extend beyond the lab and have been found in societal-level violent crime rates, even after controlling for alternative explanations (e.g., southern culture of honor effects on aggression; Anderson & Anderson, 1996).

Clinical Applications: Violent Offenders, Domestic Violence

Of particular interest to clinical contexts is the prevalence of specific knowledge structures among violent offenders. Researchers in this domain have applied GAM to better understand the role of the development of early maladaptive schemas (stable, rigid knowledge structures regarding the self, others, and relationships that contribute to maladaptive behavior; EMSs) in youth and relations between these cognitions and engaging in violent crime. In some excellent work by Gilbert, Daffern, Talevski, and Ogloff (2013), several EMSs, such as beliefs that one cannot control themselves or that they are entitled to beneficial treatment, were related to aggression and positive attitudes toward violence. Work in this domain has addressed the role of maladaptive cognitions, but have focused narrowly on specific cognitive processes, such as hostile attributions and beliefs supporting violence (Gilbert, Daffern, & Anderson, 2017). Theorists in this domain have emphasized that more attention should be paid to the available repertoire of aggressive and non-aggressive (e.g., de-escalation) scripts with emphasis on developing scripts for those with impoverished repertoires, and encouraging use of appropriate scripts when available (Gilbert, Daffern, & Anderson, 2017). Similarly, GAM has also proven useful in understanding and treating domestic violence (Warburton & Anderson, 2018).

Suicide

Social-psychological interest in suicide has a long history (e.g., Beck, Kovacs, & Weissman, 1979) Suicide does not meet the strict definition of aggression as the “target” is not motivated to avoid the harm, but examination of this psychological phenomenon can benefit from considering the behavior as a form of self-aggression. In a review by DeWall, Anderson, and Bushman (2011), it is noted that affective, cognitive, and arousal-related internal states play key roles in this behavior. Internalizing anger, for example, is among the leading risk factors for suicidal completion (Van Orden et al., 2010). Repeated cognitive rumination about suicide (i.e., suicidal ideation) is a serious risk factor for suicide (Van Orden, Merrill, & Joiner, 2005). Further, given the natural aversion individuals have toward the experience of pain and death, desensitization to such stimuli serves as a potential risk factor for suicide (Nademin et al., 2008). As pointed out by
DeWall et al. (2011), sociological approaches to understanding suicide successfully identify risk factors, but often fall short when explicating the mechanisms that drive the risk factor. Social-cognitive models of aggression easily handle these limitations and provide a rich framework for developing a rich understanding of the full array of processes that give rise to increases in risk.

**Climate Change and Violent Behavior**

Recent reviews and integrations of research on rapid climate change and violence have demonstrated that there are at least three major pathways by which current rapid global warming is increasing the relative frequency of violent behavior. One has already been mentioned—the heat effect, in which exposure to uncomfortably warm temperature increases aggressive and violent behavior, including violent crime rates (e.g., Anderson & DeLisi, 2011). The other two pathways both involve ways in which ecological disasters increase risk factors known to yield increased likelihood that children will develop into violence-prone adults (e.g., malnutrition, broken families), and risk factors known to increase political instability, intergroup violence, and war (e.g., eco-migration, unemployment). (See Plante, Allen, & Anderson, 2017; Plante & Anderson, 2017.)

**Future Directions**

With the development of broad bio-social-cognitive models such as GAM, and of modern neuroscience and behavioral science methods and tools, the study of aggression is well-equipped to develop a much more thorough understandings of nearly all aggression-related processes. Certainly, no single theoretical approach holds all the keys to understanding. General frameworks, however, are designed to be constantly updated with additional insights derived from more domain specific theories. Incorporation of specialized theories into GAM, across all domains of aggression research, is likely to drive advancements for decades to come.

Among the applications covered here (and many others), the violent media effects domain serves as an excellent model for fully explicating the psychological processes that produce any given aggression-related phenomenon. This field, in particular, has developed a relatively comprehensive understanding of the phenomenon, its antecedents, processes, and consequences. The theoretical and methodological tools have allowed a detailed understanding of moment-to-moment effects, short-term effects, and long-term developmental effects. It is our hope that this chapter, and the work cited within, provides inspiration for researchers in other domains who may benefit from examining the role all of the components of GAM in the explication of their social phenomenon of interest.

**References**

Human Aggression


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