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PHYSIOLOGICAL AROUSAL, REACTIVE AGGRESSION, AND THE INDUCTION OF AN INCOMPATIBLE RELAXATION RESPONSE

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ABSTRACT. *This review examines the major cognitive/social approaches to reducing reactive aggression and their interdependency on neural mechanisms associated with arousal. According to psychological theory, physiological arousal serves as a nonspecific energizer of cognitively defined emotions. Physiological models emphasize a bottom-up approach, many higher cortical functions serve to reduce heightened arousal and these reductions are essential before cognitive techniques can modulate aggressive behavior. Higher cortical functions are associated with complex cognitive processes necessary for self-control, anticipating consequences, and behavioral inhibition. Heightened arousal interferes with cognitive performance; disinhibiting aggression and reinforcing behavior that reduces arousal. Studies manipulating empathy, humor and sexual content have demonstrated efficacy of incompatible responses to reduce anger and aggression, but when attributions are negative and arousal high all of these manipulations can increase chances of overt aggression. The incompatible response hypothesis is extended beyond empathy, humor, and sexual arousal to include relaxation techniques for prevention and control of aggression. Cognitive-behavioral therapeutic programs have successfully reduced aggression by combining relaxation, systematic desensitization, and biofeedback with cognitive restructuring and anger management training. © 1998 Elsevier Science Ltd*

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ALTHOUGH THERE HAVE been divergent opinions concerning the definition of aggression, most researchers in this field have moved toward acceptance of two different kinds of aggressive behavior (Baron & Richardson, 1994). Reactive aggression involves responses undertaken to terminate or reduce aversive conditions or retaliate against a perceived threat or provocation. Reactive aggressors are driven by strong internal arousal to assault the target, not considering costs or benefits, lashing out at a victim with little or no self-restraint (Berkowitz, 1993). In contrast, instrumental aggression involves proactive behaviors designed to attain a specific goal other than seeking to harm or injure the person attacked. Many robbers

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are instrumental aggressors, as are batterers, who want to assert their dominance and control over others; habitually using force in a cool and premeditated manner to attain their objectives. A central theme in this review is that heightened arousal is an antecedent of reactive aggression in contrast to the more calm and controlled behavior associated with instrumental aggression. There are situations where people display a mixture of both proactive and reactive aggression; for example, when an aggressor's commands are resisted or refused, he might become emotionally aroused and impulsively strike out at a victim.

The aim of this review is to examine various theoretical and therapeutic approaches that reduce reactive aggression, particularly in terms of physiological arousal. Implicit in many theories of aggression are conceptual links between intensity of stimulated physiological arousal and probability of aggressive response (Berkowitz, 1990; Zillmann, 1983). First, the review examines how conceptual links were historically derived from psychophysiological models of emotion and how current neurophysiological models suggest ways of reducing aggression. Second, we present an overview of research that suggests that heightened arousal interferes with the cognitive constraints to aggression, motivates the person and transfers from nonaggressive sources to amplify aggression. Finally, studies of empathy, humor, and sexual content are compared to therapeutic uses of behavioral techniques to lower arousal as incompatible responses to aggression. In general, relaxation can lower arousal and combined with cognitive self-control skills, can lessen the likelihood of emotional outbursts and reactive aggression.

NEUROPHYSIOLOGICAL MODELS OF AROUSAL

According to Berlyne's (1960) theory, arousal is an intervening variable used to clarify such diverse phenomena as motivation, sleep, attention, and emotion. Arousal is a term widely used to describe a nonspecific facilitation of cortical transmission that results in increased alertness, responsiveness, and vigilance (Hebb, 1972). According to Berlyne (1960), the portion of the nervous system hypothesized to control alertness and attention is the reticular arousal system. This system contains diffuse ascending cortical projections that respond to the emotional intensity or urgency of stimuli based on past experience and physiological biases. Berlyne's (1960) conception of the reticular arousal system took on new meaning as knowledge of the functions of some of the specific neurochemical pathways mediating arousal became more apparent (Koob, 1991). While some researchers have hypothesized one mechanism for arousal, aggression research suggests that there are many specific and nonspecific brain systems affected by arousal (Laborit, 1993).

There is continual communication and control exerted between cortical, subcortical, and autonomic levels of the nervous system. Investigators generally think of top-down activity when discussing self-control of aggression (Leventhal, 1991). For example, people are sometimes capable of inhibiting overt violence and to some degree voluntarily controlling facial expression by cognitive processes. A thought or mental image can initiate the body's adrenal cortical responses, heart rate, and immune activity (Stemmler, 1989).

Cognitive models of anger and aggression give relatively little attention to bottom-up processing, though influences from lower to upper levels may be the most pervasive and important predictor of aggressive behavior (Pfister & Muir, 1992). Reactive physical violence often has a primitive subcortical quality—kicking, gouging, scratching, hitting, spitting, biting. A wife is picked up bodily and thrown against a wall. Windows are broken, doors smashed, and holes punched in walls. A man kills another by a single stab wound to the heart, and then delivers more stabs to the dead body. Without thinking, a young woman bites her crying baby on the cheek, leaving a life-long scar (Elliott, 1988). Reactive aggression is mediated by subcortical centers and modulated by higher cognitive processes.

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