

color sense, sex differences, drug effects, and genius. Although he was a prolific author on psychological matters, Ellis remains a relatively unknown figure in the history of psychology, an obscurity due in large part to the fact that he neither trained in psychology nor held an academic position. Only recently have scholars examined the influence of Ellis on psychology, particularly his approach to the study of sexual deviance.

Most of Ellis's wide-ranging studies share a theoretical reliance on evolutionary theory. Drawing upon the work of Darwin and other evolutionists, Ellis selected among these writings, produced his own version of social and biological evolution, and then extended it to explain various psychological processes. Among the evolutionary tenets in his work are notions of variation, inheritance of characteristics, latency (the quiescence of an inherited trait for one or more generations followed by its reappearance), recapitulation (individual development recapitulates development of the race), natural and sexual selection, and the social evolution of customs and habits.

The application of evolutionary notions to human psychology is evident in Ellis's *Man and Woman: A Study of Human Secondary Sex Characteristics* (London, 1894) which arguably was the first systematic text published on empirical studies of the psychology of sex difference. In addition to asserting the necessity for conducting empirical studies of sex difference, Ellis also sought to distinguish "natural" or biologically based sex differences from "artificial" or socially induced differences, an aspiration which remains central to contemporary sex difference studies. He also distinguished between sex differences that are primary, secondary, and "tertiary" (characteristics such as intelligence and metabolism). He utilized an evolutionary criterion to assess differences in numerous characteristics including head size, affectability, intellectual impulses, and the variability of these characteristics. This evolutionary measure relied upon the idea of recapitulation in that Ellis classified the various characteristics as resembling either the human child or the savage: on this scale characteristics more resembling the human child represented a progressed degree of evolution. Ellis concluded that women were more akin to the child prototype, and hence, not only were they the more advanced sex but men were evolving after the female type. Especially in his later writings, however, Ellis warned that social progress and the realization of women's fuller participation in society might impede the manifestation of natural traits. He thus held that such social experiments would only be beneficial if they were consistent with biological evolution.

Ellis's better known work on the psychology of sex appeared in his multivolume *Studies on the Psychology of Sex* which began with the *Study of Sexual Inversion*, (London, 1897). Evolutionary theory was employed to argue that sexuality and reproduction were separate phenom-

ena; to establish what constituted "normal" sexual expression; and to explain types of sexual deviance, especially "inversion" or homosexuality. Sexual inversion was, according to Ellis, an organic variation of evolved characters, yet he believed that homosexuality was not a disease, as many of his contemporary sexologists claimed. By naturalizing homosexuality and by similarly justifying various sexual activities (including masturbation) as natural, higher-order acts, Ellis conveyed a sentiment of tolerance and open-mindedness.

Ellis's legacy, then, resides in his elaborate typologies, distinctions between natural and social, and in taking an open-minded attitude toward sex. Ellis is distinctive in his idiosyncratic meshing of liberal politics with scientific determinism and a philosophy of enlightenment with a dutiful reverence toward the hard empirical facts of nature. His works and ideas not only influenced psychologists who would later undertake empirical studies of sex and sex differences but also lay readers who were informed by his popular books and articles.

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Jill Morawski

EMIC-ETIC THEORY. See Cross-Cultural Psychology, article on Theories and Methods of Study.

EMOTION. [This entry comprises three articles: a broad overview and description of the term, including a brief history of the study of emotion in the field of psychology and a survey of the various kinds of emotion; a review of the principal theories of emotion, including those from various subdisciplines of psychology; and a discussion of the methods used to research and measure emotion and mood.]

An Overview

Psychology has witnessed a renaissance of interest in emotion. Emotion is now a central theme in neuroscience, development, personality, psychopathology, and culture. Although researchers approach emotion with

different measures and theoretical backgrounds, most agree in defining emotions as brief, rapid responses involving physiological, experiential, and behavioral activity that help humans respond to survival-related problems and opportunities. Emotions are briefer and have more specific causes than moods.

History of the Study of Emotion in Psychology

Emotion was a central interest to theorists who pioneered the science of psychology. In *The Expression of Emotions in Man and Animals* (1872/1988), Charles Darwin provided evidence of universality, continuity across different species, and explanations of why particular expressions are shown for particular emotions. In his 1884 essay "What is an emotion?" William James advanced two propositions that are the impetus of research and argument to this day: Each emotion is defined by specific physiological responses; and the experience of emotion follows rather than precedes the behavioral response of emotion.

The scientific study of emotion, however, would wait until the late 1960s to begin to emerge as a subdiscipline of psychology in its own right. Behaviorists who dominated psychological research during the 1930s, 1940s, and 1950s were skeptical of studying seemingly unobservable emotions that would prove difficult to measure with means other than introspection. The cognitive revolution in psychology of the 1960s, 1970s, and 1980s gave priority to cognitive and informational explanations over motivational and emotional explanations of human behavior.

The renaissance of interest in emotion has several origins. The theorizing of Sylvan Tomkins in the early 1960s directed a generation of researchers to consider the biological bases of emotion and the role of expression in emotional experience. Schachter and Singer's two-factor theory of emotion of 1962, which held that emotion is the result of the context-determined labeling of physiological arousal, had appeal because it seemed counterintuitive. Cognitively oriented theorists such as Herbert Simon posited that emotions serve functions within information processing systems. The study of stress and coping led researchers to consider different kinds of stress in the form of specific emotions. Finally, the cross-cultural studies of Paul Ekman and Izard, first published in 1969, demonstrated that facial expressions of emotion were universal, challenging the prevailing view that emotions, like the sounds of language, were culturally specific.

Questions, Issues, and Tensions in the Study of Emotion

The study of emotion is guided by a set of interrelated questions whose answers vary according to the theoretical perspective of the researcher. First, what is an

emotion? How do emotions differ and resemble each other and other psychological entities, such as sensations and moods? Is it most productive to develop theories about emotion in general, or about specific emotions or classes of emotions, such as the self-conscious, approach-related, or positive emotions? Are some emotions more basic than others, in the sense that more basic emotions are simpler, irreducible, and biologically based?

Second, what are the causes of emotions? To understand the proximal causes of emotion, researchers have examined how cognitive appraisals, expressive behavior, and physiological response contribute to the intensity and quality of emotional experience. Other researchers have considered the more distal processes that account for the content of emotion, addressing which aspects of emotion might be closed systems, predetermined by genetic code and biological maturation, and which aspects of emotion are open systems totally written by learning and culture, and which aspects are partially open.

Finally, why do humans have emotions? What functions do emotions serve? What adaptive problems do they solve? Theorists since the classical philosophers have often assumed that emotions disrupt rational, adaptive behavior. More recently, theorists, inspired by evolutionary theory, have argued that emotions solve specific problems essential to human survival, such as forming attachments, fleeing predators, or allocating collective resources. Researchers have likewise considered the functions of the different emotional responses, asserting that the facial, postural, and vocal display of emotion communicates important information to others, the physiology of emotion helps prepare individuals for quick action, and the experience of emotion serves to organize cognitive processes. These three general questions—what emotions are, what causes them, and what their functions are—motivate the different research traditions described in the ensuing sections.

Research on Different Aspects of Emotion

Research on different aspects of emotion has focused on how emotion is communicated, how it is registered in the autonomic and central nervous systems, and how it relates to cognitive appraisal, language, and judgment.

Communication. Information about what emotions are being experienced is conveyed by a person's facial expression, gaze activity, posture, gesture, voice, and spoken word. The research on the communication of emotion has centered on three related questions. First, is the experience of different emotions encoded or communicated in distinct behaviors? Second, do individuals accurately decode or interpret other individuals' emotions from their expressive behavior? Third, can individuals disguise their emotional reactions or fabricate

emotions they are not experiencing, and if so, what is the nature of that emotional experience?

Most studies have focused on people's abilities to interpret emotional expression. The initial studies of Paul Ekman and also of Carroll Izard presented photographs of theoretically derived facial expressions of emotion to individuals in different literate cultures and had those individuals judge the emotion shown. Ekman also did such studies with people who had little exposure to Western culture—the Fore of New Guinea. In those studies and dozens that followed, individuals from different cultures accurately identified facial displays of anger, disgust, fear, happiness, sadness, and surprise, in some studies shame and contempt, and more recently embarrassment and amusement. In one of the only cross-cultural studies of emotional expression (rather than recognition), Ekman found that American and Japanese students displayed similar emotional behavior when alone, but showed much different, culturally proscribed emotional displays when in the presence of an authority figure.

Subsequent research has focused on the nature of emotion perception and the functions of facial expressions within social interactions. Studies have ascertained that the perception of facial expressions is categorical, and that people may be biologically prepared to respond to certain expressions in adaptive ways. For example, when people are presented with facial displays of anger, even at subliminal levels, they respond with fear. Studies of parent-child interactions have found that facial expressions reward children for certain behaviors and discourage them from more dangerous behaviors, such as approaching a visual cliff.

Other researchers have investigated the acoustic properties of different emotions, motivated by the assumption that emotion is encoded in distinct acoustic properties that are reliably decoded by observers. Although the research is less extensive, findings indicate that different emotions are signaled by distinct acoustic properties, such as rise time and pitch, and that the acoustic signals of emotion play an important role in social interactions, for example, those between parent and child.

Autonomic Nervous System. William James argued that each emotion, from anger to aesthetic rapture, is defined by a distinct pattern of ANS activity, evident in changes in heart rate, breathing patterns, sweating, and other responses, that supports adaptive action. Walter Cannon and Carl Lange countered that emotions could not be associated with discrete ANS responses, which are too diffuse and slow to account for rapid and differentiated emotional responses.

To this day, the question of whether emotions involve discrete ANS responses is hotly contested. Studies have documented some emotion-specific ANS responses when people move emotion-related facial muscles or re-

live emotional experiences. For example, fear, anger, and sadness, compared to disgust, are associated with increased heart rate elevation, and anger is associated with increased blood flow to the hands, compared to fear. Critics have noted that these studies do not differentiate the ANS activity of certain emotions. Other studies have documented specific ANS responses associated with other emotions. The increased capillary blood flow in the cheeks associated with blushing and embarrassment differs from fear-related ANS activity, while parasympathetically mediated crying associated with sadness differs from nonemotional crying. Sympathetically mediated piloerection, the contractions of muscles surrounding the hair follicles on the neck, is another little explored ANS response related to specific emotions. More recent work by Stephen Porges has documented the role of parasympathetic ANS activity in stress responses and emotional communication.

Central Nervous System. Researchers examining central nervous system (CNS) activity have been motivated by such questions as: What is the CNS activity associated with each emotion? As emotions unfold, are different CNS structures and processes involved? Using such techniques as EEG, which measures electrical activity on the surface of the scalp, PET and functional MRI, which are slower in resolution than EEG but allow researchers to examine more specific brain sites, researchers have begun to make progress in understanding the CNS activity associated with emotion.

One of the first systematic attempts to examine emotion and the central nervous system was undertaken by Richard Davidson and his colleagues. Motivated by an approach-withdrawal framework, they have shown that approach-related emotions, such as happiness, correlate with relative left hemispheric activity, whereas withdrawal-related emotions, such as disgust, correlate with relative right hemispheric activity.

Other researchers have attempted to identify more specific CNS structures or systems that relate to emotion. Jaak Panksepp has posited that specific CNS structures and neurotransmitter systems relate to emotion systems related to play, expectancy, flight, and fight. Recent evidence by Joseph LeDoux compellingly demonstrates that the amygdala, a portion of the midbrain, provides an immediate emotional evaluation of stimuli, which is integrated with other kinds of information about the stimulus.

Cognitive Appraisal. Consistent with the formulations of Aristotle and Sartre, certain researchers have defined emotions as the products of appraisals of environmental events relevant to the individual's goals and well-being. Rapid, automatic appraisals of environmental events are believed to be the proximal causes of emotional experience. Although it is difficult to measure appraisal processes directly, the study of emotion-related appraisal is a central area in emotion research.

Richard Lazarus's theory of appraisal posits that each emotion is defined by a discrete "core relational theme," which is the specific appraisal of the individual's interaction with the environment that produces an emotion. For example, anger is produced by the appraisal that a demeaning offense has occurred against me or that which is mine. Dimensional appraisal theorists such as Ira Roseman, Klaus Scherer, Craig Smith, and Phoebe Ellsworth have proposed specific patterns of appraisal that differentiate the emotions, such as the valence, causal agency, effort, and certainty of the event. The advantage of a dimensional approach is that it can account for similarities in emotions and the transitions between them.

Language and Representation. Poets, therapists, and romantic partners all struggle to put emotions into words. The study of the language and representation of emotion reveals that people represent emotions with specific words, metaphors (e.g., emotion as a natural force), and complex narratives.

Studies of the words people use to describe emotions have addressed basic questions in emotion research. For example, members of different cultures classify emotion words into categories that resemble the categories for which there are facial expressions of emotion, suggesting that the organization of the emotion lexicon corresponds to the biological constituents of emotion. In contrast, reviews of the emotion lexicons of different cultures find variation in the emotions that are represented lexically as well as the number of emotion words (English has about 2,000, whereas the Ifaluk of Micronesia have 56). Certain distinctions made in English, between fear and shame for example, reportedly are not made in other languages; conversely, emotions represented by single words in other languages, such as the Czech *listost*, defined as the sudden realization of tragic circumstances, are not found in single English words.

Other researchers have studied how the representation of emotion is learned and influences emotional response. For example, mothers tend to talk about all emotions except anger to their girls more than their boys, which may account for why women appear to talk more about emotional events. Other researchers have addressed how the labeling of emotional experience changes the emotion, which has intrigued psychologists from Sigmund Freud and William James and is relevant to clinical treatment and certain psychological disorders, such as alexythymia, which is defined by a pronounced absence of emotion words. Evidence indicates that the labeling and written representation of stressful experiences gives structure and coherence to the experience and reduces the likelihood of health-related problems.

Judgment, Perception, and Memory. The widespread assumption that emotions influence judgment, memories, and perception has motivated research on

the effects of emotions on cognitive processes. Evidence indicates that emotions influence the content of cognitive processes: Positive and negative emotions influence memories from the past, levels of optimism, and personal satisfaction in valence-specific ways. Emotions also exert more specific influences on cognition: Anger but not sadness leads people to accentuate the injustice of others' actions. Finally, emotions influence the style of information processing: Anger and happiness lead to more automatic, heuristic, and less careful judgments, whereas sadness and fear are associated with more controlled, systematic, and careful judgments.

Research on Specific Emotions

Whereas certain researchers focus on the general properties of emotions, others focus on specific emotions. The same questions motivate such research: What are the defining properties, causes, and functions of specific emotions? The conceptual focus, however, is on single emotions or conceptually related families of emotions.

For example, several investigators have examined the forms and functions of the so-called self-conscious emotions, which include shame, embarrassment, guilt, and pride. Early emotion theorists defined these emotions as slight variations of the same emotion. Recent empirical work however, suggests that although embarrassment, shame, and guilt all remediate previous social transgressions, these three emotions have different antecedents, appraisals, and experiential properties, and in the case of embarrassment and shame, different facial displays. Other similarly motivated research has ascertained distinctions between jealousy and envy. More recently, theorists have speculated about possible differences between such little-studied positive emotions as amusement, contentment, relief, and sensory pleasure. Finally, other researchers have focused on variations within a category of emotion, as in Paul Rozin's study of the different kinds of disgust about death, gore, and moral violations, and their variations of the facial expression of disgust.

Related Topics in the Field of Emotion

Research on the aspects of different emotions has inspired researchers to look at how emotions emerge in the course of development and relate to individual differences and psychopathology.

Development. Emotions play a critical role in development. Consistent with the influential theorizing of John Bowlby, from the first day of the child's life emotional exchanges between parent and child contribute to the development of attachments. Parents' emotional displays are an essential source of information about the environment for the child. Learning how to regulate emotions appropriately, and to respond with embarrassment and shame following social transgressions, are important components of socialization.

Developmental psychologists have addressed several important questions regarding emotion. One of the first is the order in which children first display and understand emotions. Typically, researchers relate the emergence of specific emotions, such as fear or embarrassment, to the emergence of related abilities, such as motoric development or self-consciousness. Developmental psychologists have also advanced the understanding of certain functions of emotional expression in attachment processes. Finally, developmental psychologists have examined the processes by which young children develop the understanding of emotions and learn to talk about their emotions in social interactions, such as family conflict.

Individual Differences. Consistent with early theorizing about emotion and personality, researchers have made important discoveries concerning how and why individuals vary in the intensity and quality of the emotional experience. First, individual differences in emotion emerge in the first months of life and are quite stable during development. Second, basic dimensions of adult personality, in particular neuroticism and extraversion, consistently relate to the tendency to report and display increased negative and positive emotion, respectively. Third, the life histories of individuals prone to different emotions differ profoundly. For example, people prone to anger are less successful in love and work, whereas people prone to happiness are more successful. Finally, researchers are now investigating the distal etiological causes of individual differences in emotion, such as levels of serotonin or family conflict, and proximal causes such as individual variation in emotion thresholds or environmental events.

Psychopathology. The notion that deviation in emotional response contributes to psychological maladjustment dates to the ancient philosophers and is evident in the frequent reference to emotion in the *Diagnostic and Statistical Manual of Mental Disorders*. It is only recently that this general notion has generated systematic research.

Some researchers have identified specific emotions to which people with certain disorders are prone. Depression is characterized by high levels of negative emotion and low levels of positive emotion. Generalized anxiety disorder relates to excessive fear, and social phobia to excessive embarrassment and shame. Antisocial or externalizing disorder in young children has been linked to excessive anger and reduced embarrassment, which inhibits antisocial behavior. Researchers are now documenting the emotional correlates of other disorders, such as borderline disorder.

Other researchers have examined the interaction of the different emotion response systems within different psychopathologies. For example, contrary to claims that schizophrenia is defined by flat affect,

studies show that schizophrenics tend to report comparable levels of emotion in response to emotionally evocative stimuli, but show little of the reported emotion in the face.

Finally, other researchers have documented how coping responses to emotional experiences may contribute to psychological adjustment. For example, women may be twice as prone to major episodes of depression as men because they are more likely to ruminate than distract themselves in response to negative events, which prolongs and heightens the distress to the extent that it can lead to depression. Individuals who dissociate from the distress of losing a spouse actually experience less anxiety and depression in the course of bereavement.

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