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Emotion Theory and Research: Highlights, Unanswered Questions, and Emerging Issues

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Abstract

Emotion feeling is a phase of neurobiological activity, the key component of emotions and emotion-cognition interactions. Emotion schemas, the most frequently occurring emotion experiences, are dynamic emotion-cognition interactions that may consist of momentary/ situational responding or enduring traits of personality that emerge over developmental time. Emotions play a critical role in the evolution of consciousness and the operations of all mental processes. Types of emotion relate differentially to types or levels of consciousness. Unbridled imagination and the ability for sympathetic regulation of empathy may represent both potential gains and losses from the evolution and ontogeny of emotion processes and consciousness. Unresolved issues include psychology's neglect of levels of consciousness that are distinct from access or reflective consciousness and use of the term "unconscious mind" as a dumpster for all mental processes that are considered unreportable. The relation of memes and the mirror neuron system to empathy, sympathy, and cultural influences on the development of socioemotional skills are unresolved issues destined to attract future research.

Keywords

emotion schemas; emotion-cognition interactions; emotion knowledge; emotion regulation; emotion utilization; meme; development; consciousness; levels of awareness; emotion feelings

INTRODUCTION

This prefatory chapter, like every essay, review, or data-based article, is influenced by its author's feelings about the topics and issues under consideration as well as the author's personality and social and cultural experiences. To help counterbalance the effects of such influences on this article and provide some perspective on its contents, I present below the major theses that have emerged in my theorizing and research on emotions.

THEORETICAL PRINCIPLES

The key principles of differential emotions theory (DET; Izard 2007a) have changed periodically. They change primarily because of advances in methodology and research. They may also change as a result of theoretical debates that highlight the need for some clarifications and distinctions among constructs. The current set of principles highlight distinctly different types of emotions and their roles in the evolution and development of different levels of

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DISCLOSURE STATEMENT

The author is not aware of any biases that might be perceived as affecting the objectivity of this review.

consciousness/awareness and of mind, human mentality, and behavior. The ongoing reformulations of DET principles are facilitated by advances in emotion science, cognitive neuroscience, and developmental clinical science, as well as in social and personality psychology. For the present article, the seven principles below guided the choice of topics and the selective review of the literature on emotions and their relations to cognition, action, and consciousness. They led to a new perspective on emotion-related gains and losses from evolution and opened the door to theoretical development and research on emerging topics such as the role of the mirror neuron system in emotion experiences, empathy, and sympathy and memes and their relations to emotion schemas.

An overarching aspect of the theoretical perspective represented in the following principles and in this article is that emotion and cognition, though often treated correctly as having functionally separate features and influences (e.g., Bechara et al. 2000, Talmi & Frith 2007), are interactive and integrated or mingled in the brain (cf. Lewis 2005, Pessoa 2008, Phelps 2006). This thesis is consistent with the long-standing recognition of the high degree of connectivity among the brain's neural structures and systems. I hypothesize that emotion will have substantial and measurable effects on cognition and action when the stimulus or situation is a personally or socially significant one. The foregoing general thesis and the more specific hypothesis seem to run counter to extreme constructivist positions. Such positions (e.g., Barrett 2006) define or locate emotion at the level of perception and apparently have no place for the idea of interactions among distinct features of emotion (e.g., motivation/feeling) and cognition (e.g., higher-order conceptual processes). The present position may bear some similarity to componential–dynamic approaches, at least in terms of continuously changing aspects or configurations of mental processes (e.g., Ellsworth 1994, Scherer 2000). However, the present position may differ from the latter in viewing emotion and cognition as always interacting and thus normally precluding pure cognitive and emotion states.

SEVEN PRINCIPLES

1. Emotion feeling (*a*) derives from evolution and neurobiological development, (*b*) is the key psychological component of emotions and consciousness, and (*c*) is more often inherently adaptive than maladaptive.
2. Emotions play a central role in the evolution of consciousness, influence the emergence of higher levels of awareness during ontogeny, and largely determine the contents and focus of consciousness throughout the life span.
3. Emotions are motivational and informational, primarily by virtue of their experiential or feeling component. Emotion feelings constitute the primary motivational component of mental operations and overt behavior.
4. Basic emotion feelings help organize and motivate rapid (and often more-or-less automatic though malleable) actions that are critical for adaptive responses to immediate challenges to survival or wellbeing. In emotion schemas, the neural systems and mental processes involved in emotion feelings, perception, and cognition interact continually and dynamically in generating and monitoring thought and action. These dynamic interactions (which range from momentary processes to traits or trait-like phenomena) can generate innumerable emotion-specific experiences (e.g., anger schemas) that have the same core feeling state but different perceptual tendencies (biases), thoughts, and action plans.
5. Emotion utilization, typically dependent on effective emotion-cognition interactions, is adaptive thought or action that stems, in part, directly from the experience of emotion feeling/motivation and in part from learned cognitive, social, and behavioral skills.

6. Emotion schemas become maladaptive and may lead to psychopathology when learning results in the development of connections among emotion feelings and maladaptive cognition and action.
7. The emotion of interest is continually present in the normal mind under normal conditions, and it is the central motivation for engagement in creative and constructive endeavors and for the sense of well-being. Interest and its interaction with other emotions account for selective attention, which in turn influences all other mental processes.

Elaboration and empirical support for principles 1–6 can be found in the following sources and their reference lists (Ackerman et al. 1998; Izard 2002, 2007a; Izard et al. 2008a,b,c; Silvia 2006). Principles 1–3 apply to all emotions, and 4–6 primarily concern emotion schemas. Principle 7 consists of propositions about the most ubiquitous of all human emotions—interest-excitement. Specific empirical support does not exist for the hypothesis of continual interest in the normal mind.

In this article, I discuss the issues of defining the term “emotion” and types of emotion, emotion-cognition interactions, emotions and consciousness, relations among types of emotions and types of consciousness, and note some remarkable gains and losses from the evolution of emotions and multiple levels consciousness.

This article addresses a critical need for clear distinctions between basic positive and basic negative emotions and particularly between brief basic emotion episodes and emotion schemas. Unlike basic negative emotions that occur in brief episodes and involve very little cognition beyond minimal perceptual processes, emotion schemas involve emotion and cognition (frequently higher-order cognition) in dynamic interactions (Izard 1977, 1984; cf. emotional interpretation, Lewis 2005).

This article also contrasts phenomenal (primary) and access (reflective) consciousness, considers the construct of levels of consciousness, and questions the integrity of current conceptualizations of the unconscious mind. Typically, psychologists ignore the concepts of phenomenal consciousness and levels of consciousness and do not distinguish these constructs from the unconscious. I conclude by identifying some unanswered questions and briefly comment on a few emerging topics—continuous emotion-cognition interactions, memes and emotions, and the mirror neuron system and empathy—that seem destined to become more prominent in psychological science in the coming years.

ON THE ORIGINS AND NATURE OF EMOTIONS

None of the many efforts to make a widely acceptable definition of emotion has proved successful (Izard 2006, Panksepp 2003a). Yet, I dare once again to raise the 124-year-old storied question asked by James (1884): What is emotion? It happens that the answer James gave to his own question has a rather popular reprieve in the annals of contemporary neuroscience. Like James, Damasio (1999) argued that brain responses constitute emotion or the body expression of emotion and that emotion feeling is a consequence of the neurobiological (body) expression. In contrast, I propose that emotion feeling should be viewed as a phase (not a consequence) of the neurobiological activity or body expression of emotion (cf. Langer 1967/1982).

The Origins of Emotions

Russell (2003) proposed that core affect is continuous in the brain and provides information on the pleasure/displeasure and arousal value of stimuli. In contrast, I have maintained that a discrete emotion or pattern of interacting emotions are always present (though not necessarily

labeled or articulated) in the conscious brain (Izard 1977, ch. 6; Izard 2007a,b). Barrett (2006) suggested that discrete emotions arise as a result of a conceptual act on core affect or as a function of “conceptual structure that is afforded by language” (Barrett et al. 2007, p. 304). In contrast, we have proposed that discrete emotion feelings cannot be created, taught, or learned via cognitive processes (Izard & Malatesta 1987; Izard 2007a,b). As Edelman & Tononi (2000) observed, “... emotions are fundamental both to the origins of and the appetite for conscious thought” (p. 218, cf. Izard 1977, ch. 6). So, perceptual and conceptual processes and consciousness itself are more like effects of emotions than sources of their origin. Discrete emotion experiences emerge in ontogeny well before children acquire language or the conceptual structures that adequately frame the qualia we know as discrete emotion feelings. Moreover, acquiring language does not guarantee that emotion experiences can always be identified and communicated verbally. Even adults have great difficulty articulating a precise description of their emotion feelings (cf. Langer 1967/1982).

Thus, emotion feelings can be activated and influenced by perceptual, appraisal, conceptual, and noncognitive processes (Izard 1993), but cannot be created by them. In describing the origins of qualia—conscious experiences that include emotion feelings—Edelman & Tononi (2000) wrote, “We can analyze them and give prescription for how they emerge, but obviously we cannot give rise to them without first giving rise to appropriate brain structures and their dynamics within the body of an individual organism” (p. 15). They maintained that such structures arise as a result of brain changes due to “developmental selection” (p. 79), an aspect of neural Darwinism. Eschewing the cognitive-constructivist approach advocated by Barrett (2006), Edelman & Tononi (2000) concluded that “the development of the earliest qualia occurs largely on the basis of multimodal, bodycentered discriminations carried out by proprioceptive, kinesthetic, and autonomic systems that are present in the embryo and infant’s brain, particularly in the brainstem” (p. 157).

Emotion Feeling as Neurobiological Activity

Apparently consistent with the position of Edelman (2006), Langer (1967/1982), and Panksepp (2003a,b), I propose that emotion feeling is a phase of neurobiological activity that is sensed by the organism. It is sensed and expressed even in children without a cerebral cortex (Merker 2007). This component of emotion is always experienced or felt, though not necessarily labeled or articulated or present in access consciousness.

Emotion feeling, like any other neurobiological activity, varies from low to high levels of intensity. The autonomic nervous system may modulate the emotion feeling but does not change its quality or valence (cf. Tomkins 1962, 1963). Neither a moderate nor a high level of autonomic nervous system activity is necessary for the emergence of emotion feelings. The conscious mind is capable of detecting and discriminating among slight changes in neurobiological activity and among the resultant qualia (Edelman 2006) that include emotion feelings. [Contrary to earlier formulations (Izard 1971, Tomkins 1962), neural processes in observable facial expressions may or may not be a part of the critical neurobiological activity involved in emotion feeling.]

Emotion feelings arise from the integration of concurrent activity in brain structures and circuits that may involve the brain stem, amygdale, insula, anterior cingulate, and orbitofrontal cortices (cf. Damasio 2003; Lane et al. 1997; Panksepp 2003a,b). Levels of emotion feelings, like other neurobiological activities, range from low and subtle to high and extreme. Current theory and evidence suggest that the feeling component of emotions contributed to the evolution of consciousness and to the affective, cognitive, and action processes involved in goal-oriented behavior.

Defining emotion feeling as a phase of a neurobiological process circumvents the argument that feeling is nonphysical and hence cannot be causal. A counterargument, though, is that at best, feelings are only the qualia of neurobiological processes and not neurobiological activity per se. However, even if this were true, Edelman (2006) maintains that qualia could still be described as causal because they are true representations of core thalamo-cortical activity. Thus, whether or not one accepts the present proposal that feelings are a phase of neurobiological activity, they can still be conceived as causal processes.

The present formulation of the origins and nature of emotion feelings differs from those that describe emotion feeling and emotion state (or emotion-related neurobiological activity) as separate and independent (e.g., Lambie & Marcel 2002). Moreover, the view of emotion feeling as a phase of the neurobiological activity or body expression of emotion differs from the idea that neurobiological or body expression must precede emotion feeling (Damasio 1999, p. 283). The current description of emotion feeling is tantamount to saying that it is evolved and unlearned neurobiological activity. For those who think that the idea of emotion feelings as evolved neurobiological processes is strange or unfounded, the tough questions are: Where else could emotion feelings come from? What else could they be?

Feeling is the Key Psychological Aspect of Emotion: Motivation and Information

Feeling is the dynamic component in emotion (cf. Panksepp 2003a,b) and in two related psychobiological processes—entrainment and individuation (cf. Langer 1967/1982). The motivational, cue-producing, and informational functions of feelings enable them to entrain, or simplify and organize, what might become (particularly in challenging situations) an overwhelming number of impulses into focused cognitive processes and a few adaptive actions (cf. Langer 1967/1982). Such feeling-mediated entrainment of impulses across situations and developmental time facilitates the formation of feeling-cognition-action patterns that constitute individuation—the organization of traits and their assembly into a unique personality. However, feeling an emotion does not guarantee that it will be labeled, articulated, or sensed in reflective consciousness or at a high level of awareness. The level of awareness of an emotion feeling depends in part on its intensity and expression, and after language acquisition, on labeling, articulating, and acknowledging the emotion experience. These capacities, critical to personality and social development, depend on the neural activity and resultant processes involved in symbolization and language.

Through development, the conceptual self becomes important to the process of feeling and expressing an emotion, but a higher-order conceptual “self” is not essential for either. Infants experience and express basic emotions long before they can provide any evidence of a self-concept (Izard et al. 1995), and so do children without a cerebral cortex (Merker 2007).

Motivational and cue-producing emotion-feeling provides information relevant to cognition and action (Izard 1971, p. 185). Others have conceptualized emotion as information, and the topic has inspired a considerable body of related research (Clare et al. 2001, Schwarz & Clore 1983). Consistent with the idea that emotion feelings are cue-producing and informational phenomena, they may also afford a kind of prescience. Feelings may predict the effect of future stimulations by anticipating the link between future critical situations and subsequent emotion experiences and needs, e.g., danger→fear→safety or loss→sadness→social support (cf. Langer 1967/1982, Vol. 1, p. 101). Such anticipatory activities can facilitate the socialization processes associated with the learning of emotion-related social skills in an imagined or “as if” world.

Although an emotion feeling may begin to form reciprocal relations with perception or cognition by the time that it is fully sensed, there is no reason to assume that its quality is altered by perceptual and conceptual processes (Panksepp 2003a,b). Actually, the particular quality

of each discrete emotion feeling evolved because its effects on other senses, cognition, and action are generally adaptive (cf. Edelman & Tononi 2000). For all basic emotions, motivational and action processes occur in similar fashion across situations. Among emotion schemas, however, there are wide differences in motivational, cognitive, and action processes across individuals. The determinants of which particular emotion feeling and what cognitive content occurs in a specific emotion schema include individual differences, learning, culture, and the conceptual processes influenced by them (Izard 2007a; cf. Shweder 1994).

Agreement on Components and Characteristics of Emotion

Though there is no consensus on a general definition of the term “emotion” (cf. Kleinginna & Kleinginna 1981), many experts do agree that emotions have a limited set of components and characteristics (Izard 2006). Although they do not agree in all details, they agree that emotions have an infrastructure that includes neural systems dedicated, at least in part, to emotion processes and that emotions motivate cognition and action and recruit response systems. We may also be reaching a consensus that there are different forms of emotions, e.g., basic emotions rooted and defined primarily in evolution and biology and emotion schemas that include cognitive components that differ across individuals and cultures (Izard 2007a, Panksepp 2007).

Emotions as Causal Processes

Although experts agree that emotions motivate or influence cognition and action, not all agree on precisely what mediates the effects of emotions. The answer may depend on whether it is a basic emotion or an emotion schema. It may also depend on whether and how a distinction is made in the roles of emotion neurophysiology and emotion feelings (cf. Panksepp 2003a,b).

Arguably, no one thing (even emotion) is ever the sole mediator of personally or socially significant behavior. Other person and contextual variables typically contribute to the causal processes. Yet, I propose that emotion feeling is virtually always one of the mediators of action in response to basic emotion and a mediator of thought and action in response to emotion schemas. Thus, the specific impact of emotion feeling in generating and altering behavior depends on the type of emotion involved in the causal process. Feeling in basic emotion affects action but not higher-order cognition, which has little or no presence in basic emotion processes. Feeling in emotion schemas may frequently affect action and will surely affect cognition. Thinking is a key agent in regulating (sometimes suppressing; Gross 2002) and guiding behavior that stems from emotion schemas.

TYPES OF EMOTIONS

Emotions can be usefully divided into two broad types or kinds—basic emotion episodes and dynamic emotion-cognition interactions or emotion schemas. Failure to make and keep the distinction between these two kinds of emotion experiences may be the biggest source of misunderstandings and misconceptions in current emotion science (Izard 2007a, Gray et al. 2005). I included an update on the distinction between types of emotions here for two reasons. First, I see the fundamental nature of emotions and the closely connected issue of emotion-cognition-action processes as central to emotion science, now and for the foreseeable future. Second, I think researchers often look for the correlates and effects of basic emotions (labeled simply as emotions) when the variables in their experiments are actually emotion-cognition interactions or emotion schemas.

Basic Emotions

In the past, I have used the term “basic emotion” in referring to any emotion that is assumed to be fundamental to human mentality and adaptive behavior (Izard 1977). Recently, misunderstandings and debates about its meaning led me to draw a sharp distinction between basic emotions and affective-cognitive structures or emotion schemas (Izard 2007a). Here, consistent with that distinction, the term “basic emotion” refers to affective processes generated by evolutionarily old brain systems upon the sensing of an ecologically valid stimulus (Izard 2007a).

Basic positive emotions—The basic positive emotions of interest and joy (e.g., an infant’s interest activated by the human face; Langsdorf et al. 1983) and joy activated by the familiar face of her mother (Izard et al. 1995) are equally essential to survival, evolution, and development. However, their structure and time course may differ significantly from each other. The infant’s experiences of joy may be relatively brief by comparison with experiences of interest. The basic positive emotion of interest motivates play in early development and thus may have short or relatively long duration.

Basic positive emotions emerge in early ontogeny (Izard et al. 1995). Like the basic negative emotions, they are subject to developmental changes. The most critical of these changes is mediated by the acquisition of language and emotion labels and the ability to communicate (or share) emotion experiences through symbolic processes or language (Izard 1971, Izard et al. 2008).

Basic negative emotions—Basic negative emotions (sadness, anger, disgust, fear) typically run their course automatically and stereotypically in a brief time span. The basic emotion of fear (or a fear-action episode) was described rather precisely in the earliest human records: “A man who stumbles upon a viper will jump aside: as trembling takes his knees, pallor his cheeks; he backs and backs away ...” (Homer’s *Iliad*, c. 7000 BCE, p. 68).

Research has repeatedly demonstrated that in mammals, the experience and expression of basic fear is mediated by the amygdala (LeDoux 1996, Mobbs et al. 2007). Typically, basic negative emotions are activated by subcortical sensory-discriminative processes in response to ecologically valid stimuli (Ekman 2003, LeDoux 1996, Öhman 2005). Perceptual processes and action usually follow and run their course rapidly and automatically to enhance the likelihood of gaining an adaptive advantage (cf. LeDoux 1996, Öhman 2002, Tomkins 1962). Because of their nature, some basic negative emotions (e.g., sadness, anger, fear) are difficult to study in the laboratory. Thus, most extant research on what are usually called emotions (most often negative emotions) actually concerns negative emotion schemas.

Basic or fundamental emotions?—The discrete emotions of shame, guilt, and contempt (sometimes called the social or self-conscious emotions) and the pattern of emotions in love and attachment may be considered basic in the sense that they are fundamental to human evolution, normative development, human mentality, and effective adaptation. After language acquisition, the emotions related to the self-concept or self-consciousness are typically emotion schemas that involve higher-order cognition (e.g., about self and self-other relationships) and have culture-related cognitive components (Tangney et al. 2007).

Emotion Schemas: Dynamic Emotion-Cognition Interactions

The core idea of dynamic interaction between emotion and cognition has a long and venerable history dating back at least to the earliest written records: “... Peleus ... lashed out at him, letting his anger ride in execration ...” (Homer’s *Iliad*, c. 7000 BCE). The idea was prominently

displayed in seventeenth-century philosophy (Bacon 1620/1968, Spinoza 1677/1957) and was most eloquently elaborated by Langer (1967/1982).

In the vernacular, as well as in much of the literature of emotion science, the term “emotion” most frequently refers to what is described here as an emotion schema. An emotion schema is emotion interacting dynamically with perceptual and cognitive processes to influence mind and behavior. Emotion schemas are often elicited by appraisal processes but also by images, memories, and thoughts, and various noncognitive processes such as changes in neurotransmitters and periodic changes in levels of hormones (Izard 1993). Any one or all of these phenomena, as well as goals and values, may constitute their cognitive component. Appraisal processes, typically conceived as mechanisms of emotion activation (for a review, see Ellsworth & Scherer 2003), help provide the cognitive framework for the emotion component of emotion schemas. Their principal motivational component of emotion schemas consists of the processes involved in emotion feelings. Emotion schemas, particularly their cognitive aspects, are influenced by individual differences, learning, and social and cultural contexts. Nevertheless, the feeling component of a given emotion schema (e.g., a sadness schema) is qualitatively identical to the feeling in the basic emotion of sadness. Though there may be some differences in their underlying neural processes, the sadness feeling in each type of emotion shares a common set of brain circuits or neurobiological activities that determine its quality (cf. Edelman 2006, Edelman & Tononi 2000).

Positive and negative emotion schemas may have a relatively brief duration or continue over an indefinitely long time course. A principal reason why they can endure more or less indefinitely is because their continually interacting cognitive component provides a means to regulate and utilize them. Evidence indicates that experimentally facilitated formation of emotion schemas (simply learning to label and communicate about emotion feelings) generates adaptive advantages (Izard et al. 2008a; cf. Lieberman et al. 2007). Although we have very little data relating to their normative development, neuroscientists have begun to increase our knowledge of the substrates of emotion-cognition interactions (Fox et al. 2005, Gross 2002, Lewis 2005, Northoff et al. 2004, Phelps 2006).

Emotion schemas and traits of temperament/personality—Frequently recurring emotion schemas may stabilize as emotion traits or as motivational components of temperament/ personality traits (Diener et al. 1995, Goldsmith & Campos 1982, Izard 1977, Magai & Hunziker 1993, Magai & McFadden 1995; cf. Mischel & Shoda 1995, Tomkins 1987). In normal development, the cognitive content of emotion schemas should enhance the regulatory, motivational, and functional capacities of their feeling components. However, in some gene X environment interactions, a cluster of interrelated emotion schemas may become a form of psychopathology (e.g., anxiety and depressive disorders: Davidson 1994, 1998; J.A. Gray 1990; J.R. Gray et al. 2005; Izard 1972; Magai & McFadden 1995).

Early-emerging emotion schemas—Aside from the simple emotion-cognition connections that a prelinguistic infant forms (e.g., between her own feelings of interest and joy and a perception/image of her mother’s face), the earliest emotion schemas probably consist of attaching labels to emotion expressions and feelings. Development of emotion labeling and the process of putting feelings into words begin toward the end of the second year of life and continue during the preschool and elementary school years (Izard 1971) and throughout the life span. Indeed, games and activities that promote the accurate labeling of emotion expressions and experiences have been a component of intervention processes for many years (see Domitrovich & Greenberg 2004 and Denham & Burton 2003 for reviews).

Emotion schemas or affective-cognitive units?—The concept of affective-cognitive structure or emotion schema (Izard 1977, 2007a) seems quite similar to that of the affective-

cognitive unit as described in the cognitive-affective personality system (CAPS) theory of personality (Mischel & Shoda 1995, 1998). One significant difference may be that in the CAPS approach, an affective-cognitive unit is conceived mainly as a stable or characteristic mediating process or part of the personality system. In DET, an emotion schema may be either a temporally stable trait-like phenomenon (affective-cognitive structure) or a brief emotion-cognition interaction that may mediate behavior in a specific situation. Compared to the CAPS approach, DET gives emotion a greater role in motivation and assumes that the emotion component of the emotion schema drives the behavior mapped or framed by perceptual-cognitive processes. DET also emphasizes that, as seen particularly clearly in early development and in emotion-based preventive interventions, connecting appropriate cognition to emotion feelings increases the individual's capacity for emotion modulation and self-regulation (Izard et al. 2008a). DET and CAPS agree in assigning a significant causal role to the dynamic interplay of emotion and cognition in determining human behavior. Both approaches also conceptualize the interplay of emotion and cognitive processes as sources of data on ideographic or within-subject differences in emotion-cognition-behavior relations.

In brief, emotion schemas are causal or mediating processes that consist of emotion and cognition continually interacting dynamically to influence mind and behavior. It is the dynamic interaction of these distinct features (emotion and cognition) that enables an emotion schema, acting in the form of a situation-specific factor or a trait of temperament/personality, to have its special and powerful effects on self-regulation and on perception, thought, and action (Izard et al. 2008a).

Transitions from Basic Emotions to Emotion Schemas

In early development, the first steps in the transition from basic positive emotions to positive emotion schemas consists simply of the infant using her increasing cognitive and emotion processing capacities to make connections between positive emotion feelings and positive thoughts, memories, and anticipations of people, events, and situations. Through learning and experience, the same stimuli that once elicited a basic positive emotion may become stimuli for positive emotion schemas and greater expectations (cf. Fredrickson 1998, 2007).

Basic negative emotions occur relatively more frequently in infancy than in later development. Moreover, the transition from basic negative emotions to basic negative emotion schemas and the regulatory advantage provided by their cognitive component may prove difficult and challenging. The transition from basic anger (protests) and sadness (withdrawal) of a toddler being separated from mom, to the interest-joy response of a four-year-old being dropped off at kindergarten, may involve several rather stressful times for many children.

For adults, transitions from a basic emotion to an emotion schema may start abruptly but finish smoothly and quickly. Simply sensing that the object in your path and just a step ahead of you is long, round, and moving may activate the basic emotion of fear and the accompanying high-intensity neurobiological reactions. However, if language, learning, and another 50 ms enable you to recognize and label the object as a harmless garden snake (i.e., construct an emotion schema), you might even take it gently into your hands rather than engage in extreme behavior. The concomitant change in neural and neuromotor circuits would constitute a paradigmatic transition across types and valences of emotion and emotion-related phenomena. In this case, one would make a transition from basic fear to interest-cognition-action sequences in a positive emotion schema.

EMOTIONS AND CONSCIOUSNESS

Whatever else it may be, emotion feeling is at bottom sensation. Thus emotion feelings, like other sensations, are by definition processes that are felt or at least accessible (in the broad

sense of that term) in some level of consciousness. Level of cognitive development as well as top-down processes, such as attention shifting and focusing, may influence (or preclude) the registration of feeling in reflective or cognitively accessible consciousness (Buschman & Miller 2007). When that happens, emotion feelings/experiences occur in phenomenal consciousness (or at a low level of awareness). Phenomenal consciousness of an emotion feeling, the experience itself, generally co-occurs with some level of reflective/reportable consciousness (cf. Chalmers 1996). Thus, I propose that there are usually interactions among the neural systems that support these two types of consciousness (cf. Pessoa 2008). These interactions between the two sets of neural systems enable emotion feelings to retain their functionality in influencing thought and action, even in prelingual infants (Izard et al. 2008b).

Factors Affecting Emotion-Consciousness Relations

Another determinant of our level of awareness of emotion is the intensity of the neurobiological activity involved in emotion feeling. Low-intensity emotion feeling (e.g., interest arousal motivating learning skills related to aspects of one's work) would not ordinarily grab attention in the same way as a viper and might go unnoticed. In this case (and in other instances of low arousal), "unnoticed" does not mean that the feeling is "unconscious." It may register and be fully functional at some level of consciousness (cf. Lambie & Marcel 2002). The development of theory and techniques to examine the operations of emotion feelings in different levels of awareness should help reduce the number of psychological processes that are currently relegated to the ambiguous concept of the unconscious (Izard et al. 2008b; cf. Bargh & Morsella 2008).

Emotion Feelings and Consciousness

As the foregoing formulation suggests, the neurobiological processes involved in emotions generate conscious experiences of feelings (emotional sensations) just as in seeing green neurobiological activities in the visual brain create the experience/sensation of greenness (cf. Humphrey 2006). The sensory processes involved in emotion feelings like joy, sadness, anger, and fear may represent prototypical emotion experiences. Such emotion feelings are critical to the evolution of human mentality and reflective consciousness (cf. Edelman 2006, Langer 1967/1982).

Emotion experiences/sensations continue to be critical in the maintenance and functioning of consciousness. When trauma leads to damage or dysfunction of a sensory system, it affects the whole person, including the sense of self and of others as self-conscious. For example, when a dysfunctional visual cortex resulted in blindsight, the blindsighted person could guess rather accurately the location of objects in the environment and learn to navigate around them. Yet, she experienced her sensation-less vision as emotionless and reported that "seeing without emotion is unbearable" (Humphrey 2006, p. 68–69). She may also think of herself as "less of a self" and one that could not feel "engaged in the 'hereness, nowness, and me-ness' of the experience of the moment" (Humphrey 2006, p. 70). In the social world, the blind-sighted person lacks a basis for empathy and for understanding the mental states of others by simulation.

Taken together, these observations on the aftermath of the loss of the visual sensory system (which provides the bulk of our incoming information) suggest that having sensations may be the starting point of consciousness (Humphrey 2006, pp. 66–71). The emergence of the capacity to experience and respond to emotion feelings may have been the most critical step in its evolution (cf. Langer 1967/1982). Discrete emotion feelings play a central role in anticipating the effects of future stimulations and in organizing and integrating the associated information for envisioning strategies and entraining impulses for targeted goal-directed cognitive processes and actions. The coalescence of the emotion-driven anticipatory processes,

entrainment (organizing and integrative processes), and the resultant individuation and sense of agency may have constituted the dawn of human consciousness (cf. Edelman 2006, Humphrey 2006, Langer 1967/1982).

TYPES OF EMOTION AND TYPES OF CONSCIOUSNESS

The concepts of consciousness and awareness have received very little attention in contemporary psychology. With a few exceptions, the contributors to a recently edited volume on emotion and consciousness dealt with many interesting issues other than some critical ones on the nature of consciousness and its relation to emotions (Barrett et al. 2005b). Most contributors explicitly or implicitly assumed that access or reflective consciousness was either the only kind of consciousness or the only one that mattered to psychologists (cf. Lambie & Marcel 2002, Merker 2007).

Basic Emotions and Phenomenal Consciousness

It is quite reasonable to assume that human infants (and all nonhuman mammals; Panksepp 2003a,b) have some form of consciousness (Izard et al. 2008b, Merker 2007). Wider acceptance of this notion should save young infants a lot of pain. Various invasive procedures (including circumcisions and needle pricks to draw blood for analyses) are still performed without analgesic. The facial expression of infants undergoing such procedures constitutes the prototypical expression of pain. With increasing age, the prototypical expression of pain in response to these procedures alternates with the prototypical expression of anger (Izard et al. 1987).

Developmental data suggest that young infants experience basic emotions (Izard et al. 1995). Their inability to report their emotion experiences via language rules out the idea that they experience emotions in access (verbally reportable) consciousness and suggests that their emotion feelings must occur in some other level of awareness or in phenomenal consciousness. Current conceptualizations of phenomenal consciousness, however, may not explain all emotion experiences in infancy (Izard et al. 2008b).

Developmental scientists have obtained evidence that shows that prelinguistic infants not only experience objects and events, but they also respond to and communicate nonverbally about objects and events in meaningful ways (Izard et al. 2008b). Moreover, their experience often involves emotion that is indexed by emotion-expressive behavior and other forms of action that influence the social and physical world (Claxton et al. 2003, Izard et al. 1995). Apparently, these behaviors reflect the development of different levels or complexities of awareness, and further studies of them may offer possibilities of extending current conceptualizations of ways to access phenomenological experiences. These experiences do not fit precisely into the categories of “phenomenal” or “access” consciousness as traditionally defined. Yet these experiences are surely part of the infant’s phenomenology, and the functionality of these experiential processes clearly demonstrates that they are accessible by noncognitive routes (Izard et al. 2008b, Merker 2007; cf. Block 2008).

Emotion Feelings and Phenomenal Consciousness

The conceptualization of emotion feeling as a phase of a neurobiological process is congruent with the idea that emotions can be sensed and registered in phenomenal consciousness and at low levels of awareness without being perceived. Such emotion feelings are often described erroneously, I think, as unconscious emotion (cf. Clore et al. 2005, Lambie & Marcel 2002). What may be unconscious is not the feeling but the perception of the feeling, and this lack of perception could account for the failure of the feeling to register in access consciousness. Insofar as emotion feeling is at bottom sensation, then generating a feeling ipso facto generates

a state of consciousness. Thus, an emotion feeling always registers in phenomenal consciousness. Often, if not always, it also registers in some other level of consciousness that is accessible by various routes. After language acquisition, emotion feelings can often (but not always) be reported via symbolic processes. In prelingual infants, young children, and others with insufficient emotion vocabulary, it may be manifested in emotion-mediated behavior (cf. Izard et al. 2008b). Evidence suggests that emotion feelings are operative and expressible via facial and body movement and other behavior even when not reportable (cf. Lambie & Marcel 2002).

Happily, an enormous amount of information processing proceeds very well in the realm of the unconscious, but I propose that the functionality of emotion feelings (that are not in access or reflective consciousness) might be explained better in terms of phenomenal or other levels of consciousness. The term “unconscious” emotion implies nonfelt emotion. It seems very difficult if not impossible to identify and explain the mediators of the effects of nonfelt or nonconscious emotion (e.g., de Gelder 2005). Much of what has been called nonconscious emotion has not met the “requirement of deliberate probing by indirect measures” (Lambie & Marcel 2002, p. 16). Nor have data on unconscious emotions been examined in terms of the functional correlates of hypothesized emotion feelings. Such research might suggest replacing the concept of psychological unconscious with that of phenomenal consciousness or some other level of consciousness that cannot be verbally reported.

The concept of unlabeled, unarticulated, and linguistically inaccessible emotion feeling in phenomenal consciousness or some other cognitively inaccessible level of consciousness is compatible with the notion that this component of emotion is felt and functions as a mediator of behavior (cf. Clore et al. 2005, Izard et al. 2008b, Lambie & Marcel 2002). Because it is felt, the emotion feeling retains its characteristic motivational and informational qualities. To say that the feeling component of emotion can reside unfelt in phenomenal consciousness, any other level of consciousness, or the unconscious seems to be a pure non sequitur.

To acknowledge that the subjective component of emotion is felt and real in phenomenal and other cognitively inaccessible levels of consciousness may inspire theory and research on how an emotion feeling remains functional and motivational without being symbolized and made accessible in reflective consciousness via language. Evidence of the functionality of emotion feelings in prelingual infants and children without a cerebral cortex seems to support the argument for more research on the functionality of emotion feelings in phenomenal consciousness. So do the observations that patients who suffer blindsight report feelings without having corresponding visual experiences (Weiskrantz 2001). On the other hand, subjects with blindsight can perceive objects and make accurate perceptual judgments without any corresponding sensation or feeling at all (Humphrey 2006). The extent to which these seemingly disparate observations on people with blindsight inform normative relations among perception, sensation, and emotion feelings is not yet clear. Neither are the effects and limits of top-down control of sensation in relation to perception and to emotion feelings and their registration at some level of consciousness (Buschman & Miller 2007).

Emotion Schemas and Access Consciousness

Emotion feelings can operate in phenomenal consciousness with little or no cognitive content. This fact is easy to appreciate while remembering that phenomenal experience is the modal variety in prelingual infants and nonhuman mammals. Although prelingual infants apparently demonstrate higher levels of awareness than phenomenal consciousness, they definitely cannot exhibit reflective consciousness as traditionally defined in terms of cognitive accessibility.

Once development enables emotion experiences to become connected to higher-order cognition, children begin to link emotion feelings and concepts and to form more and more

complex emotion schemas. The language associated with a given emotion feeling in particular situations becomes a tool in emotion management, self-regulation, and other executive functions (Izard et al. 2008a).

Gains and Losses in the Evolution of Emotions and Consciousness

Darwin recognized many turns in evolution that pointed to the seeming cruelty of natural selection—life-threatening parasites, killer reptiles, and the bloody work of predators (Dawkins 1989). He also recognized the adaptive advantages in positive emotions and their expressions in social interactions: “. . . the mother smiles approval, and thus encourages her children on the right path, or frowns disapproval” (Darwin 1872/1965, p. 304). Gains related in some way to the emotions and their interactions with perception and cognition may represent the finest—and possibly most challenging—products of evolution.

Among the finest and most interesting products of evolution was gaining the capacity for language and eventually the learning of vocabulary for labeling emotions and describing and sharing emotion experiences. These gains also helped enable humans to anticipate future desirable and undesirable emotion feelings. Taken together, these newly emerged capacities represent enormous gains in executive functions, particularly for understanding and managing emotions and self-regulation (Izard 2002, Izard et al. 2008a). They have direct and indirect benefits for the cognitive and action processes involved in adaptive idiosyncratic and social functioning (Izard et al. 2008b, Lieberman et al. 2007). Some have argued that the enormous gains that resulted from brain evolution, the acquisition of language, and the accompanying increases in cognitive abilities did not come without some accompanying losses (Langer 1967/1982).

A possible loss: the evolutionary empathy-sympathy exchange—Basic empathy depends mainly on neurophysiological response systems that do not require or involve the higher-order cognitive processes involved in sympathy (Hoffman 2000). Thus, long before human evolution produced language and its accompanying cognitive prowess, a high-level of ability for empathy and empathic responding emerged in nonhuman animals (Langer 1967/1982). This great capacity for empathy apparently accounts for the lack of con-specific predation and cannibalism among nonhuman mammals. “Among the higher animals few, if any, of the carnivores—bears, wolves, lions and other great cats—habitually prey on their own kind” (Langer 1967/1982, Vol. 1, p. 141). They are restrained from predation, not by signals of appeasement or surrender, but by “a ready empathetic response, so common and effective that it takes no principle, moral or other, to safeguard the members of a species against each other’s appetites in ordinary conditions” (Langer 1967/1982, Vol. 1, p. 142).

The animal empathy that constitutes a safeguard against con-specific predation establishes a special kind of relationship that enables an essentially physiological transmission of the “feeling of one creature to another so it appears to the latter as its own” (Langer 1967/1982, Vol. 1, p. 140). In contrast, as the media are wont to remind us through blow-by-blow accounts of flagrantly aggressive and ethically and morally devious behavior, humans prey on each other with considerable frequency. And such predation often leads to death and destruction, even genocide. Furthermore, although cannibalism (a total breakdown in empathy) is generally absent among higher-order nonhuman animals, it has been observed in many human cultures.

Compared to instantaneous empathy, sympathy depends in important ways on conceptual processes (including the projected costs and benefits of helping) that are notably slower and less certain of occurrence. Sympathetic responses are also more subject to top-down control (e.g., mental manipulations stemming from biases and imagined consequences) than rapid, automatic, animal empathy. Thus, sympathetic responses may often be too little and too late for the victims of disasters, some of which result from only slightly disguised human predation

exemplified in transactions between rich and poor and between high- and low-status ethnic groups. Thus, a potentially grave question remains: Does the evolutionary shift in capacities for empathy and sympathy represent a net loss or a net gain?

The pros and cons of unbridled imagination—There is also some question as to whether the evolutionary increases in the power of imagination should be judged a net gain or loss in weighing the emotion-related products of evolution. In some individuals and circumstances, unbridled imagination can facilitate tragedies on a personal as well as a national and global scale. Imagination can be fueled by either positive or negative emotion feelings or the interaction of both, and in turn, it can produce a cornucopia of both positive and negative emotion stimuli and behavioral responses (cf. Langer 1967/1982). Imagination doubtless played a role in the creation of nuclear weapons and still plays a role in planning their projected uses. It is also a factor in the development of factories, products, and policies that increase global warming and the pollution of the earth and the atmosphere at a dangerous rate.

In contrast, during early ontogeny the feeling-thought patterns of unbridled imagination facilitate cognitive and social development from the first moment that the young child engages in make-believe or pretend play. In these developmental processes and throughout the life span, imagination remains part emotion feeling and part cognition. It continues to add to individual and cultural accomplishments through the creative endeavors of artists and scientists.

Thus, “In the evolution of mind, imagination is as dangerous as it is essential” (Langer 1967/1982, Vol. 1, p. 137). Nurturing imagination through the life span with a good balance of emotion feelings and the encouragement of empathy, sympathy, and reason, and an appreciation of how these ingredients can interact and work together for the common good, ubiquitous peace, and the preservation and flourishing of the species seem equally essential.

Remarkable Gains from Linking Emotion Feelings and Language

The process of symbolizing emotion in awareness has the potential to add significantly to adaptive personality and social functioning. Language is by far the most common method of symbolization across individuals and cultures, and researchers have verified at the behavioral and neural levels the positive effects of linking words to discrete emotion expressions and feelings (L. Greenberg & Paivio 1997, Izard 1971, Izard et al. 2008a, Kennedy-Moore & Watson 1999, Lieberman et al. 2007). Major among the positive effects that accrue when we can use language to symbolize emotion feelings, especially in early development but also throughout the life span, are those relating to increases in emotion knowledge, emotion regulation, and emotion utilization.

Emotion utilization is the harnessing of an emotion’s inherently adaptive motivation/feeling component in constructive affective-cognitive processes and actions (Izard 1971, 2002, 2007a; Izard et al. 2008c; cf. Mayer & Salovey 1997). Emotion utilization involves spontaneous as well as planned actions, and it is conceptually different from direct attempts to regulate emotion or emotion-related behavior (cf. Eisenberg & Spinrad 2004). Although emotion regulation and emotion utilization are different constructs, they interact dynamically. Emotion utilization may be viewed as the optimal mode of emotion regulation, and various forms of the latter enhance the former.

It would be difficult to overestimate the significance of the civilizing and socializing effects of learning to recognize, articulate, and utilize emotion feelings constructively, not only in early development but also throughout the life span. A key process here is developing connections between feelings, words, and thoughts. Unfortunately, linking emotion feelings to maladaptive thoughts like those that characterize racism, sexism, ageism, unbridled profit motives, and plans for vengeance, revenge, or terrorism can wreak extensive havoc to

individuals, ethnic groups, and all of human kind. For an abundance of evidence supporting the foregoing assertion, read history and watch or listen to any daily news program.

UNRESOLVED ISSUES AND TOPICS FOR FUTURE RESEARCH

Two unresolved issues seem to impede scientific advances in the study of consciousness and levels of awareness. The first concerns the role of phenomenal consciousness and various linguistically inaccessible levels of awareness in research on mind and behavior. The second concerns the relation of phenomenal consciousness and the psychological unconscious, their similarities and differences.

Psychologists' Neglect of Phenomenal Consciousness

Several factors may have contributed to the general neglect of phenomenal consciousness in psychological theory and research. The first is a long-standing reluctance to acknowledge the extent to which emotions drive cognition and action and the possibility that some of the driving emotions register only in phenomenal consciousness. The second is the strong tendency of mainstream psychology to neglect developmental perspectives on critical issues and thus to ignore evidence of the existence and functionality of phenomenal consciousness and other linguistically inaccessible levels of awareness in early development and probably in various forms of psychopathology. A third problem is that many psychologists think that most emotions are episodic, of limited duration, and in focal awareness. A related misconception is that once an emotion episode ends, the mind is free for purely rational processes. This notion persists despite eloquent arguments suggesting that there is no such thing as pure reason (Creighton 1921, Langer 1967/1982), especially in relation to personally or socially significant matters. Evidence suggests that in humans it may not be possible to study cognition and emotion separately (Lewis 2005, Phelps 2006). This conclusion is quite consistent with the present position, if the term "emotion" refers to emotion schemas.

A more appropriate goal would be to develop more effective ways to study emotion-cognition interactions and integration/mingling and consequent behavior change, particularly in research that involves constructs like emotion schemas (Izard 1977, 2007a), emotional interpretations (Lewis 2005), or affective-cognitive units (Mischel & Shoda 1995). This would include most emotion research that does not focus on basic negative emotion episodes.

A final and perhaps most worrisome reason why phenomenal consciousness is still not a major concern of psychologists is that it is conflated with the psychological "unconscious." Clearly, a vast amount of the processes of the brain and the rest of the body (blood circulation, digestion) often do occur without our awareness of them and, in normal circumstances, without direct effects on thought and action. When significant behavioral effects do occur without readily observable causes, they are often assigned to the psychological unconscious, where mechanisms are difficult to identify and explain (Kihlstrom 1999).

More parsimonious and accurate explanations of unconscious behavior might accrue if we looked for mediators of thought and action (e.g., emotions) that reside in phenomenal consciousness. An example is the phenomenological (feeling) component of an unlabeled and thus unarticulated emotion experience, a feeling that you know you are experiencing but cannot specifically identify or describe. Inability to put the feeling into words bars it from linguistic accessibility and thus from access consciousness as typically defined, but not from phenomenal consciousness and various levels of awareness. An emotion feeling in phenomenal and other nonlinguistic levels of consciousness retains its properties, including its power to motivate and regulate cognition and action. Thus, conceptualizing fully functional emotion feelings as processes in phenomenal consciousness (Panksepp 2005) provides an alternative way of

explaining much of what has been attributed by others to the psychological unconscious (e.g., Kihlstrom 1999, Winkielman et al. 2005; cf. Clore et al. 2005, Lambie & Marcel 2002).

Concern about types of consciousness may stimulate further thought and research about which mental processes relate to phenomenal consciousness and which are truly unconscious. Such research could look for processes that reside at a level of awareness that is unavailable via cognitive or verbal access but not necessarily via other forms of access. Several types of nonverbal behaviors reflect the operations of mental processes that clearly are not in linguistically accessible consciousness and that may reside in phenomenal consciousness (Izard et al. 2008b; cf. Merker 2007). The lack of linguistic accessibility does not render an emotion or emotion feeling nonfunctional.

Phenomenal consciousness and other forms of linguistically inaccessible consciousness may be better concepts for psychology than is the concept of unconscious. The latter concept is notoriously vague and ill defined in the psychological literature. Dictionary definitions characterize it as not conscious as a state, without awareness, or sensation, virtually nonphysical, and thus make some uses of it very close to the domains of spookiness and Cartesian dualism.

The Psychological Unconscious: A Default Explanatory Construct?

Although there is considerable agreement on the qualities of thought processes in psychological or access (verbally reportable) consciousness, there is no consensus on the contents and processes of the unconscious (cf. Bargh & Morsella 2008). The behavior of prelingual infants suggests that it is not prudent to label all verbally unreportable processes as unconscious, a practice that may impede or misguide the search for causal processes. Better heuristics might come from the conceptualization of causal-process mechanisms operating at different levels of awareness and as accessible by multiple behaviors other than verbal report. Dividing the mind and all mental processes into two domains—conscious and unconscious—might be the greatest oversimplification in current psychological science. Moreover, misattribution of causal processes to the unconscious may open a Pandora's Box replete with blind alleys and dead ends.

Four things have contributed to psychologists' penchant for attributing causal processes to the unconscious rather than to emotion feelings, including emotion feelings in phenomenal consciousness. First, many psychologists have typically looked for nonemotion mediators to explain changes in cognition and action. Second, emotion feelings (and their roles in influencing cognitive processes) are notoriously difficult to identify and describe in words (Creighton 1921, Langer 1967/1982). However, infants and young children experience emotions and respond to them in meaningful ways long before they can label or describe emotions (Izard et al. 2008b). Such evidence points to the utility of assessing emotion feelings by measuring their functional correlates. Third, many psychologists remain reluctant to attribute to emotion a significant causal role in ordinary as well as critical thinking, decision making, and action despite a growing body of evidence to the contrary (e.g., Bechara et al. 2000, DeMartino et al. 2006, Lerner & Tiedens 2006, Miller 2006, Naqvi et al. 2006). Fourth, many psychological scientists tend to think that emotions are typically brief and that emotion feelings are always sufficiently intense to grab and hold attention. Actually, plausible arguments suggest that emotion feelings are phenomena that vary on a very wide dimension of intensity while retaining their functional/causal properties (Izard 2007a).

Emerging Issues: Continuous Emotion, Memes, and the Mirror Neuron System

The topics of continuous emotion or continuous emotion-cognition interaction and integration, memes, and the mirror neuron system (MNS) may prove to be critical for emotion science and

to psychology in general. The idea of continuous emotion in phenomenal consciousness or access consciousness will prove difficult to address in empirical research, but that may soon change with improved technology for studying brain-emotion-behavior relations. Already there is some convergence among theorists and researchers who argue that there is no such thing as a conscious mind without emotion or affect (Izard 2007a; cf. Lewis 2005, Phelps 2006, Russell 2003). The other two, memes and the MNS, relate to emotion and behavior in ways not completely understood. Yet, they have already become hot topics for those interested in new approaches to understanding within- and across-generations transmission of cognitive and action structures and the neurobiological bases for the transmission of emotion feelings in empathy and the processes in empathic and sympathetic responding.

Continuous Emotion-Cognition Interaction

The notion that some emotion or emotion-cognition interaction is continuous in phenomenal or access consciousness or some level of awareness is not new (e.g., Bacon 1620/1968). The hypothesis implicit in that idea may prove difficult to falsify. Yet, without the attribution of causal power to emotion (feeling) and the concept of continual emotion-cognition interaction, we may have no way to explain selective attention. And selective attention is a necessary factor in the simplest forms of exploration and learning as well as in higher-order cognition and sequences of organized behavior.

I have hypothesized that the brain automatically generates the emotion of interest to capture and sustain attention to particular objects, events, and goals. This mode of operation is standard when the brain is not responding to internal or external conditions that activate other emotions, emotion schemas, or emotion-cognition-environment interactions (Izard 2007a; cf. Panksepp 2003a,b).

A major challenge for future research is to understand how emotion and cognition behave in their continual interaction. One possibility is that they achieve complete integration and influence behavior as a unified force or single factor. However, I propose that although emotion and cognition continually interact, they do not lose their separate identities. They retain separate and distinct functional properties (cf. Pessoa 2008). Whereas emotion feeling undoubtedly contains a kind of information (Clare et al. 2001) or cues for behavior (Izard 1971, 2007a), emotion remains primarily about motivation. Cognition (particularly about goal concepts that typically have an emotion component) may be conceived as having a motivational aspect, but it remains primarily about knowledge.

Memes and Emotions

Memes are one of several epigenetic mechanisms that challenge the dominance of DNA as the central life force (cf. Noble 2006). Natural selection may operate on not only genes, DNA, or RNA. It can also act on “replicant” units (memes) that consist of cognition and action patterns, things other than biological structures that can be transmitted through imitative learning (Dawkins 1989). Apparently, memes emerged to serve unique adaptive functions in social interactions.

In the course of evolution, the brain continued to evolve and increase in complexity until learning via imitation became a major tool in the human repertoire and a way of acquiring memes. Imitation and make-believe play in early development should prove a fertile ground for studying the transmission of memes. Even newborn infants can imitate simple facial behavior (Meltzoff & Moore 1994) that may constitute part of the emotion expressions that they display later in infancy (Izard et al. 1995). By age three years, children show great imitative skills while enjoying the fantasyland of make-believe play and learning socioemotional skills by assuming the roles of persons far beyond them in age, knowledge, skills, and experience.

Thus, it was both phylogenetic transmission and the highly creative processes of ontogenetic development (Noble 2006) that produced the capacity for imitative learning, which in turn essentially created a context where memes could replicate and compete (Jablonka & Lamb 2005).

Though memes were originally described in terms of cognition and action patterns (Dawkins 1989), the exclusion of emotion as a component may have been inadvertent. Indeed, emotion schemas seem perfect candidates for attaining status as memes. They not only have a cognitive component but also an emotion component and a kind of action component (the action tendencies in emotion states; Izard 2007a,b). Thus, emotion schemas are well suited to emerge and operate as memes. Their emotion feeling component is often expressed through facial, vocal, and body-movement signals that are easily imitated, even by young children. In addition, imitating the expressive behavior of another person may activate neural and sensory motor processes that increase the likelihood of experiencing the emotion (and action tendencies) of the other person (Izard 1990, Niedenthal 2007). Young children's imitation of their parents' positive emotion expressions and interactions may contribute to the development of memes that represent significant social skills. Thus, emotion-schema memes (ESMs) as replicant units with a feeling/motivational component seem to be an expectable (epigenetic) extension of biogenetic-evolutionary processes.

Because emotions are contagious (Hatfield et al. 1993, Tomkins 1962), memes that are essentially emotion schemas can propagate profusely. They can do so for two reasons. First, such schemas have the attention-grabbing and motivational power of an emotion (Youngstrom & Izard 2008). Second, they are highly functional phenomena independent of their relations to biological fitness and survival (cf. Aunger 2002, Blackmore 1999, Distin 2004). The idea that an emotion schema might form a replicant unit opens another door to investigations of the transfer of adaptive as well as maladaptive patterns of emotion, cognition, and action within and across generations.

Emotion schema memes begin to develop early in ontogeny, become plentiful, and may relate substantially to the MNS. There has been a surge of interest in the MNS, in part because it may be among the neural substrates of social perspective taking and empathy (e.g., Carr et al. 2003, Keysers & Perrett 2004, Rizzolatti & Craighero 2004).

Mirror Neuron Systems, Emotions, and Empathy

If the concept of memes becomes a staple in psychology, it may happen for two reasons. First, perhaps the most interesting and socially significant memes have an emotion component and are essentially emotion schemas whose behavioral manifestations (facial, vocal, gestural expressions of emotion) can be readily observed and analyzed. Second, they may depend in part on the MNS, which seems to mediate capabilities for perspective taking and empathy. The MNS may enable one to take the perspective of another and provide the shared emotion feeling that defines the essence of empathy (cf. Dapretto et al. 2006, Keysers & Perrett 2004). The MNS apparently translates one's sensory-perceptual experiences and accompanying conceptions of the expressions and movements of others into patterns of neural activity in the observer (cf. Langer 1967/1982). This neural activity and its products help the observer to understand and predict the thoughts and feelings of the observed person.

The MNS may relate to sympathy and altruism as well. The cognitive component of an emotion schema, in interaction with its feeling component, may transform empathy to sympathy. This transformation would entail a shift from a response governed primarily by neuro-physiological or motor-system contagion to one that requires conceptual processes (cf. Langer 1967/1982). An MNS that facilitates sympathy, altruism, and mimetic processes would facilitate highly adaptive advantages (Miller 2008, Talmi & Frith 2007).

Empathy alone is not always sufficient to motivate helping behavior (Rosenthal 1964/1999). The cognition (particularly the action plans) in an ESM provides the context for its feeling component, and the interaction of the cognition and feeling in the meme can guide sympathetic actions. Dysfunction of the MNS may help account for the deficits in socialization that are observed in autism spectrum disorders (Oberman & Ramachandran 2007) and in antisocial personality or perhaps in any disorder involving deficits or dysfunction in social skills (Iacoboni 2007).

The possibility that the MNS and associated emotion systems mediate the generation and propagation of memes suggests the fruitfulness of studying memes that can be clearly identified as ESMs. ESMs should prove plentiful because they have an enormous appeal to forces that generate and propagate memes. The emotion component of an ESM has the motivational power to influence perception, grab attention, generate more emotion-cognition structures, and influence action. ESMs may constitute a major factor that shapes consciousness, personality and social functioning, and culture (Youngstrom & Izard 2008).

CONCLUDING REMARKS

Emotion research has increased exponentially since Tomkins's (1962, 1963) landmark volumes helped bring a nascent emotion science into an unevenly matched competition with the forces of the contemporaneous revolution that produced cognitive science. The two disciplines are becoming increasingly collaborative and progressing toward becoming one. As the realization of this exciting prospect proceeds, great challenges await scientists who will seek to understand how the brain assigns weights or significance to emotion and cognition (which assumedly retain distinct functions) as they are integrated or mingled in different periods of development, personalities, and contexts. They will find equally interesting challenges in research on ways to facilitate these processes to gain adaptive advantages, bolster constructive and creative endeavors, and prevent destructive and maladaptive behavior.

SUMMARY POINTS

1. Emotion feelings are a phase of neurobiological activity and the key psychological/motivational aspect of emotion. They constitute the primary motivational systems for human behavior.
2. Emotion feelings are prime factors in the evolution, organization, and operations of consciousness and the different levels of awareness.
3. The ability to symbolize feelings and put them into words provides a powerful tool for emotion regulation, influencing emotion-cognition relations, and developing high-level social skills.
4. The term "emotion" has defied definition mainly because it is multifaceted and not a unitary phenomenon or process. Use of the unqualified term "emotion" makes for misunderstandings, contradictions, and confusions in theory and research.
5. Basic emotions, emotion schemas, and emotion-schema memes are distinctly different in terms of their origin, content, causes, and effects.
6. Transitions from basic emotions to emotion schemas and emotion-schema memes are major milestones in development and in achieving social and emotion competence.
7. The psychological unconscious is an ill-defined and potentially misleading term. There is no consensus regarding its contents and functions. The concept of levels

of awareness may provide a better bridge to understanding human mentality and brain/mind processes.

8. Emotion utilization is the harnessing of an emotion's inherently adaptive emotion motivation/feeling component in constructive affective-cognitive processes and actions. Symbolization and effective communication of emotion feelings play a key role in emotion utilization, particularly in real or simulated social interactions.
9. The concept of emotion-cognition interaction, well validated in neuroscience and behavioral research, suggests that the presence of functionally distinct features in the interactants would increase both the flexibility and generality of the resultant processes.

FUTURE ISSUES

1. Experimental validation of the hypothesis that the feeling component of some emotion or emotion schema is continuous at some level of awareness should prove an interesting challenge for future research. So should studies designed to verify the hypothesis that interest or an interest schema is the default emotion or emotion-cognition interaction.
2. Insights on the early development and life-span growth of emotion-schema memes should add substantially to our understanding of the contributions of social and cultural factors in mental processes and behavior.
3. Distinguishing between emotion regulation and emotion utilization may provide new insights on the independence and interdependence of these two constructs.
4. Determining how the emotion and cognitive components of emotion schemas and emotion-schema memes integrate or mingle in the brain should provide leads for translational research. The findings from such research should contribute to preventive interventions that facilitate the development of emotion and social competence and the prevention of psychopathology.

Glossary

DET, differential emotions theory

Mirror neuron system (MNS), is assumed to consist of neurons that fire both when one acts and when one observes the same action performed by another; neurons that "mirror" the behavior of another

Memes, behavioral (cognitive, emotional, action) units that can propagate (be readily copied) and become subject to natural selection

Emotion schemas, emotion-cognition interactions/structures that generate feeling-thought experiences and behavioral tendencies that range from momentary processes to trait-like phenomena (e.g., anger schemas, interest schemas)

Emotion feeling, a phase of neurobiological activity that is experienced as motivational and informational and that influences thought and action, a felt cognition, or action tendency

Levels of awareness, levels of consciousness, ranging from phenomenal consciousness to access (verbally reportable) and reflective consciousness, which support the processes in higher-order cognition-emotion schemas

Emotion-cognition interactions, dynamic neuropsychological processes that determine the relative significance of emotion and cognition in planning, decision making, and actions

Phenomenal consciousness, a level of awareness in which objects, events, and emotion feelings can register and remain verbally unreportable experiences. Emotion feelings in phenomenal consciousness retain their functionality

Access consciousness, a level of awareness that includes verbally reportable content

Entrainment, harmonious synchronization of neural processes
 Individuation, those processes through which differentiated components tend to become a more unified whole
 Basic emotions, emotions that organize and motivate rapid virtually automatic yet malleable responses that are critical in meeting immediate challenges to survival or well-being
 Emotion-schema memes (ESMs), epigenetic emotion-cognition processes derived from mimicry of emotion-expressive cognition and action and endowed with motivation for influencing development and behavior

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