Emotions and Mood

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Emotions, feelings and mood are commonly used terms in psychiatry practice. In clinics, these terms are used more or less exchangeable. Observation and assessment of mood state and changes in it are essential in clinical work in psychiatry and psychology. The terms used in this context are not standardized. In different languages, the description of mood states is not uniform and poses a problem in terminology.

Fish defines and differentiates these terms as feeling is defined as “A positive or negative reaction to some experience” or “The subjective experience of emotion”. “Emotion is a stirred up state due to physiological changes which occurs as a response to some event and which tends to maintain or abolish the causative event”. “Affects are waves of emotion in which there is a sudden exacerbation of emotion usually as a response to some event”. “Mood is “the emotional state prevailing at any given time” or “The dominant hedonic tone of the moment”. Mood state is a lasting disposition, either reactive or endogenous, to react to events with a certain kind of emotion. Although defined differently these terms are closely interrelated. It could be said, that emotion is subjectively experienced feeling that related to affect and mood.

In ICD-10, Affect and mood are used interchangeable.

Differentiation of Concepts

Bennett and Hacker have tried to differentiate different terms used in psychology of emotions. They state Feelings must be differentiated into sensations, tactile perceptions, appetites, and affections.

Sensations like pain tickle etc. just determinate bodily location of stimulus and they are different from perception for not being correct or incorrect. Unlike perception, sensations are not susceptible to cognitive error. Sensations can be further divided in localized and of overall body condition as lassitude.

Tactile perception e.g. feeling of heat, solidity, elasticity or dampness of an object – is an exercise of a cognitive faculty. This informs individual how things are in environment in respect to perceptible qualities such as warmth, cold, hardness, softness, wetness, dryness, and so forth. Like all perceptions, they may be correct or incorrect.

Appetite is desire and sensation in combination. Natural appetites are such things as feelings of hunger, thirst or animal lust. Non-natural (acquired) appetites are addictions. Sensations of appetites have a somatic site (sensations of hunger are located in one’s midriff) and are forms of unease that directs individual in act to gratify the desire. The intensity of the desire is characteristically proportional to the intensity of the sensation. Fulfilling an appetite leads to satiation temporarily Appetites are not constant, but recurrent, typically caused by bodily needs or hormonally determined drives.

Affections are the feelings that can be distinguished into agitations (e.g. Astonishment, excitement), moods (e.g. cheerfulness, depression) and emotions (e.g. fear, love) – Unlike sensations; affections do not inform one about the state of one’s body, though they are sometimes linked with sensations. Unlike feelings that are perceptions, the affections do not inform one of the states of the
world around one.

Agitations are short-term affective disturbances, commonly (but not only) caused by something unexpected, e.g. being and feeling excited. As they are disturbances, caused by unexpected disruptions, they are not motives for action as emotions may be, but temporarily inhibit motivated action. One’s agitations are manifested in expressive behavior. Agitations are considered as modes of reaction.

Moods as feeling cheerful or depressed are states or frames of mind. They may be occurrent or longer-term dispositional states (one may feel depressed for an afternoon or one may be suffering from a depression that lasts for months). Moods are less closely tied to specific objects than emotions. They are not linked to specific patterns of intentional action hence they do not afford motives for action. Moods color one’s thoughts and pervade one’s reflections.

Emotional perturbations, episodic in nature, resemble agitations in certain respects. Some, e.g. fear or anger, have characteristic somatic accompaniments, both sensations that are felt and measurable physiological reactions. Others do not, e.g. feelings of pride but they are manifest in expressive behavior that may take various forms.

Emotional attitudes, such as love, hate may last for long periods of time and motivate action done for reasons. One’s emotions are then evident in the reasons that weigh with one in one’s deliberations, in the desires one harbors in respect of the object of the emotion, and in associated thoughts and fantasies.

Emotions have objects as well as causes. A person need not know the cause of his emotion, but, save in pathological cases, he cannot be ignorant of the object of his emotion, i.e. whom he is angry with. Intensity of one’s emotions is not proportional to the intensity of whatever sensations may accompany their occurrent manifestations. Unlike appetites, emotions do not display the same pattern of occurrence, satiation, and recurrence. Human emotions, rooted though they are in our animal nature, are nevertheless run through, as mere animal emotions are not, with thought and belief, wish and want, fantasy and imagination – as should be expected of language-using, concept-exercising creatures.
Emotional Experience

Every individual has plenty of experience with emotions. Psychology has evolved from science of mind to science of theory with passage of time and involvement of new schools of thoughts. At the different level of time emotions have been studied more and more. Currently it is understood that emotional experience is a complex constellation of following component.

The Cognitive component: subjective feelings

Any language has multiple words for emotions e.g. in English there are more than 550 words. People have difficulty in describing about their emotions to others. Emotions are highly personal and subjective feelings which have their own life. Lazarus reported that key determinant of the emotions are the cognitive appraisal of the events of an individual's life. The psychological study of this component depends on the verbal report of the subject of their experiences. The conscious experience includes an evaluative aspect i.e. people characterize their emotions as pleasant or unpleasant.

The Physiological component: autonomic arousal

The autonomic nervous system, which regulates the activity of glands, smooth muscles and blood vessels, is associated with physiological arousal at time of experience of emotions. The experience of highly arousing flight or fright reaction is best example of it. ANS is controlled by neural structure in CNS by subcortical grey matter while in cerebral cortex cognitive appraisal of events take place. Hence it is proposed that emotions appear to be start by activity in a constellation of interaction of brain centers and systems.

The Behavioral component: Nonverbal expressiveness

Emotions are characteristically expressed with overt expressions as smiles, frowns etc. These are emotions expressed in “body language” or in non verbal behavior. In 1971, Ekman and Friesen, with their experiment have shown that people are able to identify six fundamental emotions through facial expressions: happiness, sadness, anger, disgust, surprise and fear. Later Ekman added that four more emotions can be recognized through facial expressions: contempt, shame, guilt, and interest.

Theories of Emotions

With the progress of understanding in psychology there are numerous models and theories of emotions differ in their emphasis on the innate biological basis versus the social, environmental issues.

Early Theories

Aristotle classified emotions into opposites and explained the physiological and hedonic qualities associated with emotions. Later, Rene Descartes introduced the idea that a few emotions (or passions) underlie the whole of human emotional behavior.

James-Lange theory

During 1880s, the American psychologist William James and the Danish physiologist Carl G. Lange independently reached the conclusion that emotions arise from perception of the physiological state after close examination of the peripheral components of emotions such as somatic arousal. The theory puts emphasis on physiological determinants of emotions. It highlights that difference in various emotion is due to difference in pattern of autonomic arousal i.e. people supposedly distinguish emotions such as fear, joy, and anger on the exact configuration of physical reaction they experience.

Cannon-Bard Theory

In 1927, a paper by Walter Cannon in American journal of psychology criticized the James-Lange theory. It argued that physiological arousal could be produced without emotional experiences as in exercises. He also added that visceral changes were not rapid enough to precede the conscious experience. Furthermore people with different emotional experiences have same physiological changes. He produced a different explanation which was later elaborated by Philip Bard.

The Cannon-Bard theory argues that emotions occur when the thalamus sends signals simultaneously to the cortex (conscious awareness) and to ANS. Hence in there theory primary role of thalamus (Limbic system) is proposed in response
Schachter’s Two-Factor Theory

Schachter views that an individual explores situational cues to differentiate between alternative emotions. He argues that this experience depends on two factors:

a) Autonomic arousal
b) Cognitive interpretation of that arousal.

He explains when an individual experiences visceral arousal he tries to search for an explanation in environment and experiences the emotions which appear most close to that explanation.

Schachter’s theory agrees with both previous two theories and merges these along with an added view that people look to external rather than internal cues to differentiate and label their specific emotions. Primary role of thalamus (Limbic system) is proposed in response to a stimulus.

Evolutionary theories of emotions

Charles Darwin in 1872 in his work “The Expression of Emotions in Man and Animals” believed that emotion developed because of their adaptive values and necessary for an organism to adapt to its environment. Human emotions were considered product of evolution. The evolutionary aspect of emotions was neglected for almost a century before the work of other experimenters who were not satisfied with the explanation of above mentioned theories. Tomkins, Izard and Plutchik are prominent names among others. This school of thought consider emotions be largely innate reactions to stimuli. Primitive animals are incapable of complex thought process are able to recognize their emotions. Hence it is considered that emotions evolved earlier than thoughts and thoughts play a little role in emotions. This is supported by origin of subcortical brain structure before cortical structures.

Regulation of Mood and Emotions and Development Stages

Emotions by definition represent responses in reaction to stimuli. Emotional reaction facilitates an appropriate response for stimuli which can be considered either positive or negative. An emotion’s association with either approach or avoidance behavior is called its valence. Positive-valence emotions are associated with approach behavior, whereas negative-valence emotions are associated with avoidance behavior to stimuli.

Emotional reactions have varying degrees of intensity. The level of emotional intensity is termed “arousal”, experienced by the organism as physiologic activation. Arousal serves as an indicator of propensity for action in response to a stimulus. Hence the role of valence is to assigns a directional component of action and arousal assigns a level of urgency to that action.

Mood and emotion are related concepts, but there are significant differences. Emotions are easily evoked by environmental stimuli and are of brief duration. In contrast moods are more long-lasting and do not need stimuli to appear. Ekman proposed that the relationship between emotions and moods is bidirectional. He viewed that mood can be brought about by “dense emotional experiences.” That is, recurrent experiences of the same emotion at a high intensity, in the absence of opposing emotions, can precipitate a sustained mood of the same valence conversely; a prevailing mood of a given valence can predispose an individual to experience a similarly valenced emotion. Examples of such related emotions and moods are fear and anxiety.

Emotional regulation and normal development

Affective neuroscience is the study of emotional processes and their neural components. Most research in affective neuroscience has been done in animals and control human subjects. But results could be extrapolated to clinical populations.

The regulation of emotion is an individual’s ability to respond to his or her life experiences with a range of socially acceptable emotions that flexibly permit or delay reactions as the situation requires. In other words, the regulation of emotion is the ability to manage arousal or to modulate the intensity of emotional reactions. Affective neuroscience has revealed that regulation of emotion is influenced by a number of neural structures, including the autonomic nervous system and the frontal cortex.

At birth only excitatory systems (sympathetic nervous system) are functional with corresponding inhibitory structures (the parasympathetic nervous system).
system and the prefrontal cortex) continue to develop after birth. Thus, newborns lack control on their internal excitatory experiences. This makes them dependent on adult caregivers to regulate their emotions by initiation of soothing, distracting, or stimulating behavior.17

Between 7 to 15 months of age two crucial changes appear in nervous system
(a) Myelination of limbic and cortical association areas which allows maturation of the inhibitory cortical areas
(b) Descent of inhibitory neural projections from the prefrontal cortex to subcortical (excitatory) structures 18. It is believed that such development in human infants contributes to a child’s ability to regulate his or her own affective experiences. In humans, improved affect regulation can be observed when infants more effectively use gaze aversion and self-soothing mechanisms17.

As age progresses to the preschool years there is an improved ability to regulate emotions. This time there is maturation of the frontal lobes which allows the development of executive functions. It leads to development of Effortful control. Effortful control refers to the “ability of an organism to inhibit a dominant response to perform a subdominant response”18. Effortful control brings ability to sustain attention and to delay reactions. The ability to sustain attention is correlated with self-control measures of affective and behavioral style. Till the third year of life there is a marked increase in executive attention. By the end of the third year children are able to inhibit an incorrect response with effortful control. Because control involves the ability to focus executive attention, to shift set, and to exert inhibitory control, effortful control facilitates the child’s ability to diminish negative affect by shifting attention away from negative cues19.

This ability to shift attention away from a negative stimulus or toward a positive stimulus is called Attentional control. By directing attention away from a negative stimulus, attentional control dampens high levels of arousal. Furthermore, maintaining attention on positive stimuli can sustain prosocial behavior. This ability is correlated with a person’s ability to cope with emotional demands20.

Additional factor of development of language during the toddler and preschool years plays important role in emotional regulation. As children develop verbal skills, they are better able to think and to talk about their emotions. They can communicate more effectively with their caregivers which lead to enhancement of social contact17. Development of language provides a form of internal inhibition called Verbal self-control. Verbal self-control consists of using the symbolic capacity of language to control unconditioned reflexes and conditioned responses. It is hypothesized that the development of verbal self-control depends on the maturation of the hippocampus and prefrontal cortex19.

Regulation of emotion progresses through childhood as cognitive and language skills continue to develop. Children older than 6 years develop the cognitive capacity to understand that some emotions should not be expressed externally and that others must be exaggerated. This cognitive capacity is called as display rule. These rules become more complex as the child matures.

With further growth there is maturation of brain and mind faculties of visuospatial skills and abstract ability. As adolescence approaches, child’s verbal skills and social environment expand. They have more opportunities and experiences to develop enhanced self-regulatory methods. These allow to recognize emotion in others and to modify one’s behavior accordingly21.

Brain Asymmetries in Emotion

One of the oldest theories of emotion in the brain is that the left hemisphere is specialized for a number of cognitive processes, and the right hemisphere is predominantly involved in processing emotion. From the beginning of the last century, several researchers have noted that brain damage to the left or right hemisphere may differentially affect emotional behavior. Denny-Brown et al22 observed that patients with damage to the right hemisphere were often indifferent or emotionally flat, whereas Goldstein23 noted that patients with damage to the left hemisphere often showed a “catastrophic reaction,” i.e., these patients were depressed, agitated, and anxious. A more recent conceptualization is that both hemispheres process emotion, but each hemisphere is specialized for
particular types of emotion, particularly in the lateral frontal cortex.

**Right hemisphere hypothesis**

The right-hemisphere hypothesis proposes that the right hemisphere is dominant for the experience and expression of emotions irrespective of valence. Behavioral studies have shown that in healthy humans, the left side of the face is emotionally more expressive; emotional intonation (prosody) is more easily recognized when presented to the left ear, and stimuli presented in the left visual field (i.e., first to the right hemisphere) are judged as more emotional and elicit greater autonomic responses. Deficits in prosody have been found in patients with right hemisphere frontal damage, and deficits in recognition of emotional facial expressions have been linked to right hemisphere damage.

This hypothesis was subsequently refined by Gainotti who pointed out that both hemispheres could play a complementary role in emotional behavior. In particular, the right hemisphere might be dominant for automatic components of the emotional response (such as experience, expression, and autonomic activation), whereas the left hemisphere is specialized for functions of control and modulation of the spontaneous emotional response. This proposal is in line with the suggestion that a mechanism of contralateral inhibition regulates the activity of both hemispheres, and that damage of one hemisphere disinhibits the other hemisphere. Thus, damage to the right hemisphere would diminish and damage to the left hemisphere would disinhibit the automatic emotional response, which might explain the affective sequels of unilateral brain lesions.

**Emotional valence lateralization hypothesis**

The valence lateralization hypothesis proposes that the left and right hemispheres are specialized for the experience of positive and negative emotions, respectively, where positive emotions include cheer, elation and confidence, and negative emotions include sadness, grumpiness, and distress. Support for the hypothesis has been mixed. Evidence for it has come from research on clinical and normal populations, including studies of emotional displays in persons with unilateral cerebral lesions and in persons with epilepsy who undergo the intracarotid amobarbital procedure and studies of asymmetries in cortical activity in persons induced into emotional states and in persons with clinical depression. Evidence against the hypothesis has come from research on similar clinical and normal populations, including studies finding that, irrespective of valence, emotional disturbances are more common following right- than left-hemisphere injury, that emotional changes in persons with temporal lobe epilepsy are more common in those with right-than with left-sided foci, and that emotional responses in normal persons are stronger to happy and sad films alike when presented to the right than to the left hemisphere.

Further support for valence hypothesis come from an experiment by Schiff and Lamon who proposed that unilateral face contractions induce positive or negative changes in emotion depending on the side of contraction (Schiff & Lamon hypothesis); left-side contractions were found to produce more negative changes, right-side contractions more positive changes in emotional state. To explain the effects of the contraction method, Schiff and Lamon propose a two-step mechanism: first, inasmuch as the muscles of the lower two-thirds of the face as well as the muscles of the hand are innervated predominantly by the contralateral hemisphere, unilateral contraction of these muscles is assumed to predominantly activate sensory and/or motor areas in the contralateral hemisphere; second, on the assumption that neural activation spreads to nearby cortical and limbic regions, including regions that mediate emotional states, there is arousal of the emotional state, positive or negative, primarily associated (according to the valence hypothesis) with that hemisphere.

In a metaanalysis of 65 studies, Wager et al concluded that there is no evidence for the hypothesis of overall right-lateralization of emotional function, and only a limited support for valence-specific lateralization of emotional activity in frontal cortex. The lateralization of emotional activity is more complex and region-specific than predicted by previous theories.
**Integrative hypothesis**

Heller proposed a neuropsychological model of emotion that integrates the competing hypotheses (integrative hypothesis). Based on evidence from behavioral, neuropsychological, and psychophysiological studies, she proposed that valence and arousal are asymmetrically represented in anterior and posterior brain regions, respectively. In particular, she suggested that relative left frontal activity is associated with the experience of pleasant emotions, whereas relative right-frontal activity is associated with negative affect. Complementing this assignment of valence to the anterior regions, she also proposed that the right parietotemporal regions play a role in the activation/arousal component of affect. These regions are believed to play a crucial role in regulating the autonomic arousal that is associated with affective states, and may be involved in the processing of emotional information and the experience of affect.

**Dysfunctional Mood and Emotions: Mood Disorders and Beyond**

Infants and young children typically show inconsistent regulation of emotions and emotional lability in the form of crying and tantrums. Normal infant’s lability may be more consistently related to a negative stimulus and it serves as a means of communicating the child’s needs to the caregiver, which is adaptive. In most cases lability is outgrown with the development of alternative forms of communication.

Both emotions and moods become dysfunctional when they occur in inappropriate contexts or with disproportional intensity. A recurrent, high-intensity dysfunctional emotion, if occurring without intervening functional emotions, could result in a dysfunctional mood, or mood disorder. Emotional lability can occur in the setting of a mood disorder, often the chief complaint in children with mood and behavioral difficulties, in individuals with developmental disabilities.

The regulation of emotions undergoes a complex, normal developmental process which is related to other areas of development but which can be disrupted, leading to mood and behavioral problems. A number of neural systems interact and contribute to the development of emotion regulation. In fact, children with bipolar disorder often present with developmental delays in these areas.

A better understanding of the relationship between the regulation of emotion and cognitive skills, notably attentional control and executive functioning, could help explain the high comorbidity between bipolar disorder and attention deficit hyperactivity disorder (ADHD). Language and learning disabilities can also contribute to emotion dysregulation and may provide a possible area of intervention. A better understanding of the role of these facilitators in the development of affective regulation would allow the development of new strategies to help people with psychopathologies of mood and emotion.

**References**

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