

Dynamic Theory of Emotions and Behaviour

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ABSTRACT

P.K. Anokhin's theory of functional systems revealed the central architecture of purposeful Behaviour, where emotions constitute one of the forms of mental brain activity with enormous biological, evolutionary, and social significance. Modern theories of emotions represent various views on the biological role and causes of negative and positive emotions.

"Biological Theory of Emotions" by P.K. Anokhin points out the key role of emotions in the systemic organization of purposeful Behaviour and gives a general description of the development of emotions at the initial and final stages of Behaviour formation.

According to "Information Theory of Emotions" by P.V. Simonov, the degree of expression of an emotion depends on the biological or social need and the difference between the necessary information and the one which the individual actually possesses to achieve the goal. At the same time, none of the theories fully gives a clear idea of the formation of emotions at different stages of purposeful Behaviour or takes into account the relationship of negative and positive emotions in the dynamics of purposeful Behaviour with successful or unsuccessful results.

The article presents the "Dynamic Theory of Emotions", which characterizes the sequential development of positive, negative emotions at different stages of purposeful Behaviour, taking into account the changing ratio of the predicted probability and real achievement of the result, as well as individual personality traits.

"Dynamic Theory of Emotions" most fully reveals the origin, biological role, and participation of emotions in purposeful Behaviour and shows the possibilities for conscious, intelligent introspection, control, and management of emotions in the systemic organization of purposeful Behaviour. The main theoretical provisions of the "Dynamic Theory of Emotions" are confirmed by a complex experimental analysis of the psychophysiological state of students. The learning activity is a real model of Behaviour that reflects the general biological patterns of the development of emotions and emotional stress.

Keywords

Brain, Psyche, Emotions, Character traits, Behaviour.

Introduction

The brain is a unique formation in living nature, with the ability to subjective, mental activity, expressed in feelings, emotions, thoughts, and consciousness [1-10]. Cognition of the nature of the mental activity of the brain is a fundamental scientific problem of general biological and social significance in human life. The presence of a subjective state was one of the most important factors

of evolution, which determined the possibility of self-education and self-development of life. Being associated with the vital needs of the body, emotions have formed in the process of evolution as an essential component of self-preservation and survival of living beings. Primarily subjective states should have appeared in the earliest forms of living beings in the form of primitive sensations, which made it possible to make a choice between what is useful and what is harmful to the body. With the help of subjective sensation, living organisms could determine what to strive for and what to avoid. The correct choice ensured the survival of living things

and the species as a whole. With the evolutionary development of living organisms, various forms of subjective states arose and became more complex, the top of which was the mental activity of the brain, including thinking.

The evolution of living beings would be impossible without a subjective assessment of one's own state and environment. The emergence of emotions as a subjective state was the most important factor in the evolution of living beings, determining self-development, survival, and self-preservation of life. Therefore, one more important evolutionary principle should be added to the well-known principles of the "Evolutionary theory" of Ch. Darwin [11,12]- the presence of a subjective factor, without which self-organization and self-development of life would be impossible [13].

Emotions are a form of mental activity of the brain, which has enormous biological, evolutionary, and social significance. They affect all vital functions of the body. It is necessary to distinguish between emotions as subjective states and emotional reactions arising against the background of emotions in the form of various somatic and vegetative manifestations. Various views on the biological role and causes of negative and positive emotions are presented in modern theories of emotions [2,14,15].

The biological theory of emotion

"Biological Theory of Emotions" by P.K. Anokhin [2] provides a general description of the development of emotions at various stages of the purposeful Behaviour formation (Figure 1). The main content of the "Biological Theory of Emotions" comes down to the fact that unmet needs cause the appearance of negative emotions, and their satisfaction leads to the emergence of positive emotions. Behaviour is aimed at avoiding negative and receiving positive emotions. When the desired result is achieved, an instant change in the sign of emotion takes place - the negative is replaced by a positive emotion, which is a kind of "reward" for satisfying an urgent need. If the obtained and expected results do not match, a "mismatch reaction" is manifested, characterized by an orientation-research reflex, accompanied by a pronounced negative emotional reaction. The qualitative nature of emotion

depends on the specifics of motivation, for example, hunger, thirst, etc. If unmet need becomes greater, the specificity of negative emotion decreases, and it acquires a nonspecific component of an aggressive nature for any type of dominant motivation.

The biological meaning of emotions lies in the fact that they create a subjective interest of humans and animals in achieving the result necessary for the body and the associated satisfaction of social or biological needs. For each subject, the emotion that exists at each moment (positive or negative) is the "ultimate truth" that is not subject to any doubt.

Emotions are powerful incentives for the survival and satisfaction of humans and animals for social or biological needs [1,2]. They allow you to subjectively assess a particular need existing in the body, its magnitude, and its qualitative nature. They make it possible to single out the most significant (biological or social) needs simultaneously existing in the body and direct the individual's Behavioural activity to satisfy the leading dominant need. In their main manifestation, emotions reflect the vector of striving: to avoid everything that is harmful and to achieve what is useful. The undoubted value of the "Biological Theory of Emotions" by P.K. Anokhin is that it points to the key role of emotions in the organization of purposeful Behaviour and gives a general description of the development of emotions at the initial and final stages of Behaviour formation.

In general, without belittling the importance of the fundamental systemic concepts of P.K. Anokhin about the organization of emotions, it can be noted that the "Biological Theory of Emotions" does not take into account all factors and does not give a complete "picture" of the development of emotions at different stages of purposeful Behaviour. Numerous examples evidence this: it can be seen that the presence of a need and corresponding motivation is not always accompanied by the appearance of negative emotions, and the achieved Behavioural result often does not lead to the emergence of positive emotion. In many Behavioural situations, if the set goal is not achieved, negative emotion does not arise; and finally, purposeful Behaviour can take place in the complete absence of any emotion.

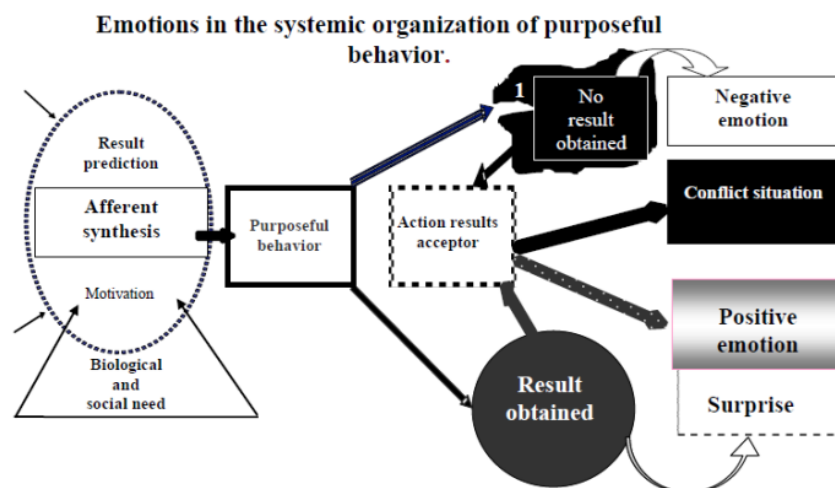


Figure 1: Scheme of the systemic organization of purposeful Behaviour (by P.K. Anokhin).

Information Theory of Emotions

According to “Information Theory of Emotions” by P.V. Simonov, the degree of expression of emotion depends on the biological or social need and the difference between the necessary information and the one which the individual actually possesses to achieve the goal [14,15].

P.V. Simonov writes: “emotion is a reflection by the brain of humans and animals of any actual need (its quality and magnitude) and the likelihood (possibility) of its satisfaction, which the brain evaluates on the basis of genetic and previously acquired individual experience” [15]. The need reflected by the brain is nothing more than motivation. The higher is the need and the stronger is the motivation associated with it, the greater, other things being equal, is the magnitude of emotions. The strength of emotions will also increase with the lower predicted likelihood of satisfying the need. The highest manifestation of emotions will occur with a small amount of information about the possibility of satisfying the need. An assessment of the possible probability of achieving a result in satisfying the need for each Behavioural act is given by humans and animals on the basis of their individual experience.

“Information Theory of Emotions” focuses on the reasons for the appearance of negative emotions at the stage of emergence of a need and does not reveal the entire dynamics of the development of negative and positive emotions in the process of implementing a purposeful behavioural act.

Systemic organization of purposeful behaviour

The Theory of Functional Systems, developed by P.K. Anokhin

[2,16], points to the central nodal mechanisms of purposeful Behaviour formation and “lays a conceptual bridge” between the mental and neurophysiological activity of the brain.

At the same time, only the neurophysiological component of brain processes is reflected in the functional system of purposeful Behaviour, while the mental activity of the brain, which remains literally “behind the scenes,” is not represented; it is only implied that it exists. Systemic organization of purposeful Behaviour has two subsystems that are interconnected and united into a single whole: neurophysiological and mental ones [17]. Mental and neurophysiological activities of the brain are interrelated, and there is a two-way connection between them (Figure 2).

At the neurophysiological level, all sensory excitation flows from the sensory organs are perceived, biological motivations are formed, as well as components of memory associated with memorizing and storing information, efferent, command programs that control movement, behaviour and autonomic reactions, reflex reactions and automated behavioural acts are performed due to the previously established pretest integration, and the obtained result is evaluated. At the mental level, understanding of all the information entering the brain is carried out, social motivations are formed, the necessary information is extracted from the memory, the goal appears, and all psychological manifestations arise, such as consciousness, thinking, emotions, etc.

The main mental functions of the brain: free will, goal setting, choice of behaviour, mental, imaginary result and assessment of goal achievement occur at a subjective conscious level.

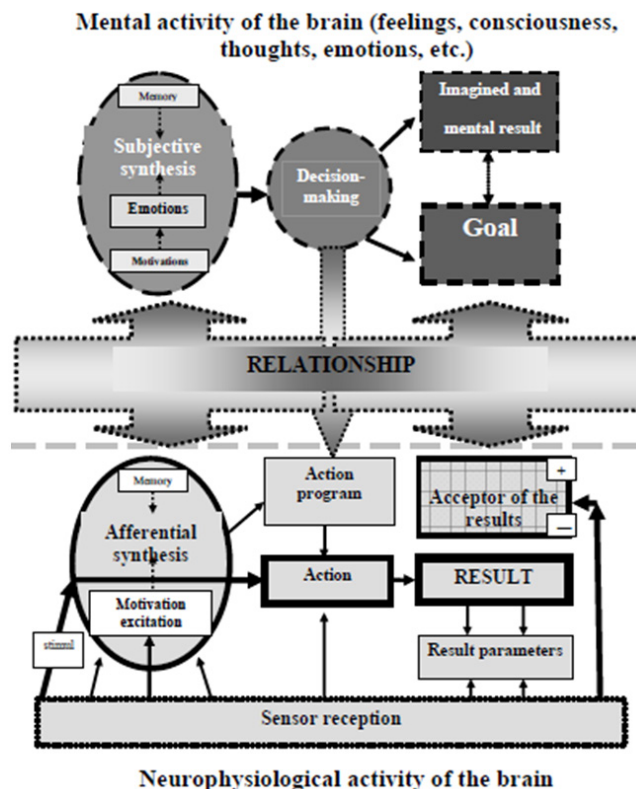


Figure 2: Scheme of the systemic organization of neurophysiological (1) and mental (2) brain activity. Designations: S.S. - starting stimulus, Sit. aff. - situational afferentation, Rev. aff. - reverse afferentation.

Mental activity manifests itself in consciousness, characterized by the ability of the brain to sense self, in the form of feelings, emotions, thinking.

In the systemic organization of purposeful Behaviour, one can see the relationship between emotions and consciousness:

- Purposeful Behaviour occurs against the background of wakefulness and in the presence of consciousness.
- Consciousness reflects the forecast of the possibility and reality of achieving a result in purposeful Behaviour, which is a determining factor in the development of emotions.
- Consciousness includes the current emotional and motivational state, which is initiated by the formation of purposeful Behaviour.

However, there is not always a relationship between emotions and consciousness in the systemic organization of purposeful Behaviour. During the formation and implementation of an automated Behavioural act, consciousness exists, but there are no emotions. During sleep, consciousness and purposeful Behaviour are absent, while emotions are present, especially during dreams [17]. It should be remembered that the formation of consciousness and emotions occurs in the mental sphere of brain activity, which is not directly reduced to neurophysiological processes [17-19]. However, a number of researchers make serious methodological mistakes when they try to reveal the nature of consciousness and emotions relying only on the neurophysiological, neurochemical mechanisms of the brain.

Dynamic theory of emotions

After conducting a deep analysis of the existing theories of emotions, we came to the conclusion that none of the theories fully gives a clear idea of the formation of emotions at different stages of purposeful Behaviour or takes into account the relationship of negative and positive emotions in the dynamics of purposeful Behaviour with successful or unsuccessful results. The existing theories of emotions are static, they do not reflect the dynamics of the relationship between need, motivation, probabilistic forecasting and achievement of a result in the process of repeated purposeful Behaviour. Based on the ideas about the formation of emotions set forth in the “Biological Theory of Emotions” and “Information Theory of Emotions”, we have developed a “Dynamic Theory of Emotions”, which characterizes the development of emotions at different stages of purposeful Behaviour, taking into account the changing ratios of the predicted probability and the actual achievement of the result, and also individual characterological personality traits [17].

The “Dynamic Theory of Emotions” examines the sequential development of emotions in various stages of purposeful Behaviour (according to P.K. Anokhin), depending on the initial forecast of the probability and the actual achievement of the result. The biological sign of emotions (positive, negative) or the absence of emotions at different stages of Behaviour depends on the ratio of the predicted probability of achieving the goal and the effectiveness in meeting

the need. The main stages of purposeful Behaviour (according to P.K. Anokhin) are presented in Figure 1 and Table 1.

When implementing purposeful Behaviour, there can be various options for the ratio of the goal achievement probability predicted by the individual and the effectiveness of the performed Behavioural act.

1. Predicted absolute confidence, i.e. 100% probability of achieving the result of Behaviour. In this case, the Behaviour ends with the real goal achievement.
2. Predicted absolute confidence in achieving the goal. However, after the Behavioural act, the desired result was not achieved. Erroneous forecasting took place.
3. The predicted low probability of the goal achievement possibility. At the same time, the required result was achieved in purposeful Behaviour.
4. The predicted low probability of the goal achievement possibility. The desired result was not achieved in purposeful Behaviour.
5. The predicted absolute impossibility to achieve the goal. The desired result cannot be achieved.
6. The predicted anticipation of result achievement when there is uncertainty about success.
7. The predicted possibility of achieving a result in case of unwillingness to perform a Behavioural act.

Various emotions arise at different stages of purposeful Behaviour depending on the probability ratio of achieving the goal predicted by the individual and the real effectiveness of the performed Behavioural act. Let us consider the cases of negative and positive emotions occurrence at different stages of purposeful Behaviour in a static mode, which means that the indicated ratios of the predicted probability of goal achievement and the actual effectiveness of the completed Behavioural act remain unchanged (Table 1).

In the first case, if the Behaviour ends in obtaining the required result with the predicted absolute confidence in achieving the goal, then there are no emotions. We called this type of Behaviour, which is not accompanied by emotions, an automated Behavioural act. In everyday life, these types of Behaviour occur most often and they are countless: an individual opened the door, turned on the light, took the handle, cut bread, etc. In these cases, there is no biological need to attract emotions as a mobilizing factor since nothing prevents the goal achievement.

In the second case, the original forecast contained absolute confidence in achieving the goal. However, the Behaviour did not lead to the desired result. Success predictions were wrong. In case of absolute confidence in success at the initial stages, Behaviour is not accompanied with negative emotions. However, in the end, in absence of the expected result, a pronounced negative emotion will appear, which arises as a “mismatch reaction” when the obtained result does not correspond to the predicted one.

Table 1: The emergence of emotions at different stages of purposeful Behaviour with different predicted possibilities and reality of result achievement (static mode).

Stages of organization of behavior Predicted probability of achieving a goal	Afferent (subjective) synthesis caused by motivation	Decision-making, formation of an action program, apparatus for predicting the parameters of the result ("acceptor of the results of action")	Action	Evaluation of the effectiveness of a behavioral act, behavior pattern	
				Result received	Result not received
Absolute confidence in achieving the result of behavior	0	0	0	ABA 0	MR <u> </u>
Low probability of the possibility of achieving the goal	<u> </u>	<u> </u>	<u> </u>	RS, RB ++	0, <u> </u>
Absolute impossibility of achieving the goal	<u> </u>	<u> </u>	<u> </u>		<u> </u> CS
	++	++	++		IRD ++
Anticipating the possibility of achieving results	+ <u> </u> VR				ABE
Unwillingness to perform a behavioral act	<u> </u> <u> </u>				WB

Legend: + positive emotion; Negative emotion; 0 lack of emotion; **MR:** Mismatch Reaction; **RS:** Reaction of Surprise; **RB:** Risky Behaviour; **IRD:** Imaginary Result, Dream; **CS:** Conflict Situation, Impossibility of Obtaining the Result; **ABA:** Automated Behavioural Act. **VR:** Virtual Result; **ABE:** Ambivalent Emotions. **WB:** Weak-Willed Behaviour, Laziness.

In the third case, if there is uncertainty about success and the previous experience of the person or animal does not allow making a decision that guarantees achievement of the necessary Behavioural result, in this case there is a negative emotion at the stage of afferent synthesis whose severity will depend on the motivation and the predicted probability of result achievement. It is this case of the emergence of emotion that is presented in the Information Theory of Emotions by P. V. Simonov [14,15]. Negative emotion will accompany the entire Behavioural act until the stage of evaluating its result in the acceptor of the action results.

In a favorable case, in situation 3, when the parameters of the achieved result fully correspond to the expected results of the action, a positive emotion arises. The latter crowns a successful Behavioural act only when there initially was, and was predicted, a low probability of adaptive result achievement. The less was the hope for success, the more positive emotional reaction ("delight", "surprise") will appear when the goal is unexpectedly achieved. At the same time, the stronger is the negative emotion at the stage of Behaviour formation and implementation, the brighter is the positive emotion in case of successful Behavioural act completion and dominant need satisfaction. This is clearly seen in the

example of a student taking an exam. Before passing the exam, he experiences strong emotional excitement, followed by enthusiastic emotion after successful passing.

In pursuit of positive emotions, a person commits risky Behaviour in which he deliberately uses a risk situation with a low probability of result achievement in order to obtain the maximum positive emotional reward in case of success. A strong negative emotion ends with a strong positive emotion. For example, fans of extreme sports, avid roulette players and gamblers do this. However, as a rule, low probability of success most often leads to failure, which causes pronounced negative emotions and serious consequences. In recent years, due to spiritual degradation among young people, there has been a pernicious interest in especially dangerous, asocial types of risky Behaviour, which often end in the death of adolescents. Positive emotions arising as a result of successful achievement of the goal, as a rule, are short-term and pass after a certain time after satisfying the existing need, for example, passing an exam. Thus, the emotional sphere will be freed for the formation of new emotions based on existing motivations and unfulfilled needs.

In an unfavorable case, in situation 4, when the necessary result was not obtained with the initially predicted small possibility of goal achievement, the negative emotion will remain and it will reflect the existing unmet need. There will be no “surprise” or “mismatch” in this case. The individual did not expect and did not receive the positive result. However, if there was some hope for success and the predicted probability of achievement was not too small, there would still be disappointment because of the result that was not obtained. The degree of “surprise” or “mismatch” depends on the initially predicted possibility of achieving the desired result. The greatest positive “surprise” emotion will arise at the moment of an unexpected receipt of a Behavioural result at an initially low or absent predicted probability of goal achievement. On the contrary, the lower is the predicted probability of result achievement, the less pronounced is the “mismatch reaction” and the associated negative emotion when the result is not achieved. The greatest negative emotion will manifest itself with the most predictable confidence in success if the goal is not achieved.

In the fifth case where absolute impossibility of goal achievement is predicted (hopeless situation), the emotional reaction depends on the personality traits. Some individuals develop long-term negative emotion. K.V. Sudakov [20] called this situation “conflict Behavioural situations” in which man and animals cannot satisfy their leading needs for a long time. Others deliberately abandon an unattainable goal and thereby find a way out of a conflict situation for themselves. Others are satisfied with an unrealizable dream and experience positive emotions from an imaginary result.

In the sixth case, it is possible that two ambivalent anticipatory emotions exist simultaneously: the negative and the positive one. Negative emotions are associated with uncertainty about getting the result and anticipating an undesirable situation in goal achievement.

Positive emotions arise from previous experience that allows you to anticipate the possibility of goal achievement. They reflect the anticipation of joy from the result obtained in the future [21]. In this case, “virtual reinforcement” or “virtual result” will appear, which will be characterized by the presence of a positive emotion even before real result is obtained. With the initial uncertainty in achieving the desired result, any receipt of additional information that increases the possibility of goal achievement causes a decrease in negative emotion and an increase in the positive one. Conversely, predicting additional obstacles to achieving a goal increases the negative emotion and at the same time weakens the positive one. At the same time, there is a dual combination of two opposite, ambivalent emotions. The ratio and magnitude of one or another emotion depends on many factors: the nature and strength of motivation, and most importantly, predictive probability of obtaining the result. The greater is the predicted probability, the less negative is the emotion and the more outrunning is the positive emotion.

Many such forms of emotional state can be cited. A person who is at the set table feels hunger and positive anticipation at the same

time. Another example is that negative emotions will reflect awe and anxiety in anticipation of a possible love date. At the same time, positive emotions will arise in anticipation of the joy of the upcoming meeting with a loved one. This possibility of combining positive and negative emotions was expressed by A.S. Pushkin in his poem.

«..... I'm sad and easy; my sorrow is light;
My sorrow is full of you,
of you, of you alone... My despondency
Is not tormented or disturbed,
And the heart again burns and loves - because
It cannot but love”.

Some people tend to be daydreaming, which evokes a positive emotion from the imaginary anticipation of a desired result that cannot be achieved.

In many cases, a positive emotion, anticipating the achievement of a result, is the reason for the excitement that arises against the background of uncertainty and lack of complete confidence in success. This kind of relationship between negative and positive emotions is especially evident in gambling. Based on the idea of P.K. Anokhin [16] about the acceptor of the results of action and “Dynamic Theory of Emotions” which characterizes emotions formation in the dynamics of the systemic organization of emotions, S. K. Sudakov [21] examines various neurochemical mechanisms of anticipatory emotional, “virtual” reinforcement.

There is a very typical situation 7 where there is an unmet need and the corresponding motivation, but there is no desire to perform the required Behavioural act. Two motivations collide. This situation is characterized by weak-willed Behaviour, laziness. In this case, negative emotions are summed up. One stems from an unmet need and an unattained result, the other one - from a negative attitude to the obligation to perform actions. Emotions can arise in a person in the dynamics of his development after a completed Behaviour or a Behavioural situation that really occurred, periodically emerging in his memory in the form of experiences about past events. E.A. Gromova [22], this kind of memory “Emotional memory”. The more significant were the emotions, the more strongly were they fixed in the emotional memory. Residual positive emotions leave impressions of achieving the most important life results. Negative emotions can be useful for getting rid of the repetition of unfavorable Behavioural situations, or be negative in nature with extremely strong protracted experiences that cause neurotic reactions.

At the same time, emotions may arise that are not directly related to the systemic organization of Behaviour and the need to achieve a specific result. This kind of emotion can be called “Spontaneous Emotions”. These include a bad mood, sadness, despondency, or a feeling of inexplicable joy that is not associated with anything in particular.

There can be various reasons for spontaneous negative emotions:

general dissatisfaction, poor health, weather conditions, seasonal changes, premonitions, hormonal changes, cycloidal nature, etc. If such spontaneous negative emotions become long-lasting, they can lead to the development of depression, and in case of mental disorders - to affective disorders. With a long-lasting unsatisfied dominant need, negative emotions lose their adaptive character and acquire a form that is nonspecific in relation to motivation in the form of emotional irritation, anger, despair, etc. At the same time, the Behaviour loses its purposeful character. Everyone knows various types of meaningless, non-result-oriented Behaviour: how to stomp, break plates, chairs, throw things, etc., which are characterized by the expression of emotions that are not aimed at achieving the desired result, and helplessness in choosing appropriate Behaviour. Summing up the above, it can be argued that the biological sign of emotions at all stages of the Behaviour organization depends on the ratio of the predicted probability in goal achievement and the actual effectiveness in meeting the need. The strongest negative emotions arise in absence of the expected result and ineffective Behaviour against the background of complete confidence in success. They are most pronounced in a conflict situation where there is an insignificant possibility of achieving Behavioural result. When the necessary Behavioural result is achieved and the need is satisfied, the biological sign of emotion changes from negative to positive almost instantly.

Emotions are the most important stimulus for Behaviour, and the Behaviour itself is aimed at avoiding negative and obtaining positive emotions. Negative emotions mobilize the body to satisfy an existing need, they “push” to action, and positive emotions “attract” to an urgent result and serve as a kind of precursor of a future result. Emotions arise and are especially necessary where there are obstacles to achieving the goal, where difficulties are foreseen and a low probability of the possibility of satisfying an urgent need is estimated. The main meaning of emotions is to mobilize all the body’s activities for significant problems in satisfying the need. Therefore, the strength of emotions, such as passion, is often determined not so much by the content of the need as by a small opportunity, i.e. unattainability of the goal. This may reveal the “falseness” of emotions, which is reflected in the saying: “The forbidden fruit is sweet.” It is quite possible that the “fruit” will not really be that “sweet”.

Based on a probabilistic subjective assessment of the effectiveness of Behaviour, emotions do not always turn out to be reliable “guides” in Behaviour. They can be disorienting in making the right decision and provoke erroneous Behaviour. Vivid emotions give a “strong impulse” to achieve the goal, but at the same time reduce the possibility of a reasonable, adequate decision making. The emotion is “blind.” - It mobilizes, directs, but, as you know, can often be a “bad advisor.” With full possibility of satisfying all the individual’s needs and whims, “satiety” sets in - nothing pleases anymore, life becomes devastated. A positive emotion will appear only in the presence of long-suffered passionate expectation, when the desired result is obtained. P.V. Simonov [14], wrote about this: “the desire to preserve positive emotions dictates an active search for uncertainty because complete information “kills pleasure”.

Negative emotions are essential for pleasure.

In the systemic organization of emotions, there is a relationship between negative and positive emotions. In fact, positive emotions cannot arise without prior negative emotions. **There are no positive emotions without negative ones.** Under natural conditions, the striving of humans and animals for positive emotions means formation of purposeful Behaviour under the stimulating influence of negative emotions with the help of which it is possible to achieve the desired result despite the presence of obstacles. Experiencing positive emotions means overcoming the negative ones. It is fundamentally important to note the changes in the nature of emotions in the dynamics of the systemic organization of purposeful Behaviour, with repeated purposeful Behavioural acts. This determines the name of the theory: “Dynamic Theory of Emotions”.

In the dynamics of Behaviour, subjective assessment of the goal achievement probability can change through the acquisition of experience, learning, training and consolidation of skills. Therefore, the nature of emotions changes with the improvement and effectiveness of purposeful Behaviour. Each successful Behavioural act that ends with a positive emotion brings experience and increases predictive probability of result achievement with subsequent subjective assessment. Therefore, the emotions accompanying the same repetitive Behavioural act may be different. For example, you can illustrate the dynamics of various emotions formation using the example of the attitude to the game. At the first attempts to participate in the game, when the necessary skills are not yet available, the child develops a negative attitude associated with uncertainty in success and failure. With successful repetition of the game, the degree of uncertainty and negative emotion will decrease and positive emotions will appear with the result achieved, which will increase the child’s interest in the game. In the future, self-confidence and confidence in his skills will increase so much that even before the start of the game, the participant will begin to experience positive emotions from anticipation of success, which are further enhanced with the actual result achieved. With repetitive, predictable and successful outcomes, negative and positive emotions will diminish. And finally, when the probability of success in the game becomes maximum, the negative emotion will disappear, followed by the positive one. The Behaviour will become automated, the game will become boring, the child will lose interest in it.

Thus, the relationship between negative and positive emotions changes in the dynamics of the forming successful purposeful activity as it improves.

If an emotion has arisen, it will definitely find its expression in somato-vegetative reactions. One can only voluntarily hide certain components of emotional reactions. For example, a well-mannered person will not show negative Behaviour, irritation, abuse, or a pronounced reaction of delight. However, in this case, the person will experience an internal emotional state. In this case, the latent components of negative emotional reactions, the so-called “delayed emotions”, will intensify internal emotional reactions.

“Dynamic Theory of Emotions” indicates the possibility of conscious introspection, control and management of emotions directly in the systemic organization of purposeful Behaviour and shows the ways to achieve this. Motivation is usually in line with need, and the conscious impact on motivation is very limited. However, it is still possible to eliminate unwanted social motivation and associated emotion. To do this, it is necessary to find, “turn on” another social need and actualize the motivation associated with it, thereby making it dominant. Another effective approach to emotional control is aimed at finding and obtaining additional information that increases the probabilistic prediction of achieving a Behavioural result. Undoubtedly, this method of emotional control is associated with the individual characterological traits of the personality, with erudition, education, experience, intellectual abilities, social status and the person’s environment. Emotional control can be learned by analyzing the appropriateness: the usefulness or uselessness of previously manifested emotions. In the dynamics of their existence, emotions can reflect the subjective attitude of an individual to previously committed actions and to the results obtained, which are compared with individual moral criteria of the permissible and the impossible. Thanks to upbringing, culture, parameters reflecting the possible and unacceptable in the society are laid in the acceptor of the action results.

Behaviour is controlled by the norms of inherent morality. In accordance with this, the individual avoids and does not commit acts that go beyond acceptable, indecent actions. If indecent Behaviour with irreparable consequences takes place for one reason or another, the person experiences negative emotions of remorse or shame, which arise when there is a “mismatch” between the inherent attitudes and the real consequences of the Behaviour. Along with all the above dynamic factors that determine the development of emotions at different stages of purposeful Behaviour, individual characterological traits of the personality, depending on the type of higher nervous activity, excitability, emotionality, irritability, etc., are of great importance.

Emotions are subjective states of a person or an animal, entirely (qualitatively and quantitatively) depending on the nature of social or biological motivation, possibility and reality of result achievement in purposeful Behaviour, individual characterological personality traits, and are characterized by a complex of somato-vegetative reactions [23].

These ideas served as the basis for experimental modelling of emotional states and emotional stress [20,24]. So far, none of the theories of emotions has taken into account the biological and social expediency of mechanisms for controlling and limiting the duration of emotional states, and has not even raised the question of their existence.

In the central organization of emotions, there are biologically expedient mechanisms for controlling and limiting the duration of negative emotional states [13]. Negative emotions with unsatisfied needs (for the most part social ones) and inability to achieve the Behavioural result still fade over time. Positive emotions disappear

even faster. Emotions should not be superficial and short-term ones, otherwise they will not be able to ensure the goal achievement, especially if this is associated with overcoming obstacles and showing the necessary perseverance. However, emotions should not be too long. If an emotion that arose on the basis of a specific unsatisfied motivation would once and for all acquire a persistent character, this would exclude the possibility of switching Behaviour to satisfy other vital needs. Thus, emotions have a certain plasticity, and a natural emotional balance is maintained in a healthy body, which is characterized by the ratio of positive and negative emotional states and their duration. Plasticity of emotions depends on many factors: age, hereditary and individually acquired characterological characteristics, emotional stress, health, etc. It is known that plasticity of emotions is the highest in children, and grief and tears are quickly replaced with good mood and positive emotions. With age, plasticity of emotions decreases, and negative emotional reactions tend to be prolonged, which predisposes to the development of emotional stress.

Conclusion

“Dynamic Theory of Emotions” gives a comprehensive description of the development of positive, negative emotions at different stages of the systemic organization of purposeful Behaviour, taking into account the changing ratio of predicted probability and real achievement of the result, as well as individual personality traits.

The “Dynamic Theory of Emotions” most fully reveals the origin, biological role and participation of emotions in purposeful Behaviour, and shows the possibilities for intelligent self-control and emotional control in real Behaviour. The main provisions of the “Dynamic Theory of Emotions” are formulated on the basis of observation of emotions in real situations and are confirmed by us in a comprehensive analysis of the psychophysiological state of students [13].

The educational activity of students is a real-life model of purposeful Behaviour, which reflects mental activity manifested in the patterns of development of emotions and emotional stress. The basic principles of the development of emotions, emotional stress are general biological ones and relate to people of various professions. Our monograph “Psychophysiology of Emotions and Emotional Tension of Students” presents a multifaceted study of individual-group psychophysiological and somato-vegetative reactions of students in an educational and examination situation based on a characterological analysis of the personality, predicting the probability of result achievement when comparing the expected and actually obtained examination score [13].

The psychophysiological state of students in a real examination situation has convincingly demonstrated the validity of the “Dynamic Theory of Emotions”, which covers the entire set of factors in the formation of emotions at different stages of purposeful Behaviour: motivational state, probabilistic forecasting and actually achieved result, individual characterological personality traits. It can be argued that of all the existing theories, the “Dynamic Theory of Emotions” describes the origin, development of emotions, the

biological role and participation of emotions in the dynamics of purposeful Behaviour in the most complete and comprehensive way. The principles of the development of emotions set forth in the “Dynamic Theory of Emotions” are universal in relation to various types of purposeful activity.

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