Modern Applied Science; Vol. 9, No. 11; 2015
ISSN 1913-1844 E-ISSN 1913-1852
Published by Canadian Center of Science and Education

Functional Model of the Emergence and Development of Stress

Efremova Galina Ivanovna[1], Timoshenko Galina Valentinovna[1], Leonenko Elena Anatolievna[1], Bochkovskaya Irina Aleksandrovna[1] & Potekhina Elena Vitalievna[2]

[1] The North Caucasus Federal University, Stavropol, Russia

[2] Russian State Social University, Moscow, Russia

Correspondence: Efremova Galina Ivanovna, The North Caucasus Federal University, Russia. Tel: 8-903-585-02-12. E-mail: efremova_ncfu@mail.ru

Received: June 9, 2015 Accepted: June 28, 2015 Online Published: September 30, 2015

doi:10.5539/mas.v9n11p258 URL: http://dx.doi.org/10.5539/mas.v9n11p258

Abstract

The article is devoted to the creation of a functional model of stress as a tool for study of the human stress response. The mechanisms of the emergence and further development of emotional stress are described. Criterion of distinguishing between adaptive and maladaptive stress is formulated. Personal characteristics, determining a person's willingness to experience maladaptive stress are highlighted. System model that allows to solve the problems of theoretical and empirical studies of stress is proposed.

Keywords: maladaptive stress, model of stress, model of personality, world view, life position, basic skills, livelihood, life task

1. Introduction

The concept of stress was one of the most widely developed and the most ambiguous for many years in psychology. The beginning of its psychological research was initiated by a statement of endocrinologist Hans Selye that stress is a complex of biochemical, physiological and behavioral responses, later called the general adaptation syndrome (15). However, a large number of obstacles emerged while studying this syndrome in psychology. The fact that there is still no definition of stress in specific psychological context of its consideration in the current scientific literature can be considered as the first of them.

2. Functional Model of the Emergence and Development of Stress

Logic as the universal language of scientific knowledge claims that the amount of defining concept must be equal to the amount of defined concept, defined concept and defining concept should not be expressed through one another, and the meaning and scope of concepts included in the definition, must be unambiguous (4). In addition, systemacy of scientific thinking requires the description of a system to not be confined to enumeration of elements of the system and a description of their properties (12). From this point of view, we study some of the existing definitions in psychology:

- "non-specific organism response to any demand" (15);

- non-specific response, functional state of stress, reactivity, that occurs among humans and animals in response to stressors - significant in strength under the influence of extreme or abnormal for a human or an animal stimuli (8);

- strong nonspecific organism reaction to stressor action, which requires a functional reorganization of the organism (6);

- strong organism reactions, both favorable and unfavorable, observed under emotional stress (13);

- a combination of stressor and stress reactivity (5).

All these meanings of "stress" are too broad, not designating the specifics of psychological context of the study.

Understanding stress as "repetitive chronic emotiogenic situations, involving violations of adaptation" (Piaget, 1973) is, by contrast, too narrow, because it doesn't allow to consider situational stress. The definition of mental stress as "a state in which a person is in conditions preventing its self-actualization" (Vasylyuk, 1984) can not be considered strict because of its use of other not specifically defined concepts ("personality", "self-actualization").

The second obstacle for the systemic psychological stress research, in our opinion, is a lack of a rigorous selection of the research subject. At the moment, what exactly is being studied in modern psychology remains unclear:

- the part of the "Selye triad", that is related to the unity of behavioral organism reactions to a stressor;

- emotional, cognitive, personality and other reactions that accompany such behavioral reactions;

- a separate type of stress, which various researchers refer to as "psychological" or "emotional";

- a separate type of stress, that is not determined by presence of objective stressor, but is a response to a subjective stressor.

For the first time, delineation of psychological and physiological stress was suggested by R. Lazarus, who denoted psychological stress as a reaction to the features of an interaction between an individual and the world, based on cognitive processes, thinking and assessment of the situation, knowledge of their own resources (1970). However, for example, M.V. Topchiy believes that this separation is conditional on the grounds that the physiological stress always includes elements of mental (emotional) stress, and mental stress causes physiological changes (2009) and V.L. Marishchuk (1995) suggests in this context that any stress is both physiological and mental (emotional). I.G. Malkina-Pyh (2008), B.A. Smirnov and E.V. Dolgopolov (2007) believe that emotional stress should be considered as a kind of psychological stress. U.A. Alexandrovsky believes that "emotional stress can not be clearly defined and it includes a set of conditions ..., developing as a consequence of prolonged or repeated emotional tension" (1).

V.A. Hansen highlights physiological, psycho-physiological, psychological and socio-psychological levels in the overall stress structure (7). However, above provisions, for all their eligibility, do not bring clarity to the issue of designating those boundaries of stress, that make it the subject of a specific psychological research.

And finally, the third obstacle to the realization of conceptually holistic stress research, we believe, is the lack of such stress model in modern psychology that meets the current scientific requirements for a model as a tool for scientific knowledge. Such model is defined as a material or mental simulation of a real-life system by specially designing its analogs, in which principles of organization and operation of the system are reproduced (3) and should be able to replace the object of study so that its study would yield new information about the object (16).

Functional, structural and parametric models, as well as the model of operation principle are considered adequate for scientific knowledge (16). Each of these kinds of models suggests the possibility of its implementation in a graphical form, as the availability of graphical links between the structural elements of the model allows us to follow these elements' implementation of their functions within the system-forming activity of the simulated object. In our opinion, the absence of such model causes difficulties in psychological research of stress topic - both as a subject, and as a part of research of mechanisms of psychosomatic risks occurrence, features of interpersonal interaction, individual and personality characteristics, etc..

Therefore, the main objective of the present study was to create such model of stress, that would meet the modern epistemological requirements listed above and would give an opportunity to organize an empirical study of the stress topic as systemic and holistic. To do this, firstly, we needed to solve the problem of the strict definition of stress as a specific subject of psychological research. In addition, it seemed important to present a graphical representation of such model, so that graphic connections between the structural elements of the model would allow us to track the these elements' implementation of their functions during the emergence and further development of stress.

Our proposed dynamic model of the emergence and further development of stress is related to the data shown by various researchers of this topic. So, the following statements became significant for us: statements of R. Lazarus that stress can be considered as a result of subjective evaluation of harmful stimulus, and that the existence of an effective coping strategy can help the individual to maintain psychosocial adaptation in the period of exposure (20), note of A. M. Prihozhan (19) that a stimulus may become a stressor in effect of a value attributed to him by a person (cognitive interpretation). We also, among others, took the parameters, described by R. I. Tigranian, into account, as conditions that define the characteristics of stress: subjective stressors assessment, subjective importance of the stressor for the subject and the degree of surprise of the stressor (20). G. U. Soldatova's highlights of the impossibility for a human to have control over the situation and the impossibility of rational explanation of what is happening as the parameters affecting intensity of psychological stress, as an unpredictability of the situation, were important for implementation of the proposed model (20).

We propose a functional model of stress that uses the author's model of personality (19), based on the idea of life as a sequence of all the challenges a man is facing in the gap between his birth and death, and the idea of vital

activity as a sequence of solutions for these problems. In accordance with the structure of the problem (conditions, required result and solution process), there are three components within the personality:

- picture of the world as a set of person's ideas about himself, the world and his place in it;

- position in life as a set of a man's attitude toward his ideas about himself and the world;

- a set of basic skills as skills that ensure a person's ability to set and solve any problem in life.

There are four stages of early personal development, in each of which one new acquisition in the component parts of the person appears, based on the sequence of pure plot events that inevitably occur in every child's life.

Picture of the world provides the substantive component of any human action. Each view is formed by four instruments of creating a picture of the world, that are mastered consistently:

- mastering (the ability to build a picture of the world, using only fragments of personal experience);

- definition (the ability to create a picture of the world, using only well-defined fragments);

- establishment of causal relations (the ability to reasonably bind fragments of the picture of the world);

- understanding the most common life patterns (the one's ability to build his own world with common laws of the universe).

Position in life provides the energy component of any human action. All human relationships are organized into a final hierarchy of significances determined by evaluating the reality by four criteria:

- criterion of pleasure-displeasure (quantification of pleasure or displeasure from interaction with any fragment of reality);

- criterion of differentiation of qualities of pleasure-displeasure (selection of different characteristics obtained in course of such interaction of pleasure or displeasure);

- winning-losing criterion of interaction (correlation of interaction rate and received pleasure or displeasure);

- integrative criterion of positive-negative significance (evaluation of preference of interaction or avoidance of such interaction with any fragment of reality based on the previous criteria).

Basic skills provide the technical component of any human action. Four basic skills are like tools of creating a picture of the world and criteria of reality evaluation in life position - are also being mastered successively at different stages of early development of human personality:

- the one's ability to feel himself (the ability to determine the desired outcome when setting tasks of life);

- the ability to recognize reality (the ability to realistically perceive conditions in which one has to achieve the desired results);

- the ability to make an effort (the ability to do necessary actions to achieve the desired result);

- the one's ability to reflect on his livelihoods (the one's ability to evaluate and adjust his livelihoods and form the most common algorithms for solving life's problems).

To construct the required functional model, we need to formulate a working understanding of stress as a specific subject of psychological research. Using the definition by G. Selye (stress is a "nonspecific organism response to any demand"), we propose to define stress as a nonspecific reaction of a person to any change of the situation that is different from the expected. Specific reaction means human response to a change of situation, correlated with the parameters of the real situation; non-specific reaction means human response, correlated with the fact of differentiation of assumptions or expectations with reality.

In terms of the proposed model healthy (ie, adaptive) person's representations of reality are based on his own experience of exploring this reality, clearly defined, provided with reasonable causal relations, constantly checked and adjusted if appropriate, that provides a probabilistic nature of assumptions of such person about the development of any given situation. His evaluation of any fragment of reality is determined only by the results of research of opportunities of interacting with it. Mode of action of such person in any situation is also based on the study of actual parameters of the current situation.

This means that a person with adaptive personality, is able to build only the assumption of possible development of any situation. When facing an unexpected option of development, he explores the real parameters of the situation regardless of his previous ideas about them. The mere fact of non-compliance of a given state of situation with originally intended state has no practical significance in this case, since only the final result of his interaction with one or another fragment of reality has a meaning for such person. In result of a study of real

parameters of situation such person chooses an adequate way of activity that is able to give him the desired result in given circumstances.

Respectively, the situation, any parameter of which does not coincide with suspected one, is causing his nonspecific reaction of activation, necessary for the implementation of a specific reaction, correlated with real parameters of the present situation. Search for such a specific reaction is done by brute-force methods, and results of each method are taken into account in the further process of finding a suitable one. This is due to the fact that relationship between a healthy person and a reality is based on a research. As a result, stress performs a fully adaptive function for such a person: a high level of activation, which is characteristic for the initial period of stress, is constantly decreasing in the course of work on finding a solution to the arisen life problem - up until the return to the original state of equilibrium.

If a person has a maladaptive personality, then:

- his perceptions of reality are not based on his own full research of reality, and complete picture of the world is not subject to constant reflection in order of checking and needed correction of this picture;

- his assessments of reality are also built not on the basis of researching the reality, but, in accordance with a priori willingness, on assuming that the interaction with each new fragment of this reality is rather pleasant or rather unpleasant, rather most winning or most losing etc .;

- his modes of action are based on inadequate representations of reality (as of the outside world, and of his own abilities) and, respectively, do not lead him to the desired results.

Such person, instead of reasonable assumptions about the possible development of the situation, builds expectations that the situation will develop in a strict accordance with his perception of it. When faced with an unexpected version of the situation, he tries to rely on his initial perceptions of its parameters and a priori estimates of its friendlyness, winningness, etc. The fact of divergence of reality from his initial expectations has an independent significance for him, because it threatens the integrity of the whole picture of the world and the assessment system. As a result, his actions are not correlated with actual parameters of the situation - and, respectively, do not lead to the expected results. As constant study of reality, in principle, is not peculiar to him, he also does not research given parameters of the situation and causes of ineffectiveness of his own actions,. This leads him to inevitable cyclical confrontation with the fact of divergence of his own expectations with reality - and to painfully experience this fact. As a result, emotional reaction to the fact of divergence of expectations with reality becomes his non-specific reaction to an unexpected change in the situation. The energy consumption for this reaction is redundant, thereby reducing the amount of energy which could be spent on the development of adequate specific reaction. As a result, specific reaction to unforeseen circumstances is also not fully correlated with the actual parameters of the present situation and is not able to produce the expected results. This, in turn, will lead him to an emotional reaction to the fact of divergence of expectations with reality. Stress is "looped", excitation level is not reduced, but increased due to negative assessments of cumulative facts of divergence of reality with expectations, turning stress into maladaptive stress.

In terms of the proposed model the criterion for distinguishing between adaptive stress and maladaptive distress is a fact of decrease of initial level of excitation to a state of homeostasis. The main reason for the formation of distress is a person's insufficiency of research as the primary mode of interaction with reality.

3. Conclusions

In our view, the proposed model of the origin and further development of stress provides the possibility to use it as a fundamental basis for the systemic stress research:

- allows you to distinguish between (up to justification by physiological indicators) the concepts of adaptive and maladaptive stress;

- provides a basis for a classification of potential intrapsychic stressors, which are essential reasons for the emergence and development of stress in terms of the proposed model;

- makes it possible to generate specific algorithms of empirical study of various characteristics of stress;

- provides a basis for theoretical study of problems, adjacent with the problem of stress - such as, for example, the mechanism of formation of psychosomatic risk or personal preconditions of such risk.

Acknowledgments

This article was prepared as part of the task #25.1679.2014/K of 11.07.2014, on performance of the research work within the project framework of the state assignment in the field of scientific activity.

References

Alexandrovsky, Yu. A. (2000). *Border psychiatric disorders: Proc. Manual*. Yu. A. Aleksandrovsky. (3rd ed.), rev. and sup. Medicine.

Fraisse, P., & Piaget, J. (1973). *Experimental psychology.* Issue 4. Moscow: Progress.

Frolov, I. T. (1961). *Epistemological problems of modeling* / Frolov. Moscow: Science.

Getmanova, A. D. (2014). *Logic: An advanced course*. Moscow: KnoRus.

Greenberg, J. (2002). *Managing the stress.* Petersburg.: Peter.

Grimak, L. P. (1989). *Reserves of human psyche.* Moscow.

Hansen, V. A. (1984). *System descriptions in psychology.* L.: Leningrad State University.

Kitaev-Smyk, L. A. (1983). *Psychology of stress.* Moscow: Science.

Lazarus, R. (1970). *Theory of stress and psychophysiology research*. *Emotional stress.* Ed. L. Levy. A.: Medicine.

Malkina-Pyh, I. G. (2008). *Psychological assistance in crisis situations.* M.: EKSMO.

Marishchuk, V. L. (1995). *Emotions in sport stress.* St. Petersburg.

O'Connor, J., & McDermott, J. (2008). *The Art of Systems Thinking.* M.: Alpina Business Books.

Petrovsky, A. V., & Yaroshevskii, M. G. *Determined actions. Psychology. Textbook for high schools on ped. specialties.* M.: Academy.

Prihozhan, A. M. (1996). *Psychological nature and age dynamics of anxiety*. Moscow.

Selye, H. (1966). *On a level of the whole organism*. Moscow: Science.

Shtoff, V. A. (1966). Modeling and philosophy. Moscow: Science.

Smirnov, B. A., & Dolgopolov, E. V. (2007). *Psychology of work in extreme situations.* H.: Humanities Center.

Tigranian, R. (1988). *Stress and its importance for the organism. From a molecule to the organism*. M.: Science.

Timoshenko, G. V., & Leonenko, E. A. (2011). *Metaphorical psychotherapy.* M.: Psychotherapy.

Topchiy, M. V., & Churilova, T. M. (2009). *Stress as an object of scientific reflection.* Stavropol NOU VPO SCSI.

Vasylyuk, F. E. (1984). *Psychology of experiences*. Moscow.

Copyrights