

## ALCOHOLIZATION IN THE STRUCTURE OF POSTSTRESS MALADJUSTMENT

**Konstantin Gaponov**

*Chief physician*

*“Regional narcological dispensary”*

*Addiction Department*

*Kharkiv Medical Academy of Postgraduate Education*

*58 Korchagintcev str., Kharkiv, Ukraine, 61176*

*onardis@ukrpost.net*

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### Abstract

Analysis of the literature data on alcoholic addiction, poststress maladjustment and its combination revealed the significant number of common node moments in pathogenic mechanisms of its appearing and realization. It concerns biological mechanisms that are common for both processes and its activation at one of them provokes the development of the other. First of all it is stem structures of brain and neuroendocrine mechanisms of central and peripheral regulation and its activation is cross for stressor reaction and alcoholization. There was revealed the leading role of stressor reaction mechanisms and its association with poststress maladjustment in formation of psychological alcoholic addiction. There was constructed hypothetical model of development and functioning of association pathogenetic mechanisms with formation of comorbidity of analyzed pathological states.

**Keywords:** poststress maladjustment, alcoholic addiction, stressor reaction, psychic mechanisms, vegetative regulation, comorbidity.

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### 1. Introduction

For our country in conditions of social commotions and disturbances, military conflict the problems of psychic health and demonstration of maladjustment of different levels including post-traumatic stress disorders become very important. It is not a secret that in such conditions the number of cases of addictive behavior such as taking alcoholic drinks with further development of alcoholic addiction significantly increases. This problem is especially acute for combat operations participants in ATO zone and after demobilization. But the mechanisms of forming connections between alcoholization and poststress maladjustment remain unexplained till now. So this research was carried out for generalization of existing studies of aforesaid problems, detection of weak and unascertained links and for formation of hypothesis for its solving.

### 2. Methods of research

The study of scientific literature about the problem of analyzed pathology was carried out from the positions of the law of transfer of quantitative changes into qualitative ones at strict abidance by the casual relationship of phenomenology and disorders mechanisms at analysis. At the same time in the research the special attention was paid to the influence of “conditions” criterion that are presented as internal connections of subject and external factors that represents midst where the development of casual phenomena and connections is possible.

### 3. Results of research

Stress situations are permanent satellites of human life. This problem is especially acute for our country with its social and economic disturbances, military actions. Stressor factors can be divided on the influence force from extraordinary events (war, disasters, technologic catastrophes) to the ordinary routine troubles. Stressor reaction is nonspecific adaptive mechanism (adaptive syndrome) directed on adjustment of physical and psychic functioning of organism as a response on stressor factor influence [1]. After stressor factor influence organism never returns to the state before stress some changes, traces in somatic and psychic spheres always take place. One of the variants of results is distress when destructive pathological changes in organism develop as a re-

sponse on stress-factor. First of all it depends on force and duration of stressor factor influence and adaptive possibilities of organism.

Stressor factors are divided on physical (somatogenic) and psychic (psychogenic) ones. Accordingly stress is distinguished on somatogenic and psychogenic one. Somatogenic one is described in literature as adaptive syndrome or nonspecific reaction of organism. Its content in narrow sense according to G. Selye theory is activation of sympathoadrenal system of organism. The development of scientific studies of somatogenic component of stressor reaction increased the spectrum of involved mechanisms of its realization and formed the notion of stress-realizing and stress-limitative systems. The first one includes CNS structures, endocrine centers, high vegetative centers, secretion activation and stress-hormones (vasopressin, ACTH, corticosteroids, catecholamines), mediators (mainly norepinephrine and so on) action [2]. The second GOOA-, opioid-, serotonergic systems and benzodiazepine receptors systems activation; decrease of secretion and catabolic hormones (corticotropin-releasing hormone, ACTH, glucocorticoids, vasopressin, catecholamines, T3 and T4) action; increase of secretion and anabolic hormones (growth hormone, insulin, androgens, mineralocorticoids) action; weakening of CNS, adrenergic structures activity; increase of cholinergic structures activity; inhibition or weakening of pain, convulsions, anxious state; easing of sleep and improvement of its quality; antioxidant system strengthening, acceleration of renewal of injured structures of organism and so on. Generally according to G. Selye theory the resources of stress-realizing system are enough for 2–3 hours. The character of stressor reaction somatic component and its consequences are determined by several factors – type and force of stress and conditions of its demonstration. Especially – the state of stressor systems of organism. Its interconnection results in neutralization of stressor factor action, adjustment to injury or death of organism. It is clearly that isolated somatic stress is impossible for human being. It is always attended with development of psychical stressor state.

Psychogenic stress and psychical component of somatogenic one are characterized with emotional and cognitive processes, need assessment and alteration of sensor information with following inclusion of psychic adjustment mechanisms. In its turn mechanisms of psychic stress are realized through processes-equivalents of central nervous system, central and peripheral links of vegetative nervous system. There are developed two types of reactions on the stressor factor influence. First – direct (acute) stressor reaction on stressor factor influence; second – reaction on stress as the complex of psychic processes that represent the way of personal adjustment to disorders (changes) that emerged as a result of stress. Both reaction must have the different grade of manifestations – from psychological to psychotic ones [3–5], but only reaction on stress forms diapason of changes from acute to the chronic ones. It is just an indicator of success of personal adjustment to changes that emerged in personal structure as a result of stressor factor and its consequences [6, 7].

It is caused on the one side by the properties of stressor reaction which mechanisms narrowly interact and interlace with mechanisms of realization of reaction on stress. First of all it is keeping in mind fixation of all psychic and somatic mechanism of stressor reaction in unitary module (contour) that is stably associated with all internal and external phenomena and processes that take place at stress [8–10].

As the result of intense affective supply and significance of formed module it is easy to reanimate it in memory especially at activation of fixed associated connections with repeated corresponding feelings and starting of stressor reaction mechanisms. In this way stressor reaction loses limitation in time and becomes cause of development of so-called “chronic” psychic stress [11]. Stress can become chronic at stressor factor influence expanded in time, factor influence consequences including somatic ones that change the further life.

Psychogenic stressor factors have wide diapason – from ordinary routine problem to social disturbances, war, catastrophes that have abrupt or gradual negative influence on different spheres of human life, keep it in captivity of permanent anxiety, strain, fear, frustration, threat up to the vital character. The severity of influence depends on actuality, significance, threat degree, action duration, harm caused by stress itself and consequences of its action. For fight with stress and its consequences in all cases there are mechanisms of psychological defense that to some extent weaken the negative influence on person [12–14].

In cases when psychological defense is inadequate, there are no adequate strategies of adjustment in conditions of frustration, at inevitable influence of stressor factor or its consequences one or another maladjustment states of different register of disorder develop in person [15]. It is especially acute for combat actions participants, force structures workers when they are needed to realize behavior strategies that are inadmissible, addictive in ordinary life conditions, forbidden during all previous life. This situation leads to the development of deep internal conflict that is stress itself and results in personal maladjustment [16].

Another important factor that determines characteristics of reaction on stress is pre-stress features of person [17–19] and social conditions of its life activity. It determines such objective and subjective indicators as prosperity, sureness in defense and adequate help, security, reliability, support and help of society, future prospects and so on. Presence or absence of these conditions or even more – the threat from society determines heaviness and forms of reaction on stress. At the same time different social changes and disturbances can be the source of stress [20–22].

In psychiatric practice according to ICD-10 there are distinguished the following clinically described psychic disorders: F43.0 – Acute reaction on stress; F43.1 – Posttraumatic stress disorder (PTSD); F43.2 – adaptive reactions disorder; F43.8 – Other reactions on heavy stress; F43.9 – unspecified reaction on heavy stress. All rubrics excluding F43.3 can be characterized as clinically described maladjustment states. It is mainly psychopathology of the boundary disorders or neurotic grade that stands rather near to nosologically independent neurotic disorders that has specific signs in its structure [23].

There are distinguished the main criteria that characterize PTSD:

- 1) endured stressor state;
- 2) flows of memories about place of life-threatening situation, appearing of “blame for survival” to dead, dreams with awful scenes of survived;
- 3) striving to avoid emotional loads, uncertainty, fear of torturing memories appearing (“playback of tragedy”), absence of contact with surroundings;
- 4) complex of neurasthenic disorders mainly with increased irritability, decrease of concentration, attention, “functioning tone”;
- 5) stigmatization of separate pathocharacterologic symptoms and tendency to formation of personal disorders with deviant behavior and different forms of addictions (alcoholic, narcotic, nutritive and so on).

Acute psychic disturbances at PTSD are characterized with derealization and depersonalization disorders; anxious-depressive states with fear for own life, tearfulness, awful dreams; depressive reactions with conversion disorders; reactions of euphoric type with verbosity, significant underestimation of heaviness of own somatic state; obsessive-phobic disorders and sleep disturbances [24–27].

In further PTSD development it is necessary to pay attention to the combination of two groups of clinical phenomena: continuing flows (reanimation) of extreme situation in consciousness of ill person with concomitant affective reactions (anxiety, fear, horror); behavior of avoiding, evasion of situation – that is striving to go away from all that can remind tragic event [28, 29]. An inclination to abuse of alcohol and drugs strengthens social maladjustment. In general the behavior peculiarities of patients with PTSD remind the image of psychopathic state. At the beginning taking alcohol and drugs brings them some relief that explains the significant spreading of both among patients with PTSD. At more distant stage (in 12–14 month) the states with sleep disorders, hopelessness, despair feeling, completely pessimistic assessment of situation in the country, identification of this situation with own destiny and connected with its thoughts about suicide are possible.

Surely person cannot stay in stress state for a long time without proper special trainings. At inadequacy of defensive mechanisms and alternative behavior strategies it becomes to look for relief and defense from anxiety, strain, hopelessness and painful feelings. For people the most accessible way of it is taking alcohol. Interconnection between alcohol and stress was revealed already in antiquity. In different countries was used to think that alcohol “smoothes” nerves. From the one side alcohol was considered as the way of stress relief, from the other – stress situations induced taking alcohol. The modern sociological studies revealed interconnection between the

stress level in society and level of problems connected with alcohol [30]. It is considered that in most stress situations alcohol has stress-protective effect. Even if not for a long time but intoxication gives relief, takes away strain, changes the perception of reality [31]. The state of intoxication evokes the feeling of life positivity. When one brings the significant life activity to the state of intoxication he becomes to drink systematically with further development of alcoholic addiction. Proceeding from the presence of close connection between the stress and alcoholization especially on clinically described variants of post-stressor disorders and alcoholization it is necessary to explain the relationship between these two pathological states.

Biological factors of alcoholic addiction development in general can be reduced to genetically caused peculiarities of enzyme systems of ethanol utilization and peculiarities of ethanol and metabolites influence on neuromediator homeostasis of brain. The speed of intoxication and its intensity are different that is caused by genetically determined isoenzymological spectrum of alcoholdehydrogenase (ADG). Activity of the different ADG isoforms has strict differences in different people [32]. Ethanol has intense organotropism – its concentration in brain exceeds the content in blood. Even the low doses of alcohol start up an activity of inhibitory GABA – systems of brain [33]. This very process leads to sedative effect that is attended with muscle relaxation, somnolence and euphoria (feeling of intoxication). Genetic variations of GABA receptors can influence on inclination alcoholism [34]. There is observed the intense activation of dopamine receptors in so-called strengthening center of brain (nucleus accumbens) and in ventral sectors of brain covering. The reaction of these very zones on dopamine that is released under action of ethanol causes euphoria and can be resulted in alcoholic addiction [35]. Ethanol also leads to emission of opioid peptides (for example  $\beta$ -endorphin) that in its turn connected with release of dopamine. Opioid peptides also play the specific role in formation of euphoria [36]. Alcohol stimulates serotonergic system of brain. There are genetically caused differences of sensitivity to alcohol that depend on alleles of genes-transporters of serotonin [37]. There is actively studied the alcohol influence on other receptors and mediator systems of brain including adrenal ones [38], cannabinol [39], acetylcholine [40] receptors, adenosine and stress-regulating (for example, corticotropin-releasing-hormone [41]) systems. The high concentrations of alcohol can cause oxidative injury of neurons [42].

Scientific researches demonstrated that stress hormone – corticotropin-releasing factor (CRF) plays an important role in development and support of alcoholic addiction. CRF is a natural substance that forms stress reaction of human organism. It is present in hypothalamus and hypophysis (activates secretion of corticotropin and other biologically active substances) and in cerebellar almond (connected with excessive anxiety and abuse of alcohol). CRF increases the force of inhibitory synapses in neurons that is also peculiar to alcohol. If the action of this hormone is correctly blocked it is possible not only get rid of alcoholic addiction but even prevent its possible appearing [43–46]. So stress hormone activation is directly connected with alcoholism development. Summing up we can say that taking alcohol influences of mechanisms of development of stressor state through inhibition of several links of stress-realizing systems and stimulation of the links of stress-limiting ones.

At the beginning abuse of alcohol (everyday drunkenness) is preclinical manifestation of alcoholization. It can be caused by stress, strain, permanent overwork, problems in relations with people, social conflicts, feeling of inferiority, difficulties in contacts with surroundings, unconscious decline of mood caused with different factors and so on. Person strives for relax, wants to exclude itself from everything that happens, go away from existing problems. Alcoholic drinks are used with different frequency and in different quantities – as systematic or desultory taking of different alcohol doses. At the same time there is no addiction to alcohol, searches of occasions for taking it or any other signs of alcoholism [48]. Everyday drunkenness can last rather long during the life without transfer to addiction but it is also the base that alcoholic addiction develops on. Analysis of reasons for intoxication allows reveal the threatening signs just on preclinic forms. Ignoring the external causes of taking alcohol that does not depend on person we can see the complex of personal (internal causes). And it indicates on:

- a) absence of personal corresponding (adequate) behavior (reacting) strategies;
- b) inadequate behavior strategy as taking alcohol and intoxication as a response on any circumstances and events of life.

The state of alcoholic intoxication is characterized with specific state of consciousness that is inherent to all psychoactive substances [48–50]. This psychic state has some peculiarities among which in the context of alcoholization and stress the most important are facilitated access to the deep psychic processes, increased suggestiveness, the curved perception and interpretation of real events, change of criticism and emotional processes [15, 50, 51]. From the one side it eases the personal stressor state, decreases strain, levels the present threats. From the other one – the experience of specific state of consciousness becomes factor that favors psychic addiction and fixation of alcoholic intoxication as a personal behavior strategy on the background of stressor state. The positive support and emotional accompaniment of the state of alcoholic intoxication become the one more factor that fixes it as a personal behavior strategy closely associated with stressor state.

The next stage of alcoholization is a clinically outlined alcoholic addiction. According to ICD-10 it is characterized with corresponding diagnostic criteria. Analysis of manifestations indicates both psychic and physical dependence from alcohol and such behavior can be considered as addictive one. The causes of alcoholization in general and addiction development in particular can be divided into biological (genetic) and psychic ones. In its genesis there are distinguished medical-biological, psychological and social factors [52–54].

Surely the disturbance of described biological mechanisms can become the factor of alcoholic addiction development. At the same time it can be favored with genetic disorders of psychic sphere (for example, psychopathy), hereditary inclination, different injuries and diseases of the central nervous system. Besides it alcoholic addiction is usually formed at disorders of emotional and volitional sphere, criticism, self-control. So we gradually pass to psychic component of alcoholic addiction etiology.

#### 4. Discussion of the results of research

The great number of researches is devoted to the study of psychosocial factors that influence on alcoholic addiction development [55, 56]. There are covered almost all possible sides and aspects of personal life in society. In general these researches can be reduced to an influence of two categories of factors:

1. Social ones: cultural and material level of life, social traditions and sets, informational overloads, abrupt change of social state of population, war, catastrophes and other.
2. Psychological ones: personal psycho-emotional peculiarities, low ability to adjustment and resistance to stress, low ability of people to social adjustment at transfer from the one social order to the other, personal rigidity.

It is necessary to pay attention to the peculiarities of enduring stress as the result of violence on person, work at force structures and participation in combat actions. These people face the necessity to use violence for defense from violence or for execution of its duty sometimes they must kill other people, be eyewitnesses of cruel behavior, death of surrounding people, friends, relatives. It is necessary to keep in mind that society cultivates in every person moral and behavior norms from the very birth. Usually there is cultivated taboo on violence, cruelty, infringement on personal honour and health, prohibition of murder. These norms are usually set in early age and are strong and rigid. In new conditions these norms are leveled especially when person is required to ignore it and to use behavior prohibited at upbringing. This fact leads to development of internal conflict between earlier adopted taboo and the new behavior that is the cause of stressor state development. At the same time returning to the ordinary way of life this person remains in the state of internal conflict and the new adopted behavior find no place in this way of life.

It is necessary to point out some peculiarities of stressor state. Its development abruptly narrows the personal choice of variants of behavior strategies in stress circumstances. Person becomes to use the most common and ontogenetically early strategies. In some cases it can be variants of teenager or even childish period of life. This rollback in ontogenesis is most brightly demonstrated by hypo- and hyperkinetic affective-shock reactions. Obviously this peculiarity of behavior choice as a response on stressor factor abruptly narrows variants and possibilities of successful stress overcoming. And its properties stimulate the strong fixation of behavior strategy that is used by person but inadequate.

So we can assert that we know the background that alcoholic addiction most of all appears on. At primary addiction all these factors are combined by two sings: the symptoms of acute



(chronic) psychic stress and frustration. At appearing of the third one – personal psychical peculiarities of different origin – we can say about secondary addiction, complication. The next step will be an attempt to consider dynamic process of interaction of exposed phenomenology as reliable pathogenetic mechanisms of formation and interaction of PTSD and alcoholic addiction.

An important condition of connection is accessibility of alcohol during the all period of stressor state, experience of alcohol influence on person or proper surroundings that has this experience. In other words it is the possibility to use the state of intoxication as a way of reaction or psychological defense in conditions of stressor influence.

As it is known the development of stressor reaction at stress always leads to personal changes. The period of personal reaction on stress occurs after the end of stressor reaction. Its structure can be conventionally divided in two components. The first one – subclinically or clinically outlined forms of the different grade of psychic or psychosomatic reacting. It can be characterized as direct way of adaptation. The second component – changes of other behavior strategies that are not directly used but have certain connection with adaptive changes. In other words person will never return to its state before stressor influence. The depth, significance and intensity of changes depend on personal depth, significance and actuality of used behavior strategies.

The next link is the stressor factor influence. If we consider the most spread PTSD as the result of participation in combat actions the first stage is mobilization to army. At first it is change of the way of life, surroundings, relations that essentially differ from the habitual civil ones and become the stressor factor. Then we must add broken life connections, personal duties, responsibility and other life values that were leaved in civil life. So the stressor factor at mobilization is the multiple one. And the more rigid are sets, rules and strategies of the personal behavior the less is its plasticity and ability to adjustment the more abrupt is stressor influence and stressor reaction. On the background of stressor reaction there are added the associated decrease of criticism, rollback to the earlier behavior strategies and influence of crowd behavior principles with leveling of personal sets. What can smooth this state? First of all personal motivation, prospect of aim (achievements), safety of all leaved in civil life and personal safety in all life spheres in future. The state of chronic psychic strain, negative emotional accompaniment needs inclusion of personal mechanisms of psychic defense and at least few positive feelings. At weak psychic defense and weak mechanisms of stress smoothing taking alcohol allows attain the desired result.

The involved mechanisms of stressor reaction, special state of consciousness in its structure and as the result of taking alcohol, intense emotional accompaniment, significance, present common neurobiological mechanisms of influence realization cause the strong fixation of the module of behavior way. Taking into account effectiveness in attaining the final personal aim of this behavior way (way of defense) module is strongly fixed by conditions of formation, supported by repetition, it is actual and significant. We just can say about the initial stage of alcoholic addiction formation. It is can now be characterized as caused by situation.

The next stage is stay in zone of combat actions and participation in it. The first place among stressor factors is vital threat, the prospect of being killed or wounded, remaining alive but disabled with all following consequences. Very often this threat is permanent and is almost not depends on person itself. In combat actions the main thing it is execution of combat mission. Watching and feeling wound and death of comrades during combat actions are the visible illustration of possible prospect for person. Then there are added routine conditions, supply and other factors that form the notion of fighting efficiency.

The next no less important stress factor is the development of personal internal conflict. In populations that are in permanent conflict state the readiness to participation in conflict becomes the national feature, person adopts use of force, violence, murder, feeling of death (own and close people death), losses in corresponding situation as the natural behavior strategies. It also concerns the most persons who are directly connected or professionally belonged to the force structures and underwent the appropriate psychological training. For crossing people who became participants of combat actions after the civil way of life all war attributes with necessity of using violence, cruelty, murder, observing the results of destructive actions, understanding of the own direct participation in this event is a severe stress factor. Besides it such principles, war laws, behavior rules and per-

sonal actions conflict with almost all ones of civil peace life that were adopted by person since the early childhood that are the base ones for peace life. This internal conflict that appears in person attends it during all life becoming one more severe stress factor.

Surely all named factors together with already existing ones not depend on person. As far as mechanisms of psychic defense and stress smoothing factors are effective in such condition the less are the destructive psychic processes. The situation that is not depends on person most often provokes anger and aggression then dysphoria, affective disorders, asthenia, depression.

Mechanisms that took part in fixation of behavior strategy module work much more effectively. It is caused by the vital threat, inclusion of biological mechanisms of survival, intense affective accompaniment, actuality and significance of situation. The formation and adoption of the new modules of behavior ways in conditions of combat action are fast; the stressor load on psychic grows. The necessity to release this pressure animates, actualizes and starts the formed (or only forming) module of defensive behavior as taking alcohol. The last one fixes better in these conditions starting mechanisms of positive support. Module gains features of universal defensive behavior associating in its content the all spectrum of emotional (affective) manifestations as starting ones. This can be assessed as formed psychic alcoholic addiction as the personal defensive strategy in stress conditions.

The next stage of maladjustment is returning to the peace way of life. As it was noticed above in severe conditions of combat actions there were elaborated and started the new life behavior strategies that were required from person by the new reality. At the same time the new behavior strategies abruptly formatted and changed strategies corresponded to the peace life. So we can say that completely another person comparing with time before participation in combat actions returns to the peace life. The following specific changes are typical for it:

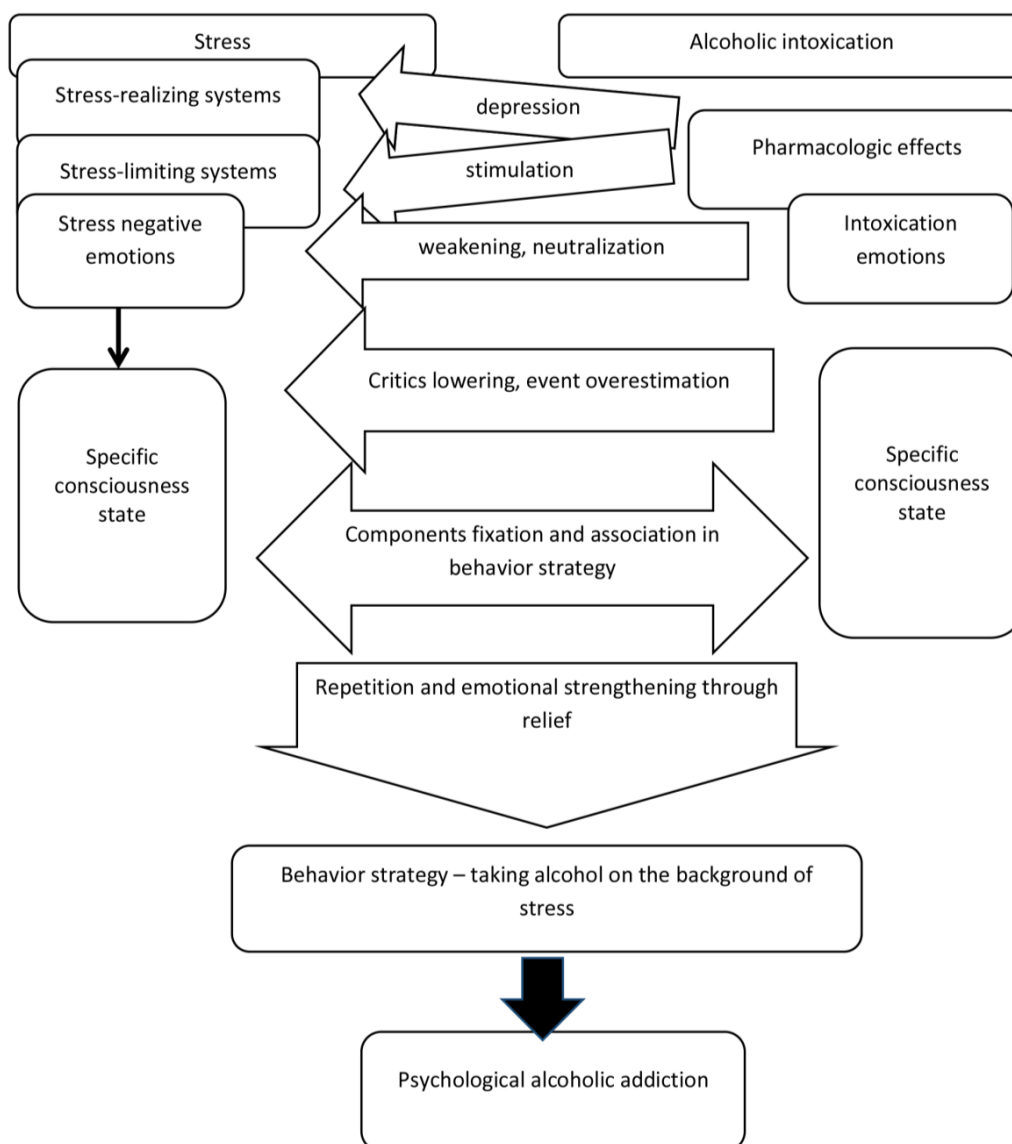
- 1) The presence of new rigid behavior strategies necessary for successful life activity in conditions of combat actions;
- 2) Formatted (changed) old behavior strategies for life activity in peace conditions;
- 3) Internal conflict between the new and the "old" behavior strategies;
- 4) Chronic psychic stressor state caused by participation in combat actions and by personal reaction on it;
- 5) The "old" and "new" problems in different spheres of life activity in peace conditions;
- 6) Revaluation of life values and priorities;
- 7) Contradiction of the new characteristics and personal behavior to the ones that "old" surroundings got used to and wait for, including close people (family);
- 8) Contradiction of the real and expected relations to the person and its status of participant in combat actions.

All cited points become the chronic stressor factors. In fact person with its new characteristics is not apprehended by the old surroundings. It expected the quite another person such as it was before mobilization. And person itself is not satisfied with its old surroundings. So the one more stressor factor appears – contradiction of person to its old place in civil social structure. At the same time person begins to use behavior strategies of the combat actions conditions and transformed from the peace life for solving problems in different life spheres, communication with close people and other members of society. Such behavior can be not understood by surroundings, cause resistance or even be interpreted as the deviant or criminal one in the peace life conditions. So there appears the maladjustment of different degree in different life spheres.

In other words there is no place for the person in old surroundings and these surroundings become strange for the person. There is no new surroundings and the older and more rigidly organized this person is the more difficult to find adequate new surroundings and place in life for it. But there are people in the same state – participants of combat actions or people with the similar life conditions – criminal society, force structures and so on.

In these conditions the rooted, usual and formed way of release of psychic strain, stress, mood improvement, decrease of circumstances pressure on person-taking alcohol drinks gets its further development. Moreover this way of defensive behavior is already strictly connected with stress and almost always has a character of psychic addiction. Using it further person becomes to gain additional changes that are inherent for alcoholic addiction that much worsens the state of maladjustment.

Formation of interaction between stress and alcoholic intoxication state with formation of psychic alcoholic addiction can be represented by the following scheme (**Fig. 1**)



**Fig. 1.** Scheme of interactions between stress and alcoholization mechanisms

## 5. Conclusions

Summing up the analysis of mechanisms, phenomenology and its interconnection in the structure and formation of poststress maladjustment and alcoholization we can make the following conclusions:

1. Poststress maladjustment and alcoholization have many common or related points in psychobiological mechanisms of realization.
2. Depending on time period of appearing its connection can be comorbid that is alcoholization as a clinical manifestation of poststress maladjustment.
3. Alcoholization on the stages of formation of poststress maladjustment can be represented as everyday drunkenness, situational or permanent psychical addiction, physical addiction.
4. Relating to poststress maladjustment mechanisms alcoholization can be considered as inadequate mechanism of personal psychic defense from the results of stressor factors influence.



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