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**THE WAY TO BECOME A FRIEND WITH STRESS**

This paper shed a light on the stress phenomenon from the perspective that contrary to lay beliefs about stress as negative phenomenon. The article explores the nature of the stress both in physiological and psychological level. The paper develops the idea about physiological changes that co-occur with stress are not necessarily bad. Much can be done during stressful experiences to promote adaptive responses. Authors conducted analyses of empirical data related to stress investigations obtained by foreign scientists. Stress as any of other phenomenon has negative and positive sides. It may destroy humanity and allow living in prosperity at the same time. The vast majority of research suggest that cognitive appraisals are powerful tools that help shift negative stress states to more ones that are positive. Positive reappraisal improve our performance, coping and physiological state of our body. Moreover, besides stress hormones (i.e. adrenaline and cortisol), stress provokes oxytocin production in our body, which triggers our prosocial behavior and thus, helps us to adapt to the environment and obtain social support. Social support suppress negative outcomes of stress and helps to apply productive coping strategies. By reframing the meaning of the physiological signals that accompany stress, person can benefit physiological reactivity, attention, performance, explore its potential applications, and shift life and its perception from negative to positive.

**Key words:** stress, sympathetic nervous system, reappraisal, emotional and cognitive regulation.

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**Стреспен достыққа жол**

Мақалада стрестік құбылыс кернеулердің жалпы қабылданған тұжырымдамасына қарсы келетін ұстанымнан, теріс құбылыс ретінде қарастырылады. Стресс ұғымы және стрестің адамдарға биологиялық және психологиялық деңгейде әсер ету сипаты анықталды. Мақалада стрестің жағымды жағы туралы идея дамиды, бұл стресс – бейімделудің қозғалтқышы болып табылады. Авторлар стрестік зерттеу саласындағы шетелдік зерттеушілердің эмпирикалық деректерін талдайды. Қандай да бір құбылыс сияқты стресс оң және теріс жағына ие. Ол адамзатты жойып, сонымен қатар жемісті өмір сүруге мүмкіндік береді. Зерттеулердің басым бөлігі стрестің когнитивті қайта бағалануы стрестің жағымсыз әсерлерге теріс әсерін өзгертудің күшті құралы екенін көрсетті. Стрестің оң қабылдауы (қайта бағалау) біздің денеміздегі қиындықтар мен физиологиялық жағдайлардың кез келген тапсырмасын орындауды жақсартады.

Сонымен қатар, адреналин және кортизол деп аталатын стресс гормондарынан басқа біздің денеміз стресс кезінде окситоцин гормонын шығарады, бұл өз кезегінде қоршаған ортаға бейімделуге және әлеуметтік қолдау алуға көмектесетін әлеуметтік бағдарланған мінез-құлықты тудырады. Өз кезегінде, әлеуметтік қолдау стрестің теріс әсерлерін азайтуға және жемқорлыққа қарсы күрес стратегияларын қолданады. Денедегі физиологиялық сигналдардың мағынасын түсіндіру (қайта бағалау) адамның физиологиялық реактивтілік, қорларды зерттеу, өмірді және оның қабылдауын терістен оңға өзгертуге мүмкіндік береді.

**Түйін сөздер:** стресс, симпатикалық жүйке жүйесі, қайта бағалау, эмоционалдық және танымдық реттеу.

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### Путь к дружбе со стрессом

Статья освещает явление стресса с позиции, противоречащей общепринятой концепции стресса, как негативного явления. Раскрываются понятие стресса и природа воздействия стресса на человека как на биологическом, так и на психологическом уровне. Работа развивает идею позитивной стороны стресса, обосновывая это тем, что стресс является двигателем адаптации. Авторы проводят анализ эмпирических данных, полученных зарубежными исследователями в сфере изучения стресса. Стресс, как и любое другое явление, имеет как позитивные, так и негативные стороны. Он может погубить человечество, но также и дать возможность жить продуктивно. Подавляющая масса исследований показала, что когнитивная переоценка стресса является мощным орудием в изменении негативных последствий стресса на позитивные. Позитивное восприятие (переоценка) стресса улучшает выполнение какой-либо задачи, копинг и физиологическое состояние нашего организма. Более того, помимо гормонов стресса, известными как адреналин и кортизол, наш организм производит гормон окситоцин во время стресса, который в свою очередь запускает социально-ориентированное поведение, помогая нам адаптироваться и получить социальную поддержку от окружения. Социальная поддержка в свою очередь позволяет минимизировать негативные последствия стресса и применить продуктивные стратегии совладания. Рефрейминг (переоценка) смысла физиологических сигналов организма, которые появляются во время стресса, позволяют человеку преуспеть в плане физиологической реактивности, исследовать ресурсы, изменить жизнь и ее восприятие с негативного на позитивное.

**Ключевые слова:** стресс, симпатическая нервная система, переоценка, эмоциональная и когнитивная регуляция.

### Introduction

Stress is an important and natural element of human beings' existence. In virtue of stress human species still alive. This statement evokes many contradictions in our understanding of the life existence. The vast majority of science literature describe stress as negative phenomena. Let us take for example following data: stress has been linked to six leading causes of death (heart disease, accidents, cancer, liver disease, lung ailments, suicide; e.g., Sapolsky, 1996; Schneiderman, Ironson, & Siegel, 2005); stress has been associated with absenteeism from work, increased medical expenses, and loss of productivity (e.g., Atkinson, 2004; Schneiderman et al., 2005); cognitive impairment, depression, and other mental illness (e.g., Hammen, 2005; McEwen & Seeman, 1999; Schwabe & Wolf, 2010; Wang, 2005); and aggression, relational conflict also has been linked to stress outcomes (e.g., Bodenmann, Meuwly, Bradbury, Gmelch, & Ledermann, 2010). Other consequences of stress that could provide linkages to health have been identified, such as increases in smoking, substance use, accidents, sleep problems, and eating disorders. Populations that live in more

stressful environments (communities with higher divorce rates, business failures, natural disasters, etc.) smoke more heavily and experience higher mortality from lung cancer and chronic obstructive pulmonary disorder (Colby et al. 1994). Thus, we can assume that stress triggers problematic outcomes both in psychological and physiological levels, moreover it causes economical expenditures and misbalance society.

However, this paper aimed to open another side of stress nature. The research would have been more relevant if a wider range of arguments (positive and negative) had been explored. For this purpose let us start review several interesting concepts discovering the nature of the stress.

Darwin's theory of evolution (1859) has challenged stress concept, which was mentioned above. He suggests that environmental stress triggered struggle for existence of human species through «fight or flight» mechanism in the conditions of competition with other organic beings. This theory emphasized the significance of environmental stress in relation to natural selection for stress resistance and adaptation. Thus, we can suggest that environmental stress made us more powerful and alive.

## Stress nature

Researchers have had a difficult time agreeing on an acceptable definition of stress. Some have conceptualized stress as a demanding or threatening event or situation (e.g., a high-stress job, overcrowding). Such conceptualizations are known as stimulus-based definitions because they characterize stress as a stimulus that causes certain reactions. Stimulus-based definitions of stress are problematic, however, because they fail to recognize that people differ in how they view and react to challenging life events and situations. From this perspective more clear definition of stress was given by Lazarus and Folkman (1984), they conceptualize it as a process whereby an individual perceives and responds to events that he appraises as overwhelming or threatening to his well-being. Individual perceives stress in accordance with his world adjustment, which may differ from another person's perspective. Continuing this line of idea Tom Cox (1985) defines stress as subjective and relative phenomena, something that may be stressful for one person may not be stressful for another. This means that we cannot make a general prescription for different situations with a certain steps in order to manage stress as it has very subjective nature. Interesting concept was given by Friedman and Rosenham (1974) related to personality type as possible source of stress. This concept somehow echoes the idea of person's perspectives in stress perception. Friedman and Rosenham introduced the Type A and Type B classification. Individuals of Type A show competitive behavior, tend to get angry easily, and are always busy in achieving their goals, whereas Type B personalities are more relaxed and do not act competitively. Type A individuals are easily 'wound up' and tend to overreact. They also tend to have high blood pressure (hypertension). Type A individuals tend to be easily aroused to anger or hostility, which they may or may not express overtly. People with Type B personality tend to be more tolerant of others, are more relaxed than Type A individuals, more reflective, experience lower levels of anxiety and display a higher level of imagination and creativity. Researchers concluded that individuals of A type are more vulnerable to heart disease than individuals of B type as they (A type) perceive environment with emotional exertion in competitive way that make this environment stressful for them.

Endocrinologist Hans Selye, a famous stress researcher, gave another concept of stress. He defined stress as the «response of the body to any

demand, whether it is caused by, or results in, pleasant or unpleasant conditions» (Selye 1976: 74). Selye's definition of stress is response-based in that it conceptualizes stress chiefly in terms of the body's physiological reaction to any demand that is placed on it. From this biological standpoint during stress, the Autonomic Nervous System (ANS) with its two sympathetic and parasympathetic branches is activated with an increased sympathetic tonus, a decrease in parasympathetic tonus and reduced heart rate variability (HRV) (Friedman & Thayer, 1998). Such a pattern is also observed in psychosocial strain situation (Ohira et al., 2008). This activation triggers fight-or-flight response, the body is rapidly aroused by activation of both the sympathetic nervous system and the endocrine system. This arousal helps prepare the person to either fight or flee from a perceived threat.

According to Cannon (1932), the fight-or-flight response is a built-in mechanism that assists in maintaining homeostasis—an internal environment in which physiological variables such as blood pressure, respiration, digestion, and temperature are stabilized at levels optimal for survival. Thus, Cannon viewed the fight-or-flight response as adaptive because it enables us to adjust internally and externally to changes in our surroundings, which is helpful in species survival.

Moreover, this activation leads to production of three main stress hormones: adrenaline, cortisol, norepinephrine (Hargreaves, 1990). Key actions of adrenaline include increasing the heart rate, increasing blood pressure, preparing body for effective response. A closely related hormone, noradrenaline, is released mainly from the nerve endings of the sympathetic nervous system (as well as in relatively small amounts from the adrenal medulla). There is a continuous low level of activity of the sympathetic nervous system resulting in release of noradrenaline into the circulation. The last hormone is cortisol produced by the cortex of the adrenal glands. This steroid hormone is more important in altering the body's metabolism (i.e., raising plasma glucose).

This physiological activation in case of prolonged trials such as intense and chronic stressors results negative outcomes in body physiology. Prolonged stress can chronically elevate blood pressure, which expose the heart to work harder, which leads to hypertrophy of the left ventricle (Brownley et al. 2000). Over time, the chronically elevated and rapidly shifting levels of blood pressure can lead to damaged arteries and plaque formation. Chronic stress also suppress immunity by directly affecting

cytokine profiles. Cytokines are communicatory molecules produced primarily by immune cells (Roitt et al. 1998). Suppression of immune system makes human organism vulnerable to various infection attacks. Taking this together, prolonged stress may cause different types of diseases and impact longevity.

Taking all together, there are two types of effect during stress experiencing which result changes in both psychological and physiological levels and this process acknowledge the thought about the unity of body and mind.

### **Application of appraisal**

Here we come to another point, which seems like a light at the end of a dark tunnel. Thus, after encountering stressful situation our body responds by physiological activation. Next stage consists of two kinds of stress response: appraisal and coping. Appraisal refers to the responses a person has to everyday situations. Those situations create a number of thoughts. These thoughts fuel a person's emotions (fear, sadness, happiness, anger, etc.), so if the thoughts are negative, the emotions will be, too. Neutral thoughts are less likely to provoke a stress response (Clark et al., 1990). Coping refers to the way a person responds to his appraisal.

According to Conceptual Act Theory appraisal transforms internal states into emotions by integrating bodily changes with external sensory information and knowledge of the situation (Barrett, 2006). The biopsychosocial model of challenge and threat offers an explanation of how appraisals and situations interact to shape stress responses (Blascovich & Mendes, 2010). Both challenge and threat states are experienced during acute stress but differ in antecedent appraisal processes and downstream physiological responses. A useful example of challenge and threat states in the process of appraisal is the situation with horse riding. Imagine that you are a horse rider and in front of you stands fast and unbridled racehorse. Avid riders might experience excitement, believing that they could handle the difficult trail, whereas novices would be more likely to experience fear if the difficulty of the trail were perceived to exceed their skill level. Individuals experience challenge when appraisals of personal resources exceed situational demands—like the expert riders in the example above. Alternatively, threat manifests when perceived demands exceed resources. Thus, at this point an important input in appraisal process make personal resources that correlates with theme of self-esteem.

Although both states are accompanied by sympathetic activation, challenge is characterized by improved cardiac efficiency and dilation of the peripheral vasculature, whereas threat decreases cardiac efficiency and constricts the vasculature in anticipation of damage or defeat (Jamieson et al., 2012). Sympathetic activation may actually be greater during approach-motivated challenge states than during threat states. This notion is consistent with the idea of physiological toughness, which suggests that activation of the sympathetic nervous system (SNS) facilitates effective coping and improves performance in situations of acute stress (Dienstbier, 1989).

Referring to challenge and threat model of appraisal recent studies have sought to improve acute stress responses by altering appraisals of arousal (e.g., Jamieson, Mendes, Blackstock, & Schmader, 2010; Jamieson, Nock, & Mendes, 2012). Research participants were told that the physiological arousal experienced during stressful situations could be thought of as a resource that aids performance. Participants who reframe the meaning of the physiological signals that accompany stress as beneficial experience more positive outcomes than those who did not.

The data presented thus far support the idea that our appraisal of stressful situation impact the biological processes in our body and if the appraisal is negative (threat) it can damage our health and if the appraisal is positive (challenge) it can improve our body efficiency without any harm to the health. Moreover, the level of performance depends on appraisal. Appraisal as a challenge allows us to perform the task in the productive way, our coping strategies are efficient. The threat appraisal suppresses our abilities to perform efficiently and avoidance becomes a main coping strategy. Taking into account all mentioned above, the whole process of stress experiencing is a big mechanism with different types of outcomes (Fig. 1 – The process of stress experiencing).

In case, if person reframe the appraisal he/she changes the outcomes. The reframing stress interpretation (challenge/threat) lead us to the notion of reappraisal. Research on reappraising arousal has extended work on emotion regulation (Gross, 2002) and cognitive behavioral therapy (CBT; Hofmann & Smits, 2008). The underlying theme of these approaches is that changing cognitions produces downstream benefits. Reappraisal, as specified by emotion-regulation models, typically involves the reinterpretation of the affective meaning of contextual cues. In other

words, emotionally charged stimuli are presented, and participants are instructed to reinterpret the stimuli (e.g., «The images are fake») or distance themselves from the stimuli (e.g., by adopting a third-person perspective; Kross & Ayduk, 2011). Clinical researchers developed CBT to help

improve patient outcomes by modifying faulty affective responses and cognitions (Barlow, 2004). For instance, depressive patients are taught to identify errors in thinking (e.g., «Everyone hates me and always will») and replace them with more rational thoughts.

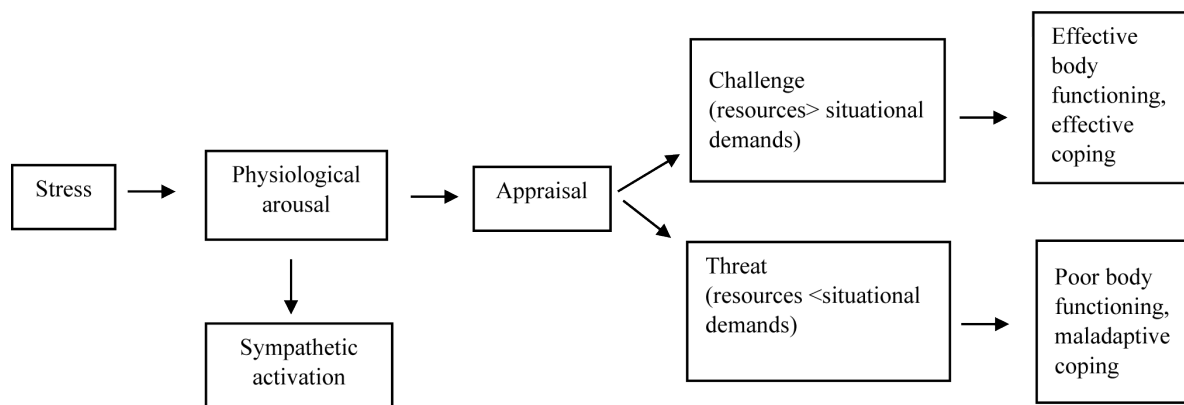


Figure 1.

Thus, by regulating our emotional and cognitive arousals we can reframe stress appraisal and its outcomes. The literature related to emotion-regulation reappraisal has often (but not always) centered on decreasing sympathetic activation during passive tasks (e.g., Gross, 2002) through (e.g., mindfulness meditation; Cincotta, Gehrman, Gooneratne, & Baime, 2011) or teaches individuals to accept arousal (e.g., interoceptive exposure; Levitt, Brown, Orsillo, & Barlow, 2004).

Another good thing about reappraisal is that it can positively affect physiology, attention, and performance. In one study, researchers examined how reappraising arousal might alter cardiovascular functioning and attention during and after a stressful evaluative task (Jamieson et al., 2012). After a resting baseline, participants were instructed that they were going to complete a public-speaking task (the Trier Social Stress Test; Kirschbaum, Pirke, & Hellhammer, 1993). Just prior to the task, they assigned one third of the participants to an arousal-reappraisal condition that consisted of instructions educating them on the functionality of stress responses and encouraged them to interpret arousal as a tool that aids performance; another third received a «placebo» intervention that described the best way to cope with stress was to ignore the source of that stress; and the remaining third were given no instructions. During the

stressful task, reappraisal participants exhibited an approach-oriented physiological profile, indexed by less vasoconstriction and greater cardiac output, compared with participants assigned to the other conditions. Immediately after the public-speaking task, attentional bias was assessed (using an emotional Stroop task; Williams, Mathews, & MacLeod, 1996). Reappraisal participants exhibited less vigilance for threat cues than did participants in the other two groups. Participants instructed to reappraise arousal not only exhibited more adaptive physiological responses during stress but also had their physiological responses return to baseline more quickly after the stressful situation, compared with no instruction controls.

In line with the idea of stress, appraisal importance goes the concept of stress management developed by Kelly McGonigal (2016). McGonigal develops the idea of stress perception, and emphasizes that challenge appraisal allows person be effective in performance and perceive stress as positive possibility to deal with task. She also confirmed the idea of unity mind and body. In her research, participants were exposed to stressful situation (public speaking). Prior to public speaking cortisol level was assessed. All participants while preparing to public speaking experienced high level of cortisol. Then participants were divided into experimental and control group. The first group was instructed to take

a body position of a leader or position symbolizing power and confidence for approximately 5 minutes prior to public speaking. The control group had no instructions, scientists mentioned that participants from control group were seating in close positions emphasizing feeling of disturbance and strain. Results showed that participants who took body position symbolizing power and confidence perceived stress less strained than participants from control group, and they exhibited lower level of cortisol than participants from control group did.

Additionally McGonigal (2016) revealed that during stress exposure human body additionally to stress hormones (adrenalin and cortisol) produces oxytocin hormone, which restores the cardiovascular system strained by stress.

Kosfeld and other scientists revealed that intranasally administered oxytocin increases trusting behavior (Kosfeld et al., 2005), thereby attenuating the activity in brain areas mediating emotional processing (amygdala, midbrain regions) and the behavioral adaptation to feedback (dorsal striatum; Baumgartner et al., 2008). The oxytocin is postulated as the biological basis of both social approach behavior and social buffering of stress reactivity (Heinrichs & Domes, 2008). Acute stress might also lead to higher availability of brain oxytocin and individual becomes attuned to prosocial behavior (trust, trustworthiness, and sharing). As social support helps human to overcome stress productively thus making social behavior as one of the coping strategies. This coping strategy is anchored so strongly that people can also change their stress responses during or immediately after the stress through positive social behavior.

Next finding related to oxytocin's role in stress is a genetic study which indicates that a common single-nucleotide polymorphism (rs53576) in the oxytocin receptor gene interacts with stress-protective effects of social support, such that only carriers of the G allele show reduced cortisol responses to stress following social support (Chen et al., 2011). These results suggest that genetic variation in the oxytocin system modulates the effectiveness of positive social interaction as a protective buffer against a stressful experience.

Being attuned to prosocial behavior human beings received social support and adapted to changing environment. Social support has been found to be associated with greater well-being in a wide variety of studies (Stepoe et al., 1996). Social is a significant factor for the coping reduction of stress. The same argument is also strong for self-efficacy (Wiebe, 1991), and the positives ways of coping.

## Conclusion

People in today's society suffer from stress in a wide range of situations. Stress is present in people's lives and is believed to be the cause of psychopathologies, diseases and inability to adapt to any given environment or work (Feldman et al., 2008). People with recurrent depressions or those exposed to chronic stress exhibits shorter telomeres in white blood cells (Wikgren et al., 2011). The telomere is the outermost part of the chromosome. With increasing age, telomeres shorten, and studies have shown that oxidative stress and inflammation accelerates this shortening. On this basis, it has been suggested that telomere length is a measure of biological aging, and telomere length has subsequently been linked to age-related diseases, unhealthy lifestyle, and longevity. The research team shows that shorter telomere length is associated with both recurrent depression and cortisol levels indicative of exposure to chronic stress. Considering this, it is a big priority for the whole society to manage stress and decrease its negative impact in order to develop people's well-being and longevity.

Reviewing the current literature, we noticed that the stress is associated with self-esteem in multiple ways. Stressful events affect self-esteem and self-esteem in turn affects the way people react to stress and cope with it, as was mentioned above we perceive stress as challenge when our personal resources exceed situational demands and vice versa in perception stress as a threat. Psychology literature exploring different fields of human being existence acknowledge the self-esteem phenomena as an important component of psychological well-being. Self-esteem also affected by social skills, prosocial behavior (Leary, 2005). Here we come to one of the possible ways to become attuned to prosocial behavior, which is stress experience. Human's body during stress exposure produces oxytocin that evokes our social skills and need for social support.

The last and the main thing is that we can change negative outcomes of stress to positive through reappraising and perceiving it as a challenge to adopt new strategies or to obtain new information about the phenomenon, to improve the level of our performance etc. This reappraisal will positively affect our physiological state and may become one of the possible ways to change our live to better one.

In summary, it has been shown from this review that stress is natural component of our existence and it allowed us to adapt and exist in the environment. As any other phenomenon, stress has positive and negative sides and it is our choice which of the sides, whether positive or negative will affect our life.

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