

IT IS GOOD TO BE STRESSED: IMPROVING PERFORMANCE AND BODY RESPONSES BY STRESS REAPPRAISAL

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Abstract

Despite the commonly shared belief that effects of stress depend on the amount of stress arousal, a wide body of research derived from appraisal theory indicates that it is rather the way people think about stress what influences its' outcomes (Akinola, Fridman, Mor, Morris, Crum, 2016; Crum, A. J., Salovey, P., Achor, S., 2013; Cohen, Sherman, 2014; Crum, A. J., Philips, D. J., 2015; Crum, Akinola, Martin, Fath, 2017; John-Henderson, Rheinschmidt, Mendoza-Denton, 2015). The aim of this paper is to put together actual research concerning psychological interventions effective in shaping adaptive cognitive and physiological responses to stress. It is focused on arousal reappraisal as a way of enhancing performance. Literature published from 1999 to 2017 was reviewed by using the following databases: EBSCO, Google Scholar, PubMed. Arousal reappraisal interventions appeared to be effective in improving performance, eliciting more adaptive physiological responses and working in experimental and real-life context. Based on presented studies possible future applications for both business and clinical area are discussed.

Key words: stress, arousal, reappraisal, coping, performance, psychophysiology.

Biopsychosocial model of challenge and threat

Suppression of arousal is commonly believed to be helpful in coping with stress. When individuals experience high arousal before or during difficult situations and interpret it as anxiety or threat it is associated with lower performance (Cassaday, Johnson, 2002). People

share a belief that calming down has beneficial effects on performance (Brooks, 2014). This tendency to down-regulate arousal can be correlated with avoidance coping with acute and chronic life stressors. A good example illustrating this tendency is 10-year longitudinal study which indicated that avoidance coping is linked to depressive symptoms (Holahan, Moos, Holahan, Brennan, Schutte, 2005) Trying to avoid stress can also lead to reduced happiness, life satisfaction and well-being (Elliot, Sedikides, Murayama, Tanaka, Thrash, Mapes, 2012).

The biopsychosocial model of challenge and threat highlights mechanism which shapes stress responses. According to this model there is an interaction between appraisal and situation which determines whether subject elicit challenge or threat response. When individual appraises situation as exceeding personal resources one is more likely to experience threat response. When perception of situational demands exceeds personal resources one is more likely to elicit challenge response (Blascovich, Mendes, 2010). Both responses are characterized by greater activation in sympathetic nervous system (SNS) but threat response is characterized by vasculature constriction in anticipation of harm or defeat. Whereas challenge response is correlated with greater cardiac efficacy and peripheral vasculature dilation which improves delivery of oxygenated blood to the brain. Body of research also indicates that challenge responses correlate with improved performance in many areas such as pattern-detection, cooperative games, decision-making tasks or presentation under pressure (Blascovich, Mendes, Hunter, Salomon, 1999; Mendes, Major, McCoy, Blascovich, 2008; Kassam, Koslov, Mendes, 2009; Crum, Akinola, Martin, Fath, 2017). Challenge states can be accessed by reappraisal which purpose is to reshape how arousal is constructed rather than by lowering arousal (Jamieson et al., 2012). Reappraisal is a way of transforming stress responses instead of reducing or calming down stress responses (Jamieson, Mendes, Nock, 2012b)

The goal of this review is to collect and discuss a series of studies suggesting that stress reappraisal before and during adversity can be beneficial and to highlight possible variety of effective interventions that can be used in ones' life.

Coping with pre-performance anxiety

Brook (2014) conducted a series of experiments investigating whether reappraising anxiety as excitement would be a better strategy for performance than calming down. The author hypothesized that reappraising anxiety (high-arousal emotion) as excitement (high-arousal emotion) is more efficient than putting effort to relax (low-arousal). Experiments involved tasks such as karaoke singing, public speaking and math performance. In the "singing study" and "public speaking performance study" reappraisal was induced by asking participants to repeat out loud self-statement: "I am excited". In "math performance study" participants were introduced to a short instruction: "Try to get excited". In each study arousal reappraisal led to better outcomes than trying to calm down (Brook, 2014).

Another study examined the results of reappraisal for physiological responses in real life setting. Students who were preparing for Graduate Record Examination (GRE) were told that arousal improves performance. Researchers collected saliva samples before and after the manipulation. It was analyzed for sympathetic nervous system activation (salivary alpha amylase – sAA). Reappraisal manipulation led to increase of sAA level and significantly better performance in practice GRE than control group with no instruction before the exam. 1-3 months later the reappraisal GRE group scored higher than the control group in actual GRE. Reappraisal instruction was: "People think that feeling anxious while taking a standardized

test will make them do poorly on the test. However, recent research suggests that arousal doesn't hurt performance on these tests and can even help performance... people who feel anxious during a test might actually do better. This mean you shouldn't feel concerned if you do feel anxious while taking today's GRE test. If you find yourself feeling anxious, simply remind yourself that your arousal could be helping you do well" (Jamieson, Mendes, Blackstock, Schmader, 2010).

Jamieson, Nock, Mendes (2012a) wanted to check whether reappraising arousal during social exposition will promote positive effects on performance and cardiovascular responses (e.g. cardiac output and peripheral resistance). Participants were assigned to three conditions: reappraisal, ignore external cues and control. Subjects in the reappraisal condition read instruction about adaptive function of physiological arousal. Instruction indicated that higher arousal during stress is not harmful and it benefits performance. Participants' cardiovascular responses were measured before and during stressful public speaking task (Trier Social Stress Test). First participants had to deliver a five minute videotaped impromptu speech in front of two judges. During the speech judges demonstrated aversive feedback (crossed arms, frowning etc.). Then participants completed a test for attentional bias (Stroop task). The second part of the experiment was an arithmetic task. The participants had to count backward subtracting 7 from 996 for 5 minutes. As a result of the intervention reappraisal participants demonstrated better cardiovascular functioning (lower total peripheral resistance and greater cardiac output), increased perceptions of more accessible resources and reduced attentional bias for emotionally negative information (Jamieson, Nock, Mendes, 2012a). Additional studies showed that arousal reappraisal is also effective for participants suffering from social anxiety disorder (SAD) where negative emotions and anxiety are intensified. Reappraisal group experienced higher coping resources, more adaptive physiological reaction and lower attentional bias. Researchers expected it to have adaptive influence for future stressful experiences. Another finding emphasized that reappraisal enhances recovery after experiencing stress. Subjects who reappraised arousal experienced faster physiological responses return to baseline after stressful circumstances than the control group (Jamieson, Mendes, Nock, 2012b).

Study conducted by Beltzer, Nock, Peters and Jamieson (2014) aimed to check whether arousal reappraisal is effective for improving affective displays and social performance under evaluative stress. Participants took part in social evaluative task which included public speaking (Trier Social Stress Test) and impromptu arithmetic task. Subjects were 42 people diagnosed for social anxiety disorder (SAD) and 43 people who did not meet the criteria of SAD. Subjects received two reappraisal instructions that aimed to increase the perception of available coping resources. First one was verbal:

"In stressful situations, like public speaking, our bodies react in very specific ways. The increase in arousal you may feel during stress is not harmful. Instead, these responses evolved to help our ancestors survive by delivering oxygen to where it is needed in the body. We encourage you to reinterpret you bodily signals during the upcoming public speaking task as beneficial".

Second instruction was a summary of three scientific articles focused on adaptive functions of stress responses during performance circumstances. After each summary participants had to answer two questions about summary's content.

Participants' 3 minute preparation was followed by 5 minute videotaped speech covering their strengths and weaknesses. The subjects were observed by two evaluators who were expressing negative nonverbal feedback (frowning, furrowed brown etc.). At last participants

completed impromptu 5-minute arithmetic task. They were asked to count backward in steps of seven from 996. This time judges also provided negative feedback.

Reappraisal participants delivered better speeches evaluated by three raters blind to conditions. Videotaped speeches were rated for affective displays of anxiety and shame, nonverbal signaling (smiling, fidgeting gestures, eye contact, body orientation) and general speech performance. Reappraisal participants demonstrated less negative affect (anxiety and shame), less avoidant nonverbal signaling and displayed increased sympathetic nervous system activation which was measured by level of salivary alpha amylase – sAA collected at baseline and directly after public speech. Speeches delivered by reappraisal participants were rated marginally better than controls'. Reappraisal participants experienced higher sympathetic activation compared to controls and reported greater level of coping resources relative to no instruction controls. Reappraisal instruction effects did not vary as a function of anxiety level which suggests that anxious (SAD) and less anxious (no SAD) both benefited from intervention. Participants with SAD showed more avoidant nonverbal signaling, more negative affective displays and performed more poorly relative to less anxious individuals (Beltzer, Nock, Peters, Jamieson, 2014).

Reappraisal in a real-life setting

Study conducted by Jamieson, Peters, Greenwood and Altose (2016) was the first that tested arousal reappraisal on exam performance in a classroom setting. Participants were students of a community college attending developmental mathematic course. Community college courses aim at offering disadvantaged, at-risk or underachieving students the possibility to change their life. Half of participants were given stress reappraisal intervention which emphasized adaptive aspects of stress arousal. A control group was given placebo instruction that encouraged students to ignore stress. Reappraisal participants received higher scores and reported less anxiety toward math evaluation relative to control group. First researchers examined students' math anxiety, stress appraisals and academic performance during exam 1. Next subjects received arousal reappraisal relative to placebo control. Then stress appraisals and math anxiety was measured again. Intervention consisted of summaries of scientific materials aiming at educating students about adaptive function of stress responses. Placebo participants received summaries that emphasized ignoring stress as the best strategy to improve performance. Every summary was followed by two multiple-choice questions in order to guarantee that students will read the presented material. Participants who received arousal reappraisal received better scores on Exam 2 relative to placebo controls. Reappraisal participants also received marginally greater scores at the end of semester (Jamieson, Peters, Greenwood and Altose, 2016).

Summary

- Focusing, accepting and embracing authentic emotional states is more effective for performance than trying to switch from high-arousal emotional states to low-arousal states.
- Arousal reappraisal is correlated with lower cognitive, physiological and interpersonal costs than suppression.
- People can improve their performance under pressure by simple self-statement: "I am excited" or by being advised to: "get excited".

- Transforming physiological arousal to a challenge response benefit in better performance.
- Effects of arousal reappraisal are observed in both laboratory and real-life setting.
- Individual can decide whether he or she interprets arousal as negative state (e.g. threat, anxiety) or as sign that body is mobilizing resources to handle life demands (approach motivation, challenge response).
- Arousal is a mediator of behavioral outcomes.
- Arousal of sympathetic nervous system can go together with adaptive or maladaptive responses. Challenge response is associated with greater activation of sympathetic nervous system (SNS), better performance and better health outcomes than threat response.
- Challenge response is associated with increased cardiac efficiency, and vasodilation (approach orientation) while threat response is associated with decrease in cardiac efficiency and vasoconstriction (avoidance orientation).
- People instructed to “rethink” (reappraise) arousal (stress) as functional experience themselves as having more resources, enter better cardiovascular functioning and show smaller attentional bias towards threat.
- Reappraisal aims to change cardiovascular responses from less to more adaptive when there is no risk of bleeding to death from injury.
- Arousal reappraisal helps in faster recovering from stress.
- Arousal reappraisal can be beneficial for social-interactive outcomes in evaluative situations.
- Arousal reappraisal is beneficial for individuals suffering from social anxiety disorder (SAD) and those without SAD.
- Effects of arousal reappraisal are observed in both laboratory and in real-life environment.
- Challenge states are linked to improved performance while threat responses are a predictor of poor performance.
- Using arousal reappraisal in educational context can be simple and effective strategy to help students increase their performance.

Conclusions

Traditional interventions, programs and workshops for better performance and public speaking are focused on teaching people to calm down by downregulating emotional intensity. Although research focused on arousal reappraisals is in its' early stage it appears to be very promising. A growing body of research shows that helping people change their appraisal of stress arousal can be beneficial for performance in both experimental and real-life circumstances. This type of intervention is an effective way to change cognitive and biological responses to stressful situations by promoting more adaptive stress responses. Taken all together reappraisal interventions are about teaching people how to view inner sensations during stressful situations as a resource in order to support performance. We still need more evidence to assess whether arousal appraisal interventions work for a long time but in reference to mentioned (Jamieson et al. 2010; Jamieson et al. 2016) and other studies we can hypothesise that they do. For example, positive view of anxiety was associated with smaller risk of burnout for physicians and teachers one year later (see Strack, Lopes, Esteves, 2015, for a review). Private and professional human life is usually full of evaluative context which typically elicit negative affect and anxiety (Jamieson, Nock, Mendes, 2013). Jamieson

et al. (2016) recommended implementing this kind of interventions in educational context in order to create life improvements for a wide group of students. They also suggested potential for distilling and spreading this (Jamieson et al. 2016) and other types of interventions (see Folkman, Moskowitz, 2000; Crum, Langer, 2007, Yeager, Dweck, 2012; Crum, Phillips, 2015 for a review).

I believe future directions lie also in applying such interventions in clinical setting. Patients who experience elevated stress arousal due to diagnosis, medical procedures, patient-personnel interactions et al. could benefit from receiving simple interventions (verbal, written, infographic). Those interventions would aim at embracing stress and result in outcomes regarding more positive social interaction, perception of more resources and more adaptive physiological responses to adversities.

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