

Short communication

**PHYSICAL ACTIVITY, MENTAL HEALTH AND
POSITIVE EMOTIONS**

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Abstract

This article presents a review of some studies connected with physical activity, mental health and emotions. There are limitations in the methodology used in physical activity and mental health studies. In this kind of research it's difficult to establish cause. This article will present reasons why such situations happen. Emotions play a big role in human lives. Physical activity can be used to change and regulate human feelings. It can cause positive emotions and also reduce experiencing negative feelings by individuals. Regular participation is important as exercises can help in the treatment of depression and anxiety. In general within the population research of physical activity found it had stronger influence in decreasing anxiety than depression. Furthermore physical activity has similar influence on brain functioning and hormones secretion as antidepressant drugs. For exercise professionals it's important to know what kind of factors can make physical activity less pleasant or unpleasant and control them, for the good of their students. This article provides such information.

Key words: *physical activity, emotions, mental health*

Introduction

For a long time it has been known that physical activity can make people feel better. This fact is evident in improving mental health and increasing motivation for participation in sport. Physical activity can be an important factor in treating anxiety and mood disorders for example depression because it has similar influences like drugs on mental health. The difference is that physical activity doesn't cost any money and doesn't cause any side effects (as with drug treatment) It offers a multitude of benefits for human health by improving cardiovascular, immune, skeletal and muscular systems. It also has been shown that physical activity can bring benefits for

cognitive functioning of individuals. The article will present review of studies about connection between physical activity and benefits for emotional functioning.

Limitations in studies about physical activity and mental health

Relating to measurement of connection between physical activity and its influence on emotional and mental health, we should take into account some of the important methodological limitations. One of the most considerable factors is that correlation doesn't mean causation. If for example we get a result that there is positive correlation between mental health and physical activity, it doesn't mean that mental health is a result of participation of physical activity. Another answer can be that people characterized by better mental health are more likely to take part in sport and physical exercises than people with mental problems. It is possible that physical activity and better mental health are connected with other factor such as genetic or economic status.

To find out if there is causation the most important seems to be well-designed experimental study. First, the sample should be representative of chosen population to generalize the results of study. Secondly researchers should assign the participants randomly into experimental and controlled groups. During research including physical activity it's also important to control expectations of benefits in any given research sample because normally people are aware that physical activity should have a good influence for their health. Most mental health variables are measured by self-reports which represent subjective thoughts about any given topic. For this reason controlled group (which will not participate in regular physical activity) should be involved in some activities which will make them think that these activities will bring something positive to their lives. They could for example take part in some seminars about health promotion or take a placebo drug.

People involved in research should not know in which group any given experiment applies. For example an active ingredient which could have influence on their feelings differs from a controlled group where no changes appear. It is also known that it would be better for research when participants from controlled and experimental groups will not have contact with each other. It is also important what name will be given to the study. It is challenging to provide strong evidence of casual relationship between mental health and physical activity. During presentation of some results from different studies we should be careful with making conclusions on this topic. It is important to do research and speak about the connections between physical activity and its influence on mental health and feeling

better, because it can have significant influence on quality of humans lives (Ekkekakis & Backhouse, 2014).

Physical activity, sport and its positive effect on mental health and emotions

Practicing intense physical activity or sport increases the release of endorphins bringing the exercising person into a state of calm and relaxation (Allen & Coen, 1987) and also inhibits the production of stress hormones such as adrenocorticotrophic hormones or corticosteroids (Allen, 2000). These two mechanisms seem to play an important role in making individuals calm down during or after doing exercises. The peak of secretion of endorphins occurs within 30 minutes of intense exercises. Other studies show that endorphins are responsible for reducing tension and anxiety, inducing a sense of relaxation (Herring et al., 2010).

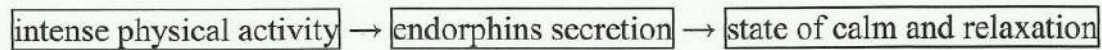


Figure 1. Connections between intense physical activity and state of calm and relaxation

Systematic review of 32 researches concern the assessment of the impact of physical activity on positive and negative moods among older adults. In people participating in the exercises positive emotion was significantly increased higher compared making it to the controlled groups (average score ES=0.35). In the experimental groups the level of negative emotions was significantly lower (average score ES=0.39) (Arent et al., 2000).

Many studies demonstrated that physical activity can be an attractive and alternative way to regulate individuals' emotions (Puetz et al., 2006; Reed & Buck, 2009; Reed & Ones, 2006). Physical activity is also connected with numerous health benefits; it is free and doesn't cause any side effects. Furthermore the intensity of physical activity is self-selected in individual's positive high-activation state (giving energy and vigor). If the intensity of exercise is on quite a high level and causes a pleasant high-activation state it will be followed by an enjoyable low activation state and last for some time after physical exercise. Because of these positive effects on emotions physical activity might replace some unhealthy substances such as alcohol or sugar as an equally effective substitute. People who are addicted are looking for something which can change the way they are feeling quickly. Instead of drinking alcohol or taking drugs to improve their mood or change their emotions they could take part in some exercise program, which quite quickly can help them to feel better in a short time.

Studies on people with addictions suggest that incorporation of physical activity in their treatment programs has a good influence on their feelings and facilitates recovery process (Ekkekakis & Backhouse, 2014).

Physical activity, anxiety and depressive mood

According to Landers and Arent (2007) generally the reduction of anxiety is characterized as minimal in effect, but is clinically meaningful and important. There is proof that both aerobic and anaerobic exercises (for example resistance training) lower the level of anxiety and depressive moods. Systematic review of surveys and meta-analyzes about the relationships between negative emotions in the general population and physical activity, indicates that the effect size (ES) exercises varies from 0.15 to 0.56 for depression and from 0.53 to 0.72 for anxiety, which means that the impact of physical activity on depression is small or moderate and on anxiety is medium and large (Landers & Arent, 2007).

Still researchers don't know how different frequency, duration and intensity of physical activity influence on the level of anxiety or depressive mood. Results of some experimental studies showed that the level of anxiety decreases after about 20 minutes of intensive exercises for 40-50% of one maximum repetition but increases immediately after the 20-minute exercise sessions performed with the force of 85% of one maximum repetition (Bartholomew & Linder, 1998). Other studies have confirmed that the training must be moderate intensity to cause the greatest and longest lasting decrease in anxiety. More frequent exercise sessions seem to be the most beneficial in reducing anxiety. It is because the anxiolytic effect of exercise is strongest from the 46h after the completion of a session (Landers & Arent, 2007).

Similar results were obtained in the intensity of exercise for depressive mood. An exercise program of low intensity (7kcal/kg/week) reduces the depressed mood for about 30% and of moderate intensity (17.5kcal/kg/week) for about 47% (Dunn et al., 2005). According to Landers and Petruzello to effectively reduce the depressive mood, exercise programs should be used for no less than 9 weeks. General recommendation for frequency, duration and intensity of exercise requires that adults participate in physical activity of medium intensity for 30 minutes a day, 5 – 7 days in a week. This level of physical activity seems to be sufficient to lower depressive symptoms (Ekkekakis & Backhouse, 2014).

The similarities in the physiological effect of antidepressant drugs and physical activity on the human brain

Physical activity can cause changes in hormone secretion and brain functioning. During regular physical activity as well as taking

antidepressant drugs the level of brain-derived neurotrophic factor (BDNF) increases. BDNF is necessary for good functioning of some neurons connected with the areas of the brain which are responsible for cognitive, sensory and motor functioning. The best treatment results are obtained when individuals are taking antidepressant drugs and practicing some exercises (BDNF level is higher in the brain after 2 days of taking drugs and practicing exercises). If a person takes only antidepressant medicine the BDNF level is increased after 2 weeks.

It is well known that according to some researchers, depression is associated with lower level of norepinephrine synthesis in the brain. Physical exercise as well as anti-depressants causes a change in the noradrenergic system. Moreover the exercises cause changes in the secretion of dopamine, which is the precursor of norepinephrine. Because of its influence on brain functioning physical activity together with some antidepressant drugs can bring the best benefits for people who suffer from depression.

Intense exercise can cause activation of the cannabinoid system in the brain which is responsible for decreasing the level of perceived pain and blood pressure. This effect can last up to 10 hours after completion of physical exercise and also produce a calming effect (Landers & Arent, 2007).

Table 1

Comparison between antidepressants and regular physical activity and their influence on brain functioning

antidepressant drugs	regular physical activity
increasing BDNF	increasing BDNF
cause changes in the noradrenergic system	cause changes in the noradrenergic system
–	cause changes in the secretion of dopamine
–	activates cannabinoid system
some side effects	no side effects

Factors which can make physical activity unpleasant

If physical activity brings only benefits to human lives why do people not participate regularly in exercises sport or games? The first factor is the attributes of physical activity itself. Some people like to run others like swimming. Participants will be tired or bored doing exercise, playing sport or participating in games which they don't like. Furthermore when intensity of exercise exceeds the ventilatory threshold being physically

active can be less pleasant, this can result in difficulty in breathing. A second group of factors connects with the characteristics of individuals, their personalities, level of self-esteem etc. Individuals who are obese or overweight and don't practice any sport for a long time, can feel a lack of confidence in his/her physical ability or think negatively about themselves, this can reduce the level of positive emotions experienced by him/her during physical activity. Another reason why reduction of pleasure during participation in sport can occur is the environmental conditions, for example high heat. Social environment is also important, for example a personal coach should provide positive feedback and strengthen the individual's autonomy. In other cases students may feel controlled by their coach and perform his orders reluctantly, making participation in sport very unpleasant (Ekkekakis & Backhouse, 2014).

There are also some limitations for practitioners who are physically active regularly. In athletes who practice sport regularly, every break in training lasting at least 72h causes symptoms similar to abstinence which increases tension and unpleasant arousal or frustration (Allen, 2000). Some studies indicate that there is a threshold of exercise intensity above which the exercise probably doesn't bring positive effects on mood.

Conclusions

Physical activity can change people's feelings from negative to positive. This effect can have life-changing applications such as promoting mental health or can help individuals go out of addiction. Being physically active can be good for persons struggling with depression or anxiety, because physical activity has similar influences on brain functioning and hormones secretion as antidepressant drugs. It does not cost financially for people to do exercises and there are no side effects for their mental and physical functioning. Physical activity also causes some benefits for other spheres of life such as physical health. Still there is a big need for professional studies about connection between physical activity, mental health and emotions, which take into account all the factors which can disturb results achieved during research. The knowledge about this topic will be more objective and can be used to create treatment programs which will include physical activity exercises. Limitations of feeling better effect should be also being taken into account. This information can be especially helpful for exercise professionals who should be flexible and remember that pleasure and displeasure is powerful in human lives and is the main forces which cause their behavior.

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