

Colors of pain. Mechanisms of the effects of colors on pain perception

Colors are an integral part of people's lives, as they are one of the basic properties of surrounding objects. Perceived color depends, among other factors, on the amount of light reflected by the object and the length of the wave that reaches the eye. Besides the basic function of color which is helping to discriminate objects more precisely, colors can influence many aspects of people's functioning, such as cognition, emotions, behaviour, attention or even pain.

Despite the fact that pain and color are two distinct constructs, they have a common characteristic – both are subjective experiences. Moreover, we experience both pain and colors in daily life, although luckily the former not as often as the latter. Pain could be acute, short-lived or chronic, long-lasting. Regardless of the source and type of pain, usually there is a possibility to change its subjective experience. Recent studies indicate that, among other factors, colors can have such a modulating effect on pain perception. Along with the evidence and research results, also some questions arise. How can we enhance or lessen this effect? What is the mechanism of this effect? Whether expectations and emotional states could influence this effect?

This project aims at answering those questions. It is already known that red color could enhance pain perception, while green or blue colors are more tranquilizing and decrease pain perception. However, the relation between colors and pain has not yet been fully described. One of the mechanisms of this effect could be expectations. People have different expectations about colors and how they can affect our pain perception. It is then possible that such expectations are one of the mechanisms of the effect of colors on pain. Another possible factor influencing this effect could be emotions, both positive and negative. Studies' findings imply that positive emotional states often accompany the decrease in pain, whereas negative emotions accompany the increase in pain. It is then possible that also in case of colors and their effect on pain perception, emotions play an important role.

To achieve the goals of this project, three experiments have been planned. First experiment will verify if the use of virtual reality can intensify the effect of color on pain perception and whether prior expectations regarding such effect influence the pain perception. In the second experiment it will be verified whether people's expectations about the influence of color hue on pain perception can be the mechanism of the reported effect and if this effect is independent of the type of experienced pain. Third and last experiment will answer the question whether the participant's emotional state can be substantial factor in the effect of colors on pain perception. Moreover, in all experiments psychological and physiological measures of pain will be assessed in order to check whether the changes in pain perception are found on both psychological and physiological levels.

The results of this project could be meaningful for both further experimental studies and clinical practice. Color cues or stimuli are frequently used in experimental studies investigating different aspects pain, including the effects of placebo on pain. Researchers studying the mechanisms of pain or placebo effects could account the influence of colors in their studies and understand or interpret better obtained results. At the same time, clinicians could develop new coping with pain or pain management strategies with regard to the influence of colors on pain perception.