

## Positive Neuroscience – Analyzing Research Directions of The New Integrative Approach

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### Abstract

**Introduction.** Positive neuroscience is an integrative area that aims to study physiological mechanisms in a positive-psychological context. The research of this field touches the problematics of prosocial behavior, personality strengths (VIA), well-being and altruism. The novelty of this research includes theoretical substantiation of the formation of a new direction for the scientific space in Russia – positive neuroscience. **Theoretical justification.** The main trends of modern positive psychology are positive socialization, well-being and personality strengths (VIA). Three practical areas of application of positive neuroscience are the formation of psychological well-being of the individual, prevention of aggression and stimulation of prosocial behavior of the individual. We analyzed neuroscience researches for its consistency with the positive psychological approach to the study of personality and the possibility of further integrative study of personality at the intersection of three areas of psychological knowledge: positive psychology, personality psychology, and systems psychophysiology, particularly in the aspect of studying aggression and prosocial behavior. Positive neuroscience is both an independent branch of fundamental psychological knowledge and an additional and alternative way of investigating the classical concepts of personality psychology, social psychology and systemic psychophysiology within the framework of the positive-psychological direction, which is confirmed by psychological research. **Discussion.** Positive neuroscience is a highly promising direction both in the theoretical aspect of studying and describing personality, and in the practical aspect of identifying and finding the most effective ways to form psychological well-being and psychological resilience of the individual, its prosocial patterns of behavior and prevention of aggression and destructive behavior.

## Keywords

positive psychology, positive neuroscience, social neuroscience, well-being, altruism, prosocial behavior, aggression prevention

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## Introduction

One of the contemporary directions in psychology is positive psychology, a large-scale and rapidly developing field of modern psychological science that studies the psychological well-being of individuals, social groups, and society as a whole (Rean, Stavtsev & Shevchenko, 2022; Leontiev, 2012; Seligman, Steen, Park & Peterson, 2005). Positive psychology seeks to explore the positive personality traits that make life "worth living" including the study of the concepts of hope, wisdom, creativity, aspiration for the future, courage, spirituality, responsibility, perseverance, and others (Rean, Stavtsev & Shevchenko, 2022), as well as negative aspects of human psychological functioning (Rean, Stavtsev, 2020). Thus, the positive-psychological concept is based on a number of empirically verifiable statements, such as learned helplessness or the model of personality strengths (VIA) (Curiosity, Optimism, Energy, Gratitude, Love, Fairness, Creativity, etc.). At the same time, many psychological fields have developed a demand for integrative research, e.g., in psychoanalysis, the Association for Neuropsychoanalysis (URL: <https://npsa-association.org/>). Neuroresearch complements existing theoretical concepts of psychological science and can also detail theories, confirm or refute hypotheses.

Positive neuroscience is about integrating neuroscience research into a positive psychological context. Neuroscience studies may be outside of the field of positive direction, but are significant to positive neuroscience. They draw on data from neuroimaging, computational neuroscience, cognitive neuroscience, and other disciplines. Positive neuroscience aims to study physiological functions related to aspects of human life that contribute to well-being (Summer, 2019; Greene, Morrison & Seligman,

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2016). Positive neuroscience explores how the brain responds to positive and negative emotions, how it can be modified through neuroplasticity, and what practices promote mental well-being and quality of life. The objects of positive neuroscience include such positive psychological phenomena as altruism and prosocial behavior, flow states, psychological well-being, and others.

The purpose of this article is to summarize the neuroscience research relevant to positive psychology as well as to analyze the prospects and limits of this integrative approach.

## **Theoretical justification**

### ***Trends in modern positive psychology***

Speaking about positive psychology and its place in the system of psychological sciences and trends, we should note not only the problem field of positive psychology research, lying in the field of detailed structural and systematic study of positive aspects of personality psychology and social psychology, but also such an important feature of this approach as empirical verification based on a large volume of qualitative and quantitative studies and experiments (Rean, Stavtsev, 2020; Stavtsev, Rean & Kuzmin, 2021). In this regard, it is necessary to emphasize the particular importance of one of the key models within positive psychology, the "VIA" (Values In Action) model or the 24 strengths model of personality (Peterson & Seligman, 2004; Stavtsev et al., 2021). This model was introduced in 2004 as part of Christopher Peterson and Martin Seligman's textbook work CSV (Character Strength And Virtues: A handbook and classification). The book is a structured scientific classification of humanistic ideas and theories, as well as positive personality qualities, theories and approaches to measuring these traits. The book was created in analogy with the Diagnostic and Statistical Manual of Mental Disorders, the "desk book" of psychologists from various fields working with mental disorders. After analyzing a huge amount of scientific, philosophical and artistic literature, scientists have identified 6 core strengths that can be divided into 24 personality strengths. To determine whether a personality characteristic was suitable for inclusion on the CSV list, the authors needed to establish whether the characteristic could be reliably investigated from an empirical perspective. The CSV included personality strengths and characteristics that are positive in a multicultural sense (relevant regardless of nationality, region, cultural background, religion) (Rean, Stavtsev & Kuzmin, 2023). The model of "Personality Strengths" showed high reliability when working with large groups of respondents in the Russian Federation, the personality strengths forming "the quartet of psychological resilience" (Curiosity, Vitality, Optimism, Gratitude) were identified, a predictive model of psychological well-being of the personality in professional activity was built on the example of the profession of sociognomic type (teachers) and a number of other important empirical regularities

consistent with the studies of foreign colleagues were revealed (Rean, Stavtsev, 2021b; Rean, Stavtsev & Kuzmin, 2021, 2022, 2023; Stavtsev et al., 2021).

We should separately emphasize the importance of research at the intersection of positive psychology and neuroscience in the field of Mihaly Csikszentmihalyi's "flow theory" (Csikszentmihalyi, 2015; Rean, Shevchenko & Stavtsev, 2022). The study of psychophysiological characteristics of finding a person in a productive working state is an extremely significant and relevant task of modern science, and makes a significant contribution to the development of modern ways of interacting with information, including education and, in particular, gamification of education (Rean, Shevchenko & Stavtsev, 2022).

At the same time, positive psychology can act as an extremely effective tool in solving the important social challenge of aggression and aggressiveness in society (Rean, Stavtsev, 2020). By aggression in our article, we mean the definition given by R. Baron and D. Richardson: "Aggression is any form of behavior aimed at insulting or harming another living being who does not want such treatment" (Baron, Richardson, 2001, p. 27). By prosocial behavior, we mean behavior that is helpful to fellow human and the society as a whole (Twenge, Baumeister, DeWaal, Ciarocco & Bartels, 2007). From an evolutionary biology perspective, it is common to think of aggression as an integral part of human nature: "an instinct like any others" (Lorenz, 1994, p. 6). However, not all evolutionary biologists share this view; here it is worth noting the opinion of Frans de Waal. Thus, de Waal in his book (2014) notes that mammals with a developed social instinct seek harmonious relationships and tend to avoid conflicts. According to the researcher's approach, it is assumed that people learn while interacting with society by modeling their behavior based on observations of others. A. Bandura supposed (2000) that people do not just respond to stimuli from the environment but also actively interact and influence their environment. From this, it can be inferred that humans, as social animals, may be prone to aggression not so much because of their biologic-evolutionary determinants, but because of their individual characteristics and the social characteristics of their environment. What Steven Pinker also mentions is that although violence and aggression throughout human evolution have been inevitable reactions to certain conditions, violent tendencies have undergone significant changes over time and with the development of culture and society. Pinker argues (2021) that due to advances in rights and morality, aspects of our personality such as the capacity for empathy, self-control, moral sense, and reason have suppressed these aggressive instincts over time, resulting in a significant decrease in violence and aggression in modern society.

According to researchers working in the field of positive psychology, prosocial behavior benefits other people or society as a whole, because the aggregate of high personal well-being of individuals benefits society (Peterson & Seligman, 2004). That is, by seeking personal well-being, we gain societal well-being, and here we can speak of selfish altruism as a good for society (Lieberman, 2020). Speaking about the impact of prosocial behavior and aggression on well-being, it is worth mentioning several studies.

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Thus, aggression displays are a predictor of a decrease in prosocial behavior (Obsuth, Eisner, Malti & Ribeaud, 2015). To assess the interaction between prosocial behavior and aggression, this study used self-reports from teachers (1325), parents (1191), and children (1334), for a total sample of 3850. Data collection took place in several stages from 2004 to 2010. This study found that aggression measured in one year predicted a decrease in prosocial behavior in the following year. However, it is worth noting that the inverse relationship was not significant, i.e., prosocial behavior in the current year did not predict changes in aggressive behavior in the following year (Obsuth et al., 2015). Based on theoretical and empirical data, it can be assumed that prosocial behavior affects positively the individual's level of well-being, while aggressive behavior predicts a decrease in prosocial behavior, well-being. Thus, a study by Jung & Schröder-Abé (2019), using self-reports of a total sample of 1663 individuals from 10 to 20 years old, demonstrates that the prosocial behavior scale, acting as a moderator between the aggression acceptance and physical aggression scales in children and adolescents, decreases the likelihood of actual aggression, i.e., the higher the prosocial behavior scale, the lower the likelihood of physical aggression, even at high levels of the "aggression acceptance scale". This study also emphasizes that people who lack stable social relationships are particularly susceptible to peer aggression. At the same time, Hu, You, Ling, Yuan & Huebner (2021) found that prosocial behavior is positively related to self-esteem and hope (optimism). These studies highlight the importance of prosocial behavior as an aspect of reducing aggression. By fostering positive, social qualities such as empathy, kindness, and cooperation, we set a trend where people are less likely to engage in aggressive behavior. Programs aimed at preventing aggression should be designed with the importance of encouraging and reinforcing prosocial behaviors, peer attachment, and improving family atmosphere of support and communication (Rean, Stavtsev, 2021a). At the same time, the psychophysiological approach to studying and explaining the relationship between aggression and prosociality, especially in a positive-psychological way, is extremely underrepresented in modern scientific research. Positive neuroscience is useful for searching answers using psychophysiological methods to issues about the nature of the relationship between physiological indicators and such social characteristics of personality as psychological well-being and personality strengths, as well as with such phenomena as prosocial behavior of personality, aggression and aggressiveness, type of personality thinking (analytical and holistic) and many others.

### ***Neurostudies relevant to positive psychological theory***

#### *Learned helplessness and depression*

As we have mentioned earlier, neuroresearches can expand the understanding of existing theories of personality psychology, both proving and disproving some particular

positions or hypotheses. For example, the concept of one of the founders of positive psychology, Martin Seligman – “learned helplessness” – is a human or animal state in which an individual does not take action to improve his or her condition (does not try to avoid negative stimulus or receive positive stimulus), although he or she has such an opportunity. Generally, this phenomenon manifests itself after several unsuccessful attempts to influence the circumstances of the environment, characterized by passive behavior of the subject, refusal to act to eliminate the negative effects of the environment, despite the availability of such an opportunity (Peterson & Seligman, 2004; Rean et al., 2023). Originally, technically speaking, learned helplessness was formed from the inability to avoid shock caused by uncontrollable unfavorable events (Maier & Seligman, 2016). Thus, the phenomenon of learned helplessness should not occur when the event is controllable. This study also left unanswered the fact of presence of respondents not being susceptible to the learned helplessness effect in the presence of prolonged uncontrollable adverse circumstances.

By the way, it was the study of “unsusceptible” responders that became one of the most important starting points of the direction of positive psychology (Rean et al., 2023). Current psychophysiological research suggests that uncontrollability is not an active component in the formation of helplessness (Baratta, Seligman & Maier, 2023). The neural circuits that underlie learned helplessness show that passivity and increased anxiety are the default response to prolonged adverse events. Downward circuits that descend from the ventromedial prefrontal cortex down to the dorsal column nuclei and other structures are used to suppress this default response. Accordingly, control learning is the creation of a cortical representation that adverse events will be controllable in the future (Maier & Seligman, 2016; Baratta et al., 2023). The authors suggest that the expectation that adverse events will be temporary and controllable is the best natural defense against helplessness, and the “Raphé nuclei” circuit can be viewed as a “chain of hope” (Maier & Seligman, 2016). The authors hypothesize that therapy and prevention of depression in humans can be aimed at the formation of new cognitive representations (Baratta et al., 2023). It is on these regularities that the logic of development of psychological resilience of an individual is based. By developing certain strengths of personality, in particular, curiosity, energy (zest), gratitude and optimism, one can acquire a kind of “immunity” to learned helplessness, and, as a consequence, to many related negative phenomena – depression, anxiety and others (Rean, Stavtsev & Kuzmin, 2022).

An fMRI study on the effects of meditation was also conducted as part of the Positive Neuroscience Project (Greene et al., 2016). Both a positive psychological effect and changes in activation in the right amygdala, hippocampus and medial prefrontal cortex were found, confirming the effectiveness of meditation in the management of anxiety disorders (Hölzel, Lazar & Milad, 2016).

### *Prosocial behavior, altruism, empathy and love*

For example, the book "Positive Neuroscience" by D. Green, I. Morrison and M. Seligman, which is fundamental for this direction, pays special attention to the research of altruism and prosocial behavior as one of the key factors in the formation of well-being. Altruism in the VIA model is most related to the "Sociality" group of traits. This group includes fairness, leadership, and teamwork (Bruce Wan, de Bont, Hekkert & Chow, 2022). One aspect of altruism is the ability for an individual to share information that may be useful to another in a relevant way. The tendency to share information with others can also be related to a person's desire for reward. A study by Zaki & Mitchell (2016) tested the hypothesis that people may sacrifice valuable resources in exchange for information, and the mere opportunity to help another leads to engagement of the dopaminergic system. The results of the study showed that in about 70% of cases, people shared information even if it was not financially beneficial (Tamir, Zaki & Mitchell, 2015; Zaki & Mitchell, 2016). The result of an fMRI study testing whether informing the Other is related to the reward system showed that the opportunity to share information activated the corpus striatum (CS) and ventromedial prefrontal cortex involved in reward processing. The result of this study suggests that the value of being able to help another by sharing knowledge is represented in the same neuronal system that is associated with reward processing and prosocial behavior (Tamir et al., 2015; Zaki & Mitchell, 2016). Thus, the interpretation of the study presented by Zaki & Mitchell in the context of the positive-psychological concept allows us to conclude that altruism at the psychophysiological, neural level is related to the reward system.

One area of positive neuroscience research should be the study of the transition from passive "asthenic" empathy to proactive "stenic" empathy, which is action-oriented and aims to help as soon as possible. There is a difference between asthenic empathy (observing) and directed stenic empathy, which is expressed in the willingness to perform an act aimed at helping the "other". Thus, according to the "perception-action" model, it is assumed that immediate response requires the creation of a perception of an appropriate help behavioral response. This may explain why some people come to help without thinking about the level of danger, while others (non-helpers) do not (Post, 2003; Dovidio, Piliavin, Schroeder & Penner 2006; Buchanan & Preston, 2016). Stenic empathy as a condition for the active action of helping another (altruism), unlike asthenic empathy, requires a certain level of neurohormonal state and response to the situation. This combination of factors provides the motivating neurohormonal state and elicits the altruism response. Altruism requires not only an observer's understanding of the situation, but also a reaction of caring for the threatened (Preston, 2013). Thus, empathy (asthenic) may be present but may not lead to active altruism, which shows the difference between the two phenomena (Buchanan & Preston, 2016). In situations that do not require an immediate response, the individual is able to make decisions more deliberately and by experiencing all of the feelings experienced in relation to the event. When examining the



differences between asthenic and stenic empathy, research related to stressful situations is found. Stress is neurohormonal in nature, involving activation of the hypothalamic-pituitary-adrenocortical axis (HPA), which also results in the release of cortisol (Dickerson & Kemeny, 2004; Mason, 1968; Buchanan & Preston, 2016). From a physiological perspective, the stress response is designed to store the body's energy. Thus, asthenic empathy may be present but not lead to active altruism (stenic empathy), which shows the difference between the two phenomena (Buchanan & Preston, 2016).

Buchanan & Preston (2016) conducted a study testing the hypothesis of physiological stress resonating between individuals by assessing alpha-amylase and cortisol. According to the results, it was found that a group of observers produced cortisol-related responses in response to observing another person's stress situation, and there was a positive correlation between observers' expression of empathic concern and cortisol and alpha-amylase levels (Davis, 1983; Buchanan & Preston, 2016). Observers' cortisol responses were proportional to those of their interlocutors (some experiencing distress, others observing it).

The research team of Singer et al. (2006) also studied empathy and altruism. In their study, in the first stage, respondents were asked to interact with professional actors with "honest" and "dishonest" reputations, and in the second stage, the fMRI method was used to record their reactions to the pain experienced by the actors. The results of the study showed that women experienced empathy regardless of the reputation of the person, while men experienced empathy in relation to a person with a good reputation, and in relation to the "dishonest" one the activity of satisfaction zones was noted (Singer et al., 2006; Znamenskaya, Sozinova, 2013). One of the basic mechanisms of social interaction is affective touch, such sensitive touches that have a socio-communicative orientation. Thus, it was found (Greene et al., 2016) that brain networks involved in affective, "social touch" process stimulus information (predominantly in the insula, as well as in somatosensory areas) and integrate it with other social information (involving the superior temporal sulcus), as well as with reward and decision-making networks, behavior (involving the orbitofrontal cortex). Such affective "social touch" may also be associated with the formation of a sense of well-being (Greene et al., 2016).

There are also Russian psychophysiological studies of prosocial behavior that are relevant to the positive-psychological theory. There was a study by Yu. I. Aleksandrov et al. (2017) on the influence of alcoholization on prosocial behavior. The data obtained by the researchers demonstrate the processes of reversible dedifferentiation (increase in the actualized experience of less differentiated systems) (Aleksandrov et al., 2017, p. 83), which can speak about more unified and predictable behavior of people under alcohol intoxication (Aleksandrov et al., 2017).

An important strength of character in positive psychology is love – the ability to establish and value close relationships with others; the ability to empathize, share, and care for others (Peterson & Seligman, 2004; Rean et al., 2023). A study by Bartels & Zeki



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(2004) used fMRI to compare brain areas involved in parental and romantic love. In the first series of the study, respondents were shown pictures of their partners and friends, while in the second series, respondents were shown pictures of their own children and children of acquaintances (Bartels & Zeki, 2000, 2004; Summer, 2019). A comparison of these data showed that both forms of attachment activated the same areas of the reward system and decreased the activity of areas involved in the social judgmental, negative emotion system (Bartels & Zeki, 2004; Summer, 2019). The researchers concluded that there is a push-pull mechanism that reduces the activity of areas mediating negative emotions, avoidant behavior, and social evaluation while simultaneously triggering reward-related mechanisms (Bartels & Zeki, 2004).

### ***Discussion and conclusion***

Positive neuroscience is a promising direction of integration of neuro-methods with the positive psychological concept. Within the framework of this direction, integrated studies of learned helplessness, depression, prosocial behavior, etc. are conducted. Thus, neurostudies of learned helplessness complement the existing generally accepted model by emphasizing that the formed cognitive representation of the present and future is important (Maier & Seligman, 2016; Baratta et al., 2023). Extremely relevant research is the study of the correlation between empathy and active altruism, as well as the study of neural mechanisms of prosocial behavior (Singer et al., 2006; Znamenskaya, Sozinova, 2013; Buchanan & Preston, 2016; Greene et al., 2016; Aleksandrov et al., 2017). These studies complement the existing theoretical basis of positive psychology and allow to adjust approaches to prevention and therapy of various psychological disorders (e.g., the effect of meditation in anxiety disorders). At the same time, in-depth understanding of the processes of formation of asocial patterns of behavior, in particular, aggression of personality, together with cognitive techniques of transformation of asocial patterns of behavior into prosocial patterns of behavior through mediation and moderation through the development of personality strengths make it possible to develop new effective programs of socialization, education and re-socialization of the individual.

Moreover, a detailed analysis of the mechanisms of the impact of positive psychology, in particular, positive psychological interventions, with the help of positive neuroscience resources will improve the effectiveness of already existing and practically oriented positive-psychological methods of education, socialization and resocialization of the individual (Stavtsev, 2022).

That is why, in our opinion, positive neuroscience is an extremely promising direction of development of Russian scientific knowledge area.

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## **Conflict of Interest Information**

The authors have no conflicts of interest to declare.