

# The Motivation of Prosocial Behavior of Adolescents

Valentyna KYRYCHENKO<sup>1</sup>,  
Zhanna PETROCHKO<sup>2</sup>,  
Valeriia NECHERDA<sup>3</sup>,  
Olha YEZHOVA<sup>4</sup>,  
Olena DENYSIUK<sup>5</sup>

<sup>1</sup>Institute of Problems on Education of the National Academy of Educational Sciences of Ukraine, [v.kyrychenko59@gmail.com](mailto:v.kyrychenko59@gmail.com)

<sup>2</sup>Borys Grinchenko Kyiv University, Ukraine, [z.petrochko@kubg.edu.ua](mailto:z.petrochko@kubg.edu.ua)

<sup>3</sup>Institute of Problems on Education of the National Academy of Educational Sciences of Ukraine, [necherda@gmail.com](mailto:necherda@gmail.com)

<sup>4</sup>Sumy State University, Ukraine, [o.ezhova@med.sumdu.edu.ua](mailto:o.ezhova@med.sumdu.edu.ua)

<sup>5</sup>Borys Grinchenko Kyiv University, Ukraine, [o.denysiuk@kubg.edu.ua](mailto:o.denysiuk@kubg.edu.ua)

**Abstract:** *In article the neuropsychological approach of theoretical and experimental analysis of the study of motivation of prosocial behavior of adolescents is presented. Attention is paid to the theoretical study of prosocialization of personality and the possibility of positive motivation at different age stages, according to the neuropsychological characteristics of adolescents. The role of structural characteristics of the cognitive-motivational sphere is presented, which became actively developed in neuropsychological and cognitively oriented theoretical directions: a cognitive direction of neo-Freudianism (the Meninger school), the motivational-cognitive theories of personality, the directions of cognitive psychology. The analysis of theoretical concepts, directions of the problem motivation of prosocial behavior decision of adolescents from the viewpoint of the neuropsychological approach is carried out. In order to achieve this goal, it has been used a number of methods in this study: general scientific – a theoretical analysis of psychological and pedagogical scientific literature and generalization of data, specific scientific – ranking of experimental data. To determine the main components of the educational motivation of adolescents the method of diagnosing the structure of educational motivation is used, which allowed to investigate the most significant motives of educational activities and their qualitative analysis among pupils of different forms and discipline areas (Fetiskin, 2002). So as to substantiate the connection between the prosocial behavior of an adolescent and the principal components of educational motivation, pairwise comparisons of the indicators of pupils-adolescents studying in different discipline areas were conducted. It is concluded the cognitive-motivational styles, which shape the prosocial behavior of the individual, also provide the preference of certain ways of intellectual behavior that best eligible to the cognitive inclinations and abilities of a person. A concept the "cognitive styles" characterizes the individual difference in the cause, need, aspiration and way of obtaining, processing and using information. Cognitive style describes a way to motivate of an adolescent.*

**Keywords:** *Prosocialization, the structure of educational motivation, adolescence, the cognitive styles, the cognitive-motivational styles.*

**How to cite:** Kyrychenko, V., Petrochko, Z., Necherda, V., Yezhova, O., & Denysiuk, O. (2022). The Motivation of Prosocial Behavior of Adolescents. *BR.AIN. Broad Research in Artificial Intelligence and Neuroscience*, 13(1), 308-323. <https://doi.org/10.18662/brain/13.1/286>

## Introduction

Prosocial behavior of a person determines the possibility of realizing human potential in society. The opportunity to become a full member of society, a happy and socially significant person is a priority factor in upbringing a child in a prosperous family. Preschool, general education and higher education institutions are gradually joining the upbringing and prosocialization of a child in a family. Such gradual prosocialization is common in the world.

An important and at the same time complex sphere of human activity is the educational process, during which an individual is developed, learned, educated and socialized (Demchenko, 2021; Prots, 2021; Kosholap, 2021). Along with the main researches of national and foreign scientists on the characteristics of prosocial behavior, it is important to consider the main prosocial motivational factors of adolescence in their leading educational and cognitive activities. The ability to get an education and make an independent choice of profession, a field of activity and a self-realization, identifying conscious motivation to master priority disciplines becomes key in choosing a learning motivation and a prosocial educational behavior of adolescents.

There are motivational factors at every stage of socialization of a person. So that the topic of our article is answering of such questions as: What are these motivational factors?; Whether they affect the child's personality effectively enough?; Whether the key neuropsychological motivational levers of prosocialization of adolescents, as a particularly vulnerable age group effective?

**The aim** of this article is a theoretical and experimental analysis of the investigation of motivation of prosocial behavior of adolescents.

## Theoretical analysis of research on prosocial behavior of adolescents

Scientific papers of prosocialization of a person and the possibility of positive motivation at different age stages, according to neuropsychological characteristics, have been studied by Jason J. Barr and Anne Higgin-D'Alessandro (2007); Gustavo Carlo and Laura Padilla-Walker (2020); Veenstra, R., S. Lindenberg, A.J. Oldehinkel, A.F. DeWinter, F.C. Verhulst and J. Ormel (2008); Elisabeth Malonda, Anna Llorca, Belen Mesurado, Paula Samper, M. Vicenta Mestre (2019); Richard A. Fabes, Kristina Kupanoff (1999); Tetiana Ternavska and Yulia Zhurat (2021).

The authors of the study "Empatiya ta prosotsialna povedinka pidlitkiv u bahetovymirnomu konteksti shkilnoi kultury" Jason J. Barr and Anne Higgin-D'Alessandro (2007) compare the impact of life and educational process of regular and alternative schools. They think the motivational tools of the teaching staff of alternative schools have a more effective impact on the socialization of adolescents.

Veenstra, R., S. Lindenberg, A.J. Oldehinkel, A.F. DeWinter, F.C. Verhulst and J. Ormel (2008) propose analysis on the society level of data based on the latest global values research, according to cold or hot climates, evaluate cooperative inculturation of children to the extent of their richer society, but selfish inculturation in conditions of poverty of society; clarify climatic requirements – the theory of prosociality of resources.

In collective study by Elisabeth Malonda, Anna Llorca, Belen Mesurado, Paula Samper, and M. Vicenta Mestre (2019) the established associations between peer attachment, warmth from mother and father, strict mother-father control, prosocial behavior, and physical and verbal aggression in adolescence are presented. Researchers make parallels between the peer attachments and mother-father parenting styles that are directly related with prosocial behavior and aggression.

The investigation of prosocial behavior by scientists Gustavo Carlo and Laura Padilla-Walker (2020) – as actions that benefit to others – proves this behavior continues to develop in complex ways. Such actions are important for understanding the moral development, as well as the health and well-being of an adolescent, and have also an impact on solving social and global problems (for example, hate crimes, cooperation, peace). The authors turn to the study of prosocial behavior in adolescence, the period of age-related changes in these actions, which is considered important in the development of moral identity.

Richard A. Fabes and Kristina Kupanoff (1999) present the author's meta-analysis of data on age and gender differences in prosocial behavior, with special emphasis on early adolescence. Scientists argues that prosocial behavior in adolescence has rarely been studied, but during this age time a general increase of prosocial behavior comparing to early age is observed. Moreover, gender differences in prosocial behavior (attachment to girls) increase during this time.

Tetiana Ternavska and Yulia Zhurat (2021) connect pedagogical neglect as a consequence of ineffective prosocialization of a child in the early stages of his/her development. The authors link difficult upbringing with

the intellectual abilities of a child and the need for their development by parents in preschool age; reveal the effectiveness of re-education of pedagogically neglected children in adolescence, the possibility of their resocialization.

### **The neuropsychological and cognitively oriented theories of motivation**

The idea on the key role of structural characteristics of the cognitive-motivational sphere began to be actively developed in neuropsychological and cognitively oriented theoretical areas, which include: 1) the cognitive direction of neo-Freudianism (D. Rapaport, R. Gardner, M. Druzhinin, Higuera-Trujillo, Llinares, Macagno (2021); Kholodnaia (2004); 2) the motivational-cognitive theories of personality (J. Kelly (2000); 3) the cognitive psychology (Gardner, Holzman, Klein, Linton, Spence (1959); Gardner, Jackson, Messick, (1960) ); Teplytskyi O., Teplytskyi I., Semerikov S., Solovyov V. (2015); Pavlova & Zachyosova & Grebenshchikova (2018) and Ternavska T., Shaumian, O., Mishenina, T., Voloshchuk, I., Raievska, Y., & Hrys, A. (2020), Jung R. E, Gasparovic C., Chavez R.S.etal. (2009).

The cognitive perception of information directly affects the effectiveness of motivation of the leading and creative activities of a person, which is studied by a team of modern researchers led by N. Pavlova and T. Ternavska (Pavlova & Zachyosova & Grebenshchikova (2018) and Ternavska T., Shaumian, O., Mishenina, T., Voloshchuk, I., Raievska, Y., & Hrys, A. (2020).

An intrinsically and mentally healthy adolescent's brain develops, perceives and withstands cognitive loads and has motivational levers to produce the results of this activity. The results of thinking, in turn, are indicators of the effectiveness of self-motivation in construction an individual educational path of a person, the ability to create an original and even unique product of thinking (Jung R. E, Gasparovic C., Chavez R.S. et al. (2009).

In spite of the differences, these cognitive approaches could be united through an attempt to empirically demonstrate the role of the motivational-cognitive structures (i.e, various aspects of the structural organization of mental experience) as a determinant of a human behavior.

Firstly, the need to distinguish between semantic (the subject's ideas about the world) and the actual cognitive (mechanisms that help for ideas to appear and transform) aspects of the motivational and cognitive reflection.

The content of cognition is available to a individual in self-observation and self-motivation to cognition, while cognitive structures are not subject to direct observation either by a researcher or by an experimenter.

Secondly, the necessity to comprehend the facts of transituational variability of behavior, which again gave special actuality to the question on the degree of legality of a human behavior. Taking into account neither the factor of personality traits nor the factor of the situation could not explain the causes of individual behavior, it was necessary to find a mechanism for its regulation, which would simultaneously represent the characteristics of the person, the characteristics of the situation, and motivating factors for intellectual activity.

Thirdly, the orientation on explaining the high creative potential of all major forms of the motivational activity. Strange flexibility, unpredictability and productivity of the human intellectual behavior led to the idea of the existence "inside" of a subject / person some mental formations, independent of others and capable to generate own motives and rules of the information organization (selection, structuring, transformation) (Druzhinin (2008).

Thus, a retrospective analysis of the three above-mentioned directions in the study of the structural characteristics of the motivational-cognitive sphere is more appropriate. Special attention should be paid to the study of facts and patterns that allow us to understand the peculiarities of the composition and structure of the mental (intellectual) human experience.

The *cognitive direction of neo-Freudianism* (Meninger school) was focused on the search structural entities in the cognitive sphere (they were called "cognitive controls"), which mediate the influence of external actions, motivational states. The complex of cognitive controls forms a cognitive style, by other words, a peculiar unique way of processing information about his/her environment. Individual differences in cognitive styles lead to different adaptive approaches to reality, which could be equally effective regardless of the degree of "correctness" of the results of cognitive activity (Rapaport (1996).

Adherents of this trend believed that motivational-cognitive styles characterize certain aspects of observation concerning cognitive processes, the environment, the design of the place of perception, decision-making but a cognitive structure reflects the psychological basis that determines these processes (Higuera-Trujillo, Llinares, Malinares 2021).

Consequently, in the study of styles for the first time the idea of the role of structural organization of the individual mental experience of the subject /person as one of the determinants of individual differences in intellectual activity is expressed. Moreover the main position was occupied by one of the important functions of the structures of mental experience: depending on the characteristics of their organization, they through the formation of a set of cognitive controls ("cognitive styles" in modern terminology) provide control over the information processing at the same time blocking or regulating the affect activator (Kholodnaya (2004).

*The motivational and cognitive theories of personality* explained the uniqueness of personality through the peculiarities of human understanding of what is happening. J. Kelly, making theory of personal constructs, was one of the first who tried to analyze personality through his/her cognitive sphere, creating a theory of the personal constructs. It should be mentioned that ideas of J. Kelly led to a number of studies devoted to clarify and deepen ideas on the structural aspects of individual mental experience that characterize a degree of its cognitive complexity (J. Kelly (2000).

A human perceives, interprets and evaluates reality through a certain way of organized subjective experience, presented in the form of a system of personal (i.e, inherent for concrete personality) constructs according to J.Kelly.

The structural representations of motivational-cognitive formations have been further developed in experimental cognitive psychology. Researches of the information processing have shown the presence of special mental formations-mediators such as cognitive structures involved in the attempt and motivation, perception, transformation and the storage of information.

Followers of the *cognitive psychology direction* believed that cognitive styles characterize certain aspects of observation of motivational processes, and cognitive structure reflects the psychological basis that determines these processes (Rapport (1957); Gardner, Holzman, Klein, Linton, Spence (1959); Gardner, Jackson, Messick (1960).

Therefore, in scientific papers of motivational and cognitive styles inherent in the motivational sphere for adolescents, the idea of the role of structural organization of individual mental experience of the subject /person as one of the determinants of individual differences in intellectual activity was first expressed. The main position was occupied by one of the important functions of the structures of mental experience: depending on

the characteristics of their organization, they through the formation of a set of cognitive controls ("cognitive styles" in modern terminology) provided control over the information processing, while blocking or regulating affective impulses.

Any cognitive activity, together with the content-operational and the emotional-volitional components, is filled with a motivational one according to S. Semerikov and his colleagues (Teplitsky O., Teplitsky I., Semerikov S., Solovyov V. (2015).

The ability for educational and cognitive behavior, and as a consequence, prosocial one of a adolescent, implies the existence of a general ability similar to the general intelligence and, possibly, creativity. The success of learning is influenced by both general intelligence and attitudes, interests, motivation and other mental qualities of a person (Huseynov) (2015).

There are implicit and explicit ability to learn. In particular, V. Druzhinin believes that implicit is the ability to learn without purposeful conscious effort on the part of a learner. Conversely, explicit is the ability to learn, based on purposeful and conscious efforts of the subject / individual of learning (Druzhinin (2008).

In this regard, the ability to learn is somehow related to the level of motivational sphere, which is the basis of conscious organization, diligence, perseverance, determination, self-control of a learner.

### **The cognitive-motivational styles as a basis for motivation of prosocial behavior**

*The cognitive-motivational styles* involve the manifestation of personal organization as a whole. Individual ways of the life impressions (styles) processing are closely related to needs, motives, affects, feelings of neuropsychological satisfaction of own significance.

The cognitive-motivational styles that form the prosocial behavior of the individual also involve preference to certain ways of intellectual behavior that best coincides with the cognitive inclinations and abilities of the subject / individual. The concept "cognitive styles" characterizes the individual difference in the cause, need, aspiration and method of obtaining, processing and using information. The cognitive style describes a way to motivate activity.

Motivation is the primary determining factor in the person's decision-making, especially when a subject acts in stressful or extreme

conditions, which is often inherent in adolescent behavior (learning, new / constant circle of communication, hormonal changes). Thus, the gradual and long-term formation of prosocial behavior will have a positive effect on concentration, activation of thinking processes, memory, perception and learning in general.

Depending on the kind of learning motivation (cognitive, achievement, self-development, communicative, emotional and external) the style of intellectual behavior of the individual, purpose, process and end result of any cognitive activity determines.

The cognitive motivation takes place in all cases when it is openly expressed the need, intention, desire or hope to learn something new, to know it, to use the acquired knowledge.

The motivation of achievement is manifested when a person sets a positively formulated goal, seeks to achieve significant results, success in activities.

The motivation of self-development is expressed in the tendency of a subject to self-analysis; detachment of positive and negative personal qualities which influence onto the quality of education; formation of aspirations and skills to set high but adequate goals; striving to improve his/her intellectual level.

The communicative motivation arises in desire to communicate. Like the need for activity, a person needs communication, the satisfaction of which is a necessary condition for the normal mental development of a individual and the development of cognitive activity. Pupils' audience, teachers, classmates are all subjects of communication, like-minded people.

The emotional motivation involves emotional satisfaction from learning. Positive states are joy, admiration, satisfaction (i.e. positive emotions) within the leading activities related to a particular work.

External stimulation is realized through external praise, when the subject of learning is approved by someone for good work or achieving positive results.

Self-esteem, self-perception and self-control of an individual determine in some way the productivity of cognitive activity.

The activity that determines the effectiveness of cognitive activity is expressive in the direction and stability of cognitive interests.

An individual is subjectively aware of the need through the goal, but it is manifested in the motives of behavior (aspirations, needs, interests, etc.), which push a person to be active.

Let us consider a definition of these concepts with dictionaries.

A motive (from Latin *motus* - to activate, push) -

- 1) activator to work and related with satisfaction of person's needs;
- 2) objectively directed activity of a certain force;
- 3) awareness of the reason underlying a choice (Petrovsky, 1990).

A need is a state of a living organism, human personality, social group or society as a whole, which expresses necessity for something, dependence on the objective conditions of life. It is the driving force of a subject's activity (Honcharenko, 1997).

An interest (from Latin *interest* – has a matter, important) is a form of cognitive need that provides guidance on an individual to understand the purpose of activity and thus contributes to orientation, acquaintance with certain facts, a fuller and deeper reflection of reality (Honcharenko, 1997).

In the action of the content analyzing of the above concepts, certain conclusions can be done. As we know, a specific need is the main form of interest. It is amplified in the process of substantive activity, and therefore in the process of its implementation a certain motivated behavior is formed, developed and consolidated.

Learning is the main activity of an adolescent who is motivated both externally, by a teacher, and internally, by a learner. When the motivation for learning is organized only from the outside (checking of parents, control of the administration of a school, teachers, a class teacher), then, of course, a teenager learns for the sake a good mark, certificate. If external factors (stimuli) are internalized, then an internal desire to acquire knowledge, skills, abilities is formed, which is based on deep interest. In the innovation process, the role of a teacher changes from dominant to leading, i.e. the role of not only a mentor but also as a participant in the educational process. In the process of learning it is necessary systematically to stimulate, develop and strengthen cognitive interest both as an important motive for learning and as a stable feature of the prosocial personality.

One of the leading problems in the formation of prosocial behavior of the adolescent are his/her interests, inclinations, a future choice of profession, a preparation for high-quality pass of the external independent evaluation. That is, the main motive of a subject's educational activity will be the choice of academic disciplines, the importance of a subject, which in his/her future will play a decisive role. It is very difficult to take the first step, that is to convince a teenager that all disciplines are not additional subjects, which are an extra burden when mastering disciplines of a basic

specialty. A teacher must formulate own version of the answer to the question of a modern teenager-pragmatist: "Why should we study this subject?". In addition, this answer should be repeated, and the answer-method, an organic component of the whole educational process. A successful answer will be able to convince the purely pragmatic orientation of the modern pupil audience and prove for them that ideological, life, moral and ethical issues also have the right to exist in educational courses.

### **The diagnosis of the structure of educational motivation**

To prove the relationship between the adolescent prosocial behavior and the determinants of learning motivation, pairwise comparisons of pupils-adolescent studying in different disciplines were conducted. The respondents were pupils of 9-10 forms of specialized secondary schools, numbering 104 persons (58 girls and 46 boys).

The methodic of the educational motivation structure diagnosing allowed to study the most significant motives of educational activity and their qualitative analysis among pupils of different specialties (Fetiskin, 2002). The learning motivation is a characteristic of the next component of cognitive activity that we study – the component of "cognitive styles".

The operant force of a socially adapted personality is the motives of his/her behavior. The motive of behavior is the internal motivating force, which provides the movement of an individual to cognitive activity, activates intellectual development in the process of activity. Motives could be needs and interests, aspirations and emotions, attitudes and ideals. From a psychological point of view, motives are the internal impetuses of any activity, on which the success and effectiveness of the latter depends.

In our research we identified several group motives of prosocial behavior.

A cognitive motive is expressed in the awakening of cognitive interests and is realized through the satisfaction of the process of cognition and its results. The cognitive activity of person is the leading sphere of life. Therefore, the formation of cognitive motives in adolescents is a leading factor in the success of cognitive activity, because through it the natural human need is realized.

The communicative motive is manifested in the desire to communicate. Like the need for activity, a person needs communication, the satisfaction of which is a necessary condition for a normal mental development of an individual and the development of cognitive activity. The

pupils' audience, teachers, classmates are the subjects of communication, like-minded people.

The motive of emotional satisfaction is shown as interest in a particular activity, the process of performing this process, a positive emotional state during learning activities, feelings of joy and satisfaction from certain behavior.

The motive of self-development gives an understanding of the importance of knowledge, the need for self-education, dissatisfaction with the level of own knowledge, desire and aspirations to solve the problem alone.

The pupil's position is interest in a certain type of activity, with no prospects for the future, responsibility to a team, teachers, parents, confirmation of own social status i.e. status as a pupil in a particular team, the desire to be a leader.

The external stimulation repels the desire to earn approval from peers, a team, selfishness and ambition, fear of a teacher, parents, the opportunity to receive an unsatisfactory grade.

The motive of achievement is the desire to be an educated member of society, to feel responsibility, answerableness to a team, society, parents, the benefits of mastering a future profession, mercantilism, material gain, to make a rapid career.

As can be seen from the above it was determined the cognitive motive of the adolescent's behavior is heterogeneous in the choice of respondents. Thus, it is most pronounced in pupils of physics-mathematical and historical-legal classes (an experimental group) and pupils of chemists-biological and philological classes (a control group).

The communication motive has not very important place for successful educational activities and effective behavior of pupils in all areas, as evidenced by rather moderate indicators. However, the socio-communicative orientation of future philologists on the background of pupils of other fields is characterized by its high level (higher than historians-lawyers by 187%, mathematicians-physicists – 15,9%, chemists-biologists – 16,9%).

The emotional motive of educational activity is also important for pupils of all directions. Positive emotional state during educational activities for pupils of chemistry and biology (67,4%) and mathematicians-physicists (65,7%) is quite important, perhaps because many pupils focus on a

comfortable emotional environment while communication, or to get emotional satisfaction from learning.

For pupils of many areas is usual by the dominance of the motive of self-development and this is especially evident for chemists-biologists (89,5%). Although for historians-lawyers this motive in teaching is not relevant.

The motive "pupil's position" is not high among pupils of all fields, although in comparison with others in philologists, it has the highest value (59,4%). Along with the motive "pupil's position" the external stimulation of pupils' educational activities is also reflected in the low rates of this motive. The data are the basis for the assumption that pupils have more significant for the individual motives for learning than the two mentioned above.

The motive of achievement, comparing to other motives, has the foremost importance in the adolescents behavior of all the areas we have studied. It is leading, and is especially evident in chemists-biologists. We assume that many pupils focus on certain future creative achievements, a career success, avoidance of employment problems, which depends on current academic success. It gives possible to make a qualitative interpretation of the fact that leading motivation for pupils is internal, including the motivation of achievement.

The analysis of results of the adolescent motives of behavior shows that the educational activities of mathematicians-physicists are determined by motivation for achievement, chemists-biologists – the cognitive motivation, historians-lawyers – the motive of self-development, and all others – the motive of emotional satisfaction. The latter motive is the most common.

Our research suggests that most adolescents are focused on the development of their personality, their cognitive activity and a positive emotional state during education. An important prerequisite for personal growth is the use of personality-oriented teaching methods, the creation of didactic conditions for the formation of cognitive activity of pupils, in particular in the study of disciplines in different areas according to the choice of a adolescent.

This investigation made possible to identify the leading characteristics of the components that determine the formation of motivation about the adolescents social behavior. These characteristics are: the motivational orientation of pupils to cognition (the control group – 79%, the experimental group – 72%), self-development (the control group – 69%,

the experimental group – 70%), future achievements (the control group – 87%, the experimental group – 89%), and a positive emotional state during training (the control group – 67%, the experimental group – 60%).

The results of the pilot stage of the reserch show that indicators of the motivation components of pupils-adolescent in a particular area are at different levels, while in order to achieve positive motivation for their prosocial behavior requires a harmonious correlation of each type of motivation.

## Conclusions

The prosocial behavior arrange social relationships and alleviates unwanted behavior, while encouraging well-being and social adaptation, which in turn leads to the effective development and the optimization of adolescent learning. The ability to find and respond to requests for help and support not only protects people throughout their development, but also encourages compassion, gratitude, and appreciation. In other words, prosocial tendencies promote popularity among peers and help people to trust their own skills and positive emotions.

The adolescent period of socialization of the child's personality is characterized by the following motivational factors: the motivation to achieve personal goals; the motivation of cognition and motivation "pupil's position" as a primary activity. The communicative motivation, which determines the prosocial status of an individual becomes decisive in the choice of needs, inclinations and motives of an adolscent. The emotional motivation and motivation for self-development give the feeling of stability and neuropsychological satisfaction. The key neuropsychological motivational levers of prosocialization of adolescents, as a particularly vulnerable age group, are closely related constructions of motivational and cognitive styles, harmonization of their expression in adolescent behavior. Harmonization of the correlation of indicators of the components of initial motivation requires a targeted methodology aimed on motivating the prosocial behavior of adolescents, that will be the next stage of our study in the perspective.

---

## References

- Barr, J., Higgin-D'Alessandro, A. (2007). Empatiya ta prosotsialna povedinka pidlitkiv u bahatovymirnomu konteksti shkilnoi kultury. Zhurnal henetychnoi psykholohii, [Empatiya ta prosotsialna povedinka pidlitkiv u

- bahatovymirnomu konteksti shkilnoi kultury. *Journal of Genetic Psychology*] 168 (3), p. 231–250. <https://generosityresearch.nd.edu/other-resources/publications-2/literature-reviews/adolescent-development-of-prosocial-behavior/>
- Demchenko, I., Maksymchuk, B., Bilan, V., Maksymchuk, I., & Kalynovska, I. (2021). Training Future Physical Education Teachers for Professional Activities under the Conditions of Inclusive Education. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), p. 191-213. <https://doi.org/10.18662/brain/12.3/227>
- Druzhinin, V.N. (2008). *Psikhologiya obshchikh sposobnostey*. [Psychology of general abilities]. Piter. <https://docplayer.com/92432995-Druzhinin-v-n-psihologiya-obshchih-sposobnostey-3-e-izd-spb-piter-s-il-isbn.html>
- Fabes, R. A., Carlo, G., & Kupanoff, K. (1999). Early Adolescence and Prosocial/Moral Behavior I: The Role of Individual Processes. *Journals. Sagepub*. <https://journals.sagepub.com/doi/10.1177/0272431699019001001>
- Fetiskin, N.P., Kozlov V.V., & Manuylov G.M. (2002). *Sotsialno-psikhologicheskaya diagnostika razvitiia lichnosti i malyykh grupp*. [Socio-psychological diagnosis of personality development and small groups]. Institut Psikhoterapii. <https://docplayer.com/355815-N-p-fetiskin-v-v-kozlov-g-m-manuylov-socialno-psihologicheskaya-diagnostika-razvitiya-lichnosti-i-malyh-grupp-uchebnoe-posobie.html>
- Gardner, R.W., Holzman, P.S., Klein, G.S., Linton, H.P., & Spence, D.P. (1959). Cognitive control: A study of individual consistencies in cognitive behavior. *Psychological Issues*, 1(4), 1–186. <https://psycnet.apa.org/record/1961-02266-001>
- Gardner, R.W., Jackson, D.N., & Messick, S.J. (1960). Structure and style in cognitive organization. In R. W. Gardner, D. N. Jackson, & S. J. Messick, *Personality organization in cognitive controls and intellectual abilities* (pp. 1–12). International Universities Press, Inc. <https://psycnet.apa.org/record/2006-10254-001>
- Guseynov, A.S. (2015). *Varianty zhyznii i ikh proiavleniia v motivakh vybora khobbi v period ranney vzroslosti. Psikhologiya sposobnostey: sovremennoye sostoyaniie i perspektivy issledovaniy: Materialy vserossiyskoy nauchnoy konferentsy, posviashchennoy 60-letiiu so dnia rozhdeniya* [Life options and their manifestations in the motives of choosing a hobby in early adulthood. Psychology of abilities: the current state and prospects of research]. V.N. Druzhynina, 25–26 sentyabrya 2015, Moskva: Izd-vo «Institut psikhologii RAN», p. 243. <http://www.ipras.ru/engine/documents/document10356.pdf>
- Gustavo, C., & Padilla-Walker, L. (2020). Adolescents' Prosocial Behaviors Through a Multidimensional and Multicultural Lens. *Srzd.onlinelibrary*, 31. <https://srzd.onlinelibrary.wiley.com/doi/10.1111/cdep.12391>

- Higuera-Trujillo, J.L., Llinares, C., & Macagno, E. (2021). The Cognitive-Emotional Design and Study of Architectural Space: A Scoping Review of Neuroarchitecture and Its Precursor Approaches. *Sensors*, 21(6), 2193.  
<https://doi.org/10.3390/s21062193>
- Honcharenko, S.U. (1997). *Ukrainskyi pedahobichnyi slovnyk* [Ukrainean Pedagogical Dictionary]. Lybid. <https://lib.iitta.gov.ua/106820/1/%D0%93%D0%BE%D0%BD%D1%87%D0%B0%D1%80%D0%B5%D0%BD%D0%BA%D0%BE.%20%D0%9F%D0%B5%D0%B4%D0%B0%D0%B3%D0%BE%D0%B3%D1%96%D1%87%D0%BD%D0%B8%D0%B9%20%D1%81%D0%BB%D0%BE%D0%B2%D0%BD%D0%B8%D0%BA%20%281%29.pdf>
- Jung, R. E., Gasparovic, C., & Chavez, R.S. (2009). Imaging intelligence with protonmagnetic resonance spectroscopy. *Intelligence*, 37, 192-198.  
<https://pubmed.ncbi.nlm.nih.gov/19936275/>
- Kelly, G. (2000). *Teoriia lichnosti* [Personality Theory]. Rech. <http://iakovlev.org/zip/kelly.pdf>
- Kholodnaia, M.A. (2004). *Kognitivnye stili: o prirode individualnogo uma*. [Cognitive styles about nature of individual mind]. Piter.  
[https://platon.net/load/knigi\\_po\\_filosofii/kognitivnye\\_nauki/kholodnaja\\_m\\_a\\_kognitivnye\\_stili\\_o\\_prirode\\_individualnogo\\_uma\\_2004/17-1-0-1536](https://platon.net/load/knigi_po_filosofii/kognitivnye_nauki/kholodnaja_m_a_kognitivnye_stili_o_prirode_individualnogo_uma_2004/17-1-0-1536)
- Kosholap, A., Maksymchuk, B., Branitska, T., Martynets, L., Boichenko, A., Stoliarenko, O., Matsuk, L., Surovov, O., Stoliarenko, O., & Maksymchuk, I. (2021). Neuropsychological Bases of Self-Improvement of Own Physical Health of Future Teachers in the Course of University Education. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), p. 171-190.  
<https://doi.org/10.18662/brain/12.3/226>
- Malonda, E., Llorca, A., Mesurado, B., Samper, P., Mestre, M. V. (2019). Parents or Peers? Predictors of Prosocial Behavior and Aggression: A Longitudinal Study. *Front. Psychol.*, 10, 2379.  
<https://doi.org/10.3389/fpsyg.2019.02379>
- Pavlova, N., Zachyosova, I., & Grebenshchikova, T. (2018). Mutual Understanding Between Partners in Discourse. *Psycholinguistics*, 24(1), 269-288.  
<https://doi.org/10.31470/2309-1797-2018-24-1-269-288>
- Petrovskiy, A.V., & Yaroshevskiy, M.G. (1990). *Psikhologicheskij slovar* [Psychological Dictionary]. Politizdat. <https://hum.edu-lib.com/szbrannoe/psihologicheskij-slovar-pod-red-a-v-petrovskogo-onlayn>
- Prots, R., Yakovliv, V., Medynskiy, S., Kharchenko, R., Hryb, T., Klymenchenko, T., Ihnatenko, S., Buzhyna, I., & Maksymchuk, B. (2021). Psychophysical Training of Young People for Homeland Defence Using means of Physical

- Culture and Sports. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), 149-171. <https://doi.org/10.18662/brain/12.3/225>
- Rapaport, D. (1996). *Cognitive science. Contemporary approaches to cognition*. Harvard Univ and Buffalo Press.  
<https://cse.buffalo.edu/~rapaport/Papers/cogsci.pdf>
- Teplytskyi, O., Teplytskyi, I., Semerikov, S, & Solovyov, V. (2015). Training future teachers in natural sciences and mathematics by means of computer simulation: a social constructivist approach. *Theory and methods of learning fundamental disciplines in high school. Special issue "Monograph in the journal"*, 10(1).  
<https://ccjournals.eu/ojs/index.php/fund/article/view/1023>
- Ternavska, T., & Zhurat, Y. (2021) *Pedagogical Neglect of Pupils in a Special Institution as a Social and Pedagogical Problem. Current Problems of Harmonization of Personality Development in the Modern Educational Space*. Publishing House WSZiA.  
<https://www.wszia.opole.pl/strona-glowna/jestem-studentem/biblioteka/ebooki-dla-studentow/>
- Veenstra, R., S. Lindenberg, A.J., Oldehinkel, A.F., DeWinter, F.C.V., & Ormel, J. (2008). Prosocial and antisocial behavior in preadolescence: Teachers' and parents' perceptions of the behavior of girls and boys. *Journal of Behavioral Development*, 32, 243-251. <https://generosityresearch.nd.edu/other-resources/publications-2/literature-reviews/adolescent-development-of-prosocial-behavior/>
- Ternavska, T., Shaumian, O., Mishenina, T., Voloshchuk, I., Raievska, Y., & Hrys, A. (2020). Socio-Psychological Directions of Resocialization of Persons, Who are Located in Places of Imprisonment. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 11(3), 54-71.  
<https://doi.org/10.18662/brain/11.3/109>