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ПСИХОЛОГИЧЕСКАЯ НАУКА И ОБРАЗОВАНИЕ

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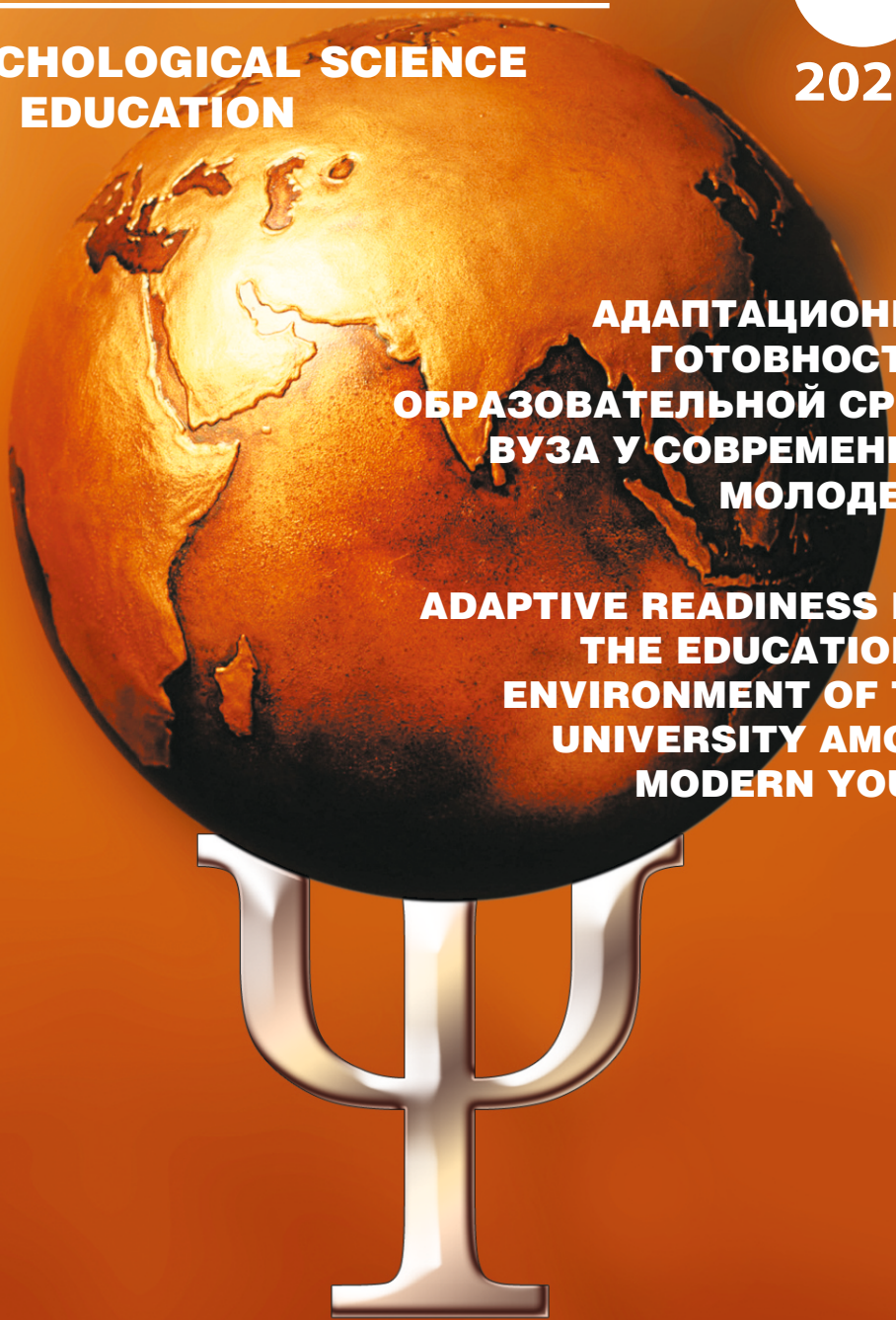

АДАПТАЦИОННАЯ ГОТОВНОСТЬ К ОБРАЗОВАТЕЛЬНОЙ СРЕДЕ ВУЗА У СОВРЕМЕННОЙ МОЛОДЕЖИ

ADAPTIVE READINESS FOR THE EDUCATIONAL ENVIRONMENT OF THE UNIVERSITY AMONG MODERN YOUTH

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2025 • Том 30 • № 1

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Московский государственный психолого-педагогический университет
Психологический институт Российской академии образования

Moscow State University of Psychology & Education
Psychological Institute of the Russian Academy of Education

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Dear Readers!

We are pleased to present the inaugural issue of the journal Psychological Science and Education (No. 1—2025). This issue features two traditional sections: “Developmental Psychology” and “Educational Psychology”, a new section titled The “Developmental Psychology” section begins with a study examining the correlation between intellectual abilities and motivational-emotional factors in young students. This theme is further explored in an article discussing the subjectivation of the process of growing up, as well as the relationship between students' self-image and their perception of a mentor, which plays a crucial role in their professional self-determination.

Another interesting study focuses on gender and educational status within the educational self-regulation model of procrastination, the addiction caused by smartphones, and the psychosocial factors contributing to math anxiety. The final article in this section analyzes students' understanding of math terminology in urban and rural areas using the APOS model.

Educational Psychology” explores students' academic motivation, life purposes, self-conruation, adaptive readiness, and subjective evaluation of situations. It addresses the challenge of developing new teaching methods that incorporate reflective practices. As part of the academical educational environment cyberloafing and cyber-bulling are examined. We also recommend the study of the correlation between standardized school exams and students' subsequent academic success. The final article in this section discusses the relationship between educational strategies and media consumption.

In the section Scientific Life find the results of the annual conference Psychology of the XXI Century: Kaleidoscope of Discoveries, the 30th Anniversary of Saint Petersburg State University. The authors encourage teachers and university professors to incorporate significant annual conferences into their preparatory educational programs.

We hope that the readers of our journal will find this new issue very interesting.

Editorial Board

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DEVELOPMENTAL PSYCHOLOGY (AGE PSYCHOLOGY)
ПСИХОЛОГИЯ РАЗВИТИЯ (ВОЗРАСТНАЯ ПСИХОЛОГИЯ)

Научная статья | Original paper

Correlations between Intellectual Abilities and Features of the Motivational-Emotional Sphere in College-Age Boys and Girls

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The research is aimed at clarifying and comparing the specifics of the correlations between intellectual abilities, manifestations of emotions and motives in boys and girls of student age. In the process of theoretical analysis, the researchers' points of view on the nature of intellectual abilities are compared, interpretations of the essential characteristics of the motivational and emotional sphere manifested in various spheres of life are presented. It is shown that the productivity of the intellectual abilities of the individual is conditioned by the prevailing motives and the degree of severity of emotional states. 105 individuals took part in the study: 40 female and 65 male students of the Siberian Polytechnicnical College at the age of 17—20 years. Various statistical methods were used to process the data. Correlation analysis allowed to reveal the correlations between the studied characteristics both in the whole sample and separately for male and female parts of it. In the total sample, an inverse correlation was found between respondents' assessment of their well-being and their performance in solving tasks, which is explained by the need for conscious regulation of intellectual activity. This correlation is most vividly manifested in the subtests on practical ability plans, in which the use of verbal-logical thinking and the synthetic act of correlating the task condition and actualization of the necessary knowledge are assumed. Statistically significant differences were found in the two-factor analysis of variance. On average, girls have a higher motivation to achieve success, more often conditioned by external factors. They are also more sensitive to the influence of mental adaptation processes on the productivity of thought operations. Young men, as a rule, have a higher subjective assessment of anxiety and a lower level of motivation to achieve success, which, however, does not significantly affect the results of their mental activity. In addition, the sample of young men has a

higher level of mental stress, as focusing on the problem-solving process may require more cognitive resources.

Keywords: cognitive processes; intellectual abilities; motivational-emotional sphere; psychometric intelligence; gender differences.

Additional materials: Churikov I.Yu., Kagan E.S., Morozova I.S. (2024). Parameters of cognitive and motivational-emotional spheres of students: Data set. RusPsyData: Repository of psychological research and instruments. Moscow. DOI: 10.48612/MSUPE/dhg9-t9ku-h2at

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Взаимосвязь интеллектуальных способностей и мотивационно-эмоциональной сферы у юношей и девушек студенческого возраста

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Представлены результаты исследования, направленного на установление специфики взаимосвязи между интеллектуальными способностями, проявлениями эмоций и мотивов у юношей и девушек студенческого возраста. Сопоставлены точки зрения исследователей на природу интеллектуальных способностей, интерпретации сущностных характеристик мотивационно-эмоциональной сферы, проявляющихся в различных сферах жизнедеятельности. Показана обусловленность продуктивности интеллектуальных способностей личности преобладающими мотивами и степенью выраженности эмоциональных состояний. В исследовании приняли участие 105 испытуемых: 40 девушек и 65 юношей в возрасте 17—20 лет, обучающихся в Сибирском политехническом техникуме. Для обработки полученных данных использовались различные статистические методы.

Корреляционный анализ позволил выявить ряд зависимостей между исследуемыми характеристиками как во всей выборке, так и отдельно по мужской и женской ее частям. На общей выборке была обнаружена обратная корреляция между оценкой респондентами самочувствия и результативностью решения ими задач, что объясняется необходимостью осознаваемой регуляции интеллектуальной деятельности. Наиболее выраженно эта связь проявляется в субтестах на практические планы способностей, в которых предполагается использование словесно-логического мышления и синтетический акт соотнесения условия задачи и актуализации необходимых знаний. В ходе двухфакторного дисперсионного анализа были обнаружены статистически значимые различия. В среднем девушки обладают более высокой мотивацией к достижению успеха, причем чаще обусловленной внешними факторами. Также они более чувствительны к влиянию процессов психической адаптации на продуктивность выполнения мыслительных операций. У юношей же, как правило, наблюдаются более высокая субъективная оценка тревожности и более низкий уровень мотивации достижения успеха, что, однако, не оказывает значимого влияния на результаты их умственной деятельности. Помимо этого, для выборки юношей отмечается более высокий уровень психического напряжения, так как сосредоточение на процессе решения проблем может требовать большего количества когнитивных ресурсов.

Ключевые слова: когнитивные процессы; интеллектуальные способности; мотивационно-эмоциональная сфера; психометрический интеллект; гендерные различия.

Дополнительные материалы: Чуриков И.Ю., Каган Е.С., Морозова И.С. (2024). Параметры когнитивной и мотивационно-эмоциональной сфер у студентов: Набор данных. RusPsyData: Репозиторий психологических исследований и инструментов. Москва. DOI: 10.48612/MSUPE/dhg9-t9ku-h2at

Для цитаты: *Чуриков И.Ю., Каган Е.С., Морозова И.С.* Взаимосвязь интеллектуальных способностей и мотивационно-эмоциональной сферы у юношей и девушек студенческого возраста // Психологическая наука и образование. 2025. Том 30. № 1. С. 5—21. DOI: https://doi.org/10.17759/pse.2025300101

Introduction

In contemporary psychological research, increasing attention is being devoted to exploring the relationship between intellectual abilities and motivational-emotional characteristics in young people, particularly among students. Advances in psychology and pedagogy provide deeper insight into the differences and similarities between intellectual and emotional domains in young men and women as they transition into adulthood.

From our perspective, the level-based characteristics of intellectual abilities and the manifestations of the motivational-emotional domain may be influenced by gender. This may be attributed to differences in learning approaches, attitudes toward success and failure, and distinct strategies for self-regulation and motivation between young men and women.

This assumption is supported by an analysis of the study conducted by L. Keller et al. [24], which examined gender differences in the academic performance of students in technical fields. By analyzing empirical data from individual participants,

the study investigated the influence of sociocultural factors on academic achievement and motivation.

The study by R.M. Abdelrahman [17] investigated the impact of metacognitive processes on academic performance, as well as the relationship between learning motivation and academic outcomes among male and female students. Additionally, I.S. Morozova and colleagues [8] examined students' decision-making processes in selecting individualized educational trajectories.

Our systematic review has identified common patterns and contributed to the development of new hypotheses and practical recommendations based on prior research. For example, the study by L. Keller et al. [24] explored gender differences in the academic performance of students in technical disciplines. By analyzing empirical data from individual participants, the research assessed the influence of sociocultural factors on academic achievement and motivation.

E.I. Perikova and colleagues [10] explored students' self-regulation strategies as an expression of their internal resources, which contribute to their overall satisfaction, motivation, and effectiveness in academic activities. N.P. Shilova [15] highlighted the importance of considering students' perceptions of their transition into adulthood during this developmental stage.

Academic motivation is a multifaceted construct that encompasses not only motives but also goals, response strategies, and persistence. In a meta-analysis, N. Sölpük Turhan [31] examined the influence of gender on academic motivation and assesses the strength of this effect. The findings enabled the author to identify dominant types and levels of academic motivation among students, as well as to evaluate the extent to which gender differences shape its components.

The theoretical model proposed by M. Pelch [28] explored the relationships between student anxiety, attitudes toward the learning process, self-regulated learning, and academic performance. The study highlighted significant gender differences in the structure of emotional states. Gender-related variations in students' self-perception, influenced by various sociocultural factors, are also emphasized in a large-scale study by A.M. Mej a-Rodr guez et al. [27]. Their analysis revealed that these differences remain significant even when controlling for academic achievement and parental involvement.

The interplay between students' motivation levels and emotional states has been widely investigated. For example, M.C. Florescu [21] identified a negative correlation between intrinsic academic motivation and dysfunctional emotions. Similarly, M. Shin et al. [30] demonstrated that intellectually stimulating teaching behaviors positively influence the educational process by fostering students' intrinsic motivation, increasing engagement, and enhancing their sense of self-efficacy. The critical role of perceived self-efficacy is also underscored in the work of C. Voica [33], which examines the impact of affective states on cognitive processes related to goal setting and problem-solving.

This study explores theoretical approaches to the examination of intellectual abilities and the motivational-emotional sphere of personality, with consideration of gender differences. It also presents empirical findings assessing the strength of associations between these constructs and identifying significant differences between male and female university students. The primary objective was to investigate the specific interplay between intellectual abilities, emotional expressions, and motivational factors in students. The study tested

the hypothesis that intellectual abilities, motivations, emotions, and gender identity are interconnected among university students.

Intellectual Abilities

The construction of a holistic understanding of intellectual abilities is based on the analysis of key theories. Notably, in Lev Vygotsky's sociocultural theory, the role of social interaction and cultural context in shaping cognitive development is emphasized [2]. In this framework, the concept of the Zone of Proximal Development (ZPD), which refers to the gap between what a learner can do independently and what they can achieve with the assistance of a more knowledgeable peer or adult, is introduced. According to this theory, learning is a social process, and interaction with others plays a crucial role in cognitive development. Collaborative educational activities, such as group projects, discussions, and peer teaching, can help students enhance their intellectual abilities by engaging in shared problem-solving and knowledge construction. Vygotsky's theory also highlights the impact of the cultural context on cognitive development. By considering the cultural background, experiences, and social context of students, as well as identifying and targeting the ZPD, educators can create an inclusive learning environment that takes into account cultural differences and fosters intellectual growth.

Jean Piaget's operational theory of intelligence outlines the stages of cognitive development that children go through: sensorimotor, preoperational, concrete operational, and formal operational stages [19]. According to Piaget's theory, the human organism exerts effort to adapt to disruptions in the equilibrium between the environment and the organism itself, with intelligence being the perfect tool for achieving this balance and optimal functioning. The central idea of Piaget's theory is the necessity of interaction with objects for their understanding. He emphasized the need for an exploratory component in the learning process, as intelligence grows through two complementary processes — assimilation (the organism's response to the environment) and accommodation (the impact of the environment on the organism).

R.J. Sternberg was among the first scholars to adopt a cognitive approach to intelligence, as opposed to the psychometric perspective, and developed the triarchic theory of intelligence [32]. According to his definition, "intelligence is mental activity aimed at adapting to, selecting, and shaping the real-world environment in a manner that is relevant to an individual's life." Sternberg links cognitive activity to a set of components, which include performance components, knowledge-acquisition components, and metacomponents — executive processes utilized in problem-solving and decision-making. These components are interdependent; all contribute to the problem-solving process, and none can function in isolation. However, Sternberg further clarifies that different contexts and tasks require the application of distinct types of intelligence, leading to the development of several subtheories:

1. Componential — analytical subtheory. This aspect of intelligence is focused on cognitive abilities related to academic performance, including the capacity to analyze, evaluate, and critically assess information. Individuals with high analytical intelligence excel in tasks that demand logical reasoning, critical thinking, and problem-solving skills.

2. Experiential — creative subtheory. This aspect emphasizes cognitive processes related to creativity and innovation. It involves the ability to generate novel ideas and adopt unconventional approaches to

problem-solving. Individuals with high creative intelligence are adept at thinking divergently, proposing original solutions, and recognizing connections between seemingly unrelated concepts.

3. Practical — contextual subtheory. This subtheory addresses the cognitive processes involved in adapting to and effectively navigating real-world environments. It encompasses the ability to apply knowledge and skills in practical contexts, such as work settings or everyday life. Individuals with high practical intelligence are skilled at applying their cognitive abilities to solve real-world problems and achieve success in everyday tasks.

The Triarchic Theory of Intelligence by R.J. Sternberg can be applied to the intellectual abilities of students, recognizing that individuals may excel in different areas. According to this theory, intelligence extends beyond traditional measures, such as IQ, and also encompasses practical, creative, and analytical abilities. Furthermore, many individuals may integrate all three types of intelligence, demonstrating high proficiency in each.

Current research on intellectual abilities focuses on understanding their role in cognitive activities [1] and their relationship with manifestations of giftedness [7]. It is crucial to note that intellectual abilities are influenced not only by cognitive processes but also by the emotional and motivational components of personality. Emotions can shape cognitive functions such as decision-making, memory, and problem-solving, while cognitive processes can, in turn, impact emotional experiences.

Motivational and Emotional Domain

J.P. Forgas developed the Affect Infusion Model (AIM), which posits that the influence of an individual's emotional state on cognitive processes is contingent upon the specific information processing strategy employed [22].

The selection of one of four possible strategies is determined by two key parameters. The first parameter concerns the amount of effort exerted during information processing, whereas the second refers to the productive nature of the activity, which involves generating new information. Conversely, unproductive activities are characterized by situations in which adherence to a predetermined problem-solving algorithm is required.

The likelihood of affect influencing cognitive processes is low when employing direct access or goal-directed (motivated) processing strategies. The direct access strategy is characterized by low task productivity and minimal cognitive effort, meaning that mood is unlikely to significantly impact task performance. By contrast, the goal-directed (motivated) processing strategy requires slightly more cognitive effort due to the need to achieve a specific goal.

The probability of affect influencing cognitive processes increases when utilizing the heuristic processing strategy. This strategy involves more productive activity with relatively low cognitive effort and is typically applied when motivation is low, or when the individual has little interest in the task, as well as when there is a high cognitive load due to attentional or working memory demands.

The substantive processing strategy, which necessitates both high productivity and significant effort, is used when addressing complex, large-scale tasks that lack clear or unambiguous solutions. In these cases, the individual must set their own goals and monitor their progress. The likelihood of affect influencing cognitive processes is highest in this context.

R. Lazarus' cognitive appraisal theory suggests that emotions are a result of how

an individual evaluates a situation or event [25]. This appraisal involves two key components: the interpretation of stressors (the individual evaluates the significance of an event for their well-being) and the assessment of available resources (where the individual appraises their capacity to manage the situation). Cognitive appraisal occurs rapidly and automatically. Based on the outcomes of these evaluations, individuals experience a range of emotions.

Three types of primary appraisal are identified: favorable, irrelevant, and stressful. A favorable primary appraisal occurs when the expected outcome of the event is perceived as beneficial. If, however, a stressful event is deemed significant, and the individual believes they lack the resources to cope with it, they may experience anxiety or fear. Conversely, if the event is perceived as inconsequential, or if the individual feels equipped with the necessary resources, they may experience little to no negative emotions.

Furthermore, according to the theory, secondary appraisal is subdivided into components such as the potential for acceptance, the possibility of altering the situation, the prediction of its development, and the explanation of the locus of control.

Cognitive appraisal can be influenced by a variety of factors, including personality traits, social context, and situational elements. According to this theory, individuals with higher intellectual abilities generally experience more intense emotions compared to those with lower intellectual abilities.

This theory is supported by research conducted by J.J. Gross, which showed that individuals with higher intellectual abilities tend to experience both more intense positive and negative emotions. However, they are also more capable of effectively regulating these emotions [23].

L.F. Barrett's theory of emotion construction suggests that emotions are generated by the brain through a combination of sensory input, past experiences, learned concepts, and cultural context, contrasting with the classical view of emotions as preprogrammed states with distinct neural signatures [18]. This theory supports a multidimensional perspective on emotions, where emotions are not discrete categories but rather exist along a continuum of affective experiences. This perspective allows for a more nuanced understanding of emotional variability — the process is dynamic and flexible, enabling the experience of a broad range of emotional states.

According to this theory, emotions are seen as a form of categorization. The brain processes sensory information and assigns meaning, which may vary depending on the individual and context. The same sensory input can trigger different emotional responses because individuals rely on past experiences and learned concepts to predict and construct emotional reactions to incoming stimuli. Additionally, the formation and expression of emotions emphasize the influence of environmental cues, social interactions, and situational factors.

In relation to the connection between emotions and motivation, L.F. Barrett suggests that emotions are not merely passive responses to stimuli but are actively constructed by the brain to help individuals navigate their environment and achieve their objectives. Emotions act as signals that guide behavior and decision-making, influencing the choices people make to fulfill their needs and desires. For instance, fear may prompt an individual to avoid a potentially harmful situation, whereas joy may encourage social bonding and collaboration. In this sense, motivation plays a role in shaping how emotions are generated in response to particular situations.

A person's goals, values, and priorities impact the emotions that arise and how they are experienced.

Furthermore, within the framework of Barrett's emotion construction theory, intelligence encompasses not only cognitive abilities but also emotional intelligence — the ability to perceive, understand, and effectively regulate emotions. Intelligence is viewed not as separate from emotions but rather as an intricate interaction between cognitive processes and emotional experiences. Emotions can either facilitate or hinder cognitive functioning, depending on how they are constructed and regulated in a given context. Emotional intelligence allows individuals to harness their emotions as valuable sources of information, guiding their thoughts and actions.

In general, according to L.F. Barrett's theory, emotions, motivation, and intelligence represent intertwined dimensions of human experience that dynamically interact, guiding behavior, cognition, and social interactions. Emotions influence motivation by signaling the significance of particular goals and outcomes. Motivation, in turn, shapes the way emotions are constructed and expressed in response to various stimuli. Intelligence, including emotional intelligence, plays a pivotal role in how individuals regulate their emotions, make adaptive decisions based on emotional cues, and effectively navigate social interactions. Understanding the intricate interactions among these elements can offer valuable insights into how individuals perceive and respond to their environments.

Gender Differences

Gender differences in students' intellectual abilities are an active area of psychological research. We believe that men and women may demonstrate differences in their intellectual abilities, which can significantly influence their academic performance and professional achievements. These differences may stem from variations in brain structure and hormonal background, shaped by neurobiological mechanisms, as well as differences in social roles and the experiences men and women acquire in society.

One of the most extensively studied aspects of gender differences in intellectual abilities is spatial intelligence. Research indicates that men generally demonstrate higher proficiency in this domain, which involves the ability to perceive, manipulate, and mentally transform spatial representations [24].

Conversely, verbal intelligence is another area where gender differences have been observed. Empirical studies suggest that women typically exhibit greater proficiency in verbal intelligence, encompassing language comprehension, linguistic expression, and the ability to analyze and interpret textual information.

It is important to emphasize that gender differences in intellectual abilities are not absolute; rather, they are influenced by a complex interplay of cultural, social, and educational factors.

Gender differences among students are also observed in the emotional and motivational domains. Men and women may differ in their emotional responses and motivational tendencies, which can have a significant impact on their academic performance and professional development.

One of the most well-documented aspects of gender differences in the emotional-motivational sphere is emotional sensitivity [31]. Studies suggest that women generally exhibit higher emotional sensitivity and expressiveness, displaying a broader range of emotions compared to men. Additionally, women tend to be more receptive to emotional stimuli and are more prone to heightened emotional reactions.

Motivation is another domain in which gender differences may be observed [15]. Research suggests that women are generally more motivated by social relationships, whereas men tend to prioritize career advancement and financial success. These differences may be shaped by societal expectations, stereotypical gender roles, and distinct social experiences of men and women.

It is essential to acknowledge that gender differences in intellectual abilities and emotional-motivational characteristics are not the sole or primary determinants of academic achievement or professional success. Individual factors, such as intrinsic interest, perseverance, and social or environmental support, also play a critical role in determining outcomes.

The results of this theoretical analysis provided the basis for an empirical study examining the expression of intellectual abilities, emotional responses, and motivational factors among male and female students.

Methods and Materials

The study was conducted at the Siberian Polytechnic College and included 105 students aged 17—20 years (40 female and 65 male participants). Data collection was carried out using survey-based methods.

To evaluate the level and structure of intellectual abilities, the Intelligence Structure Test (IST) by R. Amthauer (adapted by K.M. Gurevich, M.K. Akimova, et al.) [12] was administered. This assessment measured verbal, mathematical, spatial, and mnemonic abilities. The obtained results were also used to calculate participants' IQ scores based on normative tables.

To assess two fundamental and stable personality motives, the "Achievement Motivation" and "Failure Avoidance Motivation" questionnaires by T. Ehlers [11] were administered.

The Motivational Structure Test by F. Herzberg was also utilized to examine the structure of students' motivation and identify key factors influencing their satisfaction or dissatisfaction with academic activities. According to Herzberg's theory, motivation is driven by two categories of factors: motivational (intrinsic) factors and hygienic (extrinsic) factors [14]. Hygienic factors include social recognition, financial incentives, and interpersonal relationships, while motivational factors encompass opportunities for career growth, personal achievement, and the intrinsic value of academic work.

To further explore students' motivational characteristics, the "Motivation for Studying at a University" method by T.I. Ilyina was applied. A predominance of motivation for acquiring knowledge and mastering a profession over the motivation for obtaining a diploma is indicative of an appropriate career choice and a high level of satisfaction with one's field of study [5]. Additionally, the "Participation Motivation Structure" method was used to assess the underlying motives for students' participation in the study [4].

A comprehensive assessment of respondents' emotional states was conducted using various psychological methods. Neuropsychic tension test by T.A. Nemchin was employed to identify excessive strain on the body's regulatory system [9].

The "Well-being — Activity — Mood" questionnaire and the "Subjective Assessment of Current Mental States" were used to evaluate respondents' psychological state, their psycho-emotional response to stress, and individual characteristics of psychophysiological functions [3].

Well-being can be understood as a generalized characteristic (e.g., vigor, malaise) or as a more localized sensation related to specific physical discomfort in different areas of the body.

Activity reflects an aspect of temperament and is determined by the intensity and scope of an individual's interactions with both the physical and social environment. Based on this parameter, individuals can be categorized as inert, passive, calm, proactive, active, or highly energetic.

Mood is considered a relatively prolonged and stable emotional state, which can manifest either as a general emotional background or as a clearly identifiable condition. Although mood is often triggered by specific causes, it also influences an individual's overall emotional responsiveness to various stimuli.

The Clinical Questionnaire for the Detection and Assessment of Neurotic States was used to conduct a qualitative analysis of neurotic symptoms across six diagnostic scales: anxiety, neurotic depression, asthenia, hysterical response patterns, obsessive-phobic disturbances, and autonomic dysfunction [16].

Additionally, the "Determination of dominant mental state" technique, developed by L.V. Kulikov, was employed to identify relatively stable personality characteristics based on respondents' subjective evaluations. In this study, a brief version of the method was used, with core scales assessing engagement with life situations, emotional tone, generalized anxiety levels, emotional stability, life satisfaction, as well as self-evaluation accuracy and critical thinking [6].

Data were processed using the statistical software package Statistica 10. To identify differences in mean values, Student's *t*-test and analysis of variance (ANOVA) were applied. Percentages were compared using Fisher's Angular Transformation test. Pearson's correlation coefficient was used to assess the relationship between variables. The critical value for statistical significance in testing null hypotheses was set at $p < 0.05$. The data collected during the study are available in the RusPsyData repository of psychological research and tools at the Moscow State University of Psychology and Education [13].

Analysis and Discussion

Table 1 presents descriptive statistics for the structural components of intelligence, calculated for the sample of male and female participants. No significant differences were found in the mean values of the structural components between these groups.

The distribution of male and female participants according to the classification of

Table 1

Descriptive Statistics of Structural Components of Intelligence in Female and Male Groups

	Mean		Median		Standard Deviation	
	females	males	females	males	females	males
Verbal Abilities	57.18	56.03	55.5	54	18.08	13.81
Mathematical Abilities	28.88	30.15	29.0	33	8.32	8.47
Constructive Abilities	24.40	28.06	25.5	29	10.56	11.47
Mnemonic Abilities	17.23	16.34	18	19	3.12	5.43
Abstract Thinking Abilities	31.57	30.12	29.5	28	12.37	9.54
Analytical Abilities	25.60	25.91	24.5	26	7.05	5.62
Overall IST Score	118.03	121.94	119.0	126	27.85	26.58
IQ	118.00	119.48	119.5	121	13.10	12.74

levels of intellectual abilities is presented in Table 2.

To explore the relationships between the motivational-emotional indicators and intellectual abilities, a correlation analysis was performed. The motivational-emotional group consisted of 30 variables, while the intellectual abilities group included 15 (9 subscales, 5 structural components, and 1 overall score). Since the correlation analysis revealed a small number of significant correlations, only those with coefficients significantly different from zero (p<0.05) are presented in Tables 3—5.

Table 3 reveals weak but significant negative correlations between respondents' well-being and their performance on subtests assessing the ability to memorize and utilize information. These tasks involve verbal-logical reasoning and the synthetic process of relating task conditions to the activation of relevant knowledge. Effective cognitive performance requires a certain level of tension, which is reflected in conscious cognitive processes. Psychological distress and tension may have a detrimental effect on visuospatial thinking, as evidenced in the performance on intellectual tasks from the subtests assessing spatial abilities.

The set of mathematical subtests broadly assesses a wide range of cognitive operations. A weak but significant inverse correlation was also found between task performance and the degree of self-criticality. These findings suggest that a positive self-image may interfere with the ability to solve arithmetic problems, thereby decreasing the efficiency of simpler cognitive tasks. Conversely, it is also possible that students with higher performance in mathematical tasks demonstrate greater self-criticism, reflecting on their own successes in this area and perceiving themselves negatively, as they strive for even higher achievements.

The correlation analysis was then conducted separately for the male and female samples. Similar to Table 3, only significant correlation coefficients (p < 0.05) are presented.

The data obtained from the correlation analysis for the female sample (Table 4)

Table 2

Composition of the Sample of Male and Female Participants by Intellectual Ability Level

Grade	Female group	Male group	Significance Level (p)
Average	10 (25%)	15 (23.1%)	0.41
Above Average	10 (25%)	17 (26.1%)	0.45
High	20 (50%)	33 (50.8%)	0.47
Total	40	65	

Table 3

Correlation Analysis Results Between Motivational-Emotional Indicators and Intellectual Abilities for the Entire Sample

	Mathematical Abilities	Spatial Abilities	Mnemonic Abilities	IQ
Assessment of Well-being			–0.22	–0.19
Positive Self-image	–0.21			
Psychological Distress and Tension		–0.22		–0.22

show a positive correlation between the severity of asthenic syndrome and performance on intellectual tasks, both overall and across specific subtests. This pattern is evident across all subtest complexes of R. Amthauer's Intelligence Structure Test, except for the subtests assessing spatial abilities. The higher the health level on the "asthenia" scale, the better the overall psychological state of the respondents, and the greater the productivity in cognitive operations. Additionally, it is worth noting that performance on the verbal intelligence subtests is negatively correlated with achievement motivation and the respondents' self-assessment of their sense of strength and energy.

For the male sample (Table 5), a weak positive correlation was found between life satisfaction and performance on the spatial subtest tasks, where participants engaged in non-verbal logic and visual-motor thinking.

Memory and perception processes appear to be relatively resistant to the influence of psychological states, while attention-related characteristics — such as stability, selectivity, and concentration — are more significantly affected.

A pronounced negative impact of psychological distress and overall tension was observed on the ability to solve intellectual tasks, particularly those requiring spatial thinking and analytical-synthetic activities.

The results also indicate that subjective well-being in males is closely linked to cognitive abilities, emphasizing the multidimensional nature of psychological functioning and the influence of subjective experiences on cognitive processes.

Thus, the study identified a set of motivational-emotional indicators that correlate with intelligence. The mean values of most cognitive and motivational-emotional indicators in the female and male samples did not differ significantly ($p>0.05$). Using the Student's *t*-test, differences were observed only for two parameters: the average level of achievement motivation was higher in the female sample, while potential obsessive-phobic traits were more pronounced in the male sample (see Table 7).

The results obtained align with the findings of C. Cabras et al. [20]. In their study, the authors reported that female students exhibit significantly higher levels of both

Table 4

Correlation Analysis Results Between Motivational-Emotional Indicators and Intellectual Abilities: Female Group

	Verbal Abilities	Mathematical Abilities	Mnemonic Abilities	IQ
Achievement Motivation	–0.33			
Asthenia Scale	0.38	0.42	0.33	0.36
Sense of Strength and Energy	–0.34			–0.37

Table 5

Correlation Analysis Results Between Motivational-Emotional Indicators and Intellectual Abilities: Male Group

	Mathematical Abilities	Spatial Abilities	IQ
Life Satisfaction		0.29	
Psychological Distress and Tension	–0.27	–0.26	–0.37

Table 6

Results of Identifying Differences in Correlation Coefficients Between Female and Male Groups

	Verbal Abilities	Mathematical Abilities	Spatial Abilities	Mnemonic Abilities	IQ
Achievement Motivation	–0.33/0.09 (p=0.039)				
Asthenia Scale	0,38/–0,04 (p=0.036)	0,42/–0,05 (p=0.018)		0.33/–0.01 (p=0.09)	0.36/–0.05 (p=0.0425)
Sense of Strength and Energy	–0.34/–0.08 (p=0.19)				–0.37/0.04 (p=0.0417)
Life Satisfaction			–0.21/0.29 (p=0.0155)		
Psychological Distress and Tension		0.18/–0.27 (p=0.0295)	–0.14/–0.26 (p=0.54)		0.04/–0.37 (p=0.0417)

Table 7

Significant Differences in Motivational-Emotional Indicators Between Female and Male Groups

Indicator	Mean		*t*	*df*	*p*
	Male	Female			
Achievement Motivation	15.43	18.28	–2.73	103	0.008
Obsessive-Phobic Disorders	2.02	1.2	2.122		0.036

external and internal motivation compared to their male counterparts. They attributed this outcome to the fact that motivation for success in female students is often linked to receiving positive feedback from significant adults, whereas in male students, this motivation is more influenced by external factors and material rewards. Furthermore, the authors found that females tend to display stronger emotional reactions in challenging situations, which, in turn, can lead to a decrease in the effectiveness of their intellectual performance when compared to males. This may be related to lower self-esteem or a more critical self-perception among females.

In another study conducted by Y.M. Shalaby [29], it is suggested that females tend to place greater emphasis on the emotional aspects of a task. In contrast, males are generally more concentrated on developing problem-solving strategies, which may increase their psychological distress levels and, consequently, negatively affect cognitive processes such as concentration and attention.

W.W.S. Lee's study [26] found that interest and persistence are negatively correlated with stress, while perceived academic failures have a positive correlation with stress. These findings further support the idea that psycho-emotional states can influence cognitive processes, and they highlight the interrelationship between intellectual abilities and emotional characteristics.

Conclusion

The presented review has enabled us to assess the current state of research on the correlations between emotional-motivational parameters and various types of intellectual abilities. Our findings have highlighted key aspects of the interrelationship between emotional-motivational factors and intellectual abilities in male and female students.

It was found that in the female sample, there is a statistically significant positive correlation: the absence of pronounced asthenia reflects a state of healthy psychological adaptation, high work capacity, and emotional stability, which positively influences the effectiveness of solving intellectual tasks of various types. In contrast, the results of verbal intelligence tests in female respondents were negatively correlated with achievement motivation. This pattern was not observed in the male sample, where achievement motivation was generally somewhat lower and did not significantly affect their cognitive performance. This phenomenon can be partially explained by the fact that optimal results are achieved with moderate motivation. Theoretically, males approach problem-solving in a more rational manner; however, during the study, they exhibited a higher level of anxious tendencies and psychological tension.

The results of our analysis underscore the importance of examining the interrelationships between intellectual abilities and the motivational-emotional parameters in male and female students. The findings of our study can inform the development of effective strategies for student learning and development, as well as contribute to the overall improvement of educational quality. Future research will focus on exploring the role of motivation and emotions in the regulation and disruption of cognitive processes among male and female students. It is crucial to emphasize that investigating this pressing issue is essential for a comprehensive understanding of the psychological development of students, which will ultimately support the formulation of strategies aimed at enhancing their intellectual abilities and motivation across both genders.

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Subjectivation of Meanings in Perceptions of Adulthood Among Young Men and Women

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The paper presents research materials that demonstrate the features of subjectivation of meanings in the perceptions of young men and women, based on their interpretation of artistic representations of adulthood. The study aimed to identify the characteristics of subjectivation of meanings in young people's perceptions as an indicator of their maturation. The research involved a sample of 321 individuals 14—23 years old (M=18, SD=2.88) and utilized an original projective methodology ("Adulthood"), distinguishing it from conventional self-assessment questionnaires. Data analysis included Pearson's chi-square contingency tables, cluster analysis, and clustering quality assessment via the Rand index. The results highlight that the maturation of young men and women in the modern world is a heterochronous process. By analyzing artistic depictions of adulthood in the classic film "The Prank" (1977) and the contemporary film "Sasha's Country" (2022), three types of subjectivation of adulthood were identified. The study emphasizes the applicability of these typologies in educational practice and their relevance for educators and psychologists working with adolescents and young adults in life and career guidance programs.

Keywords: youth; emergence of adulthood; maturation; adulthood; subjectivation of meanings; artistic image; typology of maturation; perceptions of adulthood.

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Субъективация смыслов взросления юношами и девушками

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Представлены материалы исследования, в которых показаны особенности субъективации смыслов в представлениях юношей и девушек, основанные на восприятии художественного образа взрослости. Целью исследования стало определение особенностей субъективации смыслов в представлениях молодых людей как показатель их взросления. Исследование охватывало выборку из 321 человека в возрасте от 14 до 23 лет (M=18, SD=2,88) и проводилось при помощи оригинальной методики (Взросление), носящей проективный характер, что отличает исследование от обычно применяемых в тех же целях опросных самооценочных методик. Обработка собранных данных осуществлялась с использованием таблиц сопряженности расчета критерия хи-квадрат Пирсона, кластерного анализа и оценки качества кластеризации через индекс Рэнд. Обращается внимание на то, что полученные результаты показывают, что взросление юношей и девушек в современном мире является гетерохронным процессом. Исследование, проведенное на материале художественных образов взросления как классического фильма «Розыгрыш», так и современного фильма «Страна Саша», позволило выделить три типа субъективации смыслов в представлениях о взрослении юношей и девушек. Показана возможность определять типы субъективации смыслов в педагогической практике. Подчеркивается, что результаты исследования могут быть полезны педагогам и психологам, работающим со старшими подростками, юношами и девушками, а также с молодежью, в рамках сопровождения программ по жизненному и профессиональному самоопределению.

Ключевые слова: юношество; период возникновения взрослости; взросление; взрослость; субъективация смыслов; художественный образ; типология взросления; представление о взрослении.

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Introduction

Amid social instability and globalization, the maturation process of youth in Russia and abroad is undergoing significant transformations. In contemporary contexts, growing up is viewed as a complex process encompassing both objective and subjective markers of adulthood. Traditional criteria for maturation

(e.g., completing education, starting a family) are losing their relevance [20]. Modern youth face a destandardization of maturation in society [8], while the sociocultural context and its influence on life trajectories are becoming increasingly critical [3; 18].

The process of psychological separation from parents is considered a key stage of maturation, shaping personal characteristics and socialization. For instance, V.R. Manukyan, exploring the link between psychological separation from parents and subjective adulthood, found that successful separation fosters the formation of adult identity and psychological well-being [4]. In another study led by T. Granger, parental pressure during adolescence was shown to increase tendencies toward deviant behavior, whereas parental support promotes conscious and positive perceptions of maturation [26]. Thus, negative stereotypes about adulthood held by parents and educators may hinder healthy maturation.

From a scientific perspective, it is essential to analyze modern trends in maturation, their markers, and social dimensions, as well as identify key contradictions and challenges associated with this process. Researchers studying maturation during emerging adulthood employ diverse approaches. However, most frameworks, building on J. Arnett's work, describe this phenomenon through core features: "identity exploration, instability, self-focus, a sense of in-betweenness," and a wide range of opportunities [19; 20; 21; 22].

Researchers also emphasize modern youth's life goals in domains such as education, career, autonomy, and family [23; 24; 25; 27]. For example, E.S. Mitrofanova examines the timing of key life events (six in total), including education completion and employment, concluding that youth do not reject maturation but adapt to new societal conditions [5]. Contemporary young men and women delay entering the labor market due to prolonged education, which impacts their self-concept and self-awareness [1]. Meanwhile, adolescents in rural schools exhibit stronger aspirations toward adulthood compared to urban peers, who often perceive maturation negatively [12]. Their maturation patterns resemble broader European trends, emphasizing higher education and an extended transition from adolescence to adulthood [17].

Thus, the predominant question in contemporary studies on the construct of maturation has become the discussion of the prolonged transition to adulthood. A.V. Nazarenko and N.A. Komarova emphasize the delayed maturation of young people, noting that modern youth often avoid taking on complex social roles [6]. O.I. Razinkova analyzes the phenomena of "adult childhood" and "early maturation," highlighting the blurred boundaries between childhood and adulthood [10]. She stresses that modern children are losing clear models of adulthood, which complicates their socialization. M. Twenge and W. Keith Campbell argue that the extension of childhood is not necessarily linked to delayed maturation, as suggested by J. Arnett. In their framework, prolonged childhood may culminate either in a transition to adulthood or in the rejection of traditional markers of adulthood in favor of an individualized lifestyle. This suggests that the concept of "adulthood" may become a matter of personal choice [28].

In the context of our research, this underscores the critical importance of a scientifically grounded understanding of how young men and women perceive their own maturation differently.

Researchers have attempted to classify typologies of maturation based on various criteria. For instance, F.A. Shvets identifies types of maturation rooted in age-status self-awareness, arguing that young men

and women may perceive maturation differently depending on their social context [13]. The scholar defines "types such as a sense of adulthood, reluctance to mature, and a perception of transitional or unstable status" [13]. This typology is thus based on individuals' identification with adjacent age periods and their emotional-motivational evaluation of their own age status. Gender differences in maturation are also explored; for example, young men are often more focused on achieving material well-being and social status, while young women tend to prioritize life satisfaction and value interpersonal relationships [2]. Nevertheless, the question of a definitive typology of maturation remains open.

In our previous studies, we noted that "in artistic works, the clear boundaries between childhood and adulthood are blurred" [9], yet the interpretation of the behavior of film characters undergoing maturation is understood and accepted by contemporary young men and women. Additionally, L.V. Skorova and D.K. Suvorova demonstrated that young people do not merely associate themselves with film characters but tend to attribute their own abilities, psychological traits, and behaviors to these characters [11]. Our research has identified specific features and differences in how adolescents perceive the artistic image of a maturing film character [15; 16]. All of this supports the view that artistic cinema can serve as effective material for studying maturation.

By accounting for the heterochrony of the subjectivation of meanings in young people's perceptions of maturation, it becomes possible to create a developmental and educational environment in educational institutions tailored to individual students. The aim of this study is to determine the characteristics of the subjectivation of meanings in perceptions as an indicator of young people's maturation. The significance of this research lies in the pressing need to identify differences in the maturation process within a changing society and, consequently, to reevaluate traditional notions of maturation during the transition to adulthood.

Sample and Research Methodology

The empirical study involved a sample of 321 individuals aged 14 to 23 years (M=18, SD=2.88), including 156 young men and 165 young women. The age distribution of participants was as follows: 14 years old — 55 individuals, 15—16 years old — 69, 17—18 years old — 69, 19—21 years old — 66, and 22—23 years old — 62. The sample comprised school students (33% — 106 individuals), vocational education students (30% — 97 individuals), and university students (37% — 118 individuals). The study was conducted using the "YandexForms" platform.

An original methodology titled "Growing Up", based on youths' perceptions of cultural representations of maturation in artistic films, was employed. The methodology involved screening three scenes (up to 5 minutes each) from the film "Practical Joke" (dir. V. Menshov) and three scenes from "Sasha's Country" (dir. Yu. Trofimova), followed by discussion prompts related to the content[1].

[1] First Fragment of the Film "Practical Joke":
High school students skip class: the boys play guitar and discuss life plans. The school administrator scolds them for skipping and orders them to return to class. The youths explain their choice and defend their right to make independent decisions about attending class. They argue for their maturity by discussing their life priorities and choices.
First Fragment of the Film "Sasha's Country":
Two conversations between the protagonist (a young man) and two girls. The first girl insists on applying to university, claiming that adulthood, in her view, means not doing things you dislike. The second girl argues that creativity is a serious pursuit and can become a future career.

Respondents' answers were categorized as nominal variables using content analysis. Data were processed through contingency table analysis, Pearson's chi-square test, cluster analysis, and the elbow method. The goal was to determine which type of maturation perception each respondent aligned with.

Three expert educators, familiar with the participants, then evaluated each respondent to classify their type of maturation perception. The educators relied on descriptions of maturation perception types identified in our previous studies [15; 16]. The quality of clustering was assessed using the Rand index. The research dataset is available in the "MSPU RusPsyData" repository [14].

The results of the study

At the first stage of the study, we conducted a cluster analysis of responses to

1. Which of the characters' ideas did you find interesting? (Answers: 1 — about creativity, 2 — about time, 3 — about achieving success, 4 — no interesting ideas).
2. Have you experienced situations similar to the boys' scenario? (Answers: 1 — feeling supported by adults, 2 — feeling misunderstood by adults, 3 — striving to rely only on oneself, 4 — pursuing goals despite adults' lack of belief).
3. Have others treated you similarly to the first fragment? (Answers: 1 — feeling supported by adults, 2 — feeling misunderstood by adults, 3 — striving to rely only on oneself, 4 — pursuing goals despite adults' lack of belief).
Second Fragment of "Practical Joke":
A confident young man passionately tells his teacher about his vision for his future. He is optimistic, believes he controls his life, and expects no major challenges, despite the teacher's warnings.
Second Fragment of "Sasha's Country":
The protagonist's mother insists he attend university and avoid irresponsibility. Later, an older friend counters that the protagonist can be responsible and earn a living through creativity.
4. How will the protagonist's future unfold? (Second fragment) (Answers: 1 — failure, 2 — success due to his determination, 3 — he will achieve his goal, 4 — he will live an ordinary life, 5 — success if he heeds older adults' advice).
5. How do you evaluate the ideas in the second fragment? (Answers: 1 — feeling supported by adults, 2 — feeling misunderstood by adults, 3 — no such examples, 4 — pursuing goals despite adults' lack of belief, 5 — striving to rely only on oneself).
6. How do the film characters' views align with your friends'? (Answers: 1 — similar to Igor, 2 — similar to the adult, 3 — my friends share optimism, 4 — my friends believe life is a struggle, 5 — my friends discuss success and achievements).
7. Provide examples of adults expressing concerns like those in the second fragment. (Answers: 1 — feeling supported by adults, 2 — feeling misunderstood by adults, 3 — no such examples, 4 — pursuing goals despite adults' lack of belief, 5 — striving to rely only on oneself).
Third Fragment of "Practical Joke":
A dialogue between a young man and his father. The son critiques his father's life and shares his own future aspirations. The son's arguments reflect maturity, while the father's responses echo youthful reasoning.
Third Fragment of "Sasha's Country":
The protagonist talks to his father, first highlighting their similarities and his financial independence. When the father raises the topic of future plans, the son reacts sharply, distancing himself and asserting different life priorities.
8. How are you similar to the characters? (Third fragment) (Answers: 1 — similar to the young man, 2 — similar to the father, 3 — I strive for success and achievements, 4 — I prioritize enjoying life over achievements, 5 — both perspectives have merit; I relate/do not relate to both).
9. What defines the characters' mature attitude in the third fragment? (Answers: 1 — defining success/failure, 2 — searching for life's meaning, 3 — enjoying life/achievements, 4 — valuing future/present and time, 5 — distinguishing childishness/adulthood).
10. What causes the disagreement between the son and father? (Third fragment) (Answers: 1 — defining success/failure, 2 — searching for life's meaning, 3 — enjoying life vs. achievements, 4 — valuing future/present and time, 5 — distinguishing childishness/adulthood).
11. When have your/friends' attitudes mirrored the third fragment? (Answers: 1 — desire to relax, 2 — desire to work/study, 3 — never, 4 — unrelated personal stance, 5 — demonstrating a more mature outlook than others).

the “Growing Up” methodology, the results of which for the film “Practical Joke” are presented in Fig. 1.

For the film “Practical Joke”, respondents were categorized into three clusters:

— Group 1: 62 respondents (19%),
— Group 2: 54 respondents (17%),
— Group 3: 205 respondents (64%).

Cronbach’s alpha coefficient was calculated as 0.844, indicating “acceptable” internal consistency for this study. The results of the cluster analysis for the film “Sasha’s Country” are presented in Fig. 2.

For the film “Sasha’s Country”, respondents were categorized into three clusters:

— Group 1: 78 respondents (24%),
— Group 2: 71 respondents (22%),
— Group 3: 172 respondents (54%).

Cronbach’s alpha coefficient was calculated as 0.866, indicating “acceptable” internal consistency for this study.

Thus, the cluster analysis revealed a clear division of participants into three distinct groups (Fig. 1, 2). The optimal number of clusters was determined using Ward’s method. Three clusters provided the optimal contribution to minimizing within-cluster variance. No significant differences were found between clusters based on respondents’ age, gender, or educational level.

Next, to describe the differences between clusters, an analysis of respondents’ answers was conducted across clusters (Table 1).

According to Table 1, the following distinctions between the identified types are evident:

Type 1 demonstrates a propensity for creativity, perceives adult support as crucial, and prioritizes goal-oriented behavior. For this type, adulthood is associated with the search for meaning and awareness of success.

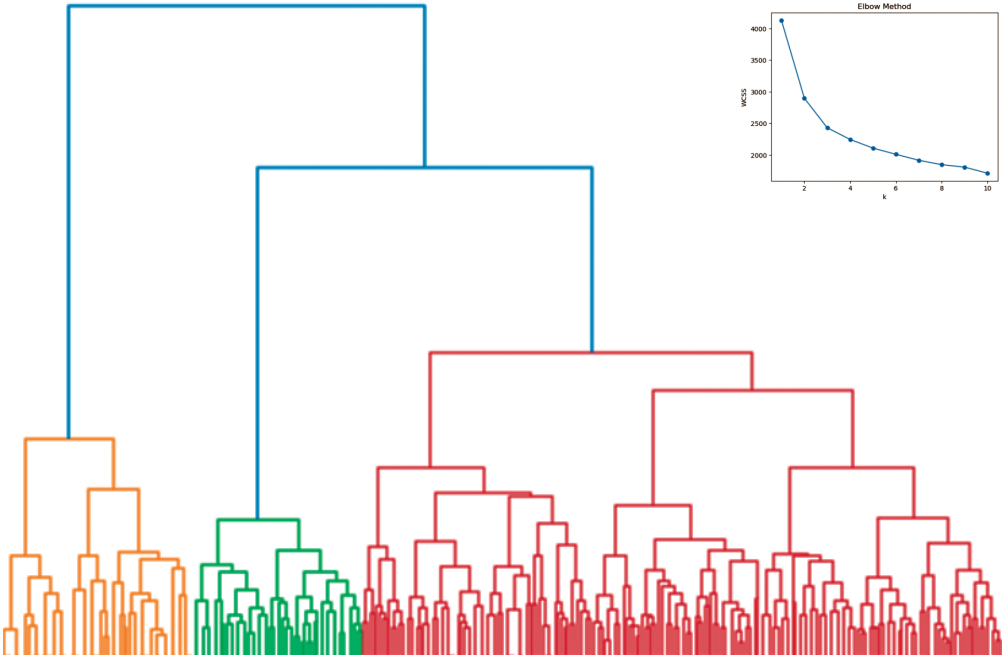

Fig. 1. Cluster Analysis of Responses to the “Growing Up” Methodology for the Film “Practical Joke” (n=321)

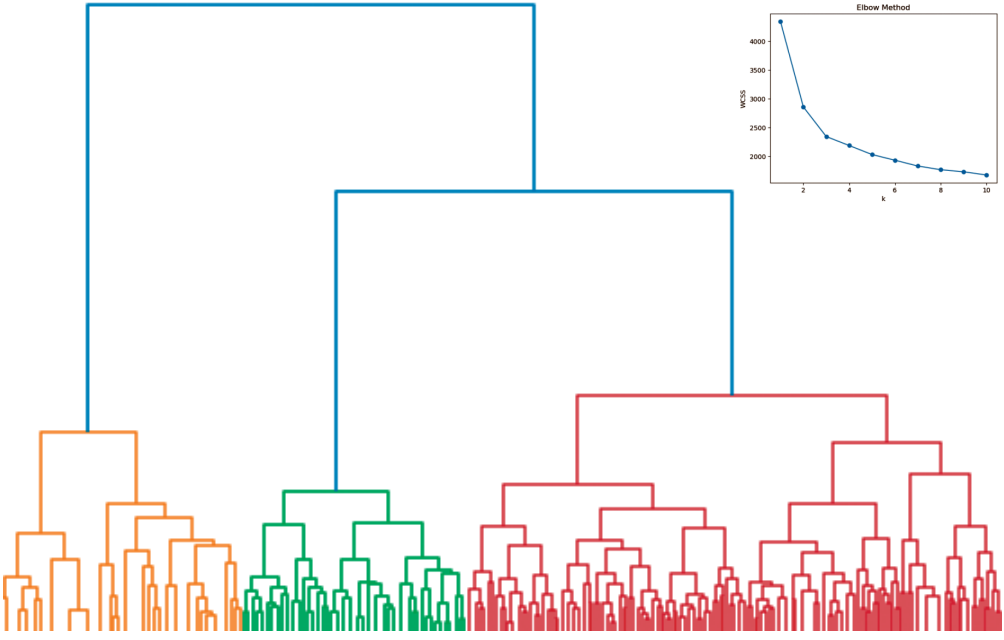

Fig. 2. Cluster Analysis of Responses to the "Growing Up" Methodology for the Film "Sasha's Country" (n=321)

Table 1

Substantive Differences Between Clusters (n=321)

The question	The answer	Standardized residues by type					The answer			Standardized residues by type	
		1	2	3		The question	1	2	3		
1	1	***12,6***	***–3,0***	***–8,0***	166,54	0,000**	***13,2¹***	***–4,5¹***	***–7,6¹***	191,38	0,000**
	2	***–2,21***	0,8	***2,41***			***–2,7¹***	–1,3	***3,4¹***		
	3	***–3,81***	***2,41***	1,2			***–4,2¹***	1,7	***2,2¹***		
	4	***4,41***	0,9	***2,91***			***–5,1¹***	***3,9¹***	1,1		
2	1	***14,2***	***–3,2***	***–9,2***	215,50	0,000**	***14,9¹***	***–4,5¹***	***–9,1¹***	233,72	0,000**
	2	0,6	–0,4	–0,2			0,1	***–2,2¹***	0,7		
	3	***–5,6***	1,7	***3,3***			***–6,6¹***	***3,1¹***	***4,1¹***		
	4	***–5,4***	0,8	***3,8***			***–5,9¹***	1,7	***3,0¹***		
3	1	***9,8***	***–3,5***	***–5,3***	117,57	0,000**	***10,7¹***	***–4,5¹***	***–5,5¹***	139,58	0,000**
	2	1,9	–1,4	–0,5			1,1	***–2,2¹***	0,9		
	3	***–2,8***	1,7	1,0			***–3,0¹***	***3,1¹***	0,0		
	4	***–5,9***	1,7	***3,5***			***–6,7¹***	1,7	***4,3¹***		
4	1	***6,6***	–1,3	***–4,4***	96,03	0,000**	***6,2¹***	–1,8	***–3,8¹***	107,35	0,000**
	2	***4,3***	***–2,4***	–1,7			***4,8¹***	***–3,3¹***	–1,4		

The question	The answer	Standardized residues by type				The question	The answer			Standardized residues by type	
		1	2	3			1	2	3		
	3	0,5	0,6	–0,9			0,6	–1,1	0,4		
	4	***–5,5***	0,4	***4,2***			***–6,1¹***	***2,8¹***	***3,0¹***		
	5	–1,7	***2,3***	–0,5			–2,0¹	3,5¹	1,2		
5	1	***3,7***	***–2,1***	–1,4	95,02	0,000**	***3,7¹***	***–2,6¹***	–1,1	92,92	0,000**
	2	***4,6***	–1,5	***–2,6***			***3,1¹***	***–2,1¹***	–0,9		
	3	***2,4***	***–2,9***	0,4			***3,5¹***	***–3,3¹***	–0,2		
	4	***–6,2***	***3,3***	***2,5***			***–6,9¹***	***4,6¹***	***2,1¹***		
	5	–1,1	***4,7***	***–2,8***			–1,3	***4,3¹***	***–2,5¹***		
6	1	***4,8***	***–3,1***	–1,5	201,82	0,000**	***5,9¹***	***–3,9¹***	–1,8	120,25	0,000**
	2	***2,0***	***–6,0***	***3,1***			1,2	***–6,2¹***	***4,1¹***		
	3	0,0	–0,6	0,4			0,5	–0,7	0,1		
	4	***–4,0***	0,0	***3,3***			***–4,1¹***	***2,1¹***	1,8		
	5	***–3,3***	***12,4***	***–7,0***			***–4,1¹***	***11,0¹***	***–5,6¹***		
7	1	***10,2***	***–2,8***	***–6,2***	145,88	0,000**	***9,8¹***	***–3,4¹***	***–5,6¹***	150,39	0,000**
	2	***2,4***	***–2,2***	–0,2			***2,2¹***	***–3,0¹***	0,6		
	3	0,1	–0,4	0,3			1,0	–0,1	–0,7		
	4	***–7,9***	***2,7***	***4,4***			***–8,6¹***	***3,4¹***	***4,6¹***		
	5	–0,5	***2,5***	–1,6			–0,8	***2,8¹***	–1,6		
8	1	***4,1***	***–3,4***	–0,7	110,60	0,000**	***4,5¹***	***–4,0¹***	–0,6	155,62	0,000**
	2	***2,9***	***–3,3***	0,2			***2,5¹***	***–3,9¹***	1,1		
	3	-0,7	-1,5	1,7			–0,1¹	***–2,0¹***	1,8		
	4	***–3,7***	***2,0***	1,5			***–4,0¹***	1,8	***2,0¹***		
	5	***–2,8***	***7,9***	***–3,9***			***–3,4¹***	***–10,3¹***	***–5,7¹***		
9	1	***6,7***	***–3,8***	***–2,5***	230,26	0,000**	***7,9¹***	***–4,9¹***	***–2,7¹***	241,66	0,000**
	2	***2,0***	***–4,2***	1,6			***2,5¹***	***–4,9¹***	1,9		
	3	–0,4	***–3,2***	***2,8***			–1,0	–1,0	1,7		
	4	***–5,1***	0,5	***3,8***			***–5,7¹***	0,0	***4,9¹***		
	5	***–3,2***	***12,6***	***–7,2***			***–4,0¹***	***12,5¹***	***–6,9¹***		
10	1	***8,1***	***–3,8***	***–3,7***	239,99	0,000**	***9,2¹***	***–5,0¹***	***–3,8¹***	293,71	0,000**
	2	1,6	***–3,7***	1,6			***2,5¹***	***–4,2¹***	1,3		
	3	–1,9	***–4,6***	***5,2***			***–2,5¹***	***–4,6¹***	***6,0¹***		
	4	***–3,8***	0,3	***2,9***			***–4,6¹***	0,3	***3,7¹***		
	5	***–4,0***	***12,6¹***	***–6,5***			***–4,9¹***	***3,7¹***	***–7,2¹***		
11	1	–0,4	***–2,1***	1,9	87,99	0,000**	0,2	***–2,4¹***	***–2,2¹***	105,94	0,000**
	2	–0,7	-1,5	–0,4			0,8	–1,3	1,7		
	3	***4,2***	***–4,0***	–0,4			***4,9¹***	***–4,9¹***	–0,1		
	4	***–3,7***	***3,2***	0,5			***–4,2¹***	***3,6¹***	0,6		
	5	–1,6	***7,2***	***–4,2***			***–2,3¹***	***7,8¹***	–4,6¹		

Key to Symbols: ** — differences significant at the 0.0001 level; bold italics — standardized residual exceeds the threshold (–2; 2).

Type 2 values achievements while not rejecting the pursuit of pleasures. Respondents in this type view an adult as someone who understands the distinctions between adulthood and childhood.

Type 3 emphasizes the importance of heeding advice from elders to achieve personal goals. For them, an adult approach to life involves distinguishing between the future and the present, as well as an understanding of time.

Thus, the identified types primarily reflect the heterochrony of the maturation process, illustrating the non-uniform actualization and subjectivation of meanings, values, coping strategies, etc., across the three groups. These types do not address the ultimate goal of maturation but highlight the variability in its progression.

Next, an expert evaluation of respondents' perceptions of maturation was conducted, with educators who teach the participants serving as experts. To mitigate potential bias from educators' preconceptions about certain students, each respondent was assessed by three independent expert educators. Given that the sample included participants of varying ages from different educational institutions, the total number of expert educators was 48. They evaluated respondents independently, using descriptions of the identified maturation types and assigning scores to their students. The instructions clarified that the three types do not represent hierarchical levels of maturity and that all three, two, or one type could manifest in a single respondent. Educators were asked to distribute 5 points among the three types for each student (e.g., allocating all 5 points to one dominant type or splitting them between multiple types).

Consistency of the three expert evaluations was confirmed via Spearman's rank correlation coefficient. The results of the correlation analysis are presented in Table 2.

The correlation analysis confirmed consistency among the expert evaluations. At the next stage, the Rand index was used to assess clustering quality, which determines whether pairs of elements (respondents) that were grouped into the same or different clusters retain their original classification.

Table 2

Correlation Analysis of Consistency in Expert Educators' Assessments

Expert assessment	1		2		3	
	Rs	P	Rs	P	Rs	P
1 тип						
1	1		0,625	0,000**	0,483	0,000**
2	0,625	0,000**	1		0,425	0,000**
3	0,483	0,000**	0,425	0,000**	1	
2 тип						
1	1		0,574	0,000**	0,550	0,000**
2	0,574	0,000**	1		0,476	0,000**
3	0,550	0,000**	0,476	0,000**	1	
3 тип						
1	1		0,709	0,000**	0,551	0,000**
2	0,709	0,000**	1		0,579	0,000**
3	0,551	0,000**	0,579	0,000**	1	

Key to Symbols: ** — differences significant at the 0.0001 level.

The Rand index ranges from 0 to 1, where 1 indicates perfect agreement between clusters, and 0 signifies no agreement.

$$Rand = \frac{TP + TN}{TP + TN + FP + FN}$$

Where:

— TP (True Positives): Pairs of elements assigned to the same cluster both in respondents' answers and in educators' evaluations.

— TN (True Negatives): Pairs of elements assigned to different clusters both in respondents' answers and educators' evaluations.

— FP (False Positives): Pairs where the first element is in the cluster, but the second is not (according to one method but not the other).

— FN (False Negatives): Pairs where the second element is in the cluster, but the first is not (according to one method but not the other).

When comparing respondents' results for the film "Practical Joke" with educators' average evaluations, the Rand index was 0.879. For the film "Sasha's Country", the Rand index was 0.875. These values indicate high consistency between the clusters derived from the "Maturation" methodology and the expert evaluations.

Discussion of Results

This study examines the heterochrony of the maturation process during the transition from adolescence to adulthood. Analysis of psychological research demonstrates that perceptions of maturation are shaped by diverse factors, underscoring the importance of understanding this process within the context of sociocultural change.

Traditionally, studies on maturation rely on surveys [2; 5; 8; 12; 13]. In contrast, our work employs a projective methodology, revealing that adulthood in youth is structured around one of three types of maturation perceptions during the transition from adolescence to adulthood. These types are metaphorically termed: "Awareness of Meanings", "Awareness of Adulthood", "Awareness of Time". These types reflect the uneven actualization and subjectivation of specific meanings, values, coping strategies, etc., during maturation, while the core content and ultimate goal of maturation remain consistent.

Previous studies highlight differences in maturation based on gender [2], geographic location (rural vs. urban) [12; 17; 18], and attempts to classify maturation along a "maturing vs. non-maturing" scale [13]. Our typology demonstrates that young men and women mature differently depending on their perceptions of adulthood. For example:

1. "Awareness of Meanings": Respondents associate adulthood with seeking life's purpose and distinguishing success from failure.

2. "Awareness of Adulthood": Respondents define adulthood by contrasting childhood and adult traits.

3. "Awareness of Time": Respondents emphasize temporal distinctions (future vs. present) and the significance of time.

These differences may refine our understanding of developmental logic during this life stage, akin to D.B. Elkonin's typology of adolescent "sense of adulthood." A.P. Novgorodtseva, analyzing this phenomenon in Elkonin's work and subsequent studies, notes variations in conflict expression and positivity/negativity depending on the manifestation of the "sense of adulthood" [7]. Our typology, revealing heterochrony in maturation meanings from adolescence to adulthood, may indicate the relevance and/or methods of addressing age-specific developmental tasks.

The findings show that depictions of maturation in the 1977 film "Practical Joke" (dir. V. Menshov) remain relevant and recognizable to contemporary youth. Expanding the methodology to include scenes from the 2022 film "Sasha's Country" (dir. Yu. Trofimova) corroborates the identified differences in maturation perceptions.

Prior research frequently emphasizes the influence of adults on youth maturation [4; 12; 26]. For instance, A.P. Novgorodtseva highlights the challenge adults face when interacting with adolescents who struggle to articulate their experiences due to incomplete self-awareness [7]. Our study demonstrates that the typology of maturation perceptions derived from cinematic portrayals aligns with educators' assessments. Thus, this typology is "accessible to educators" and can inform their pedagogical strategies for supporting youth development.

Conclusions

This study examines key trends in youth maturation and identifies additional factors influencing this process. The presented results confirm that maturation is a complex and multifaceted process requiring attention from both researchers and practitioners.

Our findings suggest that the maturation of young men and women in the modern world is a heterochronous process. The meanings reflected in the artistic portrayal of maturation — both in the classic film "Practical Joke" and the contemporary film "Sasha's Country" — reveal three types of subjectivation in perceptions of growing up. The first type associates adulthood with understanding the meaning of life and success, the second with distinguishing between "childish" and "adult" behaviors, and the third with recognizing one's future time and separating it from the present. The study demonstrates the potential to identify these typologies in pedagogical practice.

The primary limitation of this research is the sample, drawn exclusively from an educational environment. Additionally, the "Growing Up" methodology used here may restrict data depth due to participants' interpretations of specific artistic images employed as stimulus material. Perceptions of maturation may vary depending on cultural representations and their significance across age groups.

Despite these limitations, the typology of subjectivation in youth perceptions of maturation offers new opportunities to understand this process. It can inform psychologists and educators working with young people during their life self-determination.

Future research could explore the applicability of these findings to youth in professional settings outside education. Another key direction is examining connections between the identified subjectivation types and core personality traits, socio-psychological factors, activity-related influences, the actualization of age-related tasks, and readiness to address them. Further work might also standardize the "Growing Up" methodology, select additional stimulus materials, and refine research formats.

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The Correlationship between Self-image and the Image of a Mentor among Students in the Context of Professional Self-determination

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The research focuses on clarifying the concept of the image of the Self as a subject of professional self-determination and its functions in the educational and professional activities of psychology students. The article presents empirical data obtained from a sample of 76 psychology students, including students of the1st and 2nd years (N=45) and students of the 3rd and 4th years of Taras Shevchenko National University of Tiraspol (N=31). The following methods were used in the study: a test questionnaire of the orienting image of the mentor "OSON" D.A. Krasilo, aimed at identifying the type of mentor, the method Self-Assessment-25 by V.N. Kunitsyna, motivation of professional activity (K. Zamfir's method modified by A.A. Rean), the method Value Orientations by M. Rokich. In order to identify the correlation between the self-image and the mentor image of the actor of professional self-determination, statistical data analysis methods were used: the Spearman pair correlation method, the non-parametric Mann-Whitney U-test and methods of cluster data analysis in IBM SPSS Statistics 27. The types of self-image of the subject of professional self-determination are identified as "idealized" and "realistic-effective" in the 1st and 2nd year students; "reflective" and "career-oriented" in the 3rd 4th year students.

Keywords: the image of the Self; image of a Mentor; professional self-determining; motivation; value orientations; self-esteem; the period of entering adulthood.

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Взаимосвязь образа-Я и образа Наставника у студентов в контексте профессионального самоопределения

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Представлены результаты исследования, направленного на выявление и уточнение связи образа-Я и образа Наставника у субъекта профессионального самоопределения в период вхождения во взрослость. Материалы получены в эмпирическом исследовании на выборке из 76 студентов-психологов 1—2 курсов (N=45) и 3—4 курсов (N=31) ПГУ им. Т.Г. Шевченко г. Тирасполь. В работе использовались следующие методики: опросник субъективного образа наставника «ОСОН» Д.А. Красило, методика «Самооценка-25» В.Н. Куницыной, методика К. Замфир в модификации А.А. Реана, методика «Ценностные ориентации» М. Рокича. С целью выявления характера взаимосвязи образа-Я и образа Наставника у субъекта профессионального самоопределения были использованы методы статистического анализа данных: метод парной корреляции Спирмена, непараметрический U-критерий Манна-Уитни и методы кластерного анализа данных в IBM SPSS Statistics 27. Авторами выделены типы образа-Я субъекта профессионального самоопределения: «идеализированный» и «реалистично-действенный» на 1—2 курсах; «рефлексивный» и «карьерно-ориентированный» на 3—4 курсах.

Ключевые слова: образ-Я; образ Наставника; профессиональное самоопределение; мотивация; ценностные ориентации; самооценка; период вхождения во взрослость.

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Introduction

A number of Russian and international researchers in the field of developmental psychology [10; 15; 19; 21; 24] suggest that student life (ages 18—25) is a critical period for professional self-determination. During this time, often referred to as “entering adulthood” [6] or “emerging adulthood”

[12], young people make key decisions about their career paths, typically setting the stage for the next decade. Consequently, it is crucial for contemporary research to examine the correlation between various factors influencing development during these years, such as perceptions of a profession, self-perception within a profession, relevant personal and professional attributes, and mentor relationships.

Professional self-determination for students often stems from a value-based and ideological standpoint that is not yet fully mature. Individuals navigating this process must achieve stability and comprehensive development during this transitional phase (ages 18-25) as well as the subsequent stable period of youth (ages 20-30). Based on experience working with high school students facing challenges in professional self-determination, it is reasonable to assert that what they experience is more of a preliminary, idealized version of the genuine self-determination that awaits them upon entering adulthood. Self-image during this phase remains fragile and dynamic, often characterized by youthful idealism, and requires support from the social environment.

In summary, professional self-determination during the transition to adulthood involves reevaluating youthful perceptions of a profession, taking initial steps toward career self-realization, establishing real professional connections, and developing essential professional qualities and skills. The connection between this process and the development of self-image in professional self-determination is particularly noteworthy [18].

In Pridnestrovie, young people face unique challenges in professional self-determination due to an unstable and complex economic landscape. The demand for specific professions may not align with current trends, making it difficult to gain a preliminary understanding of the professional world. In this context, parents frequently serve as mentors, providing essential support to those navigating career decisions. When choosing a university, many applicants rely on idealized notions of a profession or uncritically accept the authoritarian opinions of others, often their parents. This can lead to the formation of a "foreclosed professional identity" (D. Marcia, L.B. Schneider), which may result in heightened emotional tension, internal conflict, disappointment in their chosen field, diminished motivation for university studies, a compromised value system, and low self-esteem [1]. Consequently, students frequently drop out before completing their second or third year.

Therefore, this research aims to explore the correlation between self-image and mentor figures in professional self-determination, while also shedding light on the specific characteristics and challenges faced by students during the transition to adulthood.

In his work *The Problem of Age*, L.S. Vygotsky suggested that the period of ages 18—25 should be viewed as the beginning of adult development rather than the conclusion of childhood [3]. Similarly, D. Super's concept of professional development emphasizes the "exploration" stage (ages 15—24). During this phase, young people explore various professional roles, attempting to integrate their goals, values, inclinations, and opportunities.

Numerous international researchers, such as E. Erikson, D. Levinson, R. Gould, G. Vaillant, and J. Arnett, have highlighted the unique characteristics of this period, associating it with personal and professional self-determination, the pursuit of mentors and a sense of belonging in so-

ciety, and the development of ideals and values. J. Arnett, for instance, describes ages 1825 as a transitional phase of "emerging adulthood" [22], when general guidelines for adult development are just beginning to take shape. D. Levinson also identifies a comparable period (ages 18—22) as a transitional stage between adolescence and the relative stability of young adulthood.

This article adopts the age periodization model proposed by D. Levinson, who outlined four developmental tasks that individuals must accomplish to attain adulthood and navigate the "entering adulthood" crisis. These tasks include aligning youthful aspirations with reality, finding a mentor, laying the groundwork for a career, and forming close relationships. Mentors play a crucial role not only in supporting young people and guiding them toward their dreams but also in fostering professional self-determination, career advancement, and facilitating a more mature relationship dynamic with parents [23].

Within the context of professional self-determination, self-image and the guiding influence of a mentor are interconnected and dynamic components in the social development of individuals entering adulthood. Both components will be examined in more detail.

Self-image of the Actor of Professional Self-Determination and its Components

In mastering a professional activity, the individual becomes an actor of professional self-determination, with Self-image at its core [16; 18]. Self-image develops through contradictions between motive and goal, conflicts among motives, and discrepancies between the real and ideal Self, as well as through existing opportunities, conditions, and prospects. This development reflects the individual's actorive evaluation of themselves as a professional and their personal selection of a profession as an environment for growth and development. By aligning the professional positions of the real and ideal Self, the direction of personality development within the professional environment is determined. Notably, Self-image develops primarily through professional training — the central activity during emerging adulthood (ages 18—25) — which is understood as a shared activity with a significant adult, a Mentor [3; 4].

As a dynamic psychological construct, Self-image undergoes transformation, increasing in complexity and individualization. It evolves not only in terms of knowledge, experience, and professional competencies but also in values, motives, emotions, and subjective experiences.

An analysis of conceptual models suggests that the professional Self-image consists of several structural components. At its foundation lies the individual's goal-motivational complex, shaped by their value orientations and professional motivation. First explored by S.D. Smirnov, this complex includes value orientations, which define the goals and means of activity, and professional motivation, which encompasses the internal incentives that drive, direct, and regulate work activity and professional relationships. Crucially, individual and social values are integrated within the individual's value system [25].

Modern students develop their value orientations amid significant social transformations, uncertain societal attitudes and norms, and dynamic cultural values and ideals, including professional guidelines [8]. This study draws on M. Rokeach's concept of professional self-realization values — active and productive life, interesting work,

public recognition, and professional development — as a framework for examining student value orientations during professional self-determination.

The goal-motivational complex also includes (as proposed by K. Zamfir) a three-component structure of professional motivation: internal, external positive, and external negative. Internal motivation involves high job-search activity, a desire for self-improvement, and strong self-regulation. It is associated with an individual's genuine and objectified needs, expressed as sincere interest in their professional activity. External motivation, in contrast, arises from factors beyond the individual and the professional activity itself. External positive motivation includes incentives for which the individual exerts effort, perceived as a "reward." External negative motivation consists of punishments, criticism, and condemnation, where the individual engages in an activity primarily to avoid negative emotions or consequences.

The connection between individual activity and life plan implementation is reflected in self-assessment of professionally significant personal qualities. This includes a sense of personal significance, self-confidence, the ability to assess one's capabilities accurately, and reflection on oneself within social interactions. Self-esteem in professional self-determination relates to knowledge, skills, and abilities, and their development [12], involving an assessment of one's intellectual and personal qualities compared to the ideal of the "Professional Self."

Thus, this study adopts a working model of professional Self-image based on three key parameters: self-assessment of professionally important qualities, motivation for professional activity, and values of professional self-realization.

Mentor Image in the Context of Professional Self-Determination and its Components

The image of a Mentor serves as a catalyst for an individual's professional self-determination, facilitating the maturing individual's orientation in constructing a professional career and developing a coherent value-worldview.

In accordance with L.S. Vygotsky's cultural-historical theory, the developing child relies on ideal forms of action discovered in adults through joint activity. O.A. Karabanova integrated Vygotsky's view on the interaction of ideal and real forms in ontogenesis with P.Y. Galperin's concept of the functional development of orienting activity, clarifying the role of the "orienting image of a significant other" in age-specific psychological development and its importance in individual activity planning and regulation (Karabanova, 2004). D.A. Krasilo (2010, 2012) has shown that during emerging adulthood (18-25 years), the Mentor functions as a significant other, perceived as "the same adult" and actorively accepted as a model of adulthood. In the context of professional self-determination, this model is a professional Mentor — an individual embodying "ideal forms" of professionally and personally significant qualities, competencies, and coping mechanisms. This article employs D.A. Krasilo's four-part model of the Mentor image: 1) ideal mentor (e.g., a character from a movie or book); 2) real mentor from the family (parent or another family member); 3) real mentor outside the family (friend, significant adult, teacher, coach, etc.); and 4) internal mentor (independence, self-reliance).

In the development of Self-image and the Mentor image in professional self-determination, two of the four main spheres of real self-determination were selected:

the formation of a preliminary career basis (hereafter, the career sphere) and the development of a stable value-ideological position (hereafter, the worldview sphere). These spheres are represented by two separate scales of the SIMI iventory: "Mentor in a Career" and "Mentor in a Worldview" (Krasilo, 2010, 2012).

This article reports the results from the first stage of a cross-sectional study conducted on junior and senior students. The primary objective of this stage was to establish and elucidate the relationship between Self-image and the Mentor image in professional self-determination during emerging adulthood. The analysis of these results has informed the goals and objectives of the second stage, which combines cross-sectional and longitudinal methods on a larger sample and is currently in progress, focusing on the dynamics of Self-image development in relation to the Mentor image among psychology students.

Objectives and Hypotheses

The objectives of the first stage of this study were:

1. To determine the relationship between the structural components of Self-image and Mentor image within the career and worldview domains in psychology students at PSU.

2. To identify differences in the expression of Self-image and Mentor image parameters across various career and worldview categories among junior (1st-2nd year) and senior (3rd-4th year) university students.

3. To elucidate specific relationships between structural components of the Self-image and the Mentor image within these categories, comparing junior with senior years.

The primary hypothesis of this study is:

A significant connection exists between parameters related to Self-image (self-assessment of professionally important personal qualities, professional activity motivation, and value orientations) and the expression of four types of Mentors (ideal, real from family, real outside family, and internal) in career and worldview domains among psychology students during emerging adulthood.

The subsequent specific hypotheses were:

1. Differences are expected in the expression of Self-image and Mentor image parameters across career and worldview domains between junior (1st-2nd year) and senior (3rd-4th year) students, with junior students demonstrating lower self-esteem regarding professionally valuable qualities (PVQs), a prevalence of external negative motivation for professional activity, less emphasis on the values "development" and "active productive life," and a greater inclination towards the ideal Mentor type in both domains.

2. Students who exhibit more pronounced real mentors outside their family within their career domain's Mentor image are predicted to have higher personal self-esteem, stronger internal motivation for professional activity, and prioritization of the values "development" and "productive life."

Methods

The following methodologies were employed in this empirical research:

1. «SIMI» a subjective image of a mentor inventory of the mentor by D.A. Krasilo (D.A. Krasilo, 2010, 2012) — to assess the expression of four Mentor types (ideal, real from family, real outside family, internal) in career and worldview domains [5].

2. «Self-esteem-25» Method (V.N. Kunitsyna, 2001) — to assess self-

assessment of professionally important personal qualities in students [9].

3. «Motivation of Professional Activity» Method (K. Zamfir, modified by A.A. Rean, 2006) — to assess dominant motivation types for university study (internal positive, external positive, external negative) [2].

4. «Value Orientations» Method (M. Rokeach, 1973) — to assess the hierarchy of professional self-realization values (active productive life, interesting work, public recognition, productive life, development) [19].

Sample

The sample comprised 76 psychology students from T.G. Shevchenko PSU (Tiraspol): 45 first- and second-year students and 31 third- and fourth-year students.

Statistical Data Analysis

The following statistical methods were used:

1. Spearman's rank-order correlation to determine relationships between Self-image and Mentor image parameters.

2. Mann-Whitney U test to determine differences in Self-image and Mentor image indicators between first- and second-year and third- and fourth-year students.

3. Hierarchical agglomerative cluster analysis and K-means cluster analysis to identify patterns in the relationship between Self-image and Mentor image in both student groups.

Preliminary Findings

The average values of Mentor image parameters [7] were distributed as follows: "ideal mentors" in career and worldview domains exhibited the lowest values; "real mentors" (with "mentor from family" being dominant) showed average values; and "internal mentors" had the highest values. Senior students, compared to junior students, demonstrated significantly lower average values for "ideal" and "internal" mentors, slightly lower average values for "mentors from family," but higher average values for "mentors outside family." These data are presented in Table 1.

The parameters of self-assessment of professionally important qualities [7], as well as general self-assessment, measured using the "Self-Assessment-25" method by N.V. Kunitsyna in 1st-2nd and 3rd-4th year students, correspond to a high level, however, in 3rd-4th year students there is a clear tendency towards an increase in all of the above parameters (see Table 2).

Table 1

Average values of the parameters of Mentor image among students in 1st—2nd and 3rd—4th years

Parameters	1st—2nd year	3rd—4th year
Ideal Career Mentor	22,39	19,58
Ideal worldview mentor	18,89	16,38
Real career mentor from family	30,73	29,33
Real mentor from family in worldview	31,34	30,21
Real career mentor outside the family	25,11	26,25
Real mentor outside the family in worldview	25,43	26,42
Internal career mentor	44,41	42,92
Internal mentor in worldview	46,91	43,92

The indicators of professional motivation [7], expressed in average values, reveal a high level of internal and external positive motivation in both 1st-2nd and 3rd-4th year students. External negative motivation is expressed lower, and its average value is somewhat higher in 1st-2nd year students (see Table 3).

The hierarchy of values in professional self-realization among students was measured using a ranking procedure, with the most preferred value ranked first and the least preferred last. Analysis of average ranks in Table 4 indicates that for first- and second-year students, “development” is the top preference, followed by “interesting work” and “active life.” The values of least actorive importance are “productive life” and “public recognition.”

Among third- and fourth-year students, “development” also occupies the first position in the hierarchy of professional self-realization values. Following in descending order are “active life,” “interesting work,” and “productive life.” “Public recognition” is the least preferred value, and its average rank is lower than that of first-year students. Notably, among senior students, compared with students in the initial years of study, the average ranks of the second and third positions are reversed. “Active life” occupies the second position. These observed differences may indicate shifts in the system of value orientations as students’ progress in their professional self-determination. Senior students place greater value on active personal involvement in their work, while social status and public recognition become less important.

Correlation analysis revealed significant relationships between individual Self-image parameters and the Mentor image

Table 2

Average values of self-assessment of professionally important qualities among students in 1st—2nd and 3rd—4th years

Parameters	Entrepre-neurship	Social intelligence	Communicative competence	Social competence	General self-esteem
1st—2nd year	54,82	55,00	60,09	51,80	217,07
3rd—4th year	62,13	62,38	66,83	58,79	240,29

Table 3

Average values of professional motivation parameters for 1st—2nd and 3rd—4th year students

Parameters	Intrinsic motivation	External positive motivation	External negative motivation
1st—2nd year	4,41	3,99	3,32
3rd—4th year	4,52	3,99	2,96

Table 4

Average values of ranking of professional self-realization values for 1st—2nd and 3rd—4th year students

Parameters	Active life	Interesting work	Public recognition	Productive life	Development
1st—2nd year	9,45	8,11	12,64	10,20	6,91
3rd—4th year	8,88	9,04	14,08	10,00	7,67

within the sample of psychology students (first through fourth years). Specifically, negative correlations (Table 5) were found between the expression of the "ideal mentor in career" type in the Mentor image and student self-assessment across all components of professionally important personal qualities: initiative (R = –0.329**, $p \leq 0.05$), social intelligence (R = –0.374**, $p \leq 0.05$), communicative competence (R = –0.252**, $p \leq 0.05$), social competence (R = –0.519**, $p \leq 0.05$), and general self-esteem (R = –0.383**, $p \leq 0.05$). Additionally, the "ideal mentor in worldview" parameter negatively correlates with self-assessment of social competence (R = –0.236*, $p \leq 0.01$).

Direct significant relationships (Table 6) were found between the level of external negative motivation for professional activity and the expression of "ideal mentor" and "real mentor from family" types in the Mentor image, across both career and worldview domains, respectively: "ideal mentor in worldview" (R = 0.195*, $p \leq 0.01$), "ideal mentor in career" (R = 0.233*, $p \leq 0.01$), "real mentor from family in worldview" (R = 0.367**, $p \leq 0.05$), and "real mentor from family in career" (R = 0.397**, $p \leq 0.05$). A significant positive relationship was also found between the level of internal motivation for professional activity and the expression of the "internal mentor in worldview" type in the Mentor image (R = 0.233*, $p \leq 0.01$).

Let us examine the relationships identified within the sample between the third component of the Self-image of the actor of professional self-determination — the values of professional self-realization — and the Mentor image (Table 7). Negative correlations were found between the value of "active life" and the parameter "real mentor from family in worldview" (R = –0.193*, $p \leq 0.01$), and between the value of "public recognition" and the parameters "real men-

Table 5

Correlation analysis results of self-assessment of professionally important qualities and mentor image among students (N=76)

Parameters	Enterprise	Social intelligence	Communicative competence	Social competence	General self esteem
Ideal mentor in worldview	–0.12	–0.162	–0.09	**–0.236***	–0.137
Ideal mentor in career	**–0.329****	**–0.374****	**–0.252****	**–0.519****	**–0.383****
Real mentor from family in worldview	–0.047	–0.053	–0.065	–0.129	–0.061
Real mentor from family in career	–0.058	–0.105	–0.05	–0.146	–0.082
Real mentor outside family in worldview	–0.084	–0.102	–0.035	–0.146	–0.088
Real mentor outside family in career	–0.108	–0.014	–0.003	–0.137	–0.037
Internal mentor in worldview	0.004	0.07	–0.035	0.009	–0.004
Internal mentor in career	0.01	0.108	0.013	0.01	0.036

Note: ** — Correlation is significant at the 0.01 level (two-tailed); * — Correlation is significant at the 0.05 level (two-tailed).

Table 6

Correlation analysis results of professional motivation and mentor image among students (N=76)

Parameters	Intrinsic motivation	External positive motivation	External negative motivation
Ideal mentor in worldview	–0,011	–0,076	**,195***
Ideal mentor in career	–0,055	0,079	**,233***
Real mentor from family in worldview	0,072	0,083	**,367****
Real mentor from family in career	0,055	0,019	**,397****
Real mentor outside family in worldview	–0,009	–0,114	0,014
Real mentor outside family in career	0,069	–0,042	–0,042
Internal mentor in worldview	**,233***	0,155	–0,05
Internal mentor in career	0,126	–0,003	0,065

Note: ** — correlation is significant at the 0.01 level (two-tailed); * — correlation is significant at the 0.05 level (two-tailed).

Table 7

Correlation analysis results of professional self-realization values and mentor image among students (N=76)

Parameters	Active life	Interesting work	Public recognition	Productive life	Develop-ment
Ideal mentor in worldview	–0,1	–0,082	–0,08	–0,03	–0,167
Ideal mentor in career	–0,016	0,072	–0,156	–0,137	**–,297****
Real mentor from family in worldview	–0,108	–0,062	**–,252****	–0,151	–0,009
Real mentor from family in career	**–,193***	–0,112	**–,248***	–0,016	0,063
Real mentor outside family in worldview	–0,062	–0,011	–0,07	**–,279****	0,094
Real mentor outside family in career development	–0,132	–0,035	–0,009	–0,185	0,111
Internal mentor in worldview	–0,125	0,008	0,084	–0,079	0,178
Internal mentor in career	–0,164	0,015	**,290****	0,063	0,184

Note: ** — correlation is significant at the 0.01 level (two-tailed); * — correlation is significant at the 0.05 level (two-tailed).

tor from family in career" ($R = –0.252^{**}$, $p \leq 0.05$) and "real mentor from family in worldview" ($R = –0.248^{*}$, $p \leq 0.01$). Inverse significant relationships were also found: between the value of "development" and the parameter "ideal mentor in career" ($R = –0.297^{**}$, $p \leq 0.05$), and between the value of "productive life" and the parameter "real mentor outside the family in worldview" ($R = –0.279^{**}$, $p \leq 0.05$). A direct significant relationship was established between the value of "public recognition" and the parameter "internal mentor in career" ($R = 0.290^{**}$, $p \leq 0.05$).

The obtained results can be interpreted as follows.

Students whose Mentor image features a more pronounced "ideal mentor" in the

career domain tend to underestimate their professionally important personal qualities. Similarly, reliance on the "ideal mentor" in the worldview domain is associated with a lower level of social competence. For students with more pronounced ideal mentor types, as well as real mentors from within the family circle, the driving forces for mastering professional activity are incentives that function as coercion (criticism, punishment, fear of condemnation) and avoidance of potential adverse consequences.

Regarding the value orientations of students with a dominant ideal mentor type in their careers, they are less likely to prioritize the value of development in professional activity. The absence or weak reliance on real mentors outside the family environment is associated with a higher prioritization of the value of "productive life." Conversely, a more pronounced reliance on a significant person outside the family circle in the value-worldview position indicates a lower orientation toward productive professional activity.

The value of public recognition in the profession is more likely to be prioritized in students with a higher level of stability in their value-worldview position and independence of judgment, as clearly evidenced by the significant direct connection of this value with the internal mentor in the worldview domain. Interestingly, the prioritization of the values "active life" and "public recognition" is higher in students with a smaller proportion of real mentors from the family in both career and worldview domains. Conversely, students who are guided in building a career by their parents or other significant persons from the family environment prioritize the values "active life" and "public recognition" to a lesser extent.

Table 8

Comparative analysis of parameters of the self-image of the actor of professional self-determination in students of 1st—2nd and 3rd—4th years

№ п/п	Parameters of the self-image of the actor of professional self-determination	Average scores		Mann-Whitney U test statistics	Significance level of differences
		Junior courses (or lower years)	Senior courses (or upper years)		
1	Entrepreneurship	28,8	44,96	**277**	**0,001**
2	Social intelligence	29,47	43,73	**306,5**	**0,004**
3	Communicative competence	28,86	44,83	**280**	**0,001**
4	Social competence	30,53	41,77	**353,5**	**0,025**
5	General self-esteem	28,94	44,69	**283,5**	**0,002**
6	Intrinsic motivation	33,6	36,15	488,5	0,595
7	External positive motivation	35,52	32,63	483	0,56
8	External negative motivation	36,78	30,31	427,5	0,191
9	Active life	35,45	32,75	486	0,589
10	Interesting work	32,94	37,35	459,5	0,376
11	Public recognition	33,33	36,65	476,5	0,506
12	Productive life	34,53	34,44	526,5	0,985
13	Development	33,47	36,4	482,5	0,557

The Self-image of the actor of professional self-determination is a dynamic and evolving representation of its constituent components, changing as knowledge, ideas, and competencies within the profession develop. Therefore, the next task in this study was to compare the features of the Self-image of the actor of professional self-determination and its relationship with the Mentor image in junior (1st—2nd year) and senior (3rd—4th year) students using the Mann-Whitney U test.

Significant differences ($p < 0.005$) were found across all scales of self-assessment of professionally important personal qualities (Table 8). The average level of self-assessment of PVQs is lower for first- and second-year students (56%) compared to third- and fourth-year students (69%).

At the level of trends, differences are also apparent in the expression of other Self-image parameters. Junior students exhibit higher levels of external positive and external negative motivation for learning compared to senior students. Senior students, in addition to the significant differences in self-assessment of PVQs (demonstrating higher levels of initiative, communicative competence, social intelligence, and social competence), tend to exhibit higher levels of actorive importance for the values “interesting work” (44.58%), “public recognition” (45.68%), and “development” (46.85%).

No statistically significant differences were found in the expression of the main mentor types between junior and senior students. However, at the level of trends, it is notable that in both spheres of real self-determination (career and worldview), first- and second-year students generally exhibit the highest expression of the “ideal” and “internal” mentor types. Third- and fourth-year students, on the other hand, are most pronounced in their orientation toward the “real mentor outside the family” type. This shift may be associated with the expansion of professional social contacts and separation from the parental family. If, in the initial years of study, professional choices are primarily based on a somewhat unrealistic ideal image or parental opinion, then senior students begin to focus on real professionals in their field. These results can be explained by the fact that as students progress through their professional training, acquiring theoretical and practical knowledge, they strengthen their self-confidence, increase self-esteem of professionally important qualities, and elevate the importance of professional self-realization values. This coincides with the emergence of external reference points — ideals in professional activity (real individuals — professionals whose image is correlated with specific practical skills, professional qualities, and achievements).

The analysis of these differences suggests examining the specifics of the relationship between the Self-image and the Mentor image in junior and senior students separately, using hierarchical cluster analysis (IBM SPSS Statistics 27). The dendrograms (Figures 1 and 2) reveal two clusters within the samples of both junior and senior students. To more precisely define these groupings, divisive clustering using the K-means method was employed. The structure of these clusters will be examined in more detail.

First-cluster students ($N = 12$) from the junior group are characterized by a higher representation of the ideal mentor in the career domain, along with low self-assessment scores for professionally important qualities. These char-

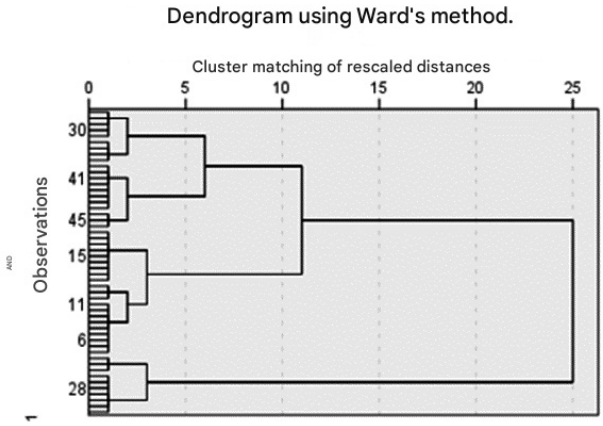


Fig. 1. Results of Ward's method hierarchical cluster analysis of data on all indicators of Self-image and Mentor image in 1st-2nd year students

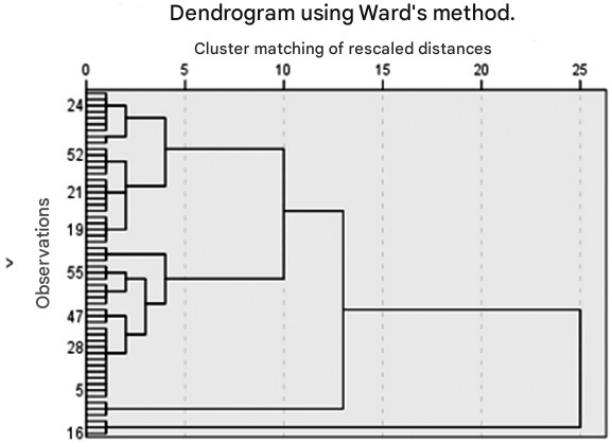
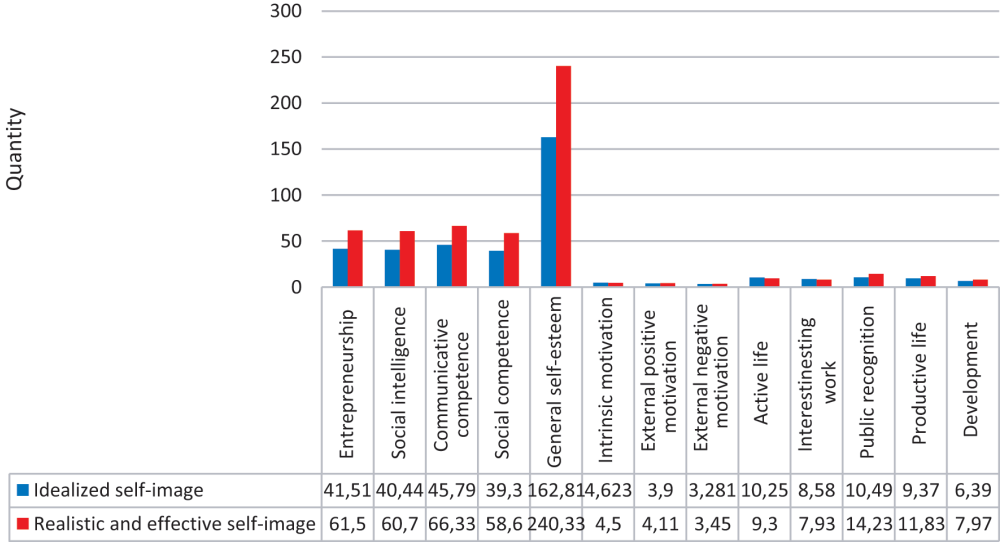


Fig. 2. Results of hierarchical cluster analysis by Ward's method of data on all indicators of Self-image and Mentor image in 3rd-4th year students

acteristics suggest classifying these respondents into a cluster of "Idealized Self-image of the Actor of Professional Self-Determination," as they exhibit unrealistic ideas about their profession, prioritize the value of "active life," and rely more heavily on an ideal image for professional mentorship. The second cluster (N = 31) comprises respondents who demonstrate higher expression of the internal mentor in the worldview domain, high self-esteem of professionally important qualities, a higher level of external positive professional motivation, and, at the level of trends, greater prioritization of the values "productive life" and "public recognition." These characteristics suggest classify-

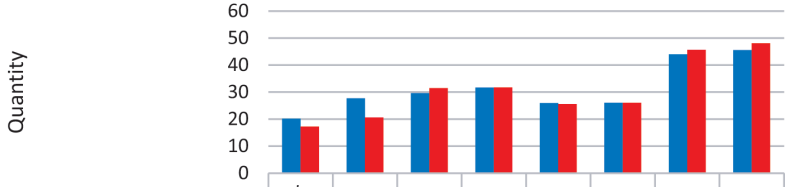
ing these respondents into a cluster of "Realistic-Active Self-image of the Actor of Professional Self-Determination," as these students demonstrate a desire for active engagement in mastering their professional activity.

In the senior years, the empirical picture differs. As illustrated in the histo-



	Entrepreneurship	Social intelligence	Communicative competence	Social competence	General self-esteem	Intrinsic motivation	External positive motivation	External negative motivation	Active life	Interestinesting work	Public recognition	Productive life	Development
Idealized self-image	41,51	40,44	45,79	39,3	162,81	4,623	3,9	3,281	10,25	8,58	10,49	9,37	6,39
Realistic and effective self-image	61,5	60,7	66,33	58,6	240,33	4,5	4,11	3,45	9,3	7,93	14,23	11,83	7,97

Fig. 3. Differences between identified clusters in indicators of the Self-image of the actor of professional self-determination in the sample of 1st-2nd year students (N=43)



	Ideal mentor in career	Ideal mentor in worldview	Real mentor from family in career	Real mentor from family in worldview	Real mentor outside family in career	Real mentor outside family in worldview	Internal mentor in career	Internal mentor in worldview
Idealized self-image	20,14	27,68	29,63	31,67	25,93	26,02	44	45,53
Realistic and effective self-image	17,23	20,63	31,5	31,73	25,6	26,03	45,67	48,07

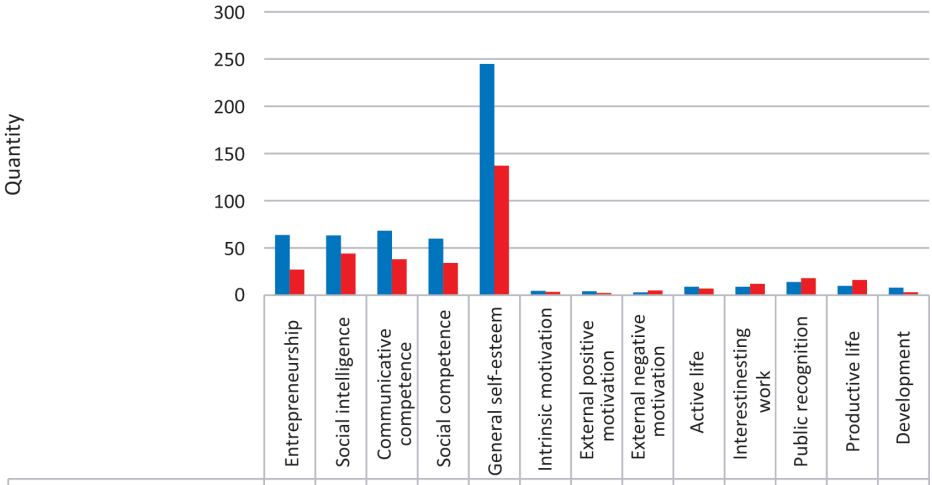
Fig. 4. Differences between the identified clusters in indicators of the Mentor image in the career and worldview spheres among 1st-2nd year students (N=43)

grams (Figures 5 and 6), which depict the cluster differences within the third- and fourth-year student sample, the first, "reflective" cluster (N = 19) is characterized by dominant variables of self-assessment of professionally important qualities and general self-esteem, along with the values of "active life" and "development." These students prioritize self-development, a stable value-based worldview, and an active life. Their mentor image in the worldview domain demonstrates higher expression of the ideal and internal mentor types.

The second, "career-oriented" cluster (N = 12) is characterized by a predominance of the values "interesting work" and "productive life," along with higher expression of the ideal mentor, the real mentor from family, and the internal mentor in the career domain (Figures 5 and 6). Compared to the "reflective" cluster, these students place greater actorive importance on three mentor types in the career domain: the ideal mentor, the real mentor from family, and the internal mentor. As shown in the histogram (Figure 6), the self-assessment of professionally important qualities in this cluster is somewhat below the average level, potentially reflecting a desire for a more realistic self-assessment. Their preference for the aforementioned professional self-realization values reflects an orientation toward respect for colleagues and the importance of interesting work and a productive life as avenues for realizing their personal potential.

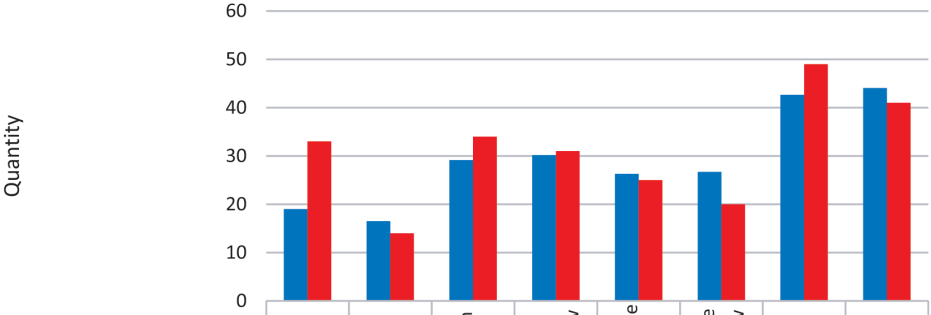
Cluster analysis has clarified and specified the connections between Self-image and Mentor image parameters in students, contingent on their year of study (junior, first- and second-year students, and senior, third- and fourth-year students). Correlation analysis revealed that a more pronounced "ideal mentor" in a student's career domain Mentor image is associated with lower self-esteem of professionally important personal qualities and a higher level of external negative motivation for compelled learning. Cluster analysis clarified that this pattern is more characteristic of junior students. Among senior students, connections were found between the "real mentor outside the family" type and self-esteem of professionally important qualities, as well as internal and external positive motivation.

Thus, it can be argued that psychology students at the beginning of their professional training tend to rely on an ideal career mentor, which is associated with lower self-esteem of their own professionally important qualities and overall self-esteem, as well as negative motivation. Senior students predominantly select a professional outside the family as a mentor in both career and worldview domains, as they gain experience interacting with real representatives of their profession during their theoretical and practical training. By the end of professional training, "active life" becomes a highly prioritized value, alongside "development," while "public recognition" decreases in significance. This shift may be associated not only with the peculiarities and patterns of professional self-determination but also with the fact that Pridnestrovian students, who typically occupy a more active life position and demonstrate a high level of internal professional motivation, are generally more oriented toward real interaction with mentors outside their family circle — teachers, senior colleagues, scientists, business professionals, etc. Furthermore, they often pursue further professional self-determination and career development in other countries, where opportunities are more abundant, the econo-



	Entrepreneurship	Social intelligence	Communicative competence	Social competence	General self-esteem	Intrinsic motivation	External positive motivation	External negative motivation	Active life	Interestinesting work	Public recognition	Productive life	Development
Reflexive self-image	63,65	63,17	68,09	59,87	244,78	4,57	4,07	2,87	8,96	8,91	13,91	9,74	7,87
Career-oriented self-image	27	44	38	34	137	3,5	2,33	5	7	12	18	16	3

Fig. 5. Differences between identified clusters in indicators of Self-image as an actor of professional self-determination in the sample of 3rd-4th year students (N=33)



	Ideal mentor in career	Ideal mentor in worldview	Real mentor from family in career	Real mentor from family in worldview	Real mentor outside family in career	Real mentor outside family in worldview	Internal mentor in career	Internal mentor in worldview
Reflexive self-image	19	16,48	29,13	30,17	26,3	26,7	42,65	44,04
Career-oriented self-image	33	14	34	31	25	20	49	41

Fig. 6. Differences between identified clusters in indicators of the Mentor's image in the areas of career and worldview among 3rd-4th year students (N=33)

my is stronger, and the likelihood of achieving professional fulfillment is higher.

The obtained results suggest that the Self-image and the Mentor image are con-

nected in the actor of professional self-determination through complex relationships. The observed differences between junior and senior students' Self-image and Mentor image are likely influenced by the variability and asynchronous nature of professional self-determination and the achievement of personal maturity. However, the significant connections and differences, along with general trends, indicate an underlying logic and pattern in the process of professional self-determination, manifested in the dynamic interplay between the Mentor image and the Self-image.

Conclusion

1. The study, employing correlation and cluster analysis, investigated the relationship between Self-image parameters (specifically, self-assessment of professionally important personal qualities, motivation for professional activity, and value orientations) and Mentor image parameters in a sample of psychology students. The results revealed statistically significant relationships, supporting the main hypothesis: a connection exists between these Self-image parameters and the expression of four Mentor types (ideal, real from family, real from outside family, and internal) within the career and worldview spheres of psychology students entering adulthood.

2. Significant differences in the Self-image among students of the 1st—2nd and 3rd-4th years were found in the parameters of self-assessment of professionally important personal qualities (self-assessment of PQC is higher among students of 3rd—4th years). For the remaining components of Self-image and Mentor image, no statistically significant differences were found between them (differences are observed only at the level of trends), which allows us to confirm the first partial hypothesis of the study regarding the presence of differences between students of the 1st—2nd and 3rd—4th years in Self-image as actors of professional self-determination.

3. The results obtained by cluster analysis and the identified differences between clusters in samples of the 1st—2nd and 3rd—4th year students allow us to confirm the second partial hypothesis that psychology students with more pronounced "real mentors outside the family" in Mentor image in the career sphere are characterized by a high level of self-assessment of PQC, a high level of internal motivation for professional activity, the priority of the values "development" and "productive life".

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An Invariant Explanatory Model of Procrastination Self-Regulation Based on Self-Efficacy and Positive Affect: Examining Gender and Educational Status

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In the educational field, psychology has empirically demonstrated the empowering effect of self-regulation. However, few studies have considered self-regulation as a component of procrastination. Examining self-regulation through this new perspective can increase understanding of the phenomenon. Thus, this study aimed to establish an invariant explanatory model of self-regulation of procrastination using self-efficacy and affect. 1224 Peruvian students (61,5% female) participated. The model obtained adequate fit indices, demonstrating the influence of self-efficacy and its effect on procrastination self-regulation behavior. The results showed that self-efficacy strongly predicts procrastination self-regulation. The direct, indirect, and total effects were all statistically significant, with a large effect size. Additionally, the model was invariant between genders and educational status. In conclusion, students with high self-efficacy may exhibit more significant control over procrastinative behaviors through positive emotional stability. This finding can be interpreted similarly for the gender and educational status groups.

Keywords: self-efficacy; self-regulation; procrastinating behavior; gender differences; educational status.

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Инвариантная объяснительная модель саморегуляции прокрастинации на основе самоэффективности и позитивного аффекта. Параметры гендера и уровня образования

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В области образования психология эмпирически доказала, что саморегуляция способствует развитию личности. Однако лишь немногие исследования рассматривают саморегуляцию как компонент прокрастинации. Изучение саморегуляции с этой новой точки зрения может улучшить понимание явления прокрастинации. Целью данного исследования было создание инвариантной объяснительной модели саморегуляции прокрастинации с использованием самоэффективности и аффекта. В исследовании приняли участие 1224 перуанских студента (61,5% женщин). Модель дала адекватные показатели, демонстрирующие влияние самоэффективности на саморегуляцию поведения при прокрастинации. Результаты показали, что самоэффективность во многом предопределяет саморегуляцию прокрастинации. Прямое, косвенное и общее воздействие были статистически значимы и имели высокие показатели. Кроме того, модель оказалась инвариантна для людей разного пола и уровня образования. В заключение следует отметить, что студенты с высокой самоэффективностью могут демонстрировать более значительный контроль над прокрастинационным поведением благодаря своей позитивной эмоциональной стабильности. Этот вывод может так же быть отнесен к представителям разного пола и уровня образования.

Ключевые слова: самоэффективность; саморегуляция; прокрастинирующее поведение; гендерные различия; уровень образования.

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Introduction

Students' academic success is not solely attributable to their intellectual abilities. Instead, success is associated with personal, biological, psychological, and social factors that play a vital role. The psychological factors are motiva-

tion, concentration, attention, attitude, memory, critical thinking, determination, perseverance, emotional state, organization, problem-solving ability, self-management, and self-regulation skills [22]. Self-regulation, in particular, has been shown to explain how students achieve academic success by regulating their behavior to benefit academic activities. Self-regulation is considered the result of cognitive, emotional, and motivational processes. Specifically, Zimmerman [45] defined it as the degree to which students are motivationally, metacognitively involved, and behaviorally active in their learning by changing personal and environmental conditions. Self-regulation is not about mental ability or performance but the self-direction process by which students transform their mental abilities into academic ones. Self-regulation involves goal-oriented thoughts, feelings, and behaviours [45], which foster academic success through effective study tools and strategies [47]. On the other hand, if a student struggles to complete a task within the allocated time frame, we are referring to procrastination, a phenomenon that significantly contributes to academic failure.

Self-regulation in Procrastination

Procrastination, a topic extensively studied in psychology [41], refers to the deliberate delay of tasks, which can lead to negative psychological outcomes. It represents a deficiency in self-regulation, which can hinder learners' time management [23]. This behavioural pattern signifies poor self-regulation skills [18]. Academic self-regulation involves goal-setting and managing motivations, thoughts, emotions, and actions. Procrastination can cause dissatisfaction, psychological vulnerability, and academic risks [17]. Self-regulation has been considered part of procrastination from a theoretical and empirical perspective [43]. Procrastination involves postponing tasks and self-regulating academic tasks [14]. Effective self-regulation, time management, and goal-setting can reduce procrastination, ensuring timely completion of assignments.

Chronic procrastinators often underestimate the time required to complete tasks, fail to prepare adequately, and spend less time gathering information. Their lack of self-regulation skills is evident in difficulties with knowledge management, cognitive processes, metacognition, self-efficacy, self-esteem, stress, fear of failure, and anxiety [5; 25]. Empirical evidence suggests that procrastinators engage in self-sabotage, make excuses, and exhibit poor self-regulation of performance [6].

Self-efficacy and Affect

According to the self-regulation model, self-efficacy is a critical variable. Self-efficacy refers to an individual's belief in their ability to perform a given task [3]. Empirical studies have demonstrated that self-efficacy significantly correlates with self-regulation and predicts academic success due to its motivational nature [38]. Additionally, self-efficacy influences academic behavior and predicts self-regulation [13]. However, few studies have analyzed the interaction between self-efficacy and self-regulation.

Affect is not limited to an emotional state but comprises various phenomena, including affective disposition, mood, and emotions. Furthermore, affect is associated with specific capabilities and skills such as emotional regulation, emotion management, and impulse control. Moreover, research has shown that affect directly impacts attention, memory, analysis, and information processing [21], consequently affecting student performance. Affective states are crucial in complex cognitive processes and the self-reflection phase of self-regulation. Self-regulation of learning is a challenge that requires students to develop skills and abilities. Positive affect can improve behavior and commitment to academic success, and recent studies have shown that positive affective state and interpersonal affective regulation are positively related to self-efficacy [16].

Emotional affect is considered a primary source of self-efficacy, which determines behavior and affective reactions [4]. Individuals with high self-efficacy tend to seek challenging tasks that produce satisfaction and positive affect [35; 36]. In contrast, low self-efficacy produces negative consequences [34]. Positive affect mediates self-efficacy and behavior, enabling behavioral

self-regulation and stress reduction [27; 34]. Affect has a direct effect on self-efficacy and has mediated variables such as burnout [44], psychological well-being [27], and innovative behavior [34]. Its potential to drive self-perception, self-esteem, self-concept, motivation, self-efficacy, and behavioral control allows affecting to be considered a mediating or predictor variable in empirical studies.

The Present Study

Based on the integration of studies variables, a self-regulation model of procrastination was developed, focusing on self-efficacy and positive affect's impact. Hypotheses were formulated for the initial model: H1) Self-efficacy positively predicts self-regulation, H2) Self-efficacy positively predicts positive affect, and H3) Positive affect positively predicts self-regulation (Fig. 1). Further hypotheses on indirect and total effects of affect were proposed: H4) Self-efficacy indirectly influences self-regulation through positive affect, and H5) Self-efficacy's total impact on self-regulation is mediated by positive affect.

The proposed model must demonstrate invariance to assess whether the relationships between model variables remain consistent across diverse groups or contexts, such as various age groups, cultures, or procrastination scenarios. Conflicting views exist in the literature regarding the link between procrastination and self-efficacy, particularly concerning gender differences. While some studies suggest that men tend to procrastinate more [30], others argue the opposite, with women displaying higher levels of procrastination [29]. This disparity impedes reaching a consensus.

Conversely, studies consistently show that men exhibit higher levels of self-efficacy than women [42], a finding supported by meta-analyses [24]. These gender differences pose challenges, requiring advanced modeling techniques to account for gender-specific functionality. It is relevant to compare not only based on gender but also between those who solely study and those who study and work to gather comprehensive insights. Therefore, two invariance hypotheses were proposed: H6) The model is gender-invariant; H7) The model is invariant for individuals who study and work and those who solely study.

Method

Participants

Data were collected from 1224 Peruvian university students through a non-probabilistic sampling using inclusion criteria: over 18 years of age, enrolled in the 2022 academic year, studying at the undergraduate level, from different shifts and academic cycles. A total of 38,5% were male and 61,5% female. The age of the participants ranged from 18 to 49 years (M=22,9 years; SD=5,48 years). Among those evaluated, 75,6% were single, 20,5% cohabit-

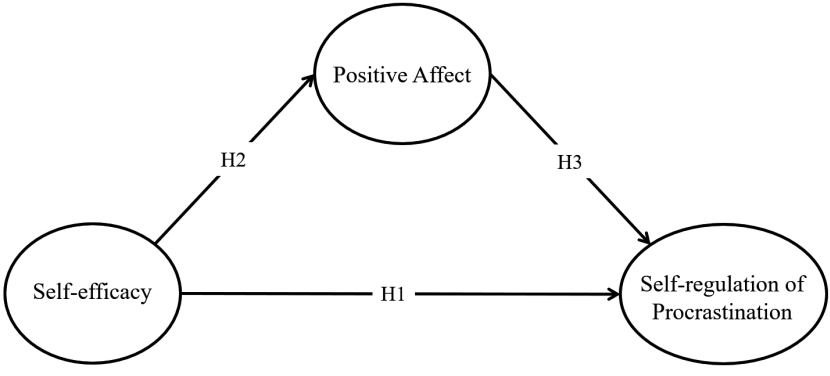

Fig. 1. Hypothesized Model

ing, 3,5% married, 0,4% divorced. Likewise, 52,4% were only studying while 47,6% were studying and working. The students belonged to careers in social sciences, health and engineering at a university.

Measures

The Scale of Positive and Negative Experience (SPANE) measures both positive and negative affect in individuals with 12 items: six for positive affect (PA) and six for negative affect (NA). Responses range from 1 (very rarely or never) to 5 (very often or always). The PA items explained 69,49% of the variance and the NA items 61,56%. The reliability coefficients were α=0,91 for PA and α=0,87 for NA. In a Peruvian sample, the scale showed reliability coefficients of ω=0,86 for positive affect and ω=0,79 for negative affect, indicating its applicability [9].

The Academic Situations Specific Perceived Self-Efficacy Scale (EAPESA) consists of 10 items with response options ranging from 1 (strongly disagree) to 5 (strongly agree). After linguistic adaptation and AFE, a general factor emerged. A subsequent CFA confirmed goodness of fit and reliability indices (RMSEA=0,091; CFI=0,990; α=0,93, ω=0,95), supporting the nine-item unidimensional model [15]. Response reliability in the sample was also assessed, yielding good alpha (0,90) and omega (0,90) indices.

The Academic Procrastination Scale (EPA), version Dominguez-Lara et al. [14], was used, which consists of 12 items with five-point Likert-type responses. It is composed of two factors: procrastination and academic self-regulation. The scale demonstrated adequate model fit of two correlated dimensions, as well as adequate reliability indices for the procrastination (ω=0,81) and self-regulation (ω=0,89) factors. However, inconsistencies were found with item 4, which had weak correlations with the other items, and its factor loading was only 0,27, indicating a poor representation of its factor. As a result, the item was removed, and adequate fit indices were obtained (CFI=0,92; SRMR=0,03; RMSEA [CI 90%]=0,06 [0,05—0,07]). Reliability for procrastination (ω=0,80) and self-regulation (ω=0,82) remained within expectations.

Procedure

Permission was requested from the university of origin of the principal author for the application of the battery of instruments through a virtual form, which consisted of: 1) Informed consent; 2) sociodemographic and academic information; 3) measures. For dissemination, teachers were asked to help disseminate the survey. Data collection was established over three months between October and December 2022.

Data Analysis

The statistical analysis was performed using R Studio version 4.2.2. First, we conducted a preliminary examination of the data by assessing measures of central tendency, dispersion, and normality statistics such as skewness and kurtosis. Next, we examined correlations to ensure there was no multicollinearity (correlation<0,80) between variables. To assess discriminant validity, we used the average variance extracted (AVE) [20].

The robust maximum likelihood estimator (MLR) was used, considering the five response options of the items as a continuous variable [39]. Goodness of fit indices, including chi-squared (χ^2), degrees of freedom (*df*), CFI, TLI, RMSEA with 90% confidence intervals, were used for model evaluation [7]. Criteria for acceptable fit included CFI and TLI>0,90 and RMSEA<0,08 with CI90%. Effect size (f^2) was calculated according to Cohen's criteria: small (0,02), medium (0,15), and large (0,35) effects [11]. Standardized (β) and unstandardized (β) regressions were computed, the latter using bootstrapping (10000 resamples) to obtain 95% confidence intervals. Direct, indirect, and total model effects were assessed accordingly.

The last analysis was the invariance of the model between gender and educational status. Byrne's suggestions for metric invariance restrictions were followed [8]: unrestricted configural; metric with restricted factor loadings; scalar with restricted intercepts; strict with restricted residuals. Evermann [19] recommendations to ensure structural invariance were followed: restrictions on variance and covariance of latent variables and restrictions on regressions

between latent variables. The criteria above were used to evaluate the models. Likewise, the comparison between restricted models used the changes in ΔCFI, ΔRMSEA where the ΔCFI must be less than 0,01 and the ΔRMSEA less than 0,05 [10].

Results

Preliminary Analysis

In this study, the normality of the items within each latent variable was first assessed. Items related to self-efficacy, self-regulation, and positive affect exhibited negatively skewed kurtosis, indicating values above the mean. Skewness values were within the acceptable range of ±1,5, confirming their normal distribution. Latent means and standard deviations of the variables were also evaluated, as shown in Table 1. The reliability coefficients (alpha and omega) for all three variables were optimal, exceeding 0,70.

Significant moderate correlations were found between the latent variables. Discriminant validity was assessed using AVE, with values higher than the correlations, indicating variable independence. The criterion of multicollinearity, with correlations below 0,80, confirmed its absence.

Model Analysis

The study tested the hypothesized regression model (Fig. 2) and evaluated its fit indices, which were found to be adequate (Table 2). Therefore, the model was deemed representative of the university student sample. Standardized coefficients of the regressions were depicted in Fig. 2, and bootstrapping technique was used to obtain confidence intervals of the regression coefficients. Results showed that self-efficacy had a positive effect on self-regulation (β=0,36, CI[0,29—0,44]) and positive affect (β=0,50, CI[0,42—0,59]), supporting H1 and H2. Additionally, the direct effect of positive affect on self-regulation was positive (β=0,16, CI[0,10—0,22]), which corroborated H3.

On the other hand, a statistically significant indirect effect of self-efficacy on self-regulation was found (β=0,10, p<0,001, β=0,08, CI[0,05—0,12]). However, when the direct effect (c) was added, the total model effect was strong (β=0,56,

Table 1

Descriptive, Reliability, Correlation and AVE of Latent Variables

	M	SD	α	ω	1	2	3
1. Self-efficacy	4,10	1,00	0,89	0,90	*0,71*		
2. Self-regulation	3,63	0,77	0,80	0,80	0,56	*0,61*	
3. Positive affect	3,87	0,63	0,86	0,86	0,48	0,43	*0,71*

Note: *M*=mean; *SD*=standard deviation; AVE (in diagonal italics).

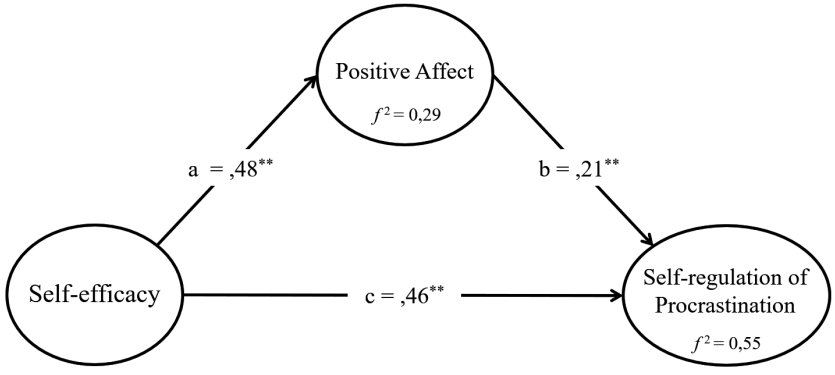

Fig. 2. Direct, Indirect, and Total Effect

p<0,001, β=0,44, CI[0,37-0,52]), demonstrating a stable predictive power of self-efficacy directly and indirectly on self-regulation through positive affect. Figure 2 shows that for positive affect, the effect size was medium (f^2=0,29), and the variance explained was 22,6%. For self-regulation, the effect size was large (f^2=0,55), and the explained variance was 35,4%.

Model Invariance

The models were evaluated independently for sex and employment status, as shown in Table 2. The results indicated that both men and women, as well as those who only study or both study and work, had adequate fit indices (CFI>0,90, TLI>0,90, RMSEA<0,08). In addition, the sex invariance model demonstrated minimal variations between the configural, metric, scalar, strict, variance-covariance, and latent regressions, as indicated by the ΔCFI and ΔRMSEA indices. The same was observed when examining invariance by employment status groups. These minimal changes, as expected, demonstrate that the model is invariant in both groups, indicating that the interpretations in the model are equitable across groups.

Discussion

This study investigates the role of self-regulation in procrastination, exploring the contribution of self-efficacy in a theoretical model. The results of this study largely replicate previous research on the relationship between self-efficacy and self-regulation [28; 38], where self-efficacy acts as a driving force on behavior regulation. Students who are unable to regulate their behavior are more prone to procrastination, which leads to postponed or incomplete tasks [32]. It

Table 2

Model fit and invariance index of the models

Models	χ^2 (*df*)	CFI	TLI	RMSEA	IC 90%	ΔCFI	ΔRMSEA
Study Model	579,23 (206)*	0,956	0,950	0,038	[0,035—0,042]		
Independent Groups							
Men	290,02 (206)*	0,973	0,970	0,029	[0,022—0,036]		
Women	461,49 (206)*	0,952	0,946	0,041	[0,036—0,045]		
Only study	407,78 (206)*	0,956	0,951	0,039	[0,034—0,044]		
Study and work	418,49 (206)*	0,944	0,938	0,042	[0,037—0,047]		
Gender Invariance							
M1	747,70 (412)*	0,960	0,955	0,036	[0,033—0,040]		
M2	778,30 (431)*	0,959	0,956	0,036	[0,033—0,040]	0,001	0,000
M3	803,91 (449)*	0,958	0,956	0,036	[0,032—0,040]	0,001	0,000
M4	824,66 (472)*	0,958	0,959	0,035	[0,031—0,390]	0,000	0,001
M5	826,15 (475)*	0,958	0,959	0,035	[0,031—0,038]	0,000	0,000
M6	827,17 (478)*	0,958	0,960	0,035	[0,031—0,038]	0,000	0,000
Educational Status Invariance							
M1	826,50 (412)*	0,951	0,945	0,041	[0,037—0,044]		
M2	851,97 (431)*	0,950	0,946	0,040	[0,036—0,044]	0,001	0,001
M3	906,47 (449)*	0,946	0,944	0,041	[0,037—0,044]	0,004	0,001
M4	964,82 (472)*	0,941	0,943	0,041	[0,038—0,045]	0,004	0,001
M5	975,39 (475)*	0,941	0,942	0,041	[0,038—0,045]	0,001	0,000
M6	978,09 (478)*	0,941	0,943	0,041	[0,038—0,045]	0,000	0,000

Notes: M1=Configural; M2=Metric; M3=Scalar; M4=Strict; M5=Variance-covariance; M6=Latent regressions, *p<0,001.

is known in psychological science: self-efficacy indirectly influences self-regulation through positive affect, which is consistent with Bandura's theoretical view of the influence of self-efficacy on cognitive, motivational, decision-making, and affective processes [2]. Emotions play a crucial role in self-regulation, especially in the self-evaluation stage where they influence goal setting, strategy planning, and performance [1]. It is known that students with low self-efficacy may struggle to regulate their behavior because they may lack the motivation and planning necessary to initiate and maintain academic performance.

Irrational beliefs can significantly increase insecurity and procrastinative behavior, which can have a negative impact on emotional stability and emotion-based learning [16; 37]. In contrast, students with high self-efficacy and emotional stability are more likely to engage in regulated behaviors, exhibiting personal initiative, goal-setting, and persistence [46]. Conversely, academic success is more likely with increased behavioral regulation and decreased affective regulation [26].

The model shows that self-efficacy has a significant impact on behavior regulation, which leads to improved goal-setting, strategic planning, and efficient task execution. This, in turn, reduces procrastination and promotes timely task completion. On the other hand, research suggests that procrastination can be worsened by factors such as disinhibition. This is supported by positive correlations with traits like irresponsibility, impulsivity, and distractibility, which contribute to decision-making procrastination [12]. This behavior has a negative impact on self-regulated learning, making it difficult for procrastinators to effectively manage their learning [40]. However, it is possible to mitigate these negative effects and potentially improve academic performance by strengthening self-regulation skills, such as goal-setting and perseverance [18].

Furthermore, individuals who struggle with managing their emotions are more likely to procrastinate. Therefore, it is crucial to improve emotional regulation skills to decrease procrastination [31]. It is worth noting that our model showed consistency across gender and employment status, despite discrepancies found in previous research [24; 29; 30; 42]. Our model appears to be applicable across diverse groups, allowing for generalization of interpretations for males, females, and students who are working and/or studying.

In general, our study highlights the critical role of self-efficacy and affect on self-regulation and procrastination and underscores the importance of emotional stability and efficacy beliefs for academic success. However, broader participant inclusion is necessary to ensure more robust conclusions [33].

Limitations. The study has limitations, including the use of non-probability sampling, which cautions against broad interpretations. Additionally, self-report instruments may introduce social desirability bias and are difficult to control for error. Unequal sample sizes in invariant models and testing only one model are also limitations. Future studies should replicate findings using probability sampling and address these limitations in order to draw more robust conclusions.

Conclusion

Despite its limitations, the study's proposed hypothetical model is supported by both theoretical and empirical literature. The model shows that self-regulation, a component of procrastination, is directly influenced by self-efficacy and affect. Additionally, self-efficacy indirectly affects procrastination through affect, suggesting that individuals with high self-efficacy can manage their behavior and avoid procrastination by maintaining positive emotions. This highlights the significance of cognitive and emotional skills in regulating behavior. The model's ability to remain consistent across different genders and educational backgrounds indicates that procrastination, self-regulation, self-efficacy, and positive affect are understood similarly by diverse groups. This makes the model's interpretations useful for men, women, students who are solely studying, and those who are working and studying at the same time. The empirical model can be used as a framework for interventions in person-

al growth workshops. Educational professionals, psychologists, and psychopedagogues can enhance students' abilities by addressing cognitive and emotional aspects indirectly through this model. Additionally, the study suggests further exploration in other domains to investigate how cognitive and emotional interventions can promote regulated behaviors.

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Smartphone Addiction, Religiosity, and Academic Procrastination among College Students: The Mediating Role of Self-esteem and Self-regulated Learning

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Academic procrastination is a prevalent issue among college students. This study aims to investigate the correlation between smartphone addiction, religiosity, and academic procrastination by considering the mediating role of self-esteem and self-regulated learning (SRL). The Procrastination Scale, Religiosity among Muslim scale, Smartphone Addiction Scale-Short Version (SAS-SV), Rosenberg Self-Esteem Scale (RSE), and Academic Self-Regulated Learning Scale (A-SRL) were administered to 512 Muslim college students (42,19% males and 57,81% females; mean age=19,72, SD=1,36). The hypotheses were evaluated using Partial Least Squares (PLS) modeling. The results revealed that smartphone addiction, religiosity, self-esteem, and SRL were significantly correlated with academic procrastination. The structural equation model revealed that self-esteem and SRL mediated the correlation between religiosity and academic procrastination. In terms of the correlation between smartphone addiction and academic procrastination, only SRL acted as a mediator, while self-esteem did not. The findings are valuable for counselors and college educators, offering insights into the connections among smartphone addiction, religiosity, and academic procrastination. This knowledge can provide practical guidance for preventing and addressing academic procrastination issues in college students effectively.

Keywords: academic procrastination; smartphone addiction; religiosity; self-esteem.

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Зависимость от смартфонов, религиозность и академическая прокрастинация среди студентов колледжей: посредническая роль самооценки и саморегулируемого обучения

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Академическая прокрастинация — распространенная проблема среди студентов колледжей. Цель данного исследования — изучить взаимосвязь между зависимостью от смартфонов, религиозностью и академической прокрастинацией с учетом опосредующей роли самооценки и саморегулируемого обучения (СРО). Для исследования были использованы шкала прокрастинации, шкала религиозности среди мусульман, шкала зависимости от смартфонов — краткая версия (SAS-SV), шкала самооценки Розенберга (RSE) и шкала академического саморегулируемого обучения (A-SRL). Выборка составила 512 студентов мусульманских колледжей (42,19% юношей и 57,81% девушек; средний возраст = 19,72, SD = 1,36). Гипотезы оценивались с помощью моделирования методом частичных наименьших квадратов (PLS). Результаты показали, что зависимость от смартфона, религиозность, самооценка и СРО связаны с академической прокрастинацией. Модель структурного уравнения показала, что самооценка и СРО опосредованно связаны с религиозностью и академической прокрастинацией. Что касается корреляции между зависимостью от смартфона и академической прокрастинацией, то тут только СРО выступало в качестве опосредованной корреляции, а самооценка — нет. Полученные результаты представляют ценность для консультантов и преподавателей колледжей, поскольку дают представление о связях между зависимостью от смартфона, религиозностью и академической прокрастинацией. Эти знания могут способствовать профилактике и эффективному решению проблем академической успеваемости у студентов колледжа.

Ключевые слова: академическая прокрастинация; зависимость от смартфона; религиозность; самооценка.

Финансирование. Данное исследование проводилось без финансирования со стороны государственных, коммерческих или некоммерческих организаций.

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Introduction

Several fundamental issues related to student activities are often encountered in learning, including academic procrastination [36]. Procrastination is a widespread phenomenon in educational settings. In recent decades, different understandings and connotations of procrastination have emerged [11]. Academic procrastination refers to the inclination to postpone academic responsibilities, disregarding the possible unfavorable outcomes that may arise [36]. Academic procrastination refers to delayed assignments and actions linked to learning and acquiring knowledge [7]. Delaying a task may temporarily relieve anxiety, but stronger negative emotions will eventually arise, and students tend to blame themselves if they fail [33]. This concept has been studied from various theoretical perspectives, and numerous causes and consequences have been proposed.

Academic procrastination poses a significant challenge within educational institutions. Almost all students have experienced postponing academic assignments to some extent. A study conducted by Fentaw et al. revealed that 80% of the 323 students engaged in academic procrastination [11]. Furthermore, several previous studies also support this survey. A study estimated that 46% of undergraduate students and 60% of graduate students regularly engage in academic procrastination behavior [30]. Similarly, a survey conducted by Rozental et al. as many as 62,2% of female students engaged in severe academic procrastination [32]. Moreover, 7,7% of the respondents reported experiencing a high level of academic procrastination [1]. These findings depict that academic procrastination is a prevalent issue in academic environments.

Previous research has identified various factors contributing to academic procrastination, among them being smartphone addiction [21; 23]. Smartphone addiction, characterized by compulsive and excessive smartphone use leading to various physical, psychological, and social impairments, is defined as the excessive and uncontrollable use of smartphones [35]. According to Sunday et al. individuals who experience smartphone addiction often face difficulties in managing, minimizing, or ceasing their excessive use of smartphones [35]. Prior analysis has consistently indicated a positive association between smartphone addiction and academic procrastination [21; 23]. Numerous prior studies have also examined the impact of religiosity on academic procrastination [31; 46]. Religiosity refers to individuals' choices, feelings, thoughts, and activities related to established or self-created religions [40]. Those who perceive surrendering to a higher power as a means of substitute control tend to mitigate self-regulation issues [46]. Individuals who strongly adhere to religious values tend to demonstrate self-control, enabling them to avoid procrastination [28]. Studies suggest that religious characteristics are negatively associated with academic procrastination [25].

Furthermore, academic procrastination is also affected by self-esteem [18; 43]. Self-esteem is defined as a sense of self-worth and self-respect, crucial for comprehending one's well-being and achievements [29]. A longitudinal study by Yang et al. revealed that self-esteem predicts academic procrastination [43]. Moreover, academic procrastination is affected by SRL, as evidenced by previous literature [22; 24]. SRL refers to the process through which students become proficient in managing their own learning [42]. Recent studies offer evidence supporting the idea that academic procrastination can be comprehended from a situational view, characterized by a breakdown in SRL [22].

Consistent with these findings, another study demonstrated a significant negative correlation between all components of SRL and academic procrastination [24].

Several studies have examined the mediating roles of SRL and self-esteem in the relationship between smartphone addiction and academic procrastination. For instance, an investigation by Eissa & Khlifa found a significant mediating effect of SRL between smartphone addiction and academic procrastination [8]. Similarly, Liu et al. identified that time control and strategic learning methods act as sequential mediators in the association between smartphone addiction and academic procrastination among Chinese students [23]. Based on these previous findings, we propose that SRL serves as a mediator between smartphone addiction and academic procrastination. Moreover, prior research has shown that excessive smartphone use diminishes self-esteem [4]. Low self-esteem, in turn, can trigger academic procrastination behavior [18; 43]. Kinik & Odaci provided evidence that self-esteem can serve as a mediating factor in the relationship between dysfunctional behavior and academic procrastination [18]. Additionally, other research found that self-esteem mediates the connection between social media addiction and academic engagement, with social media addiction negatively impacting self-esteem and subsequently reducing academic engagement [20].

Additionally, we propose that self-esteem mediated the association between religiosity and academic procrastination. This hypothesis is based on empirical studies that identify self-esteem as a predictor of academic procrastination [18; 43] and suggest that religiosity is associated with self-esteem [9; 17]. Therefore, our prediction is that self-esteem acts as a mediator in the relationship between religiosity and academic procrastination. Furthermore, several prior studies have investigated the mediating role of self-esteem in the relationship between religiosity and various psychological and emotional variables. An example is the study conducted by Craig et al. which revealed that self-esteem acts as a mediator in the connection between religiosity and mood [3]. Yoo discovered that self-esteem mediates the influence of existential well-being, a component of spiritual well-being, on depression [45].

The mediating effect of SRL in the relationship between religiosity and procrastination has received limited attention. However, previous findings have shown religiosity to be a predictor of SRL [14; 28], which, in turn, affects lower academic procrastination [22; 24]. Based on these studies, our prediction is that SRL may mediate the relationship between religiosity and academic procrastination. Furthermore, previous research has shown that self-regulation serves as a mediating factor in the association between religiosity and punctuality [38]. Furthermore, several other studies have discovered that SRL acts as a mediator in the relationship between religiosity and various individual psychological aspects. Zong & Cheah discovered that religious commitment is connected to increased levels of self-regulation, which subsequently contributes to more positive psychological adjustment [50]. Additionally, Zarzycka et al. discovered that religious individuals, by viewing their issues as under God's control, gain an alternative form of control, lessening self-regulation challenges and aiding in overcoming procrastination [46].

Prior studies have indicated that there is a negative relationship between smartphone addiction, religiosity, and academic procrastination, with self-esteem and SRL playing crucial roles. However, limited research has explored the mediating role of self-esteem and SRL in this relationship, and previous studies have yet to examine these variables simultaneously. Hence, the objective of this analysis is to offer fresh understandings into the mediating effects of self-esteem and SRL on the association between smartphone addiction and academic procrastination among students. Furthermore, while some studies have examined religiosity in the context of procrastination, this research may be one of the few studies considering the role of Muslim religiosity in academic procrastination.

The purpose of the current study was to investigate the relationship between smartphone addiction, religiosity, self-esteem, SRL, and academic procrastination. Additionally, we will

examine how self-esteem and SRL mediate the association between smartphone addiction, religiosity, and academic procrastination.

Method

Study Design and Participants

A cross-sectional survey research design was employed in this study. Convenient sampling was employed to select a total of 534 Muslim students from the 2019 to 2022 cohorts at the State Islamic Institute of Kerinci, Indonesia. However, only 521 students returned the questionnaires, resulting in a response rate of 97,56%. Ultimately, 512 valid responses were used for data analysis. Before collecting data, all participants provided informed consent, and measures were taken to guarantee their confidentiality. This research adhered to the principles outlined in the Helsinki Declaration and obtained approval from the Institutional Review Board (IRB) of the State Islamic Institute of Kerinci. All participants were 18 years of age or older.

Table 1 displays the distribution of respondents based on gender, age, daily internet usage, and residential area. Of the respondents, 296 (57,81%) were female, while 216 (42,19%) were male. The age distribution was as follows: 124 individuals (24,22%) were 18 years old, followed by 19 years old (23,83%), 20 years old (21,29%), 21 years old (17,19%), and 22 years old (13,47%). The majority of respondents reported using a smartphone for 4—6 hours (41,41%), followed by 7—9 hours (38,67%), 1—3 hours (17,38%), and more than 9 hours (2,54%).

Data collection tools

Procrastination scale

We utilized the Procrastination Scale developed by Tuckman [37]. This extensively employed measure encompasses an assessment of task postponement inclinations, aversion to unpleasant tasks, and a tendency to attribute personal distress to external factors. Comprising 16 items rated on a four-point Likert scale (1=Strongly Disagree, 4=Strongly Agree), the scale demonstrated robust internal consistency with a reported Alpha coefficient of 0,90 [37]. Subsequently, a cross-cultural adaptation was conducted for the Indonesian population. The Indonesian version of the scale exhibited a high reliability coefficient of 0,978.

The smartphone addiction scale — short version (SAS-SV)

SAS-SV is a research tool specifically created to evaluate smartphone addiction [19]. The SAS-SV was developed based on the original Smartphone Addiction Scale (SAS). The final 10 questions for the SAS-SV were selected based on content validity. The internal consistency of the SAS, as measured by Cronbach's alpha, was found to be 0,911 [19]. To adapt it for adult respondents in Indonesia,

Table 1

The characteristics of the respondents

Variables	Type	Frequency	Percentage
Gender	Male	216	42,19
	Female	296	57,81
Age	18 Years	124	24,22
	19 Years	122	23,83
	20 Years	109	21,29
	21 Years	88	17,19
	22 Years	69	13,47
Daily internet usage time	1—3 hours	89	17,38
	4—6 hours	212	41,41
	7—9 hours	198	38,67
	>9 hours	13	2,54

we translated the content into Indonesian and subsequently carried out internal consistency testing using Cronbach's Alpha, resulting in a satisfactory score of 0,941.

Religiosity among Muslims Scale

In this study, we utilized the Muslim Religiosity Scale developed by Mahudin et al. as a measure of religious beliefs and practices [27]. The final scale consists of a single factor with 10 items. The scale ranged from 1 (Strongly Disagree) to 4 (Strongly Agree) [27]. Reliability analysis revealed a Cronbach's alpha of 0,92 [27]. For the purposes of this study, we made adaptations to tailor it to the Indonesian population. Cronbach's alpha was used to assess the internal consistency of the scale. Our tests indicated that the scale yielded a high Alpha score (α=0,901).

Rosenberg self-esteem scale (RSE)

The Rosenberg Self-Esteem Scale (RSE) is a research scale developed by Morris Rosenberg in 1965 to measure self-esteem. The scale comprises 10 items with four Likert scale response choices (1=strongly agree — 4=strongly disagree). The RSE demonstrates high internal consistency, with a Guttman scale reproducibility coefficient 0,92 [15]. We translated this scale into Indonesian. Moreover, the adaptation process for the Indonesian population, conducted through internal consistency testing using Cronbach's Alpha, yielded a satisfactory score (α=0,964).

Academic self-regulated learning (A-SRL)

The Academic Self-Regulation Scale (A-SRL) is grounded in Zimmerman & Martinez-Pons' self-learning framework [26]. Comprising 55 items rated on a four-point response scale where participants indicate their agreement level from strongly agree (4) to strongly disagree (1), the scale demonstrated internal consistency with Cronbach's Alpha scores ranging from 0,73 to 0,87 [26]. In line with other research scales, adaptations were made to tailor it to the Indonesian population, resulting in a Cronbach's Alpha score of 0,983 for the scale in Indonesian.

Data Analysis

Descriptive analysis was conducted to determine the mean and standard deviation of each variable. Additionally, Spearman's non-parametric correlation test was employed to examine the relationships among the study variables (refer to Table 2). A correlation was deemed statistically significant if the p-value was ≤0,05. Spearman correlation analysis was chosen due to the non-normal distribution of several variables (refer to Table 3). Normality was assessed using the Kolmogorov-Smirnov test, a method utilized to evaluate whether a data sample adheres to a specific distribution. Rejection of the null hypothesis occurs when the p-value from the Kolmogorov-Smirnov test is below the designated significance level (<0,05), indicating a deviation from the assumed distribution.

In this study, Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to assess the developed structural model. PLS-SEM is utilized to evaluate hypotheses concerning relationships among latent variables. The study utilized the SmartPLS application version 3.2.9. The measurement model stage covers internal consistency, convergent validity, and discriminant validity. Cronbach's alpha values between 0,70 and 0,90 are considered satisfactory [13]. Convergent validity can be assessed by examining the average variance extracted (AVE), which is deemed acceptable if its value is ≥0,5 [13]. Discriminant validity can be tested by examining cross-loadings and using the Heterotrait-Monotrait Ratio (HTMT), ensuring the HTMT value is less than 1 [13]. After meeting all requirements, hypothesis testing is conducted to analyze the relationship between variables. Hypotheses are considered supported if the p-values are less than 0,05 or if the t-value exceeds 1,96 [13].

Results

The correlation among variables

Table 2 indicates the relationships between variables. Academic procrastination is positively linked to smartphone addiction (r=0,231, p=0,000) while exhibiting a negative association with self-esteem (r=–0,281, p=0,000). Notably, significant negative correlations are observed

between academic procrastination and various dimensions of SRL. Additionally, the SRL dimensions display positive associations with one another, as well as with self-esteem and religiosity, but exhibit negative correlations with smartphone addiction and academic procrastination. Furthermore, there is a significant negative correlation between smartphone addiction and self-esteem (r=–0,211, p=0,000). The correlations between all dimensions of religiosity and academic procrastination are also highly significant: Islam (r=-–0,267, p=0,000), Iman (r=–0,283, p=0,000), and Ihsan (r=–0,317, p=0,000). Furthermore, all dimensions of religiosity significantly and positively correlated with self-esteem. Therefore, it is expected that high scores on smartphone addiction, religiosity, self-esteem, and SRL will predict a strong relationship with academic procrastination among students in this study.

Measurement model

Table 3 displays the descriptive statistics for all variables, along with the results pertaining to their validity and reliability. The composite reliability value exceeds 0,7, signifying a notably high level of reliability for the constructs examined in the model. Furthermore, the assessment of convergent validity utilized the Average Variance Extracted (AVE). The AVE values acquired for all variables surpassed 0,5, indicating a substantial correlation between the indicators and the measured constructs in contrast to other latent factors [13].

Furthermore, the HTMT values between constructs were examined to assess discriminant validity. It is important to ensure that HTMT values are below 1 to maintain discriminant validity. Based on Table 4, the HTMT values for each correlation between constructs were below 1, indicating that the research model exhibits good validity.

Structural model

The results revealed a significant association between smartphone addiction and academic procrastination (β=0,124, p<0,01) as well as SRL (β=–0,337, p<0,001), while no significant correlation was observed with self-esteem (β=–0,065, p>0,05). SRL exhibited a significant correlation with academic procrastination (β=–0,386, p<0,001), along with religiosity (β=-0,200, p<0,001) and self-esteem (β=–0,444, p<0,001). Religiosity displayed a significant correlation with SRL (β=0,344, p<0,001) and self-esteem

Table 2

Correlation coefficients between variables (N=512)

	1	2	3	4	5	6	7	8	9	10	11	12	13
SA	1												
IS	–.212***	1											
IM	–.236***	.324***	1										
IH	–.245***	.288***	.311***	1									
SE	–.211***	.302***	.302***	.278***	1								
MS	–.225***	.232***	.214***	.267***	.322***	1							
GS	–211***	.212***	.256***	.232***	.278***	.278***	1						
SEV	–.289***	.233***	.220***	.219***	.298***	.323***	.267***	1					
SAS	–.277***	.276***	.209***	.278***	.319***	.321***	.323***	.288***	1				
LR	–.221***	.234***	.201***	.319***	.255***	.329***	.289***	.276***	.367***	1			
O	–.245***	.287***	.211***	.223***	.276***	.315***	.311***	.257***	.245***	.210***	1		
EST	–.255***	.235***	.246***	.216***	.336***	.289***	.223***	.269***	.302***	.223***	.331***	1	
AP	.231***	–.267***	–.283***	–.317***	–.281***	–.311***	–.317***	–.311***	–.283***	–.378***	–.278***	–.315***	1

Notes: SA = Smartphone Addiction; IS = Islam; IM = Iman; IH = Ihsan; SE = Self-Esteem; MS = Memory Strategy; GS = Goal Setting; SEV = Self Evaluation; SAS = Seeking Assistance; LR = Learning Responsibility; O = Organizing; EST = Environment Structuring; AP = Academic Procrastination; * — p<0,05; ** — p<0,01; *** — p<0,001.

Table 3

Descriptive statistics, normality test, construct validity, and reliability (N=512)

Variables	M	SD	Kolmogorov-Smirnov test	Composite Reliability (CR)	Average Variance Extracted (AVE)
Smartphone addiction	23,972	6,704	0,011	0,949	0,630
Religiosity	35,307	3,372	0,113	0,922	0,603
Self-esteem	35,602	4,967	0,061	0,967	0,549
Self-regulated learning	162,041	28,474	0,125	0,984	0,526
Academic procrastination	30,514	12,972	0,035	0,980	0,756

Table 4

Discriminant validity testing: Heterotrait-Monotrait ratio (HTMT)

Variables	1	2	3	4	5
Religiosity					
Academic procrastination	0,817				
Smartphone addiction	0,849	0,891			
SRL	0,834	0,868	0,794		
Self-esteem	0,888	0,894	0,858	0,819	

(β=0,166, p<0,01). Furthermore, the relationship between smartphone addiction and academic procrastination, mediated by SRL, was found to be significant (β=0,070, p<0,001), as was the mediation of the relationship between religiosity and academic procrastination by SRL (β=0,087, p<0,001) and self-esteem (β=0,101, p<0,001). However, the research did not yield significant evidence supporting self-esteem as a mediator in the relationship between smartphone addiction and academic procrastination (β=0,017, p>0,05) (refer to Table 5).

Table 5

Path Coefficient and Hypothesis Assessment of Direct and Indirect Paths

Path	Direct effect		Indirect effect	
	β	t–value	β	t–value
SRL → AP	–0,386	9,163**		
SE → AP	–0,444	8,636***		
SA → AP	0,124	2,806**		
RSY → AP	–0,200	4,909***		
SA → SRL	–0,337	6,011***		
SA → SE	–0,065	1,347		
RSY → SRL	0,344	5,970***		
RSY → SE	0,166	2,820**		
SA → SRL → AP			0,070	3,705***
SA → SE → AP			0,017	1,315
RSY → SRL → AP			0,087	4,166***
RSY → SE → AP			0,101	4,322***

Notes: SA = Smartphone addiction; RSY = Religiosity; SE = Self-esteem; SRL = Self-regulated learning; AP = Academic procrastination; ** — p<0,01; *** — p<0,001.

Discussion

The hypothesis testing conducted in this study confirmed a significant negative relationship between SRL and academic procrastination. Procrastination, as identified by Zhao et al. is a widespread issue related to a deficiency of self-regulation, leading to delays in the completion of crucial tasks [49]. A study also revealed a negative correlation between goal setting, decision making, designated study areas, learning procedures, and procrastination [39]. Previous research has shown that procrastinating students lack time management and goal-setting skills in the forethought phase [42]. Additionally, studies have linked procrastination to maladaptive motivation and behavioural characteristics described in the SRL literature [22].

This study highlights the relationship between self-esteem and academic procrastination. High self-esteem is associated with a lower likelihood of academic procrastination [43]. Another study found that self-esteem negatively predict academic procrastination [2]. Yang et al. also discovered that self-esteem negatively predicts initial levels of academic procrastination and positively predicts the increasing trend, while a negative trend in self-esteem predicts the increasing trend of academic procrastination [43]. Self-esteem was measured as positive self-assessment, and a negative relationship with academic procrastination was found in another study [18]. Individuals with high self-esteem and belief in their abilities tend to have lower levels of academic procrastination [11].

This research also investigates the relationship between smartphone addiction and academic procrastination. Prior analyses have indicated that individuals with smartphone addiction tend to have higher levels of academic procrastination [21; 23]. Excessive smartphone use may affect time management and prioritization of academic tasks. Correlation analysis has also found a positive association between the two variables [21]. Internet addiction has been related to academic procrastination, as the internet can distract from the learning process [6; 10]. Furthermore, smartphone addiction is associated with other procrastination behaviors and impairs the quality of life. Smartphone addiction is associated with bedtime procrastination, leading to delayed sleep [44].

This study demonstrates that religiosity has a significant negative relationship with academic procrastination. Previous research consistently indicates that individuals with higher levels of religiosity manage to engage in less academic procrastination [46]. Specifically, Madjid et al. conducted a study that elucidated how religious characteristics, such as discipline, responsibility, and respect for time, can aid in reducing academic procrastination [25]. Religion provides immediate motivation and encouragement to complete academic tasks [16]. The influence of religious values on fulfilling responsibilities and adhering to moral principles explains why individuals may feel compelled by their beliefs to avoid procrastination [12].

This study discovered that SRL has a significant role in the relationship between smartphone addiction and academic procrastination. This result is compatible with several previous investigations. For instance, a study on 228 students with disabilities found that SRL mediated the relationship between smartphone addiction and academic procrastination [8]. Specifically, time management and learning strategies were identified as mediators between smartphone addiction and academic procrastination among college students [23]. Dysfunctional behaviors were also found to have an indirect effect on academic procrastination through self-esteem [18]. Students who excessively use smartphones tend to procrastinate on their academic tasks and struggle with organizing their learning [8]. Moreover, SRL has been found to mediate the relationship between smartphone addiction and other factors such as sleep quality and academic achievement [48].

In contrast, we found no evidence that self-esteem mediates the relationship between smartphone addiction and academic procrastination. The absence of self-esteem's role in the relationship between smartphone addiction and academic procrastination may be attributed to

various reasons, one of which is that other factors may exert a stronger impact on this relationship. In a separate study, it was observed that academic self-efficacy partially acts as a mediator in the link between smartphone addiction and academic procrastination [21]. However, previous studies propose that self-esteem could serve as a mediator in the connection between smartphone addiction and depressive as well as hyperactive temperament [47].

Our study also established the significant mediating role of self-esteem between religiosity and academic procrastination. Existing research has consistently shown that higher levels of religiosity are negatively correlated with academic procrastination, indicating that individuals with stronger religious beliefs tend to show more increased levels of self-esteem [9; 17]. Conversely, investigations have indicated a negative association between high self-esteem and academic procrastination, indicating that individuals with higher levels of self-esteem tend to engage in lower levels of academic procrastination [18; 43]. The mediating role of self-esteem in the relationship between religiosity and other psychological variables has also been observed in prior studies. For instance, Craig et al. revealed that self-esteem mediates the relationship between spirituality and positive and negative affect [3].

We also established that SRL mediates the relationship between religiosity and academic procrastination, which aligns with previous research findings. A study involving university employees demonstrated that self-regulation significantly mediates the association between religiosity and punctuality [38]. Additionally, locus of control, prayer style, and self-regulatory processes may mediate the relationship between religiosity and academic procrastination [46]. The study suggests that individuals with religious beliefs may view their challenges as under God's control, offering them an alternative sense of control that helps reduce self-regulation difficulties and overcome procrastination [46]. Furthermore, existing literature highlights the crucial role of self-regulation in mediating various procrastination-related relationships. For example, self-regulation has been recognized as a mediator in the connection between emotional balance, self-regulatory competence, and procrastination tendencies [5]. Additionally, self-regulation serves as a mediator between attitudes toward time and procrastination, with individuals adjusting their behavior according to their anticipations of future outcomes [41].

This research has several limitations. The measurements were conducted cross-sectional, providing only a snapshot of the respondents' conditions without capturing long-term effects. Future studies should consider longitudinal measures for more comprehensive results. Furthermore, this research exclusively concentrated on investigating the correlation between smartphone addiction, self-esteem, SRL, and academic procrastination. It is crucial to explore the relationship between academic procrastination with learning achievement, competitive spirit, inferiority complex, and intention to quit school for a more comprehensive understanding. Additionally, there may be other mediating factors not considered in this study.

Conclusion and Implications

This research is designed to investigate the impact of smartphone addiction and religiosity on academic procrastination mediated by self-esteem and SRL. The results confirmed that self-esteem and SRL act as mediators between religiosity and academic procrastination. SRL also mediates the relationship between smartphone addiction and academic procrastination, whereas the mediating effect of self-esteem in these relationships is not significant. In addition to theoretical contributions, this study provides practical insights for campus counselors and college educators to address academic procrastination. Counselors should prioritize interventions focusing on smartphone addiction among college students. Furthermore, religious approaches, particularly in Indonesia where Islamic practices are effective, can be utilized [31]. The research underscores the role of self-esteem and SRL as mediators in the relationship between religiosity and academic procrastination, highlighting the need for intervention programs that enhance these factors among students.

Data Availability

The researchers ensure the availability of the research data. The dataset underpinning the findings of this study is publicly accessible on Mendeley Data at http://doi.org/10.17632/46rrkz8jky.1 [34].

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Psychophysiological Mechanisms of Math Anxiety: Review of Current Research

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Mathematical anxiety (MA) negatively affects all aspects of activities related to manipulating numbers, both in education and in everyday life. MA is negatively associated with mathematical self-efficacy, subjective value of mathematics, attitude, and interest towards mathematics. Individuals with pronounced MA have a lower need for cognitive load and reflective thinking. Among the predictors of MA, cognitive, personality, and social aspects can be identified. The question of the brain mechanisms of MA remains relevant. The review provides an analysis of studies on the neurophysiological correlates of mathematical anxiety using modern psychophysiological methods: electroencephalography, magnetic resonance imaging (MRI). The results of studies using these methods are inconsistent. When studying MA, attention is paid to brain structures associated with the processing of both emotional information and cognitive processes. The analysis of the literature has shown that when implementing corrective measures, it is important

to consider the lack of a unified theoretical approach, which raises questions about the causes of MA.

Keywords: math anxiety; causes of mathematical anxiety; psychophysiological methods; EEG; magnetic resonance imaging (MRI).

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Психофизиологические механизмы математической тревожности: обзор современных исследований

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Представленные в статье материалы посвящены проблеме математической тревожности (МТ). МТ негативно влияет на все стороны деятельности, связанные с манипулированием числами как в обучении, так и в повседневной жизни человека. Актуальным остается вопрос о мозговых механизмах МТ. Авторы ставили целью провести обзор исследований нейрофизиологических коррелятов математической тревожности с помощью психофизиологических методов: электроэнцефалографии (ЭЭГ) и магнитно-резонансной томографии (МРТ). Результаты исследований с их использованием неоднородны. При исследовании МТ внимание уделяется тем мозговым структурам, которые связаны с обработкой как

эмоциональной информации, так и когнитивных процессов. Результат проведенного обзора продемонстрировал, что у лиц с высокой МТ обнаруживаются значимые различия во всех измеряемых показателях ЭЭГ. У испытуемых с высокой МТ активируется больше зон, ответственных за переживание негативных эмоций (страх и боль) при решении задач, числовая информация воспринимается как угроза и вызывает напряжение. Теория механизма недостаточного торможения описывает цикл обратной связи МТ: МТ вызывается математической задачей, после чего возникает страх, занимающий часть рабочей памяти, поэтому ее объема не хватает для решения математической задачи, что приводит к неправильному решению. Рабочая память во многом определяет успешность обучения в целом и математике в частности. МРТ-исследования демонстрируют участие мозговых зон в корреляции высокой МТ и распределения внимания. Также в МРТ-исследованиях показано, что при предъявлении сложных математических заданий, независимо от МТ, активируются зоны мозга, ответственные за когнитивный контроль и регуляцию негативных эмоций. У людей с высокой МТ повышается активность регионов мозга, ответственных за выполнение числовых операций при использовании стратегии когнитивной переоценки, что проявляется в повышении эффективности решения математических задач и снижении негативных переживаний. На основе проведенного обзора делается вывод об отсутствии единой теории МТ и необходимости проведения комплексных психофизиологических исследований с учетом когнитивных и эмоциональных компонентов математической тревожности.

Ключевые слова: математическая тревожность; причины математической тревожности; психофизиологические методы; ЭЭГ; магнитно-резонансная томография (МРТ).

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Introduction

Mathematical anxiety (MA) is a negative emotional reaction characterized by avoidance, as well as feelings of unease in situations related to mathematical cognition and thinking. In other words, MA can be defined as a negative affective reaction of an individual to situations involving numbers and calculations, accompanied by feelings of tension and anxiety that hinder the manipulation of numbers and the solving of mathematical problems in a wide range of situations. MA can also be defined as a robust experiencing of negative emotions associated with broad range of situations that require the use of numbers. The difficulties some individuals face performing mathematical operations negatively impact their subjective well-being and, consequently, their socio-economic status, posing a significant challenge to contemporary Russian society. However, which psychophysiological mechanisms are involved in the formation of MA and to what extent remains a topic of discussion. As long as this issue remains unresolved, it is impossible to effectively identify the causes of MA and to carry

out corrective and compensatory measures. Thus, identifying the psychophysiological mechanisms of MA is not only an academic problem but also an acute issue justified by the demands of society: math competencies are a necessary condition for academic and professional success in the modern high-tech world. MA is negatively associated with the development of math competencies, leading to adverse consequences in career choice, limiting opportunities for employment and professional activity. This review aims to discuss the psychophysiological methods used to study the phenomenon of MA, as well as to analyze the main findings from research conducted using these methods.

MA is distinct from general anxiety or test anxiety, as well as it has specific psychophysiological and behavioral manifestations [1]. It is discussed that MA correlates with general anxiety; genetic differences contributing to general anxiety also contribute to genetic differences in MA, meaning that if a person has high anxiety, they are likely to exhibit high MA as well [40]. However, individuals who do not have high general anxiety can still display MA. Supporting this fact, data has shown that various indicators of MA correlate more strongly with each other than with constructs of general and mathematical anxiety [8]. In one study, it was found that MA arises as a response to numerical rather than textual representations of a problem [25].

Psychophysiological Methods for Measuring MA

MA Questionnaires are often used to assess MA [14;17;20;34]. However, as reported by F. Demedts and co-authors, this method of measurement is associated with a number of problems. Questionnaires require participants to recall how they feel in various situations, which involves retrospective assessment [15]. Here we encounter distortions in self-reports related to the peculiarities of memory. Additionally, the ability to self-report on one's behavior in specific situations is not available to all age groups, such as young children.

Measuring MA with psychophysiological methods is possible, as well as MA is rooted in physiological mechanisms of stress response. When MA occurs, a variety of reactions associated with the hypothalamic-pituitary-adrenal (HPA) axis and the release of glucocorticoids are activated [28;33]. Thus, MA has a well-defined physiological basis, allowing its psychological manifestations to be correlated with physiological reactions. Compared to survey methods, psychophysiological registration has several advantages, such as objectivity and the ability to directly measure MA in a modeled situation. The choice of registration methods can be based on the goals of the research. For measuring MA in educational settings such as schools and universities (i.e., in situations with high ecological validity) it is convenient to use methods that do not interfere with the everyday educational activities of respondents. Techniques may include the registration of skin galvanic response, heart rate, etc. In laboratory-based studies it is possible to use other methods: multichannel electroencephalography, magnetic resonance imaging, functional near-infrared spectroscopy, etc. In the next sections, we will take a closer look at the main psychophysiological methods used in MA research.

Electroencephalography (EEG)

Electroencephalography (EEG) is a non-invasive method for studying the functional state of the brain by recording its bioelectrical activity. Indicators such as event-related potentials, measures of rhythmic brain activity, source localization of elec-

trical activity, and connectivity metrics are examined in EEG analysis.

Event-related potentials are measured brain activity that occur in response to sensory, cognitive, or motor events. The waveforms of event-related potentials consist of a series of positive and negative voltage deflections associated with a set of basic components. Some components of event-related potentials are denoted by abbreviations (e.g., the negative result associated with an error — ERN), while most components are labeled with a letter (N/P) indicating polarity (negative/positive), followed by a number indicating either the delay in milliseconds or the ordinal position of the component in the waveform. The components of event-related potentials analyzed in MA research include: P2, P3, N450, and ERN. Differences in N450, a negative wave of the event-related potential that occurs in the 450 ms period after stimulus presentation, are explained within the framework of Eysenck's attention control theory: individuals with high MA demonstrate reactive (post-hoc) control, while those with low MA exhibit proactive (anticipatory) control [39]. More negative ERN amplitude has been shown in individuals with high MA during numerical tasks, indicating specificity in error monitoring [38]. It has also been demonstrated that individuals with high MA exhibit higher P300 event-related potential during mathematical tasks compared to those with low MA. The P300 component is a positive wave that peaks around 300 milliseconds after stimulus presentation [13]. The P300 component in individuals with MA also varies depending on decisions regarding purchases [19]. Another EEG study highlighted the important role of the P600/P3b component: this component has a higher amplitude and later onset in mathematically anxious individuals [38]. Individuals with high MA, regardless of their success in solving tasks, demonstrate higher P300 amplitude when anticipating a math problem.

EEG studies of event-related potentials have shown greater amplitude of event-related potentials during math problem-solving in students with high MA compared to those with low MA. This difference was observed across various types of math tasks [30]. This result is interpreted as an increase in working memory load.

A widely used approach involves source localization of the brain's bioelectrical activity recorded by electrodes during EEG recording. This approach allows for the identification of zones (sources) of current brain activation. Studies utilizing source localization methods (particularly sLORETA) indicate that individuals with high MA activate regions such as the insula and amygdala. The insula is involved in pain responses, while the amygdala is associated with emotional experiences (fear, stress, anxiety). Specifically, EEG studies have shown that individuals with high MA activate more areas responsible for experiencing negative emotions (fear and pain), whereas those with low MA show greater activation in regions responsible for working memory function—such as the anterior cingulate cortex, insula, and supplementary motor area [22]. These findings support theories explaining MA as a precursor to pain and align with fMRI research showing that individuals with MA activate regions associated with pain sensations during problem-solving, as well as studies demonstrating that MA is linked to activation of centers responsible for experiencing negative emotions [27;41].

Another informative EEG-indicator is the rhythmic activity of the brain. The EEG rhythm is a regular (having a fixed frequency) type of electrical activity corresponding to a certain specific state of the brain and

associated with particular cerebral mechanisms. The main EEG rhythms are linked to various mental states. Studies have shown an increase in gamma-range activity in individuals with high MA: the power of gamma oscillations increases in frontal leads [26]. A comparison of responses to numerical and textual information in people with high and low MA demonstrates that individuals with high MA exhibit higher gamma activity when perceiving numerical information compared to textual information, while no such differences were found for individuals with low MA. According to the authors, these results indicate that people with high MA perceive numerical information as a threat [10]. Additionally, studies have found differences between highly anxious and low-anxiety individuals in the alpha range [2]. Alpha activity is traditionally associated with wakefulness in a calm state, and thus the differences may reflect a variance in the ability to relax among those with high versus low MA.

Psychological traits, including MA, are related to the structural features of brain networks, particularly the number of "weak" pathways for information transmission within the network. The theory of the insufficient inhibition mechanism describes the feedback cycle of MA: MA is triggered by a mathematical problem [5;6;18]. This induces fear in the individual, occupying part of their working memory, which is insufficient for solving the math problem, leading to incorrect solutions. Functional connectivity analysis shows that individuals with low MA have more structured cortical networks with increased connectivity in areas related to working memory, such as the frontal cortex. In contrast, the brains of individuals with high MA exhibit a more dispersed and unstructured network, supporting the notion of working memory impairments [22]. Furthermore, an EEG study on cognitive fatigue during math problem-solving did not reveal differences in neural correlates of cognitive fatigue between individuals with high and low MA [42]. It should also be noted that MA can be predicted with 93.75% accuracy based on features of the electroencephalogram (EEG), using the machine learning method NBTree [21].

Magnetic Resonance Imaging (MRI), Functional MRI (fMRI), Diffusion MRI (dMRI)

When studying MA, special attention is paid to those brain structures that are associated with the processing of emotional information and working memory. Neurocognitive research using fMRI has shown that MA is linked to abnormal activity in the right amygdala [11;31]. Working memory is considered one of the important determinants of successful learning and mathematical cognition [24]. According to Baddeley's model, working memory includes three components: (I) a visuospatial component, which serves as a storage for visual and spatial information; (II) a verbal component necessary for storing verbal information; (III) a central executive component involved in regulating, manipulating, and processing information [9]. Children with low levels of the visuospatial component of working memory suffer the most from MA when learning math [36].

MRI studies using morphometry have shown that high MA is negatively correlated with the volume of gray matter in the left intraparietal sulcus, which is responsible for attention distribution [16]. A study using functional magnetic resonance imaging (fMRI) showed that when employing a cognitive reappraisal strategy, individuals with high MA exhibit increased activity in brain regions responsible for performing numerical operations (Dorsal PFC/supplementary motor cortex, Inferior frontal cortex/frontal

operculum, Medial prefrontal/temporal lobe, Temporo-parietal junction, Left anterior prefrontal cortex). At the behavioral level, this is reflected in an increase in correctly solved tasks and a simultaneous decrease in negative experiences related to math stimuli [32].

In another fMRI study it was revealed that when anticipating a complex math task, negative emotions arise in both individuals with high and low MA, and brain activity during this does not depend on a person's level of MA. It was also shown that when anticipating a complex math task, regardless of MA, areas of the brain responsible for cognitive control and regulation of negative emotions (such as the anterior cingulate cortex) are activated [23].

Using fMRI, differences in functional connectivity within and between the dorsal attention network (DAN), ventral attention network (VAN), and default mode network (DMN) were demonstrated in physics students with high and low MA while solving physics tasks [35].

A study using diffusion magnetic resonance imaging (dMRI) revealed a positive correlation between scores on the Abbreviated Math Anxiety Scale (AMAS) and the degree of microstructural connectivity in the left arcuate fasciculus (AF), the body of the corpus callosum (CC), right cingulum, and left inferior longitudinal fasciculus (ILF) in men. In women, a positive correlation was found between AMAS scores and the degree of microstructural connectivity in the genu of CC, right ILF, and bilateral fornices; a negative correlation was observed between AMAS scores and the degree of microstructural connectivity in the left cingulum and right cingulum [29].

Conclusion

The literature analysis revealed a methodological problem in studies of the brain mechanisms of math anxiety (MA), which raises questions about the causes of MA and complicates the selection of psychological and pedagogical interventions and their effectiveness.

Firstly, this is due to the complexity of the phenomenon of MA itself. MA is a distinct psychological construct with cognitive, personal and social predictors. For example, MA can arise in individuals with high anxiety and high cognitive abilities, as well as in low-anxiety individuals with deficits in specific cognitive functions.

Secondly, the results of studies using psychophysiological methods (EEG, MRI, fMRI, dMRI) demonstrate a wide range of data due to the specificity of each of the mentioned methods. On the one hand, data regarding the involvement of cognitive characteristics, such as working memory and attention control, in the formation of MA have been obtained. On the other hand, a link between MA and emotional experiences and feelings of pain has been identified.

The analysis conducted allows for a more detailed plan for further research aimed at identifying the brain mechanisms of MA. The first stage involves conducting a study using EEG, which will include participants with varying levels of MA and general anxiety. The experimental design will incorporate cognitive abilities significant for MA (working memory, solving arithmetic tasks, academic grades in math disciplines, etc.). EEG will be recorded in a resting state and during experimental tasks, allowing us to subsequently use analysis based on graph theory. The goal of our research is to specify the psychophysiological mechanisms of MA using EEG, particularly in identifying the activation of brain regions and parameters of functional connectivity. In the future, we plan to expand the study by including other psychophysiological methods.

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Comparative Analysis of the Formation of Mathematical Concepts among Students through the Prism of APOS Theory: Urban vs. Rural

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The materials presented in the article are devoted to studying the influence of regional characteristics, which define the context of the social component of secondary education (in urban and rural areas), on the formation of mathematical concepts among students. The authors aim to demonstrate the degree of formation of mathematical concepts among students depending on the regional aspect. The study presented in this article involved 96 first-year students from the Institute of Construction at Kazan State University of Architecture and Engineering. The research emphasizes that it is grounded in the APOS theory (Action-Process-Object-Schema), which allows for a step-by-step tracking of the understanding process, identifying typical errors and classifying them. According to its principles, a questionnaire was prepared to analyze the process of understanding mathematical concepts among students. The empirical foundation was formed by the data from a written survey conducted among students, with quantitative indicators analyzed at each stage of APOS, considering geographical diversity. Errors were classified as conceptual and procedural, allowing for the recognition of differences in students' competence levels according to the stages of the APOS theory. The work demonstrates the effectiveness of applying the APOS theory to a comparative analysis of the mathematical skills of urban and rural students. The research revealed no statistically significant differences in procedural errors between urban and rural students. The study established that at the Schema stage, statistically significant differences in the mastery of mathematical concepts exist between students from different groups. The article concludes that a step-by-step analysis of students' cognitive development is crucial for identifying their potential and contributes to developing effective teaching methods.

Keywords: math; function; error classification; city; village; APOS theory; action; process; object; scheme.

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Сравнительный анализ сформированности математических понятий у студентов через призму теории APOS: город против села

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Представленные в статье материалы посвящены изучению влияния региональных особенностей, определяющих контекст социальной составляющей получения среднего образования (в городе и сельской местности), на сформированность математических понятий у студентов. Авторы ставили целью статьи показать степень сформированности математических понятий у студентов в зависимости от регионального аспекта. В представленном в данной статье исследовании участвовали 96 первокурсников Института строительства Казанского государственного архитектурно-строительного университета. Отмечается, что проведенное исследование основывается на теории APOS (Действие-Процесс-Объект-Схема), которая позволяет поэтапно проследить процесс понимания, выявлять типичные ошибки и классифицировать их. Соответственно ее положениям был разработан опросник для анализа процесса формирования понимания математических концепций у студентов. Эмпирическую основу составили данные письменного опроса, проведенного среди учащихся, с анализом количественных показателей на каждой из стадий APOS с учетом географического разнообразия. Проведена классификация ошибок как концептуальных и процессуальных, позволившая выявить различия между студентами в уровне их компетентности в соответствии со стадиями теории APOS. В работе показана результативность и эффективность применения теории APOS к сравнительному анализу математических навыков городских и сельских студентов. Установлено, что статистически значимых различий в процессуальных ошибках между городскими

и сельскими студентами нет. Выявлено, что на стадии Схема имеются статистически значимые различия в усвоении математических понятий между студентами разных групп. Делается вывод о том, что поэтапный анализ когнитивного развития студентов имеет существенное значение для идентификации их потенциала и способствует разработке эффективных методик обучения.

Ключевые слова: математика; функция; классификация ошибок; город; село; теория APOS; действие; процесс; объект; схема.

Дополнительные материалы: Туктамышов Н.К., Горская Т.Ю. Материалы тестов к статье «Сравнительный анализ сформированности математических понятий у студентов через призму теории APOS: город против села»: Набор данных. RusPsyData: Репозиторий психологических исследований и инструментов. Москва. 2024. https://doi.org/10.48612/MSUPE/xu26-hfxz-h4eh

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Introduction

In the modern world, mathematics education plays a key role in developing critical thinking and analytical skills needed for successful adaptation to rapidly changing technological and social conditions.

Social, cultural, geographical, and economic factors influence the development of students' thinking [13; 18]. According to Rosstat data, 75% of university students come from urban areas, while 21% come from villages and rural settlements. This highlights the importance of research aimed at studying the peculiarities of teaching urban and rural students. Studies [13] indicate that rural youth generally have lower educational aspirations than their urban peers. In this regard, we should note the results of a team of authors who proposed a model considering regional risks to improve the quality of education in rural schools in Bashkortostan [3]. R. Parsons [19] was among the first to identify the mismatch of social and cultural contexts as a barrier to education for rural and non-rural youth. On one hand, this difference lies in the socioeconomic status between rural and urban families [16], and on the other, in the professional aspirations of rural and non-rural youth [15].

In exploring the development of students' mathematical skills and identifying influencing factors, researchers examined thought structures, math anxiety [10], and emotional experience [18]. The significance of these factors for the development of mathematical skills is confirmed by numerous studies (see, for example, [1; 5; 10]), including [8; 18] which discuss their influence on the understanding of mathematics. Although there are differing opinions on the phenomenon of mathematical understanding (see, for example, [17; 22]), the number of studies in this area has recently been increasing, particularly among foreign researchers (see the review [20]; among domestic studies, see [2]).

This study applies the APOS theory, which emphasizes sequential development of mathematical concepts through internal construction and reflection. This theory was specifically designed to study mental structures in the process of learning mathematics. Based on the principles

of constructivism and drawing on the works of J. Piaget [5], APOS theory was developed by E. Dubinsky [14] to analyze the structuring of mathematical concepts in students' minds. According to APOS theory, mental constructions rooted in reflective abstraction [14] are defined as Action, Process, Object, and Schema. Arnon and other researchers [9] describe APOS as "a theory of how mathematical concepts may be learned." Detailed descriptions of APOS applications in mathematics education are provided in the review article [20].

The choice of this research topic stems from the limited study of how regional educational conditions influence the understanding of mathematical concepts. While the external factors mentioned earlier implicitly affect the stages of APOS, this study focuses on determining the degree of mathematical concept formation among students through the lens of APOS theory in a regional context.

Problem Statement: How do regional differences in secondary education (urban versus rural) impact the formation of mathematical concepts in students?

Objective: The purpose of this study was to determine the extent of mathematical concept formation among students in the context of social and geographical diversity using APOS theory. It was hypothesized that students' social and geographical backgrounds and their level of basic mathematical training influence their degree of concept formation. This is reflected in the quantity and nature of conceptual and procedural errors at each stage of APOS theory. Consequently, the study focuses on analyzing students' errors at various stages of understanding mathematical concepts.

To achieve this objective, the following tasks were identified:

— Determine how students from different geographical (urban, rural) and social contexts understand and apply basic mathematical concepts at each stage of APOS theory;

— Conduct a comparative analysis of the frequency and types of errors at APOS stages across different groups of students.

Methods

As mentioned above, this study used APOS theory, developed by E. Dubinsky and colleagues [9], as its theoretical foundation. APOS theory (Action-Process-Object-Schema) is a modification of Piaget's ideas on reflective abstraction [5], applied to the analysis of mental structures necessary for learning mathematics (see [9] for details). Reflective abstraction focuses on universal characteristics of actions unrelated to the specific mathematical objects being manipulated [8].

Within APOS, an Action is defined as manipulation of an already existing mathematical object that the student perceives as external. Actions are based on rules and algorithms that students repeatedly practice under the teacher's guidance and are tied to specific objects. When an Action is repeated and the student responds to it, it can transform into a Process, shifting from the external to the internal realm. This stage involves internalizing actions into procedures, enabling students to independently perform actions or generalize them into processes valid for the same type of mathematical object.

When the context in which the student constructs the Process changes, the student may need to act on the Process itself to understand new problem situations. In this case, the student must perceive the Process as a unified entity, as an independent object. If the student is able to perform or imagine actions on the Process, it is said

to be encapsulated into an Object. In the context of functions, this means that the student can, for example, determine intervals of increase and decrease of functions. Actions, Processes, Objects, and other previously created mental structures associated with a given mathematical concept can be combined into a single structure known as a Schema. The Schema is activated in response to a problem situation that the student perceives as an instance of a specific mathematical concept.

The main methods used in this study were:

— A systematic approach to analyze scholarly and pedagogical publications on the research topic, to identify and synthesize the theoretical foundations of the problem;

— Content analysis of survey results, to evaluate the understanding of mathematical concepts according to APOS theory;

— Statistical analysis methods: Mann—Whitney U test, Shapiro—Wilk test, and Kruskal—Wallis test.

This study analyzes students' errors at various stages, offering ways to address them.

The empirical stage of the research was conducted at Kazan State University of Architecture and Engineering. The study proceeded in stages:

1. Theoretical stage: Establishing the premises of the research and creating a survey to assess students' readiness to understand and determine their stages of mathematical concept understanding according to APOS theory.

2. Experimental stage: Conducting the survey to identify errors and assess students' understanding of mathematical concepts, followed by analysis of the results.

The survey included 96 first-year students, 57 of whom were female and 39 male, enrolled in the "Construction" program at Kazan State University of Architecture and Engineering (KSUAE). The students were aged 17—18 years.

A questionnaire developed by the authors was used, consisting of typical Unified State Exam (USE) tasks sourced from an educational portal for exam preparation "Reshu EGE" (https://ege.sdamgia.ru/) and adapted to APOS theory. The survey assessed the formation of mathematical concepts (algebraic expressions, functions, derivatives, solving equations and inequalities, function graphs) among students. The USE tasks were used for the Action and Process stages. Examples of tasks included:

Part 2 (Process):

1. Find the minimum value of a function $y = (8 - x)e^{9-x}$ on a segment [3; 10].

2. Find the point of minimum of a function

$$y = -\frac{x}{x^2 + 256}.$$

This example illustrates tasks aimed at evaluating students' ability to understand and perform sequential actions or algorithms — key characteristics of the Process stage in APOS theory.

Results

Based on the data analysis, the information was categorized by social component, dividing settlements into three groups: Kazan, other cities, and villages/rural areas. Another important factor was the USE score, divided into two categories: 40—64 points and 65—100 points, reflecting the baseline level of mathematical knowledge. The threshold of 65 points was chosen as the average USE math score for students admitted to technical universities in Kazan (KSUAE, Kazan State Power Engineering University, Kazan National Research Technological University) in 2023 was 65 points.

The following data were obtained from the survey participants.

Analyzing the data, it can be noted that two-thirds of the first-year cohort scored above 65 on the USE. Additionally, 35.4% of all first-year students were from Kazan, 42.7% came from other cities (small towns) in Tatarstan and Russia, and 21.9% were from rural areas. Among first-year students scoring above 65, only 29.7% were from Kazan, while 43.8% came from other cities, and 26.5% were from rural areas. The majority of high-scoring students, therefore, came from other cities.

Further analysis of the proportions of first-year students from each group (Kazan, other cities, rural areas) with scores above or below 65 reveals that among those from Kazan, 55.8% scored above 65, while 44.2% scored below. For other cities, the distribution was 69.2% scoring above 65 and 30.8% scoring below. For rural areas, 80.9% scored above 65 and 19.1% below.

Following [20], errors were classified as conceptual and procedural, although other classification methods exist [4]. Conceptual errors indicate a lack of understanding of the problem's essence, failure to grasp relationships within the problem and between concepts. Procedural errors occur due to incorrect execution of operations or algorithms, revealing difficulties with technical, formal transformations even when basic concepts are understood. This approach to error analysis through APOS theory has proven highly productive, particularly in the topic of "Differentiation" [21]. Conceptual and procedural errors were diagnosed using a questionnaire designed around APOS stages, analyzing responses to identify errors, and manually reviewing and scoring answers. Results of the Shapiro—Wilk test for data from Kazan, rural areas, and other cities showed that the data were not normally distributed. The Kruskal—Wallis test for each stage (Action, Process, Object, Schema) revealed no statistically significant differences in procedural errors across the three groups. However, for conceptual errors at the Schema stage, statistically significant differences were found ($p = 0.001$, which is well below the significance level of 0.05). Pairwise comparisons using the Mann—Whitney test followed.

Let us present the results of the analysis of procedural errors made by students (see Fig. 1).

Procedural errors were most common during the Process stage across all groups. Common procedural errors included incorrect use of parentheses and substitutions, arithmetic mistakes, and failure to eliminate extraneous roots. Rural school graduates made fewer errors overall compared to others. The Mann—Whitney test showed no statistically significant differences in the number of procedural errors between different locations at a significance level of 0.05.

Conceptual errors were compared at the Object and Schema stages since these stages are more indicative of students' understanding of mathematical concepts. Let us present a graphical representation (Fig. 2) for the analysis of conceptual errors at the Object stage using Boxplot [12].

Table

Quantitative and qualitative composition of survey participants

USE Score\Location	Kazan	Other cities	Villages (rural areas)	Total
40—64	15	13	4	**32**
65—100	19	28	17	**64**
Total	34	41	21	96

Boxplot visually displays five numerical characteristics of data: minimum, first quartile (Q1), median, third quartile (Q3), and maximum, as well as outliers.

A statistical analysis conducted at the Object stage showed that the p-value for rural areas and Kazan was p=0.6496; for rural areas and other cities, p=0.5804; and for Kazan and other cities, p=0.35133. In all comparisons, the p-values were above 0.05, indicating no statistically significant differences in the number of conceptual errors among students from rural areas, Kazan, and other cities at the Object stage. Median values were 3.0 for rural areas and other cities, and 4.0 for Kazan.

An analysis of conceptual errors at the Schema stage revealed statistically significant differences between Kazan and rural areas (p=0.0035), as well as between Kazan and other cities (p=0.0007). No significant differences were found between rural areas and other cities (p=0.7254).

To visually present the differences between the groups (rural areas, Kazan, and other cities), we include a Boxplot (Figure 3) showing the distribution of the number of conceptual errors for each group

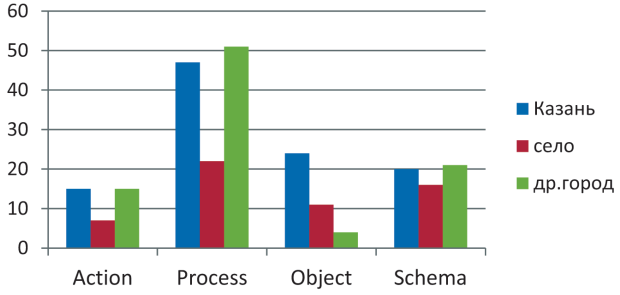

Fig. 1. Diagram of the distribution of procedural errors by APOS stages for students from Kazan, rural areas and other cities: on the vertical axis, divisions are marked (from 0 to 60), corresponding to the number of procedural errors

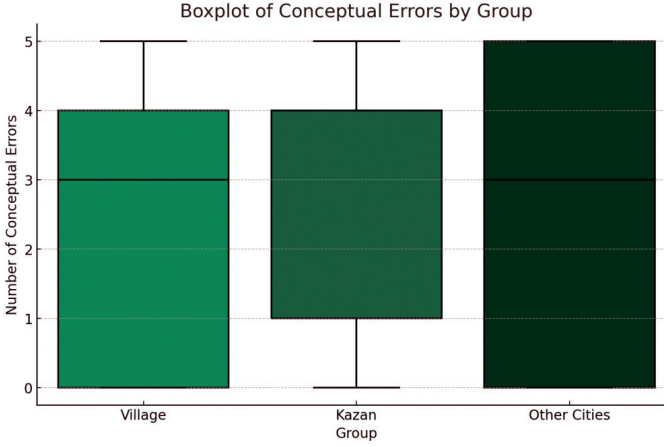

Fig. 2. Graphical representation of conceptual errors at the Object stage

at the Schema stage, with median values highlighted in yellow.

The presented Boxplot shows that the median number of conceptual errors in Kazan (7.0) is higher than in rural areas and other cities (both 4.0), with a larger spread of errors. The distributions in rural areas and other cities are similar, with less variability. The median is 7 because the value at the midpoint of the data is 7. Q3 is also 7, as 75% of the data falls at or below this value, and all surrounding data points are also 7. This means that, while not all 34 students make exactly 7 errors, a significant number of them (22 out of 34) do.

The results of the Mann-Whitney test confirm statistically significant differences between Kazan and the other groups, while there are no differences between rural areas and other cities.

For illustration, we provide examples of typical procedural and conceptual errors.

In Figure 4, it is clear that no solution is provided. The task required substituting (3+x) and (3-x) as arguments into the given function h(x), then simplifying the resulting expression. It is evident that this is a conceptual error, as the student did not understand the task's instructions.

The next example (Figure 5) relates to the same task, but here it involves a procedural error in the form of a typo.

A typo occurred during the substitution: in the third line, the second term under the square root incorrectly has "x" instead of the number 3. That is, under the square

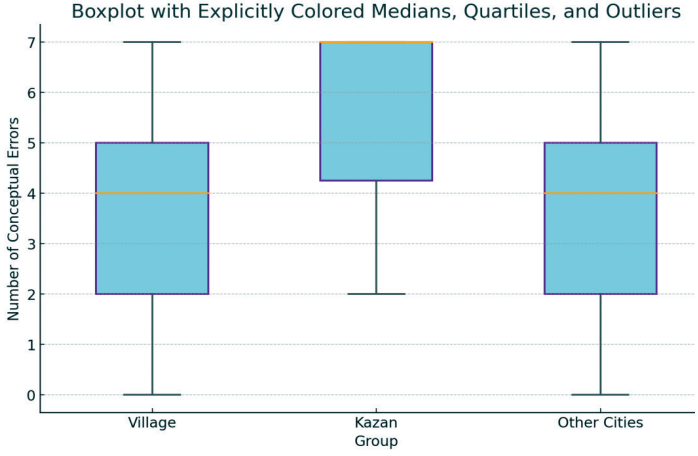

Fig. 3. Graphical representation of conceptual errors at the Schema stage

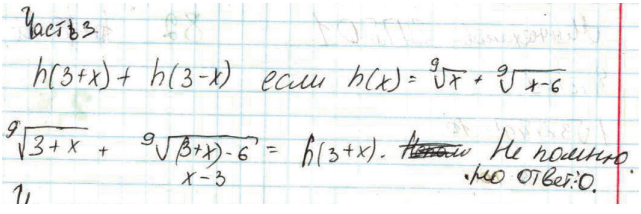

Fig. 4. An example of a conceptual error in a student's work

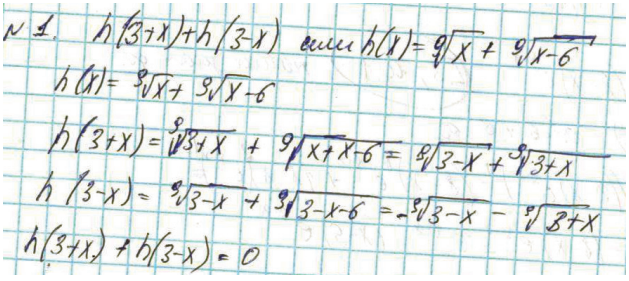

Fig. 5. An example of a procedural error in a student's work

root it says "x+x–6" when it should have been "x+3–6."

Additionally, we note that the data on which these studies are based is presented in article [7].

Discussion

Following [17], step-by-step analysis of the cognitive process helps reveal the relationship between mathematical activity and mathematical thinking. The novelty of our study lies in identifying the impact of social factors on students' mathematical concept formation. APOS stages, as a framework, help uncover gaps in education and student potential. However, the study did not explicitly consider teaching quality, socioeconomic status, psychological characteristics, or students' prior educational experiences.

Data analysis shows that most students are at the Action stage of learning differential calculus, highlighting weaknesses in critical thinking [11]. Experiments revealed that procedural errors stem from insufficient knowledge of school material on functions, elementary algebraic transformations, and connections between mathematical symbols and their visualization, aligning with findings from [6].

Rural and out-of-town students showed better results compared to Kazan graduates, especially at the more advanced APOS stages. The high number of conceptual errors among Kazan students at the Schema stage is associated with difficulties in analyzing function graphs and solving irrational equations.

Students who scored above 65 on the USE performed better at all APOS stages compared to those who scored below 65, confirming the relevance of USE scores as an indicator of mathematical knowledge.

Conclusion

Theoretical and experimental results from this study lead to several conclusions:

1. Applying APOS theory to analyze differences between urban and rural students helps identify barriers to learning mathematics and develop teaching strategies tailored to their educational backgrounds. This includes adapting instructional materials and methods and creating supportive programs that foster the critical APOS learning stages.

2. Students' errors are both conceptual and procedural. Differences in procedural errors between student groups at the Action and Process stages are not statistically significant and may be random. Conceptual errors generally occur at the Object and Schema stages, highlighting difficulties in deep understanding of mathematical concepts. At the Schema stage, statistically significant differences exist between Kazan and rural areas, as well as between Kazan and other cities.

3. The practical significance of this research lies in the ability to monitor students' academic performance, assess their understanding of mathematical concepts, and organize group discussions that help transform isolated actions into coherent processes.

Future research prospects include studying the effectiveness of pedagogical interventions and technologies to reduce conceptual and procedural errors at different APOS stages, the impact of modern technologies and innovative teaching methods on students' mathematical concept formation, and cross-cultural studies.

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The Role of Academic Motivation, Life Aspirations and Self-congruence in the Professional Intentions of Teacher Education Students

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The article presents the results of the study of the influence of psychological factors on the professional intentions of teacher education students. The training of students for their future work at schools is very important. Considering intentions as a motivational phenomenon, the authors apply self-determination theory. A research hypothesis explains that the intention of students to work at schools is indirectly related to self-congruence. The mediators of this relationship may include satisfaction with the profession, intrinsic academic motivation, and the aspiration to contribute to the community. 240 students (aged 17 to 25 years, 67% girls) were recruited for the study. The results of the structural equation modeling confirmed the hypothesis of a mediated relationship between the intention to work at schools and self-congruence. Satisfaction with the profession and intrinsic academic motivation function as mediators of this relationship. The aspiration to contribute to the community is related to the intention to work at schools, but it does not mediate the relationship with self-congruence. From a practical perspective, it is important to support students' satisfaction with the profession and their intrinsic academic motivation during their study in order to strengthen their aspiration to work at schools.

Keywords: professional intentions; students of pedagogical universities; self-determination theory; intrinsic motivation; life aspirations; autonomous functioning; self-congruence.

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Роль академической мотивации, жизненных стремлений и самоконгруэнтности в профессиональных намерениях студентов педагогического вуза

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Представлены результаты исследования проблемы влияния психологических факторов на профессиональные намерения выпускников педвузов. Актуальность проблемы обусловлена необходимостью совершенствования подготовки студентов педвузов к работе в школе. Рассматривая намерения как мотивационный феномен, авторы опираются в своем исследовании на теорию самодетерминации. Гипотеза исследования: намерение выпускников педвузов работать по полученной специальности опосредованно связано с самоконгруэнтностью. Медиаторами этой связи могут быть удовлетворенность профессией и побуждения автономного характера: внутренняя академическая мотивация и стремление внести вклад в жизнь сообщества. Выборку составили 240 студентов педвуза (возраст от 17 до 25 лет, 67% девушек). Результаты структурного моделирования подтвердили гипотезу об опосредованной связи намерения работать по полученной педагогической специальности с самоконгруэнтностью. Удовлетворенность профессией и внутренняя академическая мотивация являются медиаторами этой связи. Стремление внести вклад в жизнь сообщества связано со стремлением работать по профессии, однако оно не опосредует связи с самоконгруэнтностью. С практической точки зрения важно, что для укрепления стремления работать по специальности в ходе обучения студентов необходимо поддерживать их удовлетворенность выбранной профессией и внутреннюю академическую мотивацию.

Ключевые слова: профессиональные намерения; студенты педвуза; теория самодетерминации; внутренняя мотивация; жизненные стремления; автономное функционирование; самоконгруэнтность.

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Introduction

According to authoritative international studies, the crucial factor in the school education quality is the teacher qualification [1]. This means that for its growth it is critically important that the most capable and qualified graduates come to work in schools in the future. However, teacher education students have a weak orientation to work in schools [13], and the low percentage of graduates' employment in education is considered as one of the serious problems of teacher education in the country [8]. The idea of double negative selection has become popular, according to which the worse applicants get into pedagogical universities, and the worse university graduates get jobs in schools [6; 7; 12]. Supported by data on Moscow universities [12], this idea is criticized for ignoring the somewhat different situation in other regions [6]. The question of whether pedagogical universities successfully provide schools with new personnel continues to be discussed in both scientific and administrative environments [7-9]. An important aspect of this problem is the life plans of students, since "the determining factor of successful employment is not the problems of schools, but the professional intentions of graduates" [9, p. 60].

Studies of professional intentions and plans of teacher education students are often descriptive and have no solid theoretical background [2; 12; 13]. Professional intentions are directly related to the vocational choice motives and academic motivation, so it seems that the most relevant theoretical framework for such study is one of the leading approaches in modern psychology of motivation — self-determination theory [16]. Self-determination (autonomy) is discussed here at different levels of abstraction. It can be considered as a general personal disposition, which has a wide range of implications, and as intrinsic life aspirations common for different spheres of life. At a specific level, self-determination can be analyzed as activity-specific autonomous motives [16].

A relatively specific level of analysis in this context is the motivation of educational and professional activity. Intrinsic academic motivation as the most autonomous type of motives is considered among the most important indicators of teacher education students' readiness for working at schools [11]. The positive consequences of intrinsic motivation for professional activity are well known, for example, it is closely related to job satisfaction and involvement in the activity [10]. In teach-

ers, autonomous (including intrinsic) motivation not only contributes to well-being and less susceptibility to stress but is also combined with a preference for teaching styles that support students' autonomous academic motivation [17].

At a more abstract level, the factors important for professional intentions include external and intrinsic life aspirations. The most interesting among the latter is the aspiration to contribute to the life of the community. The previous studies showed that not only the degree of autonomy of aspirations, but also their "social breadth" was of great importance [14]. Given the social importance of the teaching profession, we can expect that such socially oriented intrinsic aspiration is important for its choice and intention to work at schools.

At an even more abstract level of analysis, a common source of intrinsic life aspirations and intrinsic motivation for various activities may be a personal disposition, manifested in the tendency to feel autonomous and able to make free choices in various situations. Although situational factors that determine the (un)satisfaction of the need for autonomy have received most research attention, there is also growing interest in relatively stable individual differences in whether autonomous or under pressure and control one feels in different situations [19; 20]. Such differences in dispositional autonomy are considered in studies on "autonomous functioning" [20]. People with salient dispositional autonomy tend to evaluate their actions as autonomous and self-regulated, or at least as consistent with their own interests and values [20].

Various methods have been proposed to assess dispositional autonomy, among which the best known in our country is the Index of Autonomous Functioning questionnaire [20]. It measures three indicators of dispositional autonomy: self-congruence (or authorship), interest-taking and low susceptibility to control [5; 20]. Self-congruence is a central element of dispositional autonomy. A self-congruent person feels that he is the "author" of his own behavior, the decisions and the choices he makes. His/her actions are perceived as congruent with personal goals and values, rather than being a forced response to circumstances or expectations of others. Interest-taking refers to the willingness to respond with interest to external events and internal experiences, contributing to a greater awareness and understanding of self. Susceptibility to control, which is less characteristic of highly autonomous people, refers to the tendency to feel less freedom of choice in various situations.

These indicators are considered as various aspects of a common construct — autonomous functioning, but their interrelationship is moderate. In the original version, the factor loadings of the three primary factors of the questionnaire on the general factor are moderate (0.32—0.58) [20]; the internal consistency of the whole questionnaire also has a rather modest value (α=0.65), despite high values for individual scales [18]. This suggests that the indicators of autonomous functioning are relatively independent components with different implications. This conclusion is confirmed by their very different correlations with other indicators [5; 20]. Following the authors of the questionnaire, we tend to consider self-congruence as the most important indicator of autonomy, as evidenced by the closest correlations of the need for autonomy and autonomous causal orientation with self-congruence [20]. According to the authors of the Russian version of this questionnaire, the self-congruence scale shows the highest correlations with external validity criteria, such as, for example, satisfaction with choice [5].

The relationship of autonomous functioning to vocational and career choice has not often been the subject of research. Nevertheless, its importance for the choice of a college major and subsequent success in its development has been established [21]. Given these data and findings from past research on the relationship of self-congruence with intrinsic life aspirations [20] and subjective quality of choice [5], we assumed its important role in the conscious and autonomous choice of a teaching profession, which is expressed in the aspiration not only to receive a teacher education but also to subsequently work as a teacher. It can be expected that self-congruence mediated through autonomous motives (intrinsic academic motivation, aspiration to contribute to the life of the community) supports satisfaction with the chosen teaching profession and aspiration to work at schools.

The purpose of the study presented in this article was to establish the role of academic motivation, life aspirations and self-congruence in the professional intentions of teacher education students.

The following research objectives were addressed:

1) organizing and conducting a survey of teacher education students using appropriate questionnaires;

2) analyzing correlations between the measured psychological variables;

3) testing fit to the obtained data of the hypothetical structural model, in which the intention to work at schools is related to self-congruence through satisfaction with the profession and autonomous motivations: intrinsic academic motivation and the aspiration to contribute to the life of the community. Given the popularity of the idea of double negative selection [6; 7; 12], an additional objective of the study was also to assess the relationship between academic achievement and students' intention to work at schools.

Sample and research methods

The sample comprised 240 1st—5th year teacher education students (mean age M=20.58; SD=1.66; 17—25 years old), including 79 (33%) males and 161 (67%) females who participated in the voluntary online survey. They are full-time students in groups with various teacher training profiles.

Methods. *The Teaching Career Preference Scale* (TCPS) was compiled for this study from two direct and two reversed items (see Appendix) with a 10-point response scale to assess the subjective probability of different career options[1]. The use of such a response scale allows for an interpretation of the final score as the subjective likelihood of pursuing a teaching career. A one-factor model with the addition of the covariance between the two reverse items shows good fit to the data: χ^2=0.01; *df=1*; p=0.921; CFI=1; TLI=1; SRMR=0.001; RMSEA≤0.001; 90% confidence interval (CI) for RMSEA: 0—0.062; PCLOSE=0.942; N=240. Internal consistency coefficients along with descriptive statistics for all measures and scales are summarized in the table below. The final scores for each scale were calculated as the mean value of responses to its items.

The "Academic Motivation Scales" questionnaire by T.O. Gordeeva and colleagues [4] was used to assess the academic motivation of students. It contains three scales of intrinsic motivation (motivation to know, achievement motivation and self-development motivation), three

[1] Further details and results of the statistical analysis along with the raw data are provided in the repository (see https://doi.org/10.48612/MSUPE/z6hx-714v-3e51).

scales of external motivation (self-esteem, introjected and extrinsic motivation) and an amotivation scale.

The "Aspirations Index" questionnaire by T. Kasser and R. Ryan in the adaptation of T.O. Gordeeva and colleagues [3] was used to assess the main life goals (aspirations) of students, reflecting their most fundamental and deepest features of the motivational sphere. It includes three scales of intrinsic aspirations (self-expression, relationships, community) and three scales of external aspirations (image, fame, influence).

The "Self-congruence" scale from the "Index of Autonomous Functioning" questionnaire [20] adapted by S.N. Kostromina and colleagues [5] was used as an indicator of dispositional autonomy. The scale consists of five direct items.

Satisfaction with the chosen profession of a teacher was measured by single-item measure: "Rate on a 10-point scale how satisfied you are with the chosen profession: (1 — not satisfied at all, 10 — satisfied to the maximum)".

Students' *academic achievement* was assessed by asking about the average grade for the last session, which was asked to be transferred from the university's information database available to students.

Data Analysis. The analysis was performed using descriptive statistics, correlation analysis, Mann-Whitney U-test, Kruskal-Wallis test and structural equation modeling. Calculations were performed in the R statistical analysis environment, and structural modeling was carried out in Mplus 8 (using MLR estimator). The following boundary values indicating acceptable (good) fit were used: CFI>0.90 (0.95), RMSEA<0.08 (0.06), SRMR<0.08 (0.06) [15].

Results

The distribution of answers on the TCPS scale (Fig. 1) is close to symmetric (*As=-0*.38), with the median value (*Me=5*.5) coinciding with the center of the ten-point scale. Hence, there is no salient tendency to prefer or avoid teaching career in this sample; these alternatives are, in general, equally probable.

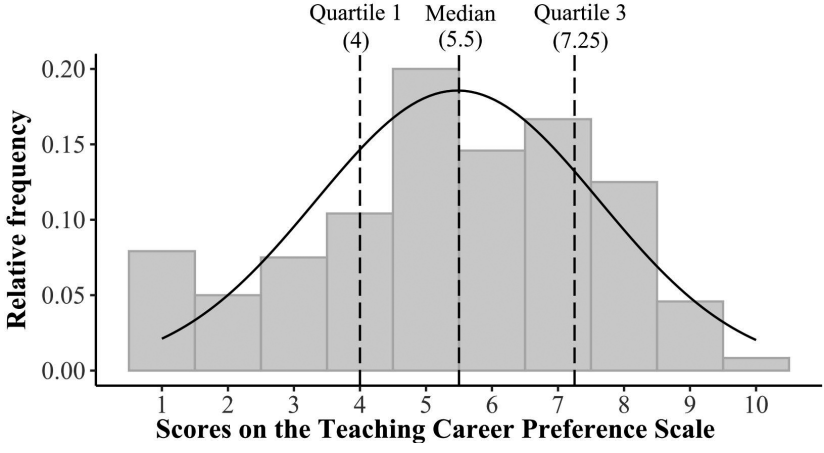

Fig. 1. Distribution of scores on the Teaching Career Preference Scale (TCPS) along with the expected normal distribution curve

Analysis of the scores on the TCPS scale in students of different years of study (Fig. 2) indicates that there are no statistically significant differences (Kraskell-Wallis test $\chi^2(4)=4.53$; *p*-not significant).

Correlations show that TCPS is statistically significantly and directly related to satisfaction with the profession, indicators of intrinsic academic motivation and aspiration to contribute to the community (see table). At the same time, it shows inverse relationships with external motivation and amotivation. Self-congruence is directly related to autonomous types of motivation and inversely related to amotivation. It is also related to all intrinsic life aspirations but shows the highest correlation with the aspiration to contribute to the community. No statistically significant correlations of TCPS and satisfaction with the profession with academic achievement were found.

Analysis of correlations with age demonstrates that older students have less salient motivation to know (–0.20; $p\leq0.01$), achievement motivation (–0.14; $p\leq0.05$), self-development motivation (–0.23; $p\leq0.01$) and self-esteem motivation (–0.14; $p\leq0.05$). Meanwhile, they have slightly higher amotivation (0.20; $p\leq0.01$). The academic achievement of men (M=4.02) is lower than women (M=4.42): these differences are statistically significant at $p\leq0.001$ (U=8722; $Z_U=4.43$). They also have lower self-esteem motivation, introjected motivation and external motivation (all significant at $p\leq0.05$). Women also show higher level of life aspirations on the Self-Expression (U=7774.5; $Z_U=2.68$; $p\leq0.01$) and Image (U=8725.5; $Z_U=4.41$; $p\leq0.001$) scales.

To test the hypothesis, a structural model was developed in which the teaching career preference factor was considered to be dependent on satisfaction with the profession, academic achievement, and the factors of self-congruence, intrinsic academic motivation, aspiration to contribute to the community. The latter two were assumed to be dependent on the self-congruence factor. After preliminary estimation of such a model with modification indices, the covariance between the two items of the TCPS scale formulated in reverse form was added to the model. The final model (Figure 3) has good fit indices: $\chi^2=155.67$; $df=110$; $p=0.003$; CFI=0.968; TLI=0.960; SRMR=0.063; RMSEA=0.042; 90% CI for RMSEA: 0.025—0.056; PCLOSE=0.821; $N=240$.

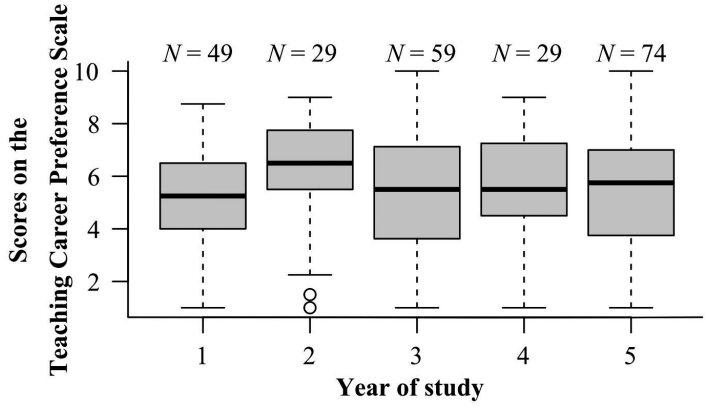

Fig. 2. Teaching Career Preference Scale (TCPS) scores in groups of different years of study: the line inside the rectangle is the median, the lower and upper edges of the rectangle are the 1st and 3rd quartiles, the edges of the dotted lines are the minimum and maximum without outliers, the circles are outliers

Table

Intercorrelations and descriptive statistics for measured variables (N=240)

Variables and measures	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Teaching Career Preference Scale (TCPS)	—																
2. Academic achievement	0,08	—															
3. Satisfaction with the profession	0,57**	0,12	—														
4. Self-congruence	0,20	0,14	0,35**	—													
Academic motivation scales																	
5. Motivation to know	0,39**	0,19	0,54**	0,42**	—												
6. Achievement motivation	0,28**	0,20	0,43**	0,41**	0,79***	—											
7. Self-development motivation	0,36**	0,24*	0,48**	0,45**	0,84**	0,81**	—										
8. Self-esteem motivation	0,20	0,27**	0,34**	0,34**	0,60**	0,58**	0,76**	—									
9. Introjected motivation	0,05	0,19	0,03	0,05	0,10	–0,01	0,19	0,45**	—								
10. External motivation	–0,26**	–0,02	–0,26**	–0,19	–0,32**	–0,38**	–0,22*	0,03	0,54**	—							
11. Amotivation	–0,46**	–0,19	–0,59**	–0,41**	–0,71**	–0,59**	–0,65**	–0,46**	–0,05	0,39**	—						
Scales of the «Index of aspirations» questionnaire																	
12. Self-expression	0	0,15	0,04	0,32**	0,2	0,18	0,25**	0,19	0,13	–0,03	–0,13	—					
13. Relationship	0,01	0,21	0,11	0,26**	0,10	0,05	0,16	0,22*	0,26**	0,18	–0,14	0,45**	—				
14. Community	0,22*	0,14	0,34**	0,38**	0,31**	0,28**	0,33**	0,35**	0,23*	–0,05	–0,32**	0,25**	0,44**	—			
15. Image	–0,01	0,13	0,05	0,13	0,21	0,18	0,24**	0,38**	0,28**	0,18	–0,13	0,15	0,31**	0,26**	—		
16. Fame	–0,04	0,14	0,15	0,30**	0,19	0,19	0,25**	0,28**	0,14	0,03	–0,15	0,18	0,23*	0,32**	0,63**	—	
17. Influence	–0,06	0,15	0,11	0,18	0,14	0,18	0,24*	0,24*	0,07	–0,08	–0,14	0,24*	0,24**	0,24**	0,47**	0,74**	—
Cronbach's α	0,77	–	–	0,81	0,91	0,90	0,89	0,88	0,74	0,70	0,89	0,70	0,78	0,73	0,83	0,82	0,86
Mean	5,48	4,28	6,9	3,52	3,61	3,22	3,5	3,33	3,18	2,79	2,22	6,4	6,33	5,39	3,91	3,84	4,39
Standard deviation	2,15	0,65	2,31	0,84	1	1,03	1,05	1,14	0,96	1,01	1,08	0,81	1,03	1,29	1,62	1,57	1,65

Note. Significance: * — p≤0.05; ** — p≤0.01. The level of significance have been corrected according the Holm's procedure for multiple hypotheses testing. Numbers of variables in columns correspond to numbers in rows.

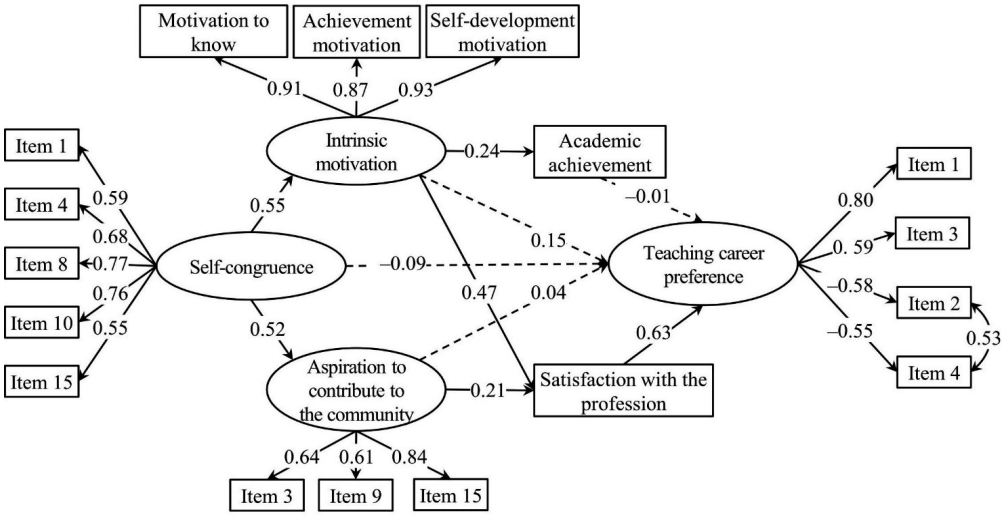

Fig. 3. Structural model of the relationships between teaching career preference, satisfaction with the profession, academic achievement, aspiration to contribute to the community, intrinsic motivation, and self-congruence: all standardized coefficients except those on the dashed lines are statistically significant at p≤0.05, residuals are omitted for parsimony

The model demonstrates that the relationships of all variables and factors with teaching career preference are fully mediated through satisfaction with the profession, which is a critical factor in career plans. The bootstrap analysis of mediated effects shows that statistically significant are the relationships of teaching career preference with intrinsic motivation (0.30; *p≤0*.001), aspiration to contribute to the community (0.13; *p≤0*.05) and self-congruence (0.23; *p≤0*.001). However, of the two mediating relationships of self-congruence with teaching career preference only one is significant: through intrinsic motivation (0.16; *p≤0*.001). The second path coefficient through the aspiration to contribute to the community showed only a borderline level of significance (0.07; p=0.06).

Discussion

The results of the study confirmed the assumption about the importance of students' self-congruence as a central indicator of dispositional autonomy for teaching career preference. The perception of one's behavior as self-congruent, based on internal values and goals, is closely related to autonomous motives and aspirations, which act as important factors of satisfaction with the chosen profession and teaching career preference. Although there is no direct impact of self-congruence to teaching career preference, its mediated effect was found to be quite significant. The conclusion about the important role of dispositional autonomy in professional preferences agrees well with the data of other studies [21].

In our study, the absence of a significant correlation between teaching career preference and academic achievement casts doubt on the possibility of negative selection [7; 12] at the stage of transition from higher education to work at school. According to our data, satisfaction with the profession,

which is not related to academic achievement but has a common factor — intrinsic academic motivation — is of primary importance for professional plans. Despite some decrease in intrinsic motivation and growth of amotivation in senior years of study, our sample did not show a decrease in the intention to work at school, in contrast to the data of V.S. Sobkin and O.V. Tkachenko [12].

The study shows that the associations of teaching career preference with intrinsic motivation, aspiration to contribute to the community, and self-congruence are mediated through satisfaction with the profession. It is concluded that satisfaction with the profession and its determinant intrinsic academic motivation must be supported during higher education to strengthen aspiration to work in the profession. In contrast to academic motivation, aspiration to contribute to the community and self-congruence are likely to be little influenced by the university environment. However, these factors also deserve attention: a scientific analysis of their development in the process of school and university education can be useful in psychological support of vocational choice and career planning.

The limitations of the study include the correlational design, which does not allow us to conclude with certainty about the causal nature of the identified relationships, the moderate representativeness of the sample collected in a single teacher training university, and the lack of control for other variables that are likely to be important for career planning: support in vocational choice from parents and teachers, past experience in professional education, and others. Also, a limitation is the use of solely self-reported data on students' career plans. Future studies will have to find out how well the declared career plans correspond to the actual employment after graduation, and to what extent it is possible to predict employment based on the characteristics of students' motivational sphere.

Conclusion

The results of the systematic study of motivational factors of professional intentions of teacher education students allow us to conclude that the intention to work at schools is largely determined by the features of the motivational sphere and is not related to academic achievement in the university. The study is the first to demonstrate the significant role of self-congruence as an indicator of dispositional autonomy in satisfaction with the chosen teaching profession and the desire to work at schools. From a practical point of view, it seems important to support autonomous academic motivation and satisfaction with the chosen profession for preparing students for real teaching and strengthening their intention to work at schools. Since self-congruence as a central indicator of dispositional autonomy of the personality predicts intrinsic motives and life aspirations that prompt the choice of teaching profession, it is of great interest to further investigate its role for vocational choice and career planning and the possibilities of its development.

Appendix

Teaching Career Preference Scale

Please answer the questions below.

1) On a 10-point scale, rate the probability that after graduation you will go to work in a school as a teacher in your field of study (1 — I will definitely not go, 10 — I will definitely go): _____

2) Estimate on a 10-point scale the probability that after graduation you will go to work as a teacher in other spheres, for example, private schools/kindergartens, institutions of supplementary education, colleges, universities, etc. (1 — I will definitely not go, 10 — I will definitely go): _____

3) On a 10-point scale, rate the likelihood that after graduation you will go to work in another field unrelated to the teaching profession (1 — I will definitely not go, 10 — I will definitely go): _____

4) Rate on a 10-point scale the likelihood that you will try to change jobs/careers, even after taking a school job (1 — absolutely definitely not, 10 — yes, definitely): _____

Calculating the results. When calculating the total score, the answers to tasks 3 and 4 are inverted using the formula: 11-answer. Then the average value of the answers to all 4 tasks is calculated.

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Научная статья | Original paper

The Role of Adaptive Readiness and Subjective Assessment of the Situation in the Academic Adaptation of University Students

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The purpose of the study is to identify the role of adaptive readiness and subjective assessment of the situation in the academic adaptation of students. The results were obtained from a sample of 385 respondents studying at higher educational institutions in Moscow, Volgograd, as well as Saratov and the region. The following tools were used: the "Scale of diagnostics of adaptive readiness of personality" (M.V. Grigorieva), the methodology of diagnosis of academic adaptation (R.M. Shamionov et al.), the author's scales of significance and stress of situations in the educational environment. It is shown that the predictors of academic adaptation of students are interactions with the administration and classmates, the importance of lectures. It is revealed that the psychological component of adaptive readiness is a predictor of academic adaptation. The travel analysis confirmed the hypothesis of the leading role of relations with the administration and classmates, lecture classes in their academic adaptation. The psychological and socio-psychological components of adaptive readiness also play an important role in the academic adaptation of students. It has been established that the components of adaptive readiness are direct predictors of academic adaptation. In addition, they are mediators of a direct link between the attitude to the educational environment and academic adaptation. It is concluded that mediation of adaptive readiness in the presented model can be recommended for the development of academic adaptation programs.

Keywords: significance; stress; interaction; academic adaptation; adaptive readiness.

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Роль адаптационной готовности и субъективной оценки ситуации в образовательной среде вуза в академической адаптации студентов

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Цель исследования — выявить роль адаптационной готовности и субъективной оценки ситуации в академической адаптации студентов. Результаты получены на выборке из 385 респондентов, обучающихся в высших учебных заведениях г. Москвы, г. Волгограда, а также г. Саратова и области. Использован следующий инструментарий: «Шкала диагностики адаптационной готовности личности» (М.В. Григорьева), методика диагностики академической адаптации (Р.М. Шамионов с соавторами), авторские шкалы значимости и стрессогенности ситуаций в образовательной среде. Показано, что предикторами академической адаптации студентов являются взаимодействия с администрацией и однокурсниками, значимость лекционных занятий. Выявлено, что психологический компонент адаптационной готовности является предиктором академической адаптации. Путевой анализ подтвердил гипотезу ведущей роли отношений с администрацией и однокурсниками, лекционных занятий в их академической адаптации. Психологический и социально-психологический компоненты адаптационной готовности также играют важную роль в академической адаптации студентов. Установлено, что компоненты адаптационной готовности являются прямыми предикторами академической адаптации. Кроме того, они являются медиаторами прямой связи между отношением к образовательной среде и академической адаптацией. Делается вывод о том, что посредничество адаптационной готовности в представленной модели может быть рекомендовано для разработки программ академической адаптации.

Ключевые слова: значимость; стрессогенность; взаимодействие; академическая адаптация; адаптационная готовность.

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Introduction

Modern conditions of social activity of young people are characterized by new challenges, dynamism and variability. The educational and developmental activity of the younger generation is no exception. The transition of the educational space to a mixed version during the pandemic period and back to the post-pandemic period, the clarification of strategic directions for the development of education determine the relevance of considering issues of academic adaptation to the educational environment, adaptive readiness.

The adaptive readiness of M.V. Grigoryeva is understood as the predisposition of a person not only to perceive, but also to accept a changing environment, the implementation of possible actions in the aspect of a new situation that establish parity between the requirements and capabilities of the environment [5]. Contributing to the effectiveness of activities in a new situation, adaptive readiness includes the symbiosis of past experience, the orientation of the individual to interact with new, dynamic conditions of the educational environment. As for the structure of adaptive readiness, a number of studies empirically identify its components: psychological, psychophysiological, socio-psychological [10; 19].

A subjective assessment allows you to analyze the situation, including in the educational environment, from the perspective of your own experience, learned norms and rules [1]. In other words, the subject's perception of the situation, attitude towards it, its interpretation and significance determine the choice of a particular behavioral strategy [2; 3]. A subjective assessment of the situation in the educational environment can lead to the manifestation of stress. Thus, according to empirical studies by Russian authors, the vast majority of students (more than 80%) have a pronounced stress-related lifestyle in general [8], the situation of intermediate certification is stressful [16]. Significant factors with subjective stress for students of a pedagogical university are given: oral and written surveys, the amount of tasks in the context of independent work, as well as the duration of training sessions [17].

Russian and foreign researchers agree that academic adaptation is the acceptance, awareness, and mastery of the norms, principles, and rules of the educational system. In other words, it is the ability to successfully interact in an educational environment [6; 22].

The components of academic adaptation are: motivation to learn, clarity of educational goals, involvement in academic interaction, and overall satisfaction with the academic environment [21]. Foreign researchers focus on the problem of chemical addiction of students, which arises as a result of anxiety and problems of interpersonal interaction, as a negative factor affecting academic adaptation [23; 24; 25]. Among the domestic studies, we note the work of R.M. Shamionov and co-authors, which presents a methodology for diagnosing students' academic adaptation to higher education. It consists of 6 scales that evaluate particular components of academic adaptation (personal, emotional-evaluative, cognitive, motivational, communicative and psychophysiological), and also includes an integral scale [18].The work of M.V. Grigorieva and co-authors presents the structural components of academic adaptation at school age: consistency of self-esteem, orientation towards independence in learning and communication with peers, psychophysiological distress, avoidance of trouble in the school educational environment based on self-regulation and action planning, the desire to improve normative behavior, social success, as well as general emotional well-being [7]. As for the correlation between the stress situation and the adaptation components, in a recent study by E.A. Makhrina, A.V. Timofeev showed that students' adaptation and stress tolerance are directly and significantly interrelated [12].

Modern works define academic stress as a psychological phenomenon that manifests itself in a variety of response options and stress resolution opportunities for students in situations of uncertainty and risk [11; 14]. Interestingly, foreign research highlights the trajectories of perceived academic stress, as well as protective factors in the context under consideration [26]. As a result of the analysis of empirical data obtained, Korean researchers conclude that resilience reduces the impact of academic stress on academic adaptation [27]. Thus, there is a growing scientific interest in various aspects of the problems of students' adaptive readiness to the educational environment of the university, the stress of the situation of entry into it, highlighting the features of students' academic adaptation and determining its structural components.

Sampling and design of the study

The study sample included 385 respondents studying at higher educational institutions in Moscow, Volgograd, as well as Saratov and the region. The average age is 22.4 years. 60% are female. 61% are residents of the regional center, 15% are from the suburbs and villages, and 24% live in a megalopolis. Students in bachelor's degree programs — 76%, master's degree — 23%, specialty — 1%. First-year students — 43%, students in the 2nd and subsequent courses — 57%.

The diagnostic battery included: scales for the diagnosis of adaptive readiness of a person [2], methods for the diagnosis of academic adaptation [14], author's scales of significance and stress of situations in the educational environment of the university, which demonstrated an acceptable level of reliability (Cronbach's alpha integral coefficient on 8 scales — 0.832).

Applied statistical procedures: calculation of descriptive statistics, one-factor analysis of variance with repetitions, Pearson correlation analysis, direct stepwise regression analysis, path analysis. Statistical package: IBM SPSS Statistics 26.

The database with the results of the study is presented in the MSPPU RusPsyData repository [20].

The results of the study

Descriptive statistics and comparison results for the obtained indicators are presented in Table 1.

Table 1

The severity of the components of adaptive readiness and academic adaptation

Components	Average value	Std. error	The results of the analysis of variance
Components of adaptive preparedness			
Psychophysiological	15,3	0,18	F(2, 383)=186,145; p<0,001
Psychological	14,0	0,18	
Socio-psychological	17,0	0,17	
The components of academic adaptation			
Personal	5,0	0,06	F(5, 380)=22,97; p<0,001
Emotional and evaluative	5,1	0,06	
Educational	5,1	0,05	
Motivational	5,3	0,06	
Communicative	5,3	0,05	
Psychophysiological	4,6	0,05	
Assessment of situations in the educational environment from the perspective of importance			
Lecture (significance)	3,8	0.06	F(7, 378)=98,107; p<0,001
Practical exercises (significance)	4,2	0,05	
Interaction with classmates with whom you have a good relationship (significance)	4,4	0,04	
Interaction with classmates with whom bad relationships have developed (significance)	2,4	0,06	
Interaction with teachers with whom you have a good relationship (significance)	4,3	0,05	
Interaction with teachers with whom there is a bad relationship (significance)	3,3	0,06	
Interaction with the administration	4,0	0,05	
Informal relations in the educational environment (extracurricular, clubs, sections, etc.), the importance of	3,5	0,06	

Note: F is the empirical value of the analysis of variance, p is the significance level.

From the table of one-factor variance analysis with repetitions, it can be seen that the more pronounced components of academic adaptation are communicative and motivational, the differences between which are absent (the authors have calculations with which they are ready to share if necessary). At the same time, the indicators of the personal, cognitive, and emotional-evaluative components also do not significantly differ. The most pronounced component of adaptive readiness is socio-psychological. In assessing the situations of the educational environment, the most significant is interaction with classmates and with teachers with whom there are good relations. According to the results of the correlation analysis, the interrelations between the indicators of academic adaptation of students and all components of adaptive readiness (in the range of 0.189—0.455 at p<0.001) were established. It was also revealed that all indicators of the importance of educational environment situations are interrelated with academic adaptation (in the range of 0.142—0.358 at p<0.001).

As part of the search for predictors of academic adaptation among the compo-

nents of adaptive readiness and attitude to the educational environment, we conducted a regression analysis procedure. The results are presented in Table 2.

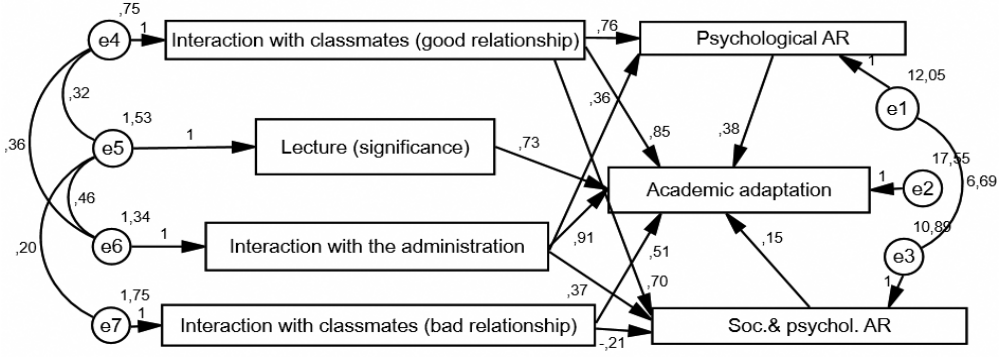
As can be seen from Table 2, the psychological component of adaptive readiness serves as the most important predictive factor of academic adaptation; predictors of academic adaptation of students are also indicators of the importance of various characteristics of the educational environment — interaction with the administration, with classmates with whom there is a good relationship, with classmates with whom there is a bad relationship, the importance of lectures.

At the next stage of the study, we conducted a path analysis (see Figure) to test

Table 2

Attitude to the educational environment and components of adaptive readiness as predictors of academic adaptation (N=385)

Indicator	Non-standardized coefficients		Standardized Beta Coefficients	t	value
	B	Std. Error			
(Constant)	7,59	1,38		5,50	<0,01
Psychological adaptation readiness	0,46	0,06	0,32	7,41	<0,01
Interaction with the administration	0,93	0,21	0,21	4,51	<0,01
Lecture (significance)	0,75	0,19	0,18	3,96	<0,01
Interaction with classmates with whom you have a good relationship	0,89	0,28	0,15	3,22	0,001
Interacting with classmates who have a bad relationship	0,48	0,17	0,12	2,88	0,004
R^2=0,35; F=39,97; p<0,001					



CMIN=3,182; df=5; p=,672;
CFI=1,000; AGFI=,987; GFI=,998; RMSEA=,000; PCLOSE=,927

Fig. The path analysis

the hypothesis about the role of adaptive readiness (AH) and attitudes to various areas of the educational environment in the academic adaptation of students. The presented indicators support the consistency of the model. This model explains 35% of the variance in students' academic adaptation by direct correlation of the importance of relationships with the administration, with classmates with whom there are good and bad relationships, as well as the importance of lectures with academic adaptation. At the same time, indicators of adaptive readiness are direct predictors of academic adaptation, and also play an intermediary role in connecting relationships and adaptation.

Discussion of the results

A comparative analysis of the components of academic adaptation has revealed that the motivational and communicative components are the most pronounced, followed by the personal, emotional, evaluative and cognitive components, while the psychophysiological component of adaptation is the least pronounced. These data are consistent with the previously obtained results, according to which the psychophysiological component was less pronounced compared to the others, and the level of motivational and communicative was more significant [18]. In this regard, the higher level of socio-psychological adaptability of students is not surprising, which obviously serves as a basis for reinforcing the motivational and communicative aspects of academic adaptation. The same can be said about assessments of "relational" situations in an educational environment where the importance of interaction with classmates and teachers with whom good relations have developed dominates. However, subsequent analysis has shown that not everything is so clear.

As a result of the correlation analysis of the indicators, we have established the relationship between the academic adaptation of students and all components of adaptive readiness (psychological, socio-psychological and psychophysiological), which indicates in favor of their stable conjugation. This result is consistent with the previously obtained data on the relationship between adaptive readiness and adaptability of students [6]. At the same time, all indicators of the importance of the educational environment situation are also interrelated with academic adaptation. Consequently, the importance of training sessions, the importance of interactions with teachers, administrators, and classmates (regardless of existing relationships, positive or bad) is associated with academic adaptation. It can be assumed that the significance of situations is the student's personal interest in establishing balanced relationships within the system, which in the learning process creates a certain comfort zone in terms of coping with various situations due to the presence of adaptive readiness, which presupposes the ability to adapt to the situation [15].

As a result of step-by-step regression analysis, it was found that the psychological component of adaptive readiness explains about 17% of the variance in students' academic adaptation. The regression model did not include the psychophysiological component of readiness, which may be due to the relative stability of the individual's psychophysiological resources, and the socio-psychological component, possibly due to the greater importance of the relationship itself in the academic environment. At the same time, the importance of educational environment situations explains a more significant proportion of the variance (18%) of students' academic adaptation, which may be due to its assessment for adaptation. Moreover, we are not talking about their tension, but, therefore, as can be assumed, about the sufficiency of inter-

est in the situation to achieve adaptation in general in the academic environment.

It should be noted that as a result of regression analysis, it was found that the predictors of academic adaptation are the importance of interaction with both the university administration and fellow students (with whom positive and negative relationships have developed), but there is no significance of interactions with teachers. At the same time, the importance of lectures is a positive predictor. Obviously, the assessment of classes here explains a certain part of the variance of academic adaptation. These results are correlated with previously obtained data from another group of researchers. Thus, it was found that the emotional components of the attitude towards the educational environment are predictors of the academic adaptation of college students [2; 13].

The path analysis undertaken by us confirmed the hypothesis about the leading role of the importance of relations with the administration and classmates, as well as lecture forms of classes at the university and the psychological and socio-psychological components of students' adaptive readiness for their academic adaptation. In the obtained model, it is established that the components of adaptive readiness are both direct predictors of academic adaptation and mediators of a direct relationship between the attitude to the educational environment (the significance of its components) and academic adaptation. The mediation of adaptive readiness in this model enhances the explained variance of academic adaptation and, therefore, can be taken into account for the development of academic adaptation programs. The lack of connection with the importance of interaction with teachers with whom subjectively assessed positive or bad relationships have developed with academic adaptation does not indicate the absence of their role in it, but may indicate a declining role of direct contact with the teacher in the current assessment situation in higher education institutions due to the significant introduction of the test system. At the same time, adaptation significantly affects academic performance [9]. Therefore, the experience of entering the educational environment of the university, reflected in adaptive readiness, and the importance of interaction in the educational environment can be considered as the basis for the academic success of students.

Conclusion

Students' adaptive readiness is a systematic personal education that characterizes the experience of entering the educational environment at various levels (psychophysiological, psychological, socio-psychological), thanks to which mechanisms are "triggered" to ensure its successful development in new university learning situations. In this study, an attempt is made to establish the role of adaptive readiness and attitude to the educational environment in the academic adaptation of students.

Summarizing the results obtained, a number of conclusions can be drawn.

The strongest predictors of academic adaptation are the importance of interactions with the administration and classmates with whom positive and negative relationships have developed, and the importance of lectures. A direct predictor of adaptive readiness is its psychological component. Students' adaptive readiness explains the general academic adaptation somewhat less. However, it mediates the connection between the significance of situations and adaptation.

In our opinion, as a relatively stable education, adaptive readiness can act as a shock absorber in the system of relations in the educational environment. Therefore, the results obtained can be used for socio-

psychological support of students' academic adaptation at different levels.

The novelty of the research results lies in obtaining previously unknown data on the factors of academic adaptation. A direct directional relationship has been established between adaptive readiness, formed on the basis of students' experience of adaptation, and academic adaptation and its mediating role in relation to the educational environment and academic adaptation. As part of the study of the problem of academic adaptation, the most important thing for researchers is that among the various factors of adaptation (including those that are absolute in the education system), some really contribute to this process, while others turn out to be insignificant and even undermine it.

The main limitations of the study are: the analysis of a sample of students regardless of the course of study and the disproportion of the sample by gender (there are more women). There are also limitations related to the assessment of everyday stressors affecting students' academic adaptation and attitudes towards digital educational technologies, including testing technologies. In subsequent works, the role of the socio-psychological service of the university in the interaction of students' attitudes to the educational environment of the university and their academic adaptation can be analyzed. Research is also required to identify the causes of stress in certain forms of work at the university and ways to eliminate them.

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Academic Adjustments For First-Year Students: Influence Factors And Measurement

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The transition from high school to the college stage is a period that students must pass. During the transition period, students who have turned into college students will face various changes in the learning process, demands, conflict problems, and new personalities in college life, which can cause stress and mental health problems. In dealing with these changes, reasonable academic adjustment, support from family and friends, and effective coping strategies are needed so that they can get through this transition period successfully and enjoy new experiences as students in college. Research on academic adjustment has been done before, so researchers are interested in conducting a theoretical study on the factors that influence academic adjustment, especially in first-year students. This research uses a literature study method by analyzing thirty research articles related to student academic adjustment. Based on the analysis results, it can be seen that the factors that affect the academic adjustment of first-year students are 1) demographic factors; 2) psychological factors; 3) environmental factors. Currently, academic adjustment can be measured using self-report questionnaires that have been developed, such as the College Inventory of Academic Adjustment, Student Adaptation to College Questionnaire (SACQ), Academic Adjustment Questionnaire (AAQ), and College Adaptation Scale (CAS).

Keywords: academic adjustment; adaptation to a new environment; first year of higher education.

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Академическая адаптация студентов первого курса: влияние различных факторов и их измерение

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Переход из средней школы в колледж проходят все студенты. В этот переходный период учащиеся, ставшие студентами колледжа, сталкиваются с изменениями в учебном процессе, новыми требованиями, конфликтами и новыми людьми, что может вызвать стресс и проблемы с психическим здоровьем. Для того чтобы успешно преодолеть этот переходный период и получить удовольствие от опыта обучения в колледже, необходимы разумная адаптация к учебе, поддержка семьи и друзей, а также эффективные стратегии преодоления сложностей. Исследования академической адаптации проводились и ранее, поэтому ученые стремятся провести теоретические исследования факторов, влияющих на академическую адаптацию, особенно у студентов первого курса. В данном исследовании используется метод изучения литературы путем анализа тридцати научных статей, связанных с академической адаптацией

студентов. По результатам анализа видно, что факторами, влияющими на академическую адаптацию первокурсников, являются: 1) демографические факторы; 2) психологические факторы; 3) факторы среды. В настоящее время академическая адаптация может быть измерена с помощью опросников самоотчета, таких как College Inventory of Academic Adjustment, Student Adaptation to College Questionnaire (SACQ), Academic Adjustment Questionnaire (AAQ) и College Adaptation Scale (CAS).

Ключевые слова: академическая адаптация; адаптация к новой среде; первый курс.

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Introduction

Indonesian people's awareness of the importance of higher education continues to grow, as evidenced by the number of high school students who continue their education to higher education. Based on data from the Higher Education Database of the Ministry of Education, Culture, Research, and Technology, there are 6349941 students with a breakdown of the percentage of Strata-1 students by 84,8%, Diploma-3 by 13,1%, and Diploma-4 by 2%. The same data source states there will be 1983786 new students 2022 and more than 2 million new students in 2023.

High school students who have graduated and become first-year students will go through a transition period where new students must adjust to the academic demands of college, develop study habits, and adjust learning strategies in a new learning environment [32]. In their statement, [31] mentioned that adaptation in campus life is significant as an experience and reflection to become a successful member of society because when students adapt well on campus, they have fulfilled their duties and responsibilities.

More specifically, student academic adjustment in college as an individual's ability to manage social, psychological, and scientific challenges when experiencing the transition to college life [4]. Lecture adaptation refers to the interaction of students with their environment, including student achievement and personal growth. Academic adjustment is crucial when students face campus life changes, demands, or conflicts [34]. This is because students' academic adaptation is complex, not only limited to adaptation in lectures, but also social, personal, emotional, and adaptation to institutions; especially in the transition to college, students often question their relationships, life goals, and self-esteem.

Students' adjustment to the university environment is critical in predicting outcomes and essential for future achievements. A necessary period in the adjustment process is seen from the first six weeks of the initial semester [9]. During this period, students will encounter various new situations, such as the lecture system, learning methods different from high school, more difficult lecture materials, friends from different regions, and a new living environment. The university education system can be confusing for new students, and this confusion becomes even more significant when students come from different languages and diverse cultural backgrounds [33].

In lectures, students are required to understand and master lecture material, be able to think critically, and analyze through assignments, practicums, exams, presentations, and so on. Revealed several problems that are often faced by new students, namely difficulties in understanding the material, nervousness during

presentations, and inability to perform optimally [30]. Researched first-year students at Al-Azhar University Indonesia and found that 44,7% of students still have difficulty adapting to the environment and demands of higher education [34].

The same thing was stated by [7] in their research, stating that around one in three new students reported experiencing mental health problems in their first year, both related to internal and external problems. Furthermore, the study also revealed students with external problems, namely low academic achievement. The same thing was also revealed by [36] that the complex demands of higher education put students at high risk of experiencing emotional problems, difficulty building social relationships, low academic achievement, loss of motivation, and failure to complete their studies.

The environmental changes that new students in college must face will shape their perceptions, especially regarding their ability to overcome various obstacles and challenges in their university life [29]. Students' inability to adjust can hinder the learning process and completion of studies. Students who fail to adjust risk experiencing academic stress [27; 34; 36]. Research conducted by [23] showed that as many as 50 out of 204 students experienced high academic stress, while 80 students experienced moderate academic stress. This happens because students are less able to adapt to the academic demands and education system in higher education, causing many students to feel depressed. In addition, the desire not to continue or resign from the recovery is one of the effects of students' inability to adjust. This could be related to the academic environment or social environment.

Based on the description above, it is known that adjustment is an essential factor for students facing the college transition period. Studies on adjustment have also been carried out before. However, considering the impact that significantly affects student life, especially in terms of academics, it is necessary to conduct a theoretical study of the factors that influence and the measurements used to determine the academic adjustment of first-year students.

Method

Researchers used the literature study method developed by [25]. Researchers researched literature from various journals, books, and other articles to form new writing on the topic raised. After searching, the researcher used the theoretical review technique, which presents several theories or concepts that focus on one previously determined topic. Then, the theories are compared by providing logical, consistent assumptions and by the scope of the research explanation.

Researchers searched using a range of article publication years from 2013 to 2022. They obtained 30 research articles on student academic adjustment, which were then used for analysis. In selecting the articles used, researchers collected data sequences that were very relevant, relevant, and quite relevant to the topic so that the data collected did not have to be the same as the topic to be raised but still had a connection [15].

Result

Based on the results of the analysis of thirty articles on academic adjustment in college students showing what factors influence, then the researchers grouped them into three categories, namely 1) demographic factors including age, gender, and social identity perspective; 2) psychological factors, including self-efficacy, self-regulated learning, academic grit, academic flow, coping strategies; resilience and 3) environmental factors including peer support, parent and child relationships.

Based on the search for previous research on measuring academic adjustment can be done using self-report questionnaires that have been developed by experts, such as the College Inventory of Academic Adjustment by [6], Student Adaptation to College Questionnaire (SACQ) by [4], Academic Adjustment Questionnaire (AAQ) by [9], and College Adaptation Scale (CAS) by [31].

Discussion

A. Influence Factors

Based on the results of the study, researchers found factors that influence students' academic adjustment and then categorized them

into three main factors, namely 1) demographic factors, 2) psychological factors, and 3) environmental factors.

1. Demographic Factors

a. Age

Age influences student adjustment. Research results by [24] show that older students adjust better.

b. Gender

Several journal results report that gender influences students' adjustment to college [5; 17; 26]. Female students demonstrate higher commitment to educational goals and attachment to college than males. Meanwhile, the research results by [24] show that male students have better emotional adjustment than female students. Several studies report that female students have higher levels of risk factors for stress and anxiety in the first year of college [11; 35].

c. A social identity perspective

Direct and indirect relationship between the social identity perspective and students' social interactions in higher education [40]. Students who assess their social status does not match that of the university where they study will limit their social interactions, impacting their social adjustment with peers, lecturers, and the college environment. Perceptions of rejection and hatred correlate with academic adjustment [3]. Students who perceive that they will receive rejection and hatred from their new residence will find it difficult to interact with other people.

2. Psychological Factors

a. Self-efficacy

Several studies state that self-efficacy influences student adjustment [1; 16; 20; 30; 38; 45]. Stephen further explained that increasing student self-efficacy at the end of the first semester is associated with a greater chance of persisting into the next semester and being academically successful. Students who have good academic self-efficacy will have a positive attitude toward themselves and their environment, making it easy for them to adapt to the environment and motivate themselves to complete academic tasks [1; 16; 38]. On the other hand, students with low self-efficacy will feel anxious and lack self-confidence, making it difficult to trust others and affecting their ability to build social relationships [41]. However, this differs from [39] research results, which stated that academic self-efficacy, widely accepted as a factor influencing student success, does not correlate with academic adjustment. These inconsistent results can be material for further examination of self-efficacy variables.

b. Self-Regulated Learning

Research results state that self-regulated study behavior directly affects academic adjustment [39]. When students develop better study habits. Although adaptive efforts are more accessible to identify in the first semester of the first year of study, they continue throughout academic training. Students who have good self-regulated learning will be able to regulate their emotions, activities, and context when studying to achieve academic goals [42]. So that when students are in a transition period in college, they will find it easy to overcome challenges and survive stressful situations in the first year of college.

c. Academic grit

The research results show that grit is positively related to academic adjustment [8]. Show that one aspect of grit, the persistence of effort, is a consistent and adaptive predictor [44]. Students with a high level of grit have enthusiasm and a never-give-up attitude when completing their assignments. This never-give-up attitude can also help students adjust to their first year at college. Grit becomes capital for students in adapting to college [27]. Individuals who have grit are described as tending to work hard to face challenges and maintain efforts and interests in the long term, even though the individual experiences failure, difficulties, or crises. Each individual's grit varies, determining how individuals interact in various environmental situations [14].

d. Academic flow

Pleasant conditions will make students comfortable studying, interacting, and carrying out desired academic activities, facilitating the academic adjustment process for new students [19]. Positive experiences in a university environment serve as a foundation for development,

and dealing with problems well is an important developmental task for a person [31].

e. Coping strategies

Problem-focused coping strategies positively relate to adjustment [38]. The same thing was expressed by [33], Students who can overcome negative situations, apply appropriate problem-solving strategies, delay immediate gratification, and know how to engage in self-development will more easily undergo the transition period during the year. First in college.

f. Resilience

Several studies report that resilience is positively related to adjustment to college [10; 13]. Further said that students with high resilience will be able to rise from adversity when they experience problems, be optimistic, and overcome obstacles in a new environment [10].

3. Environmental Factors

a. Social support

Several studies have revealed the influence of peer support on student adjustment [21; 30; 43]. Peer communication positively influences social adjustment but negatively influences personal-emotional adjustment. This means that good communication between peers improves students' social adjustment. Peer alienation harms personal-emotional adjustment but has a positive effect on institutional attachment. In other words, if students are ostracized by their peers, it will make it difficult for students emotional adjustment [43]. However, expressed different results and stated that social support had a negligible effect on adjustment [28]. Differences in the results of these studies can be reviewed to check the consistency of variable effects

b. Parental parenting style

The research results show a positive relationship between authoritative parenting and adaptation variables [18]. Further explained that harmonious (reciprocal) relationships and discussions with parents directly relate to adjustment to university [18].

B. Measurement

Academic adjustment in college was first introduced by [2], who introduced the interaction of students with their environment, with student achievement and personal growth as indicators of success [34; 37]. The results of this study are considered less able to predict academic adjustment because, the academic adjustment in students is multifaceted, so according to him, academic adjustment is an individual component that can adjust to academic, social, personal and emotional demands and institutions [4; 36].

Currently, academic adjustment can be measured using previously developed self-report questionnaires such as the College Inventory of Academic Adjustment, Student Adaptation to College Questionnaire (SACQ), Academic Adjustment Questionnaire (AAQ), and College Adaptation Scale (CAS).

1. College Inventory of Academic Adjustment

A measuring instrument for academic adjustment in higher education was first developed and introduced by [6], namely the College Inventory of Academic Adjustment. This measuring instrument can only measure academic achievement as a predictor.

2. Student Adaptation to College Questionnaire (SACQ)

Developed a more comprehensive measurement tool than previous studies, namely the Student Adaptation to College Questionnaire (SACQ), which includes several aspects such as academic, social, and personal-emotional adjustment, as well as institutional commitment and goals [4]. The SACQ is a self-report consisting of 67 items with nine options in Likert format (ranging from strongly disagree rated 1 to agree rated 9 strongly). The evidence of validity and reliability of this scale is very adequate, above 0,8.

Many researchers use this measurement tool in their research, including [9; 24; 26; 27; 39; 40; 43; 44; 45]. However, different results were shown by [12], stating that the fit index obtained on SACQ was inadequate. This means that SACQ is less suitable for measuring adjustment in college students. Therefore, further research is needed on the SACQ scale because of inconsistent research results. The number of items

that are too many is thought to be one of the factors causing it. In subsequent research, [22] evaluated the internal structure of SACQ into a short version called SACQ-S. Based on the results of exploratory factor analysis, 38 valid items were found from the initial 67 items.

3. Academic Adjustment Questionnaire (AAQ)

The Academic Adjustment Questionnaire (AAQ) was developed by [9] focusing only on students' academic adjustment. Compared to the SACQ, the AAQ is more focused on measuring students' inability to adapt academically and incorporates the neuroticism factor into the measurement tool.

4. College Adaptation Scale (CAS)

The College Adaptation Scale (CAS) was developed by [31] and consists of five dimensions: interpersonal relationships, academic activities, career preparation, personality, and social experiences. Each item is rated on a five-point Likert scale (ranging from one point for not at all to five points for strongly agree). Higher scores indicate better adjustment to college life. The Cronbach's alpha reliability coefficient of the measuring instrument at the time of development was 0,86.

Conclusion

Based on the exposure from the literature analysis, it can be concluded that the factors that influence the academic adjustment of first-year students are 1) demographic factors, including age, gender, and social identity perspective; 2) psychological factors, including self-efficacy, self-regulated learning, academic grit, academic flow, coping strategies; and 3) environmental factors including peer support, parent and child relationships. Some variables were inconsistent as predictors of academic adjustment, namely self-efficacy and social support.

Most of the articles in the study used the same subject characteristics, namely first-year students. Although some studies have modified the measuring instruments used, there are similarities in measuring instruments, namely using The Student Adaptation to College Questionnaire (SACQ) developed by [4]. Other measuring instruments that have been developed and can be used to measure academic adjustment are the Academic Adjustment Questionnaire (AAQ) by [9] and the College Adaptation Scale (CAS) by [31].

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Научная статья | Original paper

Correlation of Academic Cyberloafing and Cyberbullying

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The article presents the results of a study examining the correlation between two forms of deviant behavior associated with the use of virtual space: Cyberloafing and cyberbullying. This phenomena was considerated within the educational context. The research is based on empirical data collected from from schoolchildren and students in Chelyabinsk. 128 schoolchildren aged 14 to 18 years and 216 students aged 17 to 22 years were recruited for this study. The study methods were an Adapted Cyberloafing Scale (developed by N.V. Sivrikova), and a School Bullying Questionnaire (designed by M.A. Novikova, A.A. Rean, and I.A. Konovalov). The results of the study showed, that among the factors causing Internet-related deviations (cyberloafing and cyberbullying) are the level of education, gender, and restrictions on the use of phones within educational institutions. The research established a link between the structures of cyberbullying and cyberloafing. Game-related cyberloafing was found to be associated only with the role of a witness. In contrast, other types of cyberloafing showed a correlation with the degree of involvement in all three roles examined in cyberbullying: victim, aggressor, and witness. Overall, the findings partially validate the model of problematic information technology use proposed by F. Jabeen, A. Tandon, and others.

Keywords: cyberloafing; cyberbullying; media consumption; internet deviation; internet abuse; digital technologies in education; gadgets.

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Взаимосвязь академического киберлафинга и кибербуллинга

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Представлены результаты исследования взаимосвязей между двумя формами девиантного поведения, связанными с использованием виртуального пространства: киберлафинг и кибербуллинг. Отмечается, что особенностью данного исследования является рассмотрение изучаемых явлений в контексте образования. В статье использованы эмпирические данные, полученные в ходе опроса школьников (128 человек в возрасте 14—18 лет) и студентов (216 человек в возрасте 17—22 лет). В качестве инструментов исследования выступали: шкала киберлафинга (в адаптации Н.В. Сивриковой) и опросник школьного буллинга (М.А. Новикова, А.А. Реан, И.А. Коновалов). Результаты исследования позволили авторам сделать вывод о том, что факторами интернет-девиаций (киберлафинга и кибербуллинга) являются: ступень образования, пол и запрет на использование телефонов в образовательном учреждении. Также обращается внимание на то, что в ходе исследования было установлено: между академическим киберлафингом и вовлеченностью в кибербуллинг существует слабая корреляция. При этом игровой киберлафинг оказался связан только с вовлеченностью обучающегося в роль свидетеля кибербуллинга. Остальные типы киберлафинга оказались связаны со степенью вовлеченности в кибербуллинг в каждой из трех (жертва, агрессор, свидетель) исследуемых ролей. По мнению авторов, модель проблемного использования информационных технологий, предложенная Ф. Джабин, А. Тандон и соавторами, позволяет объяснить обнаруженные связи как цепь реакций на ситуацию скуки на уроке.

Ключевые слова: киберлафинг; кибербуллинг; медиапотребление; интернет-девиации; интернет-злоупотребления; цифровые технологии в образовании; гаджеты.

Финансирование. Исследование выполнено при финансовой поддержке Мордовского государственного педагогического института в рамках научного проекта «Девиантное поведение в виртуальном пространстве: изучение взаимосвязи киберлафинга и кибербуллинга», заявка от 31.05.2024 № МК-40-2024

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Introduction

Do students use their phones for personal purposes during class? How has this usage been influenced by recent changes to the Federal Law on Education in the Russian Federation? Is cyberloafing connected to other forms of Internet deviance? These questions are crucial for an education system that is actively cultivating a digital learning environment. The answers will help us evaluate the potential benefits and risks associated with the introduction of digital communication technologies in our lives.

It is hard to envision the modern world without information technologies, which have already become integral to the lives of every generation, particularly children and youth. These technologies have also established their place in the educational realm. However, the key question remains: How appropriately are students utilizing these tools? Improper use of gadgets can lead to the development of various issues related to virtual space, such as cyberloafing and cyberbullying. The characteristics of both behaviors have been documented. Data has been collected from various countries regarding the prevalence of cyberloafing and cyberbullying across different age groups. Nonetheless, the correlation between these forms of deviance has yet to be examined.

In this article, we explore the prevalence of cyberloafing and cyberbullying among Russian schoolchildren and students, particularly in light of revisions to the Federal Law ‘On Education in the Russian Federation.’ This law alters the status of cyberloafing, enabling it to be classified as delinquent behavior. Furthermore, we investigate the relationships between cyberloafing and cyberbullying, which hold both theoretical and practical significance.

Cyberloafing refers to the use of digital devices during work or study to attend to tasks that are unrelated to those obligations. It manifests in various ways. Depending on the context, one can identify business cyberloafing, academic cyberloafing, and phubbing. The first pertains to behavior in the workplace, the second to behavior during educational sessions, and the third to behavior in interpersonal interactions. The rise of academic cyberloafing is tied to the digitalization of education.

Australian researcher S. Nawaz highlights the importance of distinguishing between effective, ineffective, and problematic smartphone usage in today’s context. This differentiation is significant when considering the nature of cyberloafing — whether it is a form of deviant or proactive behavior.

When framed as deviant behavior, cyberloafing is discussed as being rooted in phone dependency or cyber addiction, often referred to as problematic smartphone use. There is also a substantial argument for viewing cyberloafing as a form of delinquent behavior due to ineffective smartphone usage. Some researchers characterize cyberloafing as a defensive response to stress or perceived injustice.

Understanding the structure of cyberloafing is critical. It consists of a range

of behaviors derived from the content of a user's online activities. The two-factor model proposed by V.K.G. Lim identifies two types of cyberloafing behavior: Internet surfing and email usage. A three-factor model by M.H. Baturay and S. Toker differentiates behaviors related to personal activities, news consumption, and socialization. Additionally, Turkish researchers have outlined a five-factor model encompassing interaction, online shopping, web presence, content usage, and gaming.

Engaging with virtual spaces comes with the risk of deviant behavior, including an increase in aggression. Recently, there has been a surge in incidents of bullying online, termed cyberbullying. This phenomenon consists of deliberate actions aimed at psychologically harming victims through electronic communication channels. Cyberbullying is inherently a group phenomenon, characterized by systemic violence directed at one individual, which evolves over time.

A crucial aspect of cyberbullying research is understanding its role structure. The simplest model comprises the victim, the aggressor, and the witnesses. A more intricate model includes roles such as the victim, the aggressor, the victim's defenders, the aggressor's helpers, and passive observers. A single individual can occupy different roles over time, acting as an aggressor in one scenario and a victim in another. G.U. Soldatova's findings support this idea, revealing that the personality traits of cyberbullying victims and aggressors share common characteristics.

Utilizing the 'situation-organism-behavior-consequences' model proposed by researchers in the UAE allows for a chain of reasoning: If a student feels bored during class, they may seek to fulfill needs for self-actualization, communication, and entertainment through their phones. Consequently, they may use smartphones to access the web or find interesting information, leading to cyberloafing. This behavior can create risks associated with information and communication overload, which in turn can give rise to destructive behaviors such as cyberbullying. Therefore, a relationship between cyberbullying and cyberloafing can be inferred.

In conclusion, the phenomena of cyberloafing and cyberbullying are being examined by researchers worldwide. However, whether a connection exists between them has not yet been investigated. Therefore, we have formulated the following research hypotheses:

1. The level of cyberloafing depends on gender, level of education, and banning the use of phones in educational institutions.

2. Involvement in cyberbullying depends on gender and level of education.

3. There is a relationship between involvement in cyberbullying and level of cyberloafing.

Organization and methods of the study

Study Sample: The research was conducted at South Ural State Humanitarian-Pedagogical University in Chelyabinsk, involving a total of 344 participants. The respondents' ages ranged from 14 to 22 years. Among these, 128 were schoolchildren aged 14—18 years, attending general education schools in Chelyabinsk (7th to 11th grades). Of this group, 48% were male and 52% were female. The remaining 216 participants were university students aged 17—22 years (first to fourth year). In this group, 43% were male and 57% were

female. The database used for this study is registered with the Federal Service for Intellectual Property (Certificate of State Registration of Database No. 2024625767).

Research Methods: The data collection methods employed included the Cyberbullying Scale, adapted by N.V. Sivrikova, and the School Bullying Questionnaire developed by M.A. Novikova et al. (only the Cyberbullying Scale was utilized in this study). The authors of these methods do not present normative values, focusing instead on the frequency of specific answers to the questions. They explain that representing respondents' involvement in bullying as percentages allows for comparison across different studies, aligning with how this category is described in the literature. The full texts of the methodologies are available in the authors' previous works.

Additionally, the questionnaire included demographic questions related to the respondents' gender, age, and level of education. The study was conducted in an online format, gathering a total of 368 completed questionnaires. Out of these, 344 were deemed valid for further analysis, while 24 were excluded due to incomplete responses.

In light of new amendments to the Law on Education that will take effect in January 2024, the survey included the question: 'Does your school/university have a rule prohibiting the use of phones during classes?'

We assessed the distribution parameters of the studied features within the sample population to ensure the appropriate selection of mathematical data analysis methods. The parameter values for the entire sample are presented in Table 1.

The characteristics of the empirical distribution of the studied variables differ from those of a normal distribution. Specifically, the skewness and kurtosis values fall outside the range of –1 to 1, and the Kolmogorov-Smirnov test confirmed the primary hypothesis ($p < 0.001$). This pattern was consistent when analyzing subgroups of students and schoolchildren.

Consequently, we employed non-parametric methods to identify relationships between the studied variables. These meth-

Table 1

Statistical characteristics of the distribution of the studied features in the empirical sample

Researched parameters	Kolmogorov-Smirnov Z	p	M	SD	Asymmetry	Excess
Structure of cyberloafing						
Communication	0.143	0.0001	1.9	0.88	1.2	1.5
Online shopping	0.19	0.0001	1.7	0.81	1.3	1.6
Content	0.18	0.0001	2.0	0.98	1.0	0.1
Games	0.22	0.0001	1.7	0.88	1.4	1.21
Social networks	0.17	0.0001	1.8	0.88	1.3	1.58
Cyberloafing	0.14	0.0001	1.8	0.78	1.2	1.5
Structure of cyberbullying						
Victim role	0.43	0.0001	1.15	0.38	3.6	15.7
Aggressor role	0.43	0.0001	1.13	0.33	3.4	13.8
Witness role	0.43	0.0001	1.15	0.31	2.4	5.3

ods included Spearman correlation analysis, Kruskal-Wallis H-criterion, and Fisher's exact test. We also utilized CHAID analysis during the study. Calculations were performed using IBM SPSS Statistics 23.

Study results

The survey results showed that the level of cyberloafing in the study sample is quite low (Fig. 1).

According to the group average, cyberloafing is rarely used by the study participants (M=2). At the same time, the structure of cyberloafing has its own peculiarities depending on gender and level of education, and the level of cyberloafing depends on the presence of a ban on phone use in the educational institution.

In the cyberloafing patterns of female study participants, gaming cyberloafing is

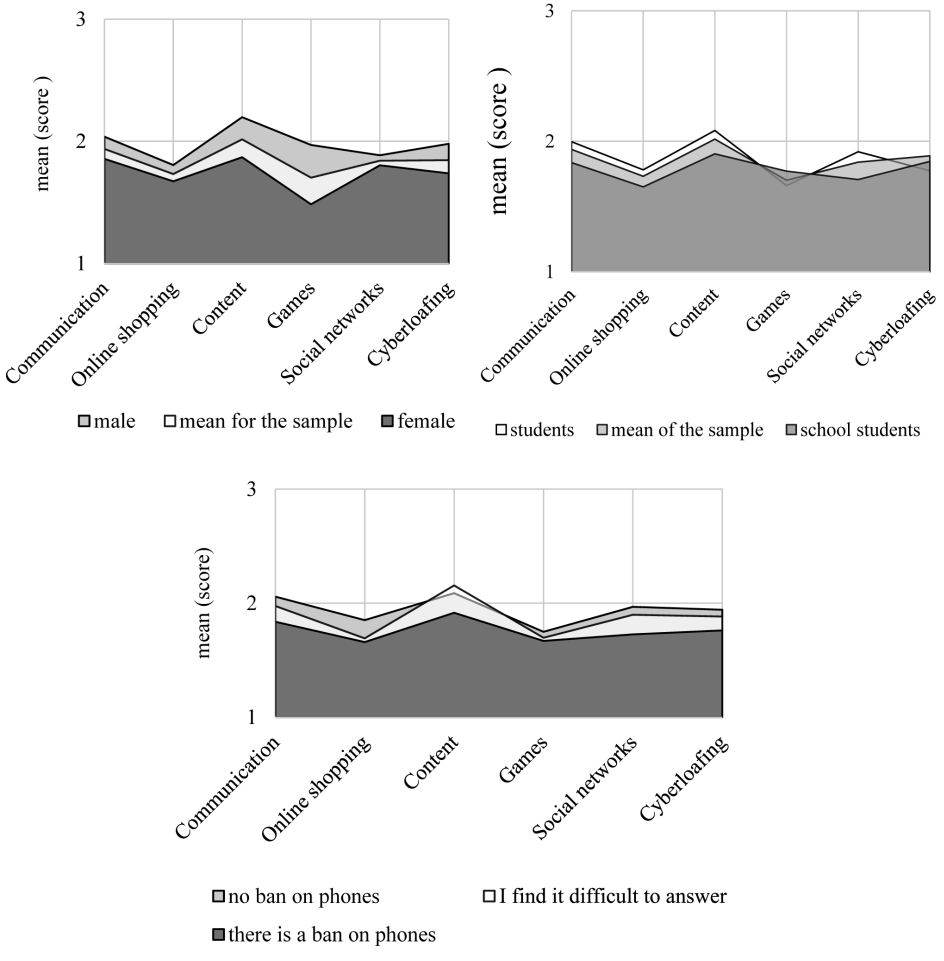

Fig. 1. Types and levels of cyberloafing

the rarest, while the most frequent forms of cyberloafing include communication, content use, and social networking. The pattern of cyberloafing among boys is dominated by the use of Internet content and socializing in classrooms. Less pronounced forms of cyberloafing among boys are Internet shopping. Differences were found in the level of cyberloafing in boys and girls (N=5.82; p=0.016).

The predominant types of cyberloafing among students are socializing, content use, and social networking. The least common types of cyberloafing among them are gaming cyberloafing. For students, the most common types of cyberloafing include communication and use of Internet content. They are least likely to use social media and gaming in lessons. According to the H-criterion, there are differences in the level of cyberloafing between schoolchildren and students (H=9.36; p=0.002).

In this study, schoolchildren and students were asked whether there was a ban on the use of gadgets in classes in their educational institutions (Fig. 2).

89% of schoolchildren study under the conditions of banning the use of smartphones in lessons. Among students, the share of such students amounted to 23.6%. There is no such ban among 53.7% of students who participated in the study and 4.7% of schoolchildren who participated in the study.

It turned out that 48% of respondents study in educational organizations where there is a ban on phone use during classes, and 35.4% study without such a ban. 16.6% of respondents find it difficult to answer this question.

Pupils who know about the ban on using phones during study sessions are expectedly less likely to do so than pupils who do not know about such a ban or doubt its existence (N=10.16; p=0.006). However, as the results of the study showed, regardless of the presence/absence of prohibitive measures, both schoolchildren and students use phones for personal purposes during educational classes (Fig. 1).

The findings indicate that gender, level of schooling, and prohibition of phone use

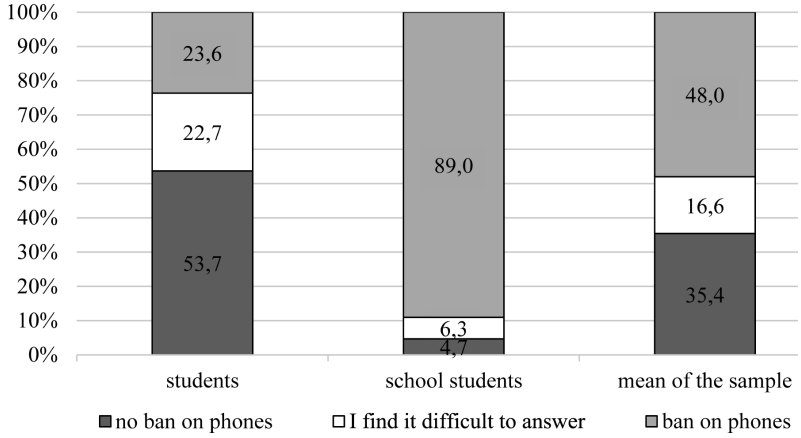

Fig. 2. Extending the ban on the use of telephones during school hours

in an educational institution affect the level of cyberloafing. Therefore, we used the CHAID analysis to examine the influence of these factors on the level of academic cyberloafing (Figure 3).

The level of cyberloafing is primarily influenced by the level of education. The share of schoolchildren who never use a phone in class is higher among schoolchildren (32%) than among students (6%). Differences are reliable at $p \leq 0.0001$ ($\chi^2=42.48$). For schoolchildren, the second-order factor influencing the level of cyberloafing was gender: among boys, the share of those using the phone for personal use during classes was higher (26%) than among girls (6%). The differences are reliable at $p \leq 0.01$ ($\chi^2=10.85$). For students, the second-order factor influencing the level of cyberloafing turned out to be the ban on phone use in the educational institution: among students for whom there is no such ban, the share of students who do not use a smartphone in class for personal purposes was the smallest (compared to other segments of the sample) — 2%. Among students who are aware of the ban on phone use in classes, the share of similar individuals amounted to 16% ($\chi^2=42.48$; $p \leq 0.01$).

Table 2 presents the results of the analysis of students' involvement in cyberbullying. Since preliminary data analysis using Fisher's exact criterion allowed us to refute the hypothesis about differences in the distribution of people involved in cyberbullying among students and pupils in the role of victim (Phi=0.092; p=0.223), aggressor (Phi=1.19; p=0.552), or witness (Phi=3.44; p=0.18), the table presents data for the entire sample. The vast majority (about 75%)

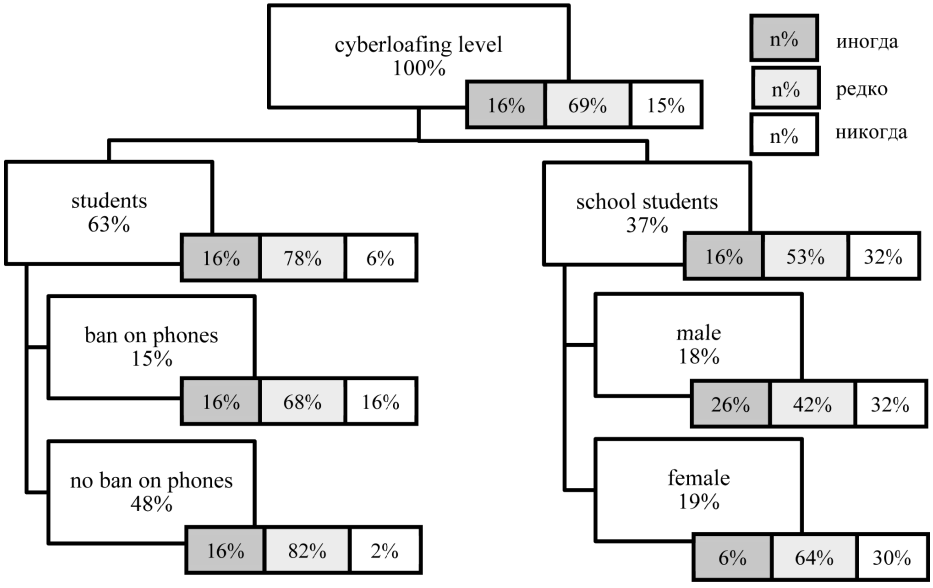

Fig. 3. Level of cyberlapping according to gender, level of training and ban on phone use in an educational institution

of respondents were not involved in cyberbullying. About 20% encounter this phenomenon personally 1 — 2 times a month. About 2% of students experience cyberbullying more than 3 times a month in the role of victim and/or aggressor. Girls are less likely than boys to witness cyberbullying (U=12888; p=0.013). No differences in the structure of cyberbullying in schoolchildren and students were found during the study.

It should be noted that there were very few people in the study sample who were involved in cyberbullying in only one role. Thus, the number of victims who would not have witnessed cyberbullying and cyberbullied at any time in the last month was only 28 (8.8%) people. The number of "pure" aggressors was even lower, at 12 people (3.8%). All other study participants who had been involved in cyberbullying 1 or more times in the last month played different roles in these situations.

Correlation analysis of the data showed that the level of cyberloafing correlated with cyberbullying involvement in any role. Direct correlations were found between all forms of cyberbullying considered in the study and cyberbullying involvement in different roles (Figure 4).

The exception was gaming cyberbullying, which was only associated with involvement in cyberbullying in the role of

Table 2

Student involvement in cyberbullying

Engagement metrics		Not once in a month	1—2 times per month	3 or more times per month
Victim role	Number of people	268	68	8
	%	77,9	19,8	2,3
Aggressor role	Number of people	266	71	7
	%	77,3	20,6	2,0
Witness role	Number of people	256	86	2
	%	74,4	25,0	0,6

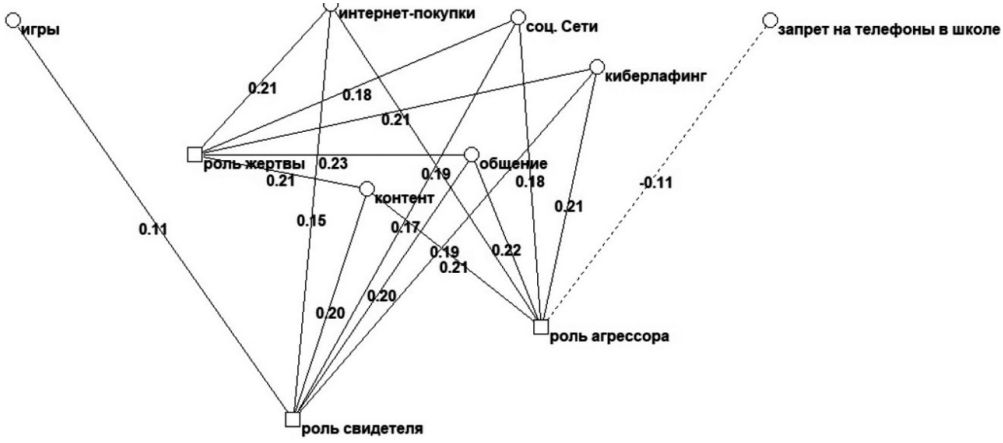

Fig. 4. Linking cyberbullying engagement to cyberloafing

a witness (r_s=0.11; p=0.05). Prohibition of phone use in an educational institution correlates with involvement in cyberbullying in the role of an aggressor (r_s=–0.11; p=0.05). Moreover, this correlation is inverse in nature.

There are weak direct correlations between the level of cyberloafing and involvement in cyberbullying in the role of victim (r_s=0.207; p=0.0002), in the role of aggressor (r_s=0.206; p=0.0002), and in the role of witness (r_s=0.187; p=0.001). It should be noted that all the correlations found were weak ($0<r_s<0.3$).

Discussion

An important aspect of studying deviant behavior is analyzing its spread within society. The results of the current study indicate that in Russia, the prevalence of cyberloafing remains low (M=2), compared to M=3.8 among students in Israel. However, given the changes made to education law in December 2023, one might have assumed that such a phenomenon in schools would have been eliminated. Unfortunately, this is not the case. Despite existing bans, schoolchildren continue to use their phones during lessons. While these bans do influence the level of cyberloafing, they do not completely eradicate it. Specifically, if students are aware of a school's prohibition on phone use during class, they are likely to use their devices less frequently. The results confirm previously observed differences in cyberloafing between students of different genders and educational levels. A significant finding from this study is that the level of cyberloafing among students primarily depends on the presence of a ban on phone use in educational institutions, while within gender groups, it largely varies based on their gender.

The predominant forms of cyberloafing among students include internet content consumption (M=2.0), communication (M=1.9), and social networking (M=1.8). Gaming cyberloafing and online shopping are the least common activities, both at M=1.7.

The psychological interpretation of these findings emphasizes the importance of internet content and communication as the main sources for satisfying the respondents' needs. The comparatively high level of internet content consumption (M=2.0) during study sessions suggests that participants seek distraction through entertainment resources. This indicates that learners actively pursue and engage with various types of content — be it videos, audio, text, or memes — underscoring their desire to remain connected to current trends. Additionally, the significance of communication and social media highlights the importance of social connections in the lives of the study participants. Social networks serve as venues for forming identities, sharing opinions, and finding support during challenging moments. In contrast, the lower rates of gaming cyberloafing (M=1.7) and online shopping (M=1.7) imply that students may prioritize collective interactions over individual entertainment and consumer practices, thereby enhancing social bonds and developing sociocultural skills in the digital environment.

Education plays a significant role in shaping users' skills in the online arena and their perceptions, highlighting the correlation between educational levels and cyberloafing ($p\leq0.0001$; χ^2=42.48). It can be inferred that among young people, those with more advanced internet communication skills — likely distinguishing students

from high schoolers — tend to engage in higher levels of cyberloafing. Conversely, students may face increased distractions from the internet during study sessions due to the greater freedom allowed in using personal devices.

The observed differences in the levels of cyberbullying among schoolchildren of various genders ($p \leq 0.01$; $\chi^2_{amp}=10.85$) can be attributed to prevailing social and cultural stereotypes that influence online behavior. Generally, girls are more susceptible to social pressure and are more likely to adhere to rules and norms. In contrast, boys may be more inclined to breach school regulations and engage more extensively with internet technologies.

For students, a significant factor in determining the level of cyberloafing is the restriction on phone use in educational environments ($p \leq 0.01$; $\chi^2_{amp}=42.48$). This phenomenon can be explained by the decreased oversight that universities have over personal device usage during classes. Consequently, when teachers or universities implement policies against gadget use in class, instances of cyberloafing tend to decline.

The investigation into the structure of cyberbullying revealed that approximately 22% of participants have experienced cyberbullying as victims. This finding aligns with data on Russian schoolchildren reported in 2018 and corroborates findings from students in other countries. This indicates that more than one in five individuals has encountered online bullying, humiliation, and threats. The results highlight the pervasive nature of cyberbullying and the urgent need for serious attention and preventive measures.

It is crucial to prioritize online safety and extend support to those affected by cyberbullying, as victims may experience severe psychological repercussions, including feelings of isolation, helplessness, anxiety, depression, and low self-esteem. These individuals may also withdraw from social situations, struggle with concentration, and find it challenging to form relationships. Furthermore, cyberbullying can undermine self-worth and lead to physical issues such as sleep disturbances, headaches, and digestive problems. Prolonged online harassment can result in serious consequences, including suicide attempts.

Given the serious psychological effects of cyberbullying, it is imperative to implement proactive measures to combat it. Key actions could include educating individuals about the consequences of cyberbullying, developing strategies to prevent it in schools and other organizations, and providing psychological support for victims.

Researchers have observed that students generally engage in cyberbullying to a lesser extent compared to other forms of bullying, such as social, physical, and verbal bullying. However, the evidence regarding gender-related differences varies across studies. Our research found that boys are more likely to witness cyberbullying than girls. Furthermore, in studies involving peers, the differences were linked to participation in cyberbullying as aggressors. These discrepancies could stem from variations in the samples studied; our research focused on high school and college students, whereas others examined only high school students.

Additionally, the results of previously conducted studies on cyberbullying do not permit an unambiguous assessment of gender differences. Some authors argue that participation in cyberbullying is more char-

acteristic of boys, while others contend that it does not depend on gender. It is important to note that international studies pay insufficient attention to children's involvement in cyberbullying as witnesses, even though it is recognized that cyberbullying often occurs in group situations. Consequently, how young people react when they witness cyberbullying is crucial for addressing this issue. Inconsistencies across studies highlight the difficulty in understanding gender differences in cyberbullying, as factors such as age, culture, and social context can all influence these differences.

The differences we observed can be interpreted through the lens of gender socialization. Traditionally, boys are socialized to be more aggressive and dominant, which may explain their higher likelihood of witnessing cyberbullying. They are more likely to encounter aggressive online behavior because it aligns with their gender role. In contrast, girls are socialized to be more compassionate and caring, which may reduce their likelihood of witnessing cyberbullying. Girls do not typically seek out online situations involving aggression and tend to unconsciously avoid such scenarios.

Regarding social norms between boys and girls, it can be hypothesized that boys may experience social peer pressure to exhibit masculinity. This pressure might result in boys refraining from intervening, even when they witness cyberbullying. On the other hand, girls often strive to conform to norms of empathy and support, prompting them to take action by either preventing or reporting instances of cyberbullying.

The correlations between the individual components of the role structure of cyberbullying and the types of cyberbullying identified in the study are strikingly similar. The sole exception was the correlation between involvement in cyberbullying as a witness and in-game cyberloafing. This suggests a lack of connection between the structure of cyberbullying and specific types of cyberloafing. However, it is important to consider that the role structure of cyberbullying indicates a fluid transition from one role to another. For instance, a single individual may assume the roles of aggressor, victim, and witness in different situations, while their level of cyberloafing remains constant. This dynamic may have significantly influenced our findings. To properly distinguish between those who act strictly as cyberbullies, victims, or witnesses, the sample size must be considerably increased. In our study, only 28 individuals (8.8%) were victims who did not witness cyberbullying, and the number of 'pure' aggressors was even smaller, at 12 individuals (3.8%). Notably, there were no witnesses of cyberbullying who were neither aggressors nor victims in the sample. In the future, we plan to expand the sample size, although this does not guarantee an increase in respondents who fit into a single role within a cyberbullying scenario.

The relationship between involvement as a cyberbullying victim or witness and the use of gadgets during school hours for purchases may indicate an attempt to compensate for negative experiences through the consumption of products or services. Furthermore, the connection between involvement as a victim or witness and online communication during school hours can be understood in the context that these individuals may remain active online — communication remains a vital aspect of socialization for them — while opting for less harmful platforms like messengers or

forums. These channels provide them with the opportunity to connect with friends and receive support without facing aggressive comments or actions.

Additionally, the link between being a victim or witness of cyberbullying and consuming internet content during class may reflect the desire of victims to distract themselves from negative thoughts and escape unpleasant realities and experiences. Similarly, the relationship between witnessing cyberbullying and levels of in-game cyberloafing may also serve as a form of escape from an uncomfortable reality. These interpretations are based on assumptions about individuals' psychological responses to the stress of cyberbullying situations. It is essential to recognize that each experience is unique, and the specific motivations for using gadgets may vary among different students.

The relationship between involvement in cyberbullying as an aggressor and the use of gadgets for online shopping, as well as the consumption of Internet content during class, can be understood through the fact that cyberbullies are typically active users of the Web. Social media serves as a significant platform for their aggressive behaviors, prompting them to socialize online even during lessons. This explains the link between involvement in cyberbullying and the use of gadgets in class for communication, particularly through social networks.

Overall, it can be said that all participants in cyberbullying are Internet users. They often use the Internet during class for personal (non-educational) purposes. This is quite expected, especially when considering cyberbullying as a group phenomenon. However, it can be inferred that cyberloafing may serve different functions for various participants in cyberbullying.

The study found a weak correlation between academic cyberloafing and cyberbullying. We have yet to identify other studies that explore the correlation between these two phenomena, so it is currently impossible to compare our findings with existing literature. Nevertheless, our results align with existing research that suggests uncontrolled media consumption during adolescence leads to increased aggression. Additionally, our findings partially support the model proposed by F. Jabin and A. Tandon, which posits that boredom in the classroom can lead to behavioral responses such as cyberloafing, consequently heightening the risk of increased involvement in cyberbullying. It is important to note that correlation analysis alone does not allow us to draw conclusions about causal relationships between these phenomena, indicating that further investigation is needed to clarify cause-and-effect dynamics.

The weak correlation observed between cyberloafing and cyberbullying may be influenced by a third variable impacting both. For instance, internet addiction could play a significant role. The use of gadgets during class may reflect internet addiction, where an individual feels incomplete without their smartphone. Concurrently, the drive to remain constantly online can elevate the risk of encountering cyberbullying. It is plausible that a common factor influencing both cyberbullying and cyberloafing is the amount of time spent online. The more time spent on the Web, the higher the likelihood of engaging in destructive cyber behavior. This study does not provide definitive answers regarding the validity of these hypotheses, nor can it confirm if both are incorrect. However, testing these hypotheses could represent a logical progression for future research.

Conclusion

The results of the study allow us to draw the following conclusions:

— The study identified predominant forms of cyberloafing among students, including consuming internet content (M=2.0), social networking (M=1.8), and online socializing (M=1.9). Less frequent behaviors included gaming and online shopping (both M=1.7). The level of cyberloafing was primarily influenced by education level ($p \leq 0.0001$; $\chi^2_{amp}=42.48$). Among high school students, gender was a secondary factor ($p \leq 0.01$; $\chi^2_{amp}=10.85$), whereas, for university students, institutional phone bans played a significant role ($p \leq 0.01$; $\chi^2_{amp}=42.48$). The hypothesis that cyberloafing levels depend on gender, education level, and phone restrictions was confirmed.

— The overall involvement of study participants in cyberbullying was low (approximately 22%). Gender differences were observed only in the role of cyberbullying witnesses (U=12888; p=0.013). While the hypothesis that cyberbullying involvement is gender-dependent was partially confirmed, the hypothesis that it varies by education level was not supported.

— The study revealed a correlation between cyberloafing and cyberbullying. Specifically, being a cyberbullying victim was associated with behaviors such as online shopping (r=0.21; p=0.05), social networking (r=0.18; p=0.05), online communication (r=0.19; p=0.05), and consuming internet content (r=0.21; p=0.05). Similarly, cyberbullying perpetrators exhibited correlations with social networking (r=0.18; p=0.05), online communication (r=0.22; p=0.05), online shopping (r=0.21; p=0.05), and internet content consumption (r=0.21; p=0.05). Witnesses of cyberbullying also showed links to social networking (r=0.19; p=0.05), online communication (r=0.2; p=0.05), online shopping (r=0.15; p=0.05), and internet content consumption (r=0.2; p=0.05). These findings confirmed the hypothesis that cyberbullying involvement is related to cyberloafing levels.

The intended purpose of the study was achieved: the link between cyberloafing and cyberbullying was uncovered. The present work supplements the existing data on new forms of deviant behavior in connection with the use of virtual space. In particular, the prevalence of cyberloafing and cyberbullying among Russian pupils and students.

Based on the theory of cyberbullying as a group action phenomenon and the perceptions reflected in the SOPA model of social media use, it was possible to explain the observed relationships between cyberloafing and cyberbullying. These theoretical foundations suggest that in the context of cyberloafing and cyberbullying, not only the feeling of lonelinessor the need for communication, but also boredom or the search for entertainment may be the original stimulus. This could explain the relationship between the two.

The present study excludes the possibility of finding causal relationships between the phenomena due to the use of cross-sectional data. This can only be inferred from the theoretical concepts of cyberloafing and cyberbullying, which have their limitations, including in the research methodology. Additional limitations arise from the use of an exclusively quantitative data collection and analysis strategy, which is exacerbated by the relatively small sample size. In order to minimize negative effects as much as possible, we paid particular attention to selecting the right data processing methods.

The use of self-report, especially in relation to deviant behavior, may be biased by the social desirability factor, which reduces the validity of the current study.

The set of factors examined in this study is also limited: Education, gender and smartphone ban. At the same time, one should be aware that there are other potentially significant factors that influence the variables studied, such as socioeconomic status, psychological well-being, and parental and teacher control.

Further research on this problem should be devoted to exploring other age groups and spatial (urban/rural) contexts, as well as other indicators of cyberloafing and cyberbullying patterns. In this context, it will be useful to increase the sample and geographical scope of the study. It will be useful to use qualitative methods to collect data on the phenomena under study in order to gain a deeper insight and understanding of the nature of the phenomena under study. An example of expanding the number of variables for further research could be the inclusion of teachers' behavior as participants in the educational system and as a factor influencing children's behavior in the classroom.

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Научная статья | Original paper

Prediction of Students' Academic Performance: The Correlation between the Results of the Unified State Exam and Academic Success

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The purpose of the work is to study the impact of the USE results on the academic performance of university students. We analyzed the data accumulated during the operation of the university information system of a large regional university. We analized data on USE scores and diploma grades received during last 13 years of university education, applying linear regression and cohort analysis to identify correlations between USE scores and student performance in various specialties. The research results demonstrated a significant correlation between USE scores and the average academic performance of students in the university. It is noted that the USE scores should be included as additional explanatory variables when building models for evaluating the educational process. They can also be used to optimize the preparation process of students for university admission and subsequent education. This research is oriented on education professionals involved in assessing and improving the quality of the educational process.

Keywords: academic performance; educational process; linear regression; cohort analysis; education quality; performance modeling.

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Проблемы прогнозирования успеваемости студентов: взаимосвязь результатов ЕГЭ и академических успехов

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Материалы статьи посвящены проблеме оценки влияния результатов единого государственного экзамена (ЕГЭ) на последующую академическую успеваемость студентов в высших учебных заведениях. Авторы ставили своей целью провести исследование, чтобы выявить, насколько суммарный балл ЕГЭ отражает способности студентов к обучению и коррелирует с их успехами в университете. Установлено, что существует значимая корреляция между результатами ЕГЭ и средним баллом студентов, а также их дипломными оценками. При этом чем больше разброс баллов ЕГЭ среди поступающих на одну специальность, тем сильнее влияние этих баллов на последующую успеваемость. Показано, что ЕГЭ, несмотря на критику, остается важным инструментом для оценки академических способностей абитуриентов и может быть использован в моделях прогнозирования успешности обучения в вузе. Делается вывод о том, что включение результатов ЕГЭ в оценку качества образования является целесообразным, так как они отражают ключевые способности и мотивацию студентов, которые влияют на их успеваемость.

Ключевые слова: ЕГЭ; успеваемость; образовательный процесс; линейная регрессия; когортный анализ; качество образования; моделирование успеваемости.

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Introduction

Since the introduction of the Unified State Exam (USE) into the Russian education system, debates about its impact on student performance and academic success in universities have remained at the center of attention of the educational community. Attitudes towards this standardized test are divided into opposing views: while some see it as an objective tool for assessing knowledge, others express concerns

about its impact on the quality of education and the process of knowledge formation among students [6; 8; 13; 17; 23].

Most publications on the influence of the USE on university education can be divided into three groups:

1. Identifying regressors and the influence of factors on university preparation — on GPA or grades in individual subjects, primarily mathematics [3; 5; 7; 11; 15; 21].

2. Predicting university performance based on USE results, primarily using neural network models [2; 12; 18; 19].

3. Theoretical understanding and description of psychological factors influencing the USE on university education [1; 9; 10; 20].

Alternative approaches to predicting academic achievements include:

- Comparing predictions based on entrance exam results and psychological characteristics, as discussed in the works of A.L. Duckworth, V.G. Erofeeva, and S.K. Nartova-Bochaver [4; 25].
- Reviewing international experience in assessment tests, as conducted in the works of D. Opposs, J.A. Baird, and others [29].
- The growing popularity of using machine learning to identify hidden patterns [24; 26; 27; 30; 31].

Let us consider some studies closely related to ours in more detail.

In the study by N.A. Chernyshova [22], data from 6,000 students over 4 years were analyzed. It was noted that the correlation between total USE scores and students' GPA is quite strong, leading to the conclusion that the USE is valid for monitoring the quality of school graduates' education and assessing applicants' knowledge.

O.O. Zamkov and A.A. Peresetsky [5] provide a detailed analysis of international research on the impact of national school exams on university education. Based on data from 505 students, they note that USE results are an adequate indicator for selecting students for the MIEF program.

L.B. Pereyaslavskaya and V.I. Pereyaslavsky [11] examine correlations between USE scores in mathematics and academic performance in general education subjects among 394 students at two universities. The article reveals a significant change in performance compared to school results and shows that grades in mathematics at both universities correlate better with USE scores in Russian than with USE scores in mathematics, indicating problems with school mathematics education in the corresponding region.

E.A. Vlasova, N.M. Mezhennaya, and V.S. Popov [3] also note that the relationship between exam grades and USE results is statistically significant and more pronounced than the relationship with total test scores, despite the fact that applicants with high USE scores often demonstrate superficial subject knowledge, which hinders their ability to solve basic-level problems in entrance tests.

O.V. Poldin [12], based on data from 157 students, studies the dependence of student dropout rates on their USE scores and notes that mathematics scores are most strongly associated with the dropout of economics students.

A.V. Semerikov and M.A. Glazyrin [19] propose predicting student success based on USE scores using a neural network model, demonstrating its 65% effectiveness based on data from 36,830 students.

S.V. Rusakov, O.L. Rusakova, and K.A. Posokhina [18], after studying data from 274 students using a neural network, suggest creating a "profile" of students at risk of dropout and low academic performance.

The relationship between academic performance and various factors is shown in articles [7; 14; 15; 28].

In our study, we tested the extent to which the total USE score reflects individual students' learning abilities, which are later expressed in their performance in various university subjects. The main question requiring investigation is the extent to which USE results truly correlate with subsequent academic success in higher education institutions.

In this regard, the following research hypotheses were formulated:

- The total USE score correlates with subsequent academic success of students in higher education institutions.

• High USE scores indicate the presence of basic academic competencies and developed cognitive skills necessary for successful university education.

• USE results have predictive value for assessing future academic achievements of students.

• These assumptions are based on the following facts:

• The exam is standardized and objectively measures students' knowledge and skills, minimizing the influence of external factors.

• High USE scores indicate the presence of basic academic competencies and developed cognitive skills necessary for successful university education.

• Previous studies show a positive correlation between USE results and students' academic achievements, confirming its predictive value.

Research Organization and Methods

Since 2006, UGNTU has operated a system for recording the activities of students and teachers. Based on data collected in the UGNTU information system, our study examined the relationship between USE results and academic performance: GPA, grades in individual subjects, and diploma grades.

Key concepts necessary for justifying the research scheme are defined:

1. **Abilities**: General (affecting performance in all subjects) and special (needed for success in a specific subject).

2. **Competencies and learning outcomes**: Competencies (knowledge, skills, and abilities for performing activities) and learning outcomes (specific knowledge, skills, and abilities to be achieved).

3. **Learnability and training level**: Learnability (a person's ability to acquire new knowledge) and training level (the level of knowledge, skills, and abilities achieved as a result of training).

4. **Factors**: Academic performance (degree of achievement of learning goals), motivation (factors driving activity), level of preparation (possession of knowledge, skills, and abilities for learning), socio-economic factors (family living standards, parents' education, etc.), and USE specifications (determining the content, structure, and format of the exam).

USE results should reflect abilities, competencies, learnability, training level, and the influence of the motivational-volitional sphere, which affect students' subsequent academic performance.

5. **Research methods**:

• Correlation analysis: Relationship between two variables.

• Regression analysis: Predicting the value of one variable based on another.

• Experimental method: Cause-and-effect relationship between two variables.

6. **Research limitations**:

• Difficulty in establishing cause-and-effect relationships.

• Imperfection of research methods.

• Influence of other factors.

The analysis was based on a database containing information on student performance over 13 years [16]. Only data from students with both USE results and diploma grades were considered. Student grades were squared to enhance deviations.

The average score (quadratic) was calculated as:

$$O = \left(\frac{\sum_{i=0}^{n} \text{ОЭ}}{n}\right)^2 \quad (1)$$

Where:
O — average score (quadratic),
OE — exam grade (excluding credits),
n — number of student grades.

$$USE = \frac{\sum_{i=0}^{n} \text{E}}{\underset{0 \le i \le n}{max}\ \text{E}} * 100 \quad (2)$$

Where:
USE — normalized USE score,
E — USE exam score,
n — number of USE exams.

Based on diploma grades and calculated average scores, their dependence on the USE score was analyzed using a linear regression model:

$$y_i = b_0 + b_1 x_i \quad (3)$$

Where:

y — output parameters,

x — input parameters,

b — regression coefficients.

For a more detailed study, a cohort analysis was performed (4). For this purpose, the whole data set was divided into specialty groups (5).

$$y_{ij} = b_{0i} + b_{1i} x_{ij} \quad (4)$$

Where: *y — output parameters,*

x — input parameters,

b — coefficients of the regression equation.

For a more detailed study, cohort analysis was conducted. The entire dataset was divided into groups of specialties.

The study examined data from 45,743 students, but the final analysis included 9,520 students with USE results, full-time education, and successful diploma defense. Among them, 3,733 were female and 5,785 were male. Additional information is provided in Table 1.

The research was conducted using several software tools: Microsoft Excel, Statistica, the university management system, and a custom data analysis program developed for student activity analytics.

Results

First, let us consider the general picture of the relationship between various factors and academic performance.

Table 1

Descriptive statistics

Statistics	USE	Average score	Age
Mean	53,4	15,6	20,8
Standard error	0,2	0,0	0,05
Median	53,0	15,0	19
Moda	49,0	9,0	18
Standard deviation	9,7	4,2	4,9
Sample variance	93,3	18,0	24,3
Excess	0,2	-0,7	101
Asymmetry	0,2	0,4	1,88
interval	66	16	157

Table 2

Correlation of various factors affecting students' academic performance and grade point average

Parameter	Part-time students	Full-time students	Dormitory	Local	FEMIT	TF	NGF
Date of birth	0,002	0,087	0,103	0,070	–0,027	0,097	0,109
Citizenship type	–0,007	–0,044	–0,103	0,011	–0,075	–0,003	–0,065
Dormitory (0-no, 1-yes)	–0,029	0,037			–0,035	0,030	0,070
Gender (0-f, 1-m)	–0,281	–0,251	–0,259	–0,254	–0,311	–0,259	–0,236
Job (0-no, 1-yes)	–0,055	0,018	0,008	0,024	0,011	0,038	0,006
Children (0-no, 1-yes)	0,012	0,022	0,027	0,021	0,033	0,043	0,001
Disability (0-no, 1-yes)	0,008	–0,013	–0,004	–0,016	–0,026	–0,002	–0,012
Age	–0,140	–0,039	–0,091	–0,035	–0,074	–0,087	0,000
USE score	0,368	0,481	0,482	0,479	0,525	0,451	0,466
Diploma grade	0,376	0,551	0,584	0,528	0,585	0,540	0,531

Note: FEMIT — Faculty of Economics, Management and IT; TF — Faculty of Technology; NGF — Faculty of Oil and Gas.

Table 2 presents the results of correlation analysis between various factors and students' GPA. For all cases except the "Correspondence students" column, data from full-time students were considered. Results for students from specific faculties are also shown: Faculty of Economics, Management, and IT (FEMIT), Technological Faculty (TF), and Oil and Gas Faculty (NGF), as they differ significantly in their specifics. As can be seen from the table, the strongest correlation with GPA among the considered factors is shown by the USE score.

Table 3 presents similar data on the correlation between USE scores and various factors.

As shown in Figures 1—3, there is a significant correlation between students' GPA and their USE scores upon admission. The correlation is 0.48, with 0.24 of the GPA explained by the USE score (significance above 0.001). Diploma grades also correlate with USE results, but to a lesser extent — 0.25, with only 0.07 of the variation in diploma grades explained by the USE score (significance above 0.001).

As is known, different specialties have different levels of competition and ranges of admission scores. It is logical to hypothesize that the greater the variation in USE scores among applicants, the greater the influence of this dif-

Table 3

Correlation of USE score and various factors affecting students' academic performance

Architecture	Part-time students	Full-time students	Dormitory	Local	FEMIT	TF	NGF
Safety of Technological Processes	0,276	0,236	0,249	0,221	0,131	0,226	0,272
Drilling of Oil and Gas Wells	0,011	–0,012	–0,056	0,015	0,012	–0,022	–0,044
Oil and Gas Geology	–0,070	–0,103	–0,109	–0,107	–0,108	–0,217	–0,026
Geophysical Methods of Prospecting and Exploration	–0,025	–0,031	–0,014	–0,042	–0,013	–0,043	–0,036
Documentation and Archival Studies	–0,015	–0,006	0,041	–0,016	–0,010	–0,046	0,010
Computer Science and Engineering	0,139	0,045	0,013	0,063	0,044	0,039	0,030
Information Systems and Technologies	0,368	0,481	0,482	0,479	0,525	0,451	0,466
Forest Engineering	0,184	0,254	0,233	0,273	0,355	0,199	0,201
Machinery and Equipment for Oil and Gas Complexes	0,328	0,433	0,453	0,421	0,492	0,418	0,408
Management	0,306	0,363	0,361	0,362	0,427	0,272	0,387
Oil and Gas Engineering	0,281	0,489	0,491	0,486	0,531	0,452	0,503
Applied Geology	0,096	0,269	0,262	0,274	0,345	0,227	0,250
Design, Construction, and Operation of Oil Pipelines	0,274	0,364	0,392	0,336	0,452	0,389	0,292
Development and Operation of Wells	0,149	0,362	0,390	0,339	0,447	0,361	0,361
Advertising and Public Relations	0,142	0,616	0,504	0,773	0,604	–0,213	0,801
Standardization and Metrology	0,282	0,333	0,341	0,327	0,368	0,289	0,325
Construction	0,228	0,361	0,330	0,386	0,458	0,331	0,324
Technological Machines and Equipment	0,305	0,455	0,461	0,449	0,503	0,415	0,437

Note: FEMIT — Faculty of Economics, Management and IT; TF — Faculty of Technology; NGF — Faculty of Oil and Gas.

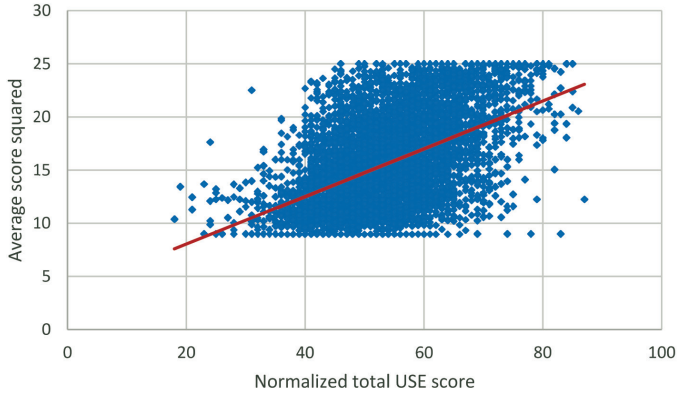

Fig. 1. Dependence of GPA on USE scores for all groups

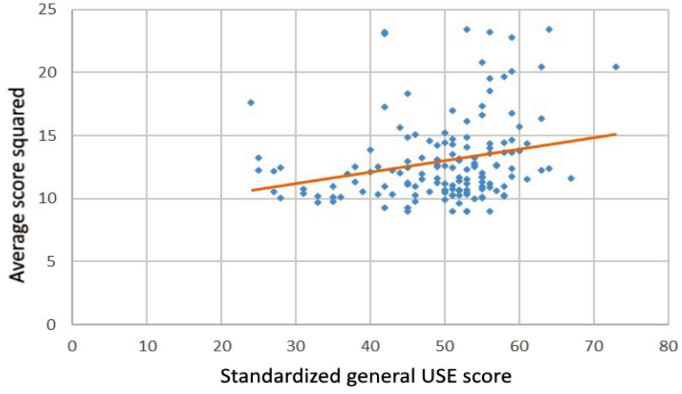

Fig. 2. Dependence of GPA on USE scores for MON (Machinery and Equipment for Oil and Gas Complex — minimum significance of explained variation)

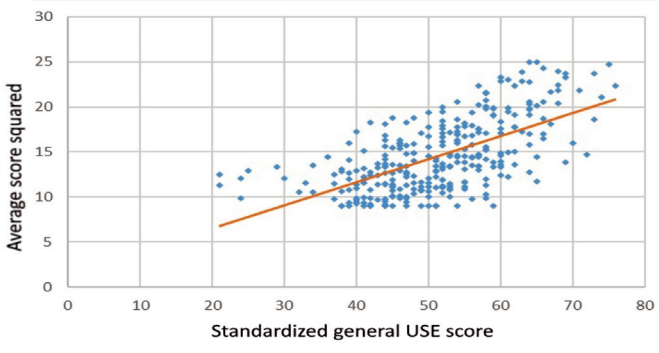

Fig. 3. Dependence of GPA on USE scores for FC
(Finance and Credit — maximum significance of explained variation)

Table 4

Summary statistics on USE results by specialty groups, percentage of GPA and diploma grade variation explained by the regression equation from USE scores

Specialty Group	Observations	Average USE Score	Std. Dev. of USE Score	Min. USE Score	Max. USE Score	% of GPA Variation Explained by USE	% of Diploma Grade Variation Explained by USE
Architecture	154	56,75	10,27	30	85	0,263***	0,010
Safety of Technological Processes	104	51,85	9,32	26	82	0,239***	0,142*
Drilling of Oil and Gas Wells	114	50,38	9,00	19	69	0,184***	0,007
Oil and Gas Geology	171	48,99	7,43	24	70	0,165***	0,089*
Geophysical Methods of Prospecting and Exploration	106	48,55	8,07	31	74	0,277***	0,123*
Documentation and Archival Studies	78	55,86	7,12	41	72	0,120***	0,000
Computer Science and Engineering	190	55,14	8,69	39	83	0,139***	0,236***
Information Systems and Technologies	336	58,24	9,20	35	87	0,268***	0,033*
Forest Engineering	194	45,15	7,66	23	73	0,119**	0,000
Machinery and Equipment for Oil and Gas Complexes	146	49,71	9,11	24	73	0,062*	0,126**
Management	202	55,02	9,51	37	84	0,397***	0,330***
Oil and Gas Engineering	1 423	57,89	9,02	32	85	0,272***	0,094***
Applied Geology	217	48,10	6,82	36	72	0,196***	0,096***
Design, Construction, and Operation of Oil Pipelines	136	53,82	11,18	23	83	0,455***	0,446***
Development and Operation of Wells	130	54,88	9,98	18	80	0,269***	0,019
Advertising and Public Relations	187	56,46	9,16	39	82	0,197***	0,039
Standardization and Metrology	118	53,65	7,86	36	79	0,139***	0,121**
Construction	98	47,77	6,52	33	69	0,219***	0,000
Technological Machines and Equipment	436	49,46	6,50	32	79	0,077**	0,000
Technology of Geological Exploration	117	51,02	6,50	40	75	0,074**	0,022
Technology of Logging Operations	109	43,70	4,50	32	62	0,078**	0,004
Technosphere Safety	188	54,80	8,14	33	85	0,314***	0,109***
Physical Education	98	47,71	9,78	21	72	0,163***	0,056
Finance and Credit	203	53,31	9,13	29	76	0,509***	0,279***
Ecology and Environmental Management	205	53,95	8,19	36	81	0,266***	0,045*
Economics	93	56,53	8,97	36	72	0,220***	0,151
Electrical Power Engineering and Electrical Engineering	357	54,47	9,00	32	82	0,233***	0,022*

Note: * – significance at 95%, ** – significance at 99%, *** – significance at 99.9%.

ference on subsequent academic performance. Since with a small variation in USE scores, the difference in academic performance among former schoolchildren is also small, they differ

less at the start of their studies, and this difference is determined by further university education and other factors. To test this hypothesis, let us examine the obtained data in more detail — we will evaluate the regression of the difference between the minimum and maximum USE scores of students admitted to different specialties on the R-squared correlation between USE scores and their GPA (see Table 4) (5). As can be seen in Fig. 4, this regression is quite noticeable and amounts to 0.34 for GPA and 0.23 for diploma grades.

$$R = \sum_{j=0}^{m} \sum_{i=0}^{n} r \quad (5)$$

Where:

R — average score (quadratic),

r — R-squared correlation between USE scores and GPA or diploma grades,

n — number of students in the specialty,

m — number of specialties in the specialty group.

Thus, it can be concluded that the range of USE scores upon admission affects average academic performance at a significance level of 0.001 and diploma defense results at a significance level of 0.011.

Conclusion

Based on the analysis of the presented data, we obtained significant dependencies of both GPA and diploma grades on USE results. Moreover, the greater the variation in USE scores among admitted students, the more accurately they determine subsequent academic performance. Undoubtedly, besides USE scores, there are many other factors that can significantly influence the quality of education. However, on average, most of the considered factors correlate with academic performance (as one of the main measurable parameters of education quality) significantly less than the abilities and motivational-volitional characteristics of students reflected in USE scores. Therefore, when building models for assessing education quality, it is advisable to include USE results as additional explanatory variables.

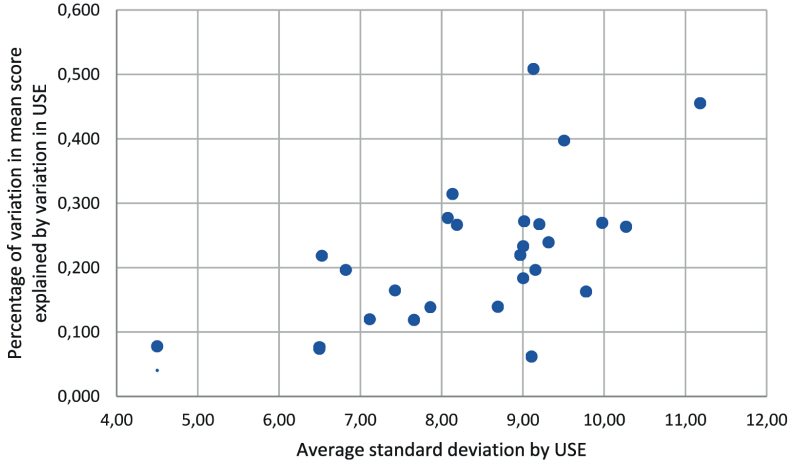

Fig. 4. Influence of the standard deviation of USE scores on the degree of correlation between USE scores and students' GPA

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Strategies of Enlightenment and Pleasure: Competing in Media Consumption

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An original concept of educational content consumption is presented, which was implemented in a study aimed at identifying Russian consumers' preferences regarding educational products in the era of infotainment. It was assumed that there are two consumer segments: those oriented towards education (followers of "Mr. First") and those oriented towards entertainment (followers of "Mr. Second"). To test this hypothesis, a nationwide online survey was conducted using the Anketolog online platform (693 respondents, of whom 48.3% were men and 51.7% were women, with an average age of 34.49 years, SD = 12.83), along with the original questionnaire "Enlightenment in the Era of Infotainment." Additionally, the following methods were used: G. Hofstede's questionnaire for assessing value differences, the brief Big-Five personality questionnaire, and a question evaluating the level of personal agency (based on the concept of I.N. Emelyanova). The results showed that followers of "Mr. Second" exhibit low openness to new experiences, high anxiety, low organization, and low self-discipline. In contrast, followers of "Mr. First" are more curious, creative, and responsible. Differences in values were also identified: individuals inclined towards entertainment tend to be more individualistic and sensitive to uncertainty, whereas those committed to education are more oriented towards collective values and experience lower stress levels. In the groups with a high level of personal agency (those with intellectual-creative and pragmatic positions), the number of respondents oriented towards education (followers of "Mr. First") exceeds the number of entertainment-oriented individuals. Conversely, in the group with an imitative position (the lowest level of personal agency), entertainment-oriented individuals predominate in quantitative terms. The findings confirm the hypothesis of two consumer segments with distinct personality traits and value orientations, which can be used both for adapting educational programs and for providing recommendations to various media outlets.

Keywords: enlightenment; infotainment; consumers of enlightenment content; the values of consumers of enlightenment content; the Big five; Mr. First; Mr. Second.

Supplementary materials: The data used in this study is available in the dataset “Analysis of educational preferences of “Mr. First” and “Mr. Second”, created by the authors, and posted at: https://disk.yandex.ru/d/HIje6QjZHyYnYQ

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Стратегии просвещения или удовольствия: противостояние в медиапотреблении

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Представлена авторская концепция потребления просветительского контента, которая была реализована в проведенном исследовании, направленном на выявление потребительских предпочтений россиян в отношении просветительских продуктов в эпоху инфотейнмента. Предполагалось, что существует два сегмента потребителей: ориентированных на просвещение (последователи «мистера Фёста») и на развлечение (последователи «мистера Секонда»). Для проверки гипотезы был проведен всероссийский онлайн-опрос с использованием онлайн-платформы Anketolog (693 респондента, из них 48,3% — мужчины, 51,7% — женщины, средний возраст опрошенных — 34,49 года, SD=12,83) и авторского опросника «Просветительство в эпоху инфотейнмента». Также были использованы следующие методики: опросник Г. Хофстеде, позволяющий оценить и выявить различия в ценностях, краткий пятифакторный опрос-

ник личности (Big-Five) и вопрос, оценивающий уровень субъектности личности (в соответствии с концепцией И.Н. Емельяновой). Результаты показали, что последователи «мистера Секонда» проявляют низкую открытость новому опыту, высокую тревожность, низкую организованность и самодисциплину. Последователи «мистера Фёста», напротив, более любознательны, креативны и ответственны. Также выявлены различия в ценностях: люди, склонные к развлечению, более индивидуалистичны и чувствительны к неопределенности, тогда как приверженцы просвещения больше ориентированы на коллективные ценности и менее подвержены стрессу. В выделенных группах высокого уровня субъектности личности (с интеллектуально-творческой и прагматической позицией) количество респондентов, ориентированных на просвещение (последователей «мистера Фёста»), преобладает над последователями «мистера Секонда». Напротив, в группе с имитационной позицией (с самым низким уровнем субъектности) в количественном отношении преобладают люди, ориентированные на развлечение. Полученные результаты подтверждают гипотезу о существовании двух сегментов потребителей с различными личностными и ценностными ориентациями, что может быть использовано как для адаптации просветительских программ, так и для составления рекомендаций для различных медиа.

Ключевые слова: просветительство; инфотейнмент; потребители просветительского контента; ценности потребителей просветительского контента; Большая пятерка; мистер Фёст; мистер Секонд.

Дополнительные материалы: Данные, использованные в исследовании, доступны в датасете «Анализ просветительских предпочтений “Мистера Фёста” и “Мистера Секонда”», созданном авторами, и размещены по адресу: https://disk.yandex.ru/d/Hlje6QjZHyYnYQ

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Relevance of the problem

In recent decades, the nature of information consumption by Russians has significantly transformed [12]. Digitalization, the growing popularity of social networks and Internet resources have changed the ways of obtaining knowledge [13]. The analysis of Russians’ preferences in choosing enlightenment products [6] helps to adapt the content to modern needs and expectations. Cultural and scientific institutions such as museums, libraries, universities, and educational centers need data on their audience’s attitudes in order to create more attractive and in-demand enlightenment programs that help raise the level of public awareness [4]. Such programs develop the critical thinking of the audience, increase their general awareness and the need for active participation in public life.

In the era of digital technologies and social media, when information is becoming more accessible and fragmented, consumers can choose enlightenment content that suits their interests and level of perception [5]. In this situation, it is necessary to understand the impact of different approaches (enlightenment vs entertainment) on the perception and assimilation of new knowledge. Some foreign studies show that rec-

reational content may be more interesting, but less effective for deep learning [28]. Other researchers had shown long before that, without an entertainment format, the audience would ignore news or enlightenment content [21], which may seem complicated or boring if it is not supported by elements of showmanship [8].

Thus, the study of differences in the perception and effectiveness of enlightenment and entertainment strategies is relevant for the development of optimal educational and cultural programs that will take into account current trends and audience preferences.

Mr. First and Mr. Second as typical consumers of enlightenment content

The names of the characters from the iconic Soviet film " A Man from the Boulevard des Capucines " (directed by A. Surikova, premiered in the USSR in 1987), borrowed and included in the title of this part, reflect the strategies of the enlightenment's influence on society. Mr. First is a noble and devoted cinematographer who came to a small town in the Wild West in order to show the locals the advantages and beauty of the surrounding world through enlightenment methods. Mr. First brings civilization and culture with him, striving to correct the morales of a cruel and rude society through the cinema format. His mission is to prove that enlightenment can transform people and make the world a better place. Mr. Second— the opposite of Mr. First, offers citizens films of a different nature: vulgar, cruel, demonstrating negative aspects of human nature and capable of awakening only the basic instincts in people. Thus, we emphasize with the help of these contrasting characters, the importance of enlightener' responsibility for a particular enlightenment product, which carries a certain moral and ethical burden. In our study, we will designate adherents of one of these strategies for the educational products consumption as followers of "Mr. First" and "Mr. Second", respectively.

Enlightenment in the age of infotainment

Infotainment [29] as a communication media strategy, an integral part of modern media culture [9] and a product of postmodernism [15] is a synthesis of information and entertainment that allows to convey complex or serious topics to the audience in an easier and more attractive form. E.L. Vartanova understands infotainment as a news stream presented in the most entertaining form [1], and B.N. Lozovsky postulates the most comprehensive definition of infotainment as entertaining by information [11]. Active competition for the audience's attention in conditions of high switchability [35] forces many authors of enlightenment content to resort to an entertaining communication format[1]. According to L.S. Yakovlev and E.V. Potekhina, the spontaneous activity of bloggers and other participants in network projects (including enlightenment ones — Author's note) is not an analogue of the media activity, but a form of self-identity [16]. A study conducted in 2023 [6] identified several major players among the Russian enlighteners. Among the first five, Russians were able to identify (knowledge with a hint) educational projects of the *Culture TV channel*, the *Knowledge Russian Society*, *Arzamas, PostNauka, Schrodinger's Cat* platforms. At the same time, the willingness to recommend the educational content of these projects does not exceed 10% (*Culture TV channel* — 22.9%).

[1] Only 20% of Russians watch educational programs to the end [6].

In our opinion, the most important predictors of infotainment are: 1) media convergence, which is a fusion of various types of media (television, the Internet, print media), which contributed to the creation of new content formats where information and entertainment elements are closely intertwined [24]; 2) technological progress, which implies the development of digital technologies, the Internet and social networks, which made it possible to create interactive and visually attractive forms content that is easily perceived by the audience [26; 31]; 3) changing audience needs, which lies in the fact that modern content consumers (especially young people [27]) prefer to receive information in a convenient and easy-to-understand form, often combining news viewing with entertainment [32]; 4) media competition, which encourages media companies to create unique and attention-grabbing content capable of retaining and expanding the audience; 5) psychological factors influencing the choice of information content that causes an emotional reaction [3]. In this regard, infotainment appeals to emotions, making information more memorable; 6) economic factors related to the fact that entertainment content attracts a much larger volume of advertising, which makes infotainment financially profitable for media content producers [22; 33]; 7) modern cultural trends such as “entertainment culture” and “request for accessibility”, stimulate the development of infotainment, which becomes a way of mass communication [30].

Enlightenment in the age of infotainment is the process of spreading knowledge and raising awareness of the audience through formats that combine information and entertainment elements. This phenomenon is characterized by the following key features:

1. Enlightenment content in the era of infotainment often goes beyond traditional formats and adapts to the formats of shows, podcasts, video blogs and memes, which makes it possible to convey the source material in a form attractive to the mass consumer [18; 19].

2. Infotainment makes enlightenment ideas accessible to a wide audience. Even complex concepts can be presented in a simple and engaging way, which attracts people who might not normally be interested in these topics [34].

3. In the age of infotainment, enlightenment content often includes elements of emotional engagement, such as dramatization, humor, or personal stories. This helps to immerse the audience deeper into the topic, making them more receptive to information [20].

4. Modern infotainment formats, such as videos on social networks or short articles, require the presentation of information in a concise and maximally precise form, which leads to the creation of short, succinct phrases or ideas that are easy to remember.

5. In the age of infotainment, there is a risk of superficial perception of information. In an attempt to make the content more engaging, complex topics can be simplified to the point where their depth and significance are lost. In addition, a significant part of the audience may not trust scientific information provided in the infotainment format [25]. This is because entertainment elements can be perceived as reducing the seriousness or credibility of the content. This is especially true for those who are accustomed to receiving information from traditional academic or official sources, where information is presented strictly and formally [17].

6. Infotainment has a strong influence on the formation of public opinion and the perception of various topics. This can both help broaden the horizons of the audience and

manipulate its perception through simplification and emotional coloring of information.

Thus, enlightenment in the age of infotainment is a complex and multilevel process that allows the dissemination of knowledge and educational ideas to a wide audience, but requires a careful approach to maintaining the quality and reliability of information.

The purpose of this study was to identify the consumer preferences of Russians in relation to enlightenment products in the era of infotainment.

During the analysis of the source base and the results of our previous research [4; 5; 6], it was assumed that there are two segments of consumers of enlightenment products (with a focus on enlightenment or entertainment). In this regard, the objective of this study was to verify the hypothesis of the existence of two segments of consumers, their portrayal and description of value orientations. As a consequence hypothesis, it was assumed that the identified types of consumers have different life positions due to the level of agency and different value orientations.

To achieve this goal, the questionnaire "Enlightenment in the age of Infotainment" was developed, consisting of seven statements with which respondents had to express their degree of agreement on a 5-point scale by R. Likert. Using such a questionnaire, it was planned to determine how much respondents are inclined to enlightenment (search for educational, cognitive content) or to entertainment (search for leisure and entertainment content), that is, to what extent the respondent would prefer to engage in self-development instead of an entertaining hobby. The statements in the questionnaire were related to specific situations and clearly indicated a choice between two strategies (enlightenment or entertainment). An example of a statement: "In general, I prefer watching the *Culture TV channel* to watching *Comedy Club* videos.

Features of the research sample and the methods used

The All-Russian online survey was conducted on April 29, 2024 through the "Anketolog" service and by collecting respondents' responses through the service Toloka.ai . During the study, 693 people were interviewed (48.3% were men, 51.7% were women), the average age of the respondents was 34.49 years (SD=12.83). In addition, the place of residence (the level of urbanization), the level of education and the subjective income level of the respondents were taken into account. 20.1% of respondents live in Moscow; in St. Petersburg and other megacities — 20.6%; in large cities with population fewer than 1 million people — 31.7% and 27.6% — in regional centers. The level of subjective income of 10.4% respondents is high or very high, 58.3% is average, 23.2% consider their incomes low and 8.1% just make ends meet.

The research tools included the author's 7-point questionnaire "Enlightenment in the age of Infotainment", a questionnaire by G. Hofstede, which allows assessing and identifying differences in the respondents' value orientations. We also used a short five-factor personality questionnaire (Big-Five) [21], translated and adapted by A.S. Sergeeva, B.A. Kirillov and A.F. Dzhumagulova (2016) [14], and a four-choice questionnaire that determines the level of personality agency (intellectual, creative, pragmatic, contemplative and imitative) in accordance with the concept of agency by I.N. Yemelyanova [7].

The research method includes a social passport that characterizes the respondent (level of education, gender, age, level of urbanization, marital status, degree of religiosity, income level).

The data was processed using the SPSS 19.0 program. Data analysis methods used: frequency analysis, average val-

ue analysis, nonparametric Mann—Whitney difference criterion, factor analysis.

The results of the study

The exploratory factor analysis using the maximum likelihood method with Varimax rotation allowed us to identify two factors (Table. 1), that confirmed their validity based on the results of confirmatory factor analysis: CMIN=23,43; df=11; p=0,015; GFI=0,991; CFI=0,984; RMSEA=0,040, Pclose=0,073.

Based on the factor analysis data presented in Table 1, the following conclusions and interpretations of the two identified factors can be drawn. High loads on the "Entertainment orientation" factor have statements related to the preference for recreational activities: "for me, cultural recreation is entertainment, not enlightenment" (load factor: 0.674); "after work, I often prefer to watch entertainment programs rather than enlightenment ones" (0.607); "I would rather read a selection of jokes rather than tips and life hacks from scientists" (0.559); "it's better to watch a sports competition for a couple of free hours than the *History channel*" (0.435). This factor can be interpreted as a propensity for entertaining, light, and perhaps more relaxing leisure activities. Respondents who get high scores according to this factor are more likely to choose activities that allow them to distract themselves and relax without thinking about gaining new knowledge or self-development. Their interests are centered around pleasure and entertainment, which may reflect a need for relaxation and stress relief.

Statements related to the preference for educational and cognitive activities have high loads on the "orientation towards enlightenment" factor: "I'd rather learn something new in the field of science than watch entertainment shows" (0.704); "I'd rather listen to a science journalist than a parodist performance" (0.635); " In general, I'd prefer watching the *Culture TV channel* to *Comedy Club* videos" (0.585). The second factor characterizes the propensity to search for knowledge, the desire for self-improvement, and an interest in cognitive and educational materials. Respondents with high scores on this factor are more likely to choose a meaningful pastime related to learning new topics, cultural development and broadening their horizons than simple entertainment.

The two factors highlighted reflect two opposing orientations in the choice of leisure: entertainment versus enlightenment. They illustrate how different people can ap-

Table 1

The results of the exploratory factor analysis

Statements	Factors	
	1	2
2. For me, cultural recreation is entertainment, not enlightenment.	0,674	
1. After work, I often prefer to watch entertainment programs rather than enlightenment ones.	0,607	
5. I'd rather read a collection of jokes than tips and life hacks from scientists.	0,559	
6. It's better to watch a sports competition for a couple of free hours than the *History channel*.	0,435	
4. I'd rather learn something new in the field of science than watch entertainment shows.		0,704
7. I'd rather listen to a science journalist than a parodist performance.		0,635
3. In general, I'd prefer watching the *Culture TV channel* to *Comedy Clu*b videos.		0,585
Proportion of explicable variance, %	22,26	15,15

proach the use of their free time in different ways: some seek relaxation and pleasure, others seek development and learning [10].

The reliability of internal consistency for the subscales was not very high, but acceptable: for the scale of "Entertainment orientation" =0.665, for the scale of "Enlightenment orientation" =0.673.

Since the phenomenon under study involves a dichotomy of the trait (enlightenment or entertainment), the entire sample was divided into three groups based on the results of descriptive statistics (average, standard deviation). 20.3% of respondents are strongly focused on entertainment, 25% on enlightenment (Table 2). Most of the sample representatives occupy an intermediate position — they choose entertainment and enlightenment content (infotainment) equally.

Next, the assumption was tested that the followers of "Mr. First" (focused on enlightenment) differ in personal characteristics from the followers of "Mr. Second" (focused on entertainment). To this end, we compared two "polar" groups in terms of personality traits (Table 3).

The results of the comparative analysis revealed differences in such indicators as openness to experience, neuroticism and conscientiousness. Entertainment-oriented respondents are less curious, less prone to fantasy and creativity, and their range of interests is narrower. On the contrary, respondents who are oriented towards enlightenment are more likely to show non-standard thinking, are more inclined to creativity and fantasy, are more curious and have a wider range of interests.

Followers of "Mr. Second" are more anxious and prone to depression, more hostile towards others, shyer and more unsure of themselves. This can be explained by the fact that the content of an infotainment often produces doubt and inconsistency of a scientific fact [2]. On the contrary, followers

Table 2

Distribution of respondents in the sample based on their orientation towards enlightenment or entertainment

Orientation	Frequency	%
Enlightenment	173	25,0
Infotainment	379	54,7
Entertainment	141	20,3
Total	693	100,0

Table 3

Differences in personality traits among people focused on entertainment and enlightenment

Personality traits	Average rank		U	P
	Enlightenment	Entertainment		
Extraversion/Introversion	163,34	150,34	11187,0	0,202
Agreeableness/Antagonism	152,16	164,05	11273,5	0,238
Conscientiousness/Problems	167,50	145,23	10466,5	0,028
Neuroticism/Emotional stability	146,27	171,28	10253,5	0,014
Openness/Closeness to experience	173,55	137,81	9420,5	0,000

of “Mr. First” are less prone to anxiety and depression, have a lower level of aggression towards others, they are more confident and less shy.

In addition, the entertainment-oriented respondents are less organized and responsible, they have less self-discipline, they strive less for achievements, and they are less reasonable. On the contrary, respondents who demonstrate an enlightenment orientation are more organized, responsible and disciplined, they are more eager for achievements, more inclined to be reasonable and more effective.

At the same time, there were no differences in the parameters of extraversion and agreeableness. The lack of differences can be explained by the fact that both of these parameters are less related to motivation and cognitive styles that determine the choice of strategy — enlightenment or entertainment. Extroversion reflects sociability, energy, and a desire to interact with others. Both followers of “Mr. First” and “Mr. Second” can be extroverts and lead an active social life, regardless of whether these activities are aimed at enlightenment or entertainment. Agreeableness characterizes the degree of benevolence, empathy, and willingness to cooperate. Regardless of their orientation towards enlightenment or entertainment, people can be equally agreeable. Entertainment-oriented people can show agreeableness through socializing in an informal setting, participating in collective games and activities, and caring for others in the context of entertainment. Enlightenment-oriented people can show agreeableness through a desire to share knowledge, help others with learning, and support constructive discussions. In both cases, regardless of motivation, people can strive to maintain harmonious relationships and display altruism.

At the next stage of the analysis of the results obtained, the assumption was tested that the values of Russians focused on enlightenment and entertainment are different. To this end, we compared two “polar” groups in terms of values (Table 4).

The results of the comparative analysis show the differences between the two groups in terms of parameters: Individualism, Masculinity and Uncertainty Avoidance. Followers of “Mr. Second” are more likely to declare the value of personal time, comfortable working conditions are more important to them, and they are more inclined to “adventurism.” Followers of “Mr. First” are less prone to taking risks, have fewer demands on working conditions in terms of comfort, and are less sensitive to spending personal time. They are probably more focused on collective values such as passing on knowledge, helping others, and contributing to the public good. This may explain their less sensitivity to spending personal time, as they are willing to sacrifice their personal interests in order to achieve higher goals.

Table 4

Differences in values among people focused on entertainment and enlightenment

Values	Average rank		U	P
	Enlightenment	Entertainment		
Individualism	140,13	178,81	9191,5	0,000
Power distance	161,86	152,16	11443,0	0,220
Masculinity	175,69	135,18	9049,5	0,000
Uncertainty Avoidance	187,27	120,98	7047,0	0,000
Long-term Orientation	160,55	153,76	11669,0	0,475

Entertainment-oriented respondents are less willing to cooperate at work, are more pessimistic about promotion opportunities, and have less interpersonal trust and personal responsibility for failures in life. On the contrary, enlightenment-oriented respondents are more willing to take responsibility for failures, are more likely to trust other people and cooperate, and are more optimistic about job opportunities.

Followers of "Mr. Second" are more likely to experience anxiety (nervousness) at work, they are more sensitive to uncertainty in management, and they are more likely to agree to work strictly according to the rules. On the contrary, followers of "Mr. First" are less sensitive to a situation of uncertainty, are more willing to act in it, are less likely to worry at work, and are willing to work with no clear rules. Thus, we can make a cautious assumption that the search for entertainment is a kind of stress management strategy for people who are less stable and more anxious.

Next, we carried out an analysis of the relationship of enlightenment orientations with different levels of a agency of personality (according to I.N. Yemelyanova [7]) (Table 5).

The results show that there is a relation between the level of agency and orientation towards enlightenment/entertainment (Pearson Chi square=32.22 at p=0.000). In groups with a high level of agency (intellectual and creative, pragmatic), the number of respondents focused on enlightenment prevails over those focused on entertainment. On the contrary, in the fourth group with the weakest level of agency (imitative), the number of followers of "Mr. Second" prevails compared to followers of "Mr. First".

The results indicate that there is a connection between the level of agency (that is, the degree of awareness and active participation of a person in their own life and decision — making) and preference for the types of activity — enlightenment or entertainment. Thus, respondents with a higher level of agency tend to show interest in activities aimed at expanding knowledge, developing thinking and improving their skills. This is because such people are likely to be more motivated to develop themselves and achieve long-term goals. Their choice in favor of enlightenment reflects their desire for active and conscious management of their lives. Among the followers of "Mr. Second" there are more respondents with imitative behavior (low level

Table 5

Differences in the level of agency among people focused on entertainment and enlightenment

Levels of Personality agency		Entertainment — Enlightenment			Total
		enlightenment	infotainment	entertainment	
Intellectual and creative	Quantity	56	120	24	200
	%	**28,0%**	60,0%	12,0%	100,0%
Pragmatic	Quantity	73	134	60	267
	%	**27,3%**	50,2%	22,5%	100,0%
Contemplative	Quantity	29	88	24	141
	%	20,6%	62,4%	17,0%	100,0%
Imitative	Quantity	15	37	33	85
	%	17,6%	43,5%	**38,8%**	100,0%
Total	Quantity	173	379	141	693
	%	25,0%	54,7%	20,3%	100,0%

of agency), focused on entertainment, which may indicate that respondents with a lower level of agency tend to choose activities that require less involvement and awareness, perhaps due to a lack of motivation for self-improvement or a sense of control over their own life. Entertainment can be perceived by them as a way to avoid difficulties or stress, offering temporary relief and pleasure, but not contributing to long-term development. Thus, it can be concluded that a high level of agency is associated with a more conscious approach to life and a preference for activities aimed at self-improvement (the audience of "Mr. First"), while a low level of agency correlates with a preference for passive, entertaining forms of activity (the audience of "Mr. Second").

Further, the groups were compared by socio-demographic characteristics: gender, age, level of education, income, and religiosity (Table 6).

As can be seen from Table 6, among people focused on enlightenment, there are more older people who are more educated and have higher income level (at the trend level). Perhaps enlightenment orientations are a dynamic characteristic of a personality that "builds up" with life experience.

Conclusions

The conducted research confirmed the hypothesis put forward and made it possible to achieve the goal set — to establish the specifics of Russians' preferences regarding enlightenment products in the context of infotainment. The solution of the research tasks made it possible to identify audience segments, their characteristics and the relationship between the orientation towards enlightenment or entertainment and key personal and value orientations.

The results of factor analysis and comparative analysis of the respondents' personality traits and values revealed two clear orientations: entertainment and enlightenment. These orientations differ in both personal characteristics and values.

Followers of "Mr. Second" show a lower level of openness to experience, they are less inclined to creativity and curiosity, which indicates a narrow range of interests. These respondents also exhibit high levels of neuroticism, which is expressed in anxiety, shyness, and self-doubt. They are less organized and responsible, have little self-discipline, and are less prone to achievement.

On the contrary, Mr. First's followers demonstrate a high level of openness to experience, which manifests itself in out-of-the-box thinking, a penchant for creativity, and a wide range of interests. They are less prone to anxiety and depressive moods, are more confident and tend to interact constructively with others. These people are also more organized, responsible, and disciplined.

Entertainment-oriented respondents value individualism and comfort more, show a propensity for risk and adventurism,

Table 6

Differences in socio-demographic characteristics among people focused on entertainment and enlightenment

Socio-demographic characteristics	Average rank		U	P
	Enlightenment	Entertainment		
Age	175,95	134,87	9005,0	0,000
Education	166,07	146,99	10714,5	0,055
Religiosity	152,96	163,07	11411,0	0,299
Income	164,99	148,31	10901,0	0,060

and experience more anxiety at work. They are less likely to cooperate and show less trust in other people. In contrast, enlightenment-oriented respondents demonstrate a propensity for collective values, are less focused on comfortable working conditions, and are less sensitive to spending personal time. They are more cooperative, more optimistic about their career prospects, and show a high level of trust in others.

Among the followers of “Mr. First” there are more representatives of the older age, with a higher level of education and income. These results confirm that the choice of leisure strategy is closely related to the level of personal development, life experience and social status.

Thus, our results suggest that the choice between entertainment and enlightenment is determined by differences in personality traits, values, and socio-demographic characteristics. In particular, followers of “Mr. Second” are more likely to seek pleasure and stress relief through simple and accessible forms of leisure, while followers of “Mr. First” prefer activities that promote their personal and professional development.

In addition to the conclusions we have drawn, the data we have obtained makes it possible to offer a number of recommendations for media representatives, enlighteners and bloggers:

1. The majority of respondents are in the intermediate group (infotainment), preferring a balance between entertainment and education, which means that enlighteners and media representatives should develop hybrid formats that effectively combine educational elements with entertainment in order to meet the needs of this significant part of the audience.

2. Enlightenment programs aimed at followers of “Mr. Second” may include elements for improving emotional well-being, developing self-organization skills and personal responsibility.

3. For an audience of older and more educated Russians, it is recommended to pay attention to the depth and content of the materials, as well as use channels that are popular among this socio-demographic group.

4. To increase the level of agency of the audience, it is necessary to introduce interactive elements such as surveys, quizzes, online discussions and assignments. These tools will help the audience not only consume content, but also actively participate in its creation and discussion, which contributes to the development of critical thinking and independence.

5. In addition, it is necessary to include elements in entertainment content that can stimulate awareness of personal values, goals and opportunities, and contribute to increasing the level of agency among the audience. For example, enlightenment content may include stories or examples that demonstrate the importance of personal responsibility and self-development.

6. The implementation of gamification elements in enlightenment materials can make such products more attractive to followers of “Mr. Second”. This may include a motivation system, such as a list of awards, levels, contests, and assignments that encourage continued learning.

7. It is necessary to include in enlightenment content plots that will encourage the audience to self-reflection, as well as help to increase the level of agency. This can be achieved through asking questions, giving examples for reflection, and inviting a discussion about personal experiences.

Such recommendations, in our opinion, will help media representatives, enlighteners and bloggers to more precisely customize their enlightenment products to the needs of the groups we have identified, contributing to both their entertainment and educational involvement.

Limitations and prospects of the study

The limitations of this study include the format of the survey conducted among subscribers of the service *Toloka.ai*, who use the Internet as a tool to get small income. However, this fact should not be considered as affecting the objectivity and honesty of the respondents' answers.

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Traditions and Innovations at the International Scientific and Practical Conference of Students, Postgraduates and Young Researchers “Psychology of the XXI Century”: An Event Report

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Traditionally, annual student and youth conferences are included in the process of studies at higher education institutions. They are implemented in order to develop students’ professional competencies and soft skills, as well as to provide future specialists with career orientation opportunities. This report is devoted to the international scientific and practical conference “Psychology of the XXI century: A Kaleidoscope of Discoveries”, which was dedicated to the 300th anniversary of Saint Petersburg State University. The conference became an event for students, postgraduates, and young researchers, it was a space for transferring knowledge and experience from the leading scientists to future specialists, and for discussing new theories, methods and practices of psychological support. About 400 students, including undergraduates, graduate students and young scientists, presented their reports at the Faculty of Psychology of Saint Petersburg State University, the total number of participants in various events almost reached a record of 1000 people. They were representatives of various scientific schools and areas of psychology from Saint Petersburg, Moscow, many other regions of Russia, and other countries (Republic of Belarus, Kazakhstan, India, China, The Netherlands). In addition to the classic formats (sections, round tables, master classes), the conference used innova-

tive approaches: interactive sessions, microconferences, topics and sections based on interests, gamification, and real-time feedback. This event received a positive response and became the start for many new projects.

Keywords: conference; psychology of the XXI century; young scientists; SPbU.

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Традиции и инновации на международной научно-практической конференции студентов, аспирантов и молодых ученых «Психология XXI века»: отчет о мероприятии

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Представлен обзор содержания международной научно-практической конференции «Психология XXI века: калейдоскоп открытий», которая состоялась в юбилейный для Санкт-Петербургского государственного университета год празднования 300-летия. Обращается внимание на то, что традиционно ежегодные студенческие и молодежные конференции в выс-

ших учебных заведениях включены в процесс подготовки обучающихся с целью формирования профессиональных компетенций, гибких навыков и карьерного ориентирования будущих специалистов. Авторы отмечают, что конференция стала событием для студентов, аспирантов и молодых ученых, так как благодаря организаторам было создано пространство для передачи знаний и опыта ведущих ученых будущим специалистам и обсуждения новых теорий, методов и практик психологического сопровождения. На площадке факультета психологии СПбГУ выступили с докладами около 400 обучающихся, включая студентов, аспирантов и молодых ученых, а суммарное число участников в разнообразных мероприятиях почти достигло рекордных 1000 человек. Это представители разных научных школ и направлений психологии из Санкт-Петербурга, Москвы, многих регионов России и других государств (Республика Беларусь, Казахстан, Индия, Китай, Нидерланды). Кроме классических форматов проведения (секции, круглые столы, мастер-классы) в конференции были использованы инновационные подходы: интерактивные сессии, микроформаты, темы и секции по интересам, геймификация и обратная связь в реальном времени. Особо отмечается, что работа конференции получила положительный отклик и стала стартом для многих новых проектов.

Ключевые слова: конференция; психология XXI века; молодые ученые; СПбГУ.

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The Faculty of Psychology at Saint Petersburg State University (SPbU) has held the international scientific and practical conference “Psychology of the XXI Century” for students, postgraduates, and young scientists since 1997. One of the most important tasks in training psychologists is integrating them into the professional community, developing their research skills, and enabling them to independently address current psychological problems in both science and practice. Therefore, this area of work is a high priority for the faculty. The relevance of these annual conferences to undergraduate and postgraduate training lies in their contribution to student development. This includes not only professional psychological competencies but also soft skills and the opportunity to build an individual learning pathway [8]. As students progress in their education, research skills become increasingly crucial, and the conference provides a valuable platform for their development. Modern research in psychology and pedagogy empirically confirms that participation in scientific conferences for young scientists, undergraduates, and postgraduates enhances students’ research skills [3; 5; 6].

The "Psychology of the XXI Century" conference annually brings together participants to discuss both actively developing areas in psychology and the relationship between these areas and traditional approaches. The conference provides a forum for students, postgraduates, young professionals, and teachers to share their perspectives. It supports a unified information space in psychology, facilitates the exchange of experiences for implementing joint projects, and fosters collaboration between students and young scientists from diverse scientific schools in Russia and abroad. It also connects these individuals with leading representatives of the Saint Petersburg School of Psychology. Finally, the conference provides opportunities for students, postgraduates, young scientists, and teachers to identify with scientific views and practices presented there.

The conference is a traditional form of experience exchange between young scientists from all over Russia and beyond. The main forms of its work include section reports, round tables, lectures by invited specialists, and master classes. The plenary session is traditionally the conference's most significant event, setting the tone for the entire program and introducing the core themes of the year's chosen topic. Invited speakers are prominent scientists and researchers in the most relevant areas of psychology, with regional, national, and international reputations. Another important event of the conference is the closing ceremony, where, in addition to summing up the results, participants share their impressions and suggestions for future conferences.

In addition to the classic formats (sections, round tables, master classes), the conference "Psychology of the XXI Century" employed the following innovative approaches in 2024:

• Interactive sessions: Facilitated interactive discussions, real-time surveys, and group brainstorming using platforms like Mentimeter and online whiteboards. Examples included "Young Specialists: Science Needs New Heroes", "Inclusive Society: Keys to Understanding", and the quiz game "Build a Psychologist in Yourself".

• Microformats: Utilized short, focused event formats to maximize engagement and allow more speakers to present their ideas. Examples included "Psychological Clinic through the eyes of a student" and the discussion sections "Psychology of Loneliness", "Psychology of Migration", and "Political Psychology".

• Topics and sections: Organized parallel sections on narrow topics, allowing participants to choose their areas of interest. For example, sections included "Professional health and well-being", "Sports Psychology", "Clinical Psychodiagnostics and Psychotherapy", "Educational Psychology", and "General and Cognitive Psychology".

• Gamification: Integrated game elements into the conference program to enhance learning and interaction. This was implemented in the quiz game "Build a Psychologist in Yourself" and the public discussion "Group Work and Psychological Counselling: What Is It and How do I Start?"

• Real-time feedback: Employed mobile applications to gather immediate feedback and suggestions from participants during "The Space Between Us: the Specifics of a Consultative Contact at the Beginning of Work", allowing for dynamic adjustments to the session.

To foster student autonomy, the Faculty of Psychology empowers the Student Council and the Student Scientific Society to organize conferences, with guidance from young researchers and faculty mem-

bers. Students take ownership of the conference by forming working groups responsible for inviting participants, managing applications, shaping the conference theme, and outlining the program. The initiative of the student community is encouraged and supported by the faculty administration through mentorship, resource allocation, and promotional assistance. This approach is intentional, recognizing that entrusting students with conference organization fosters their intrinsic motivation — a key driver of creative and innovative thinking [11]. Furthermore, research suggests that trust, inherent in giving students this responsibility, empowers talented innovators in education to develop and create [13].

Following the application deadline, the primary focus shifts to a rigorous review of participant abstracts. A hallmark of "Psychology of the XXI Century" is its commitment to fostering a collaborative environment, offering participants constructive feedback on their submitted abstracts and opportunities for refinement. This process develops participants' skills in scientifically presenting research, including articulating the study design, presenting key findings, using information sources correctly, and adhering to proper formatting guidelines. All applicants receive expert feedback on the following criteria:

• Scientific Problem/Hypothesis/Research Question: Clear articulation of a scientific problem, hypothesis, or research question.

• Research Methodology: Clear description of a research methodology appropriate to the hypothesis.

• Literature Review: Comprehensive review of existing research and links to relevant sources.

• Sample and Procedure: Detailed description of the sample, research procedure, and mathematical processing methods used.

• Results and Hypothesis: Evidence of obtained or predicted research results that align with the hypothesis.

• Presentation Style: Scientific style and logical sequence of presentation.

• Formatting: Accurate referencing in accordance with GOST requirements.

The organizing committee meticulously plans thematic sections, with invaluable support from student volunteers. Expert faculty and young scientists co-manage each section, providing detailed feedback on each report based on established evaluation criteria, and offering recommendations for future research. Experts evaluate reports based on the following criteria:

• Suggested Scientific Problem/Hypothesis/Research Question: Clear articulation of a scientific problem, hypothesis, or research question.

• Research Methodology: Clear description of a research methodology appropriate to the hypothesis.

• Literature Review: Comprehensive review of existing research and links to relevant sources.

• Sample and Procedure: Detailed description of the sample, research procedure, and mathematical processing methods used.

• Results and Hypothesis: Evidence of obtained or predicted research results that align with the hypothesis and demonstrate scientific novelty.

• Directions for future research.

• Presentation Style: Scientific style and logical sequence of presentation, clarity of presentation, reasoning, consistency in argumentation, logic of transition from concept to conclusions, demonstration of critical thinking.

A particularly valuable aspect of the scientific sections is that students often arrive at new conclusions and identify subtle points for further study through presentation and discussion with their peers. These insights, often initially overlooked, emerge as students engage in constructive feedback and answer challenging questions, enriching their understanding of their own research.

To recognize these contributions, each section has hosted a “Best Performance” contest since 2022. Winners not only receive valuable experience but also memorable gifts, certificates, and books relevant to their field. Participants also have the opportunity to take part in the poster session and win in the “Best Poster” category. Each year, the organizers strive to create innovative and engaging public events for the conference, providing students with enriching and rewarding experiences.

Main event. The International Scientific and Practical Conference of Students, Postgraduates, and Young Scientists “Psychology of the XXI Century: a Kaleidoscope of Discoveries” convened on April 10-12, 2024. Held during Saint Petersburg State University’s 300th anniversary year, the conference held special significance for the Russian psychological community, emphasizing the development and support of young scientists.

The plenary session opened with a welcoming address by Saint Petersburg State University professors A.V. Shaboltas and S.N. Kostromina, who expressed their optimism for the professional development of young researchers, encouraging them to collaborate with established experts to accelerate scientific breakthroughs. They presented a joint report emphasizing the crucial interplay between theory and practice in both incremental and groundbreaking discoveries. G.L. Isurina, Professor of Saint Petersburg State University, explored the unique challenges of applying psychotherapeutic techniques developed for individual clients to group settings, emphasizing the need for culturally sensitive approaches. S.L. Solovyova, Professor of the I.I. Mechnikov North-Western State Medical University, presented a report on the current state of psychology in medicine, highlighting the increasing integration of psychological principles in chronic disease management.

Reports on artificial intelligence in schools (from collecting reflections to digital tutors) by A.A. Komissarov, Head of the Centre for Digital Competencies of “Aeroplane” Group of Companies, and on the relationship between emotion regulation and cognitive control and emotional differentiation by D.V. Lyusin, Associate Professor of the National Research University “Higher School of Economics”, fuelled great interest in young scientists and students and provided a rich discussion.

Z.M. Sadvakasova, Professor of the Al-Farabi Kazakh National University (KazNU), spoke about social and psychological work in Kazakhstan and their approaches to psychological support for families and children with special educational needs, including the “Family Strengthening” program focused on early intervention. Later a number of issues in the field of scientific and educational cooperation between Saint Petersburg State University and KazNU was discussed, including membership in dissertation councils, joint research projects, academic mobility, double degree programs, and other topics. This collaboration highlights the importance of international partnerships in fostering innovation in education and research [1].

The conference featured a robust scientific program encompassing 19 sections, with several particularly popular areas — including "General and Cognitive Psychology," "Personality Psychology," "Pedagogical Psychology: School," "Clinical Psychodiagnostics and Psychotherapy," "Social Psychology," and "Psychology in the Digital Space" — extending over multiple days. The extended duration reflected the high level of participant engagement and interest in these areas. The topics of the sections are presented in full in the published conference proceedings [9].

For example, the section "Personality Psychology" explored the human experience through themes of existential anxiety and the meaning of life, delving into self-identification, reflection and self-knowledge, morality and ethics, and creativity and aesthetic perception. The section "General and Cognitive Psychology" explored the power of creativity and insight in problem-solving, while also examining self-attitude, strategies for overcoming crisis states, and innovative psychological approaches like art therapy, mobile applications, and virtual reality.

The section "Clinical Psychodiagnostics and Psychotherapy" addressed the complex landscape of mental disorders, including schizophrenia, borderline personality disorders, and neurotic states, examining their manifestation and impact on various emotional states and overall health.

The section "Psychology of a Person in Disease" examined the psychological characteristics of patients with somatic diseases — including women with infertility, patients with diabetes, and those with inflammatory bowel diseases — while also exploring the potential for positive psychological changes after recovery. Speakers actively discussed the multifaceted health challenges and the crucial role psychologists play in helping patients overcome them.

The section "Mental Health and Early Support for Children and Parents" delved into the complexities of interaction between parents and children with special needs, addressing the challenges and emotional states experienced by both parents and specialists. Discussions encompassed both internal factors (psychological characteristics, emotional burnout) and external factors (support programs, organizational aspects) that impact the support of families with children with disabilities.

The section "Developmental Psychology and Differential Psychology" explored the influence of various factors on personality development, including family relations and parenthood, psychological separation and interaction, emotional development and mental health in children and adolescents, and the psychological aspects of aging. A highlight was the discussion of loneliness, with participants addressing its subjective experiences, coping methods, and personality traits associated with it. The event provided new angles for insight for its causes and consequences and also its coping methods in various contexts.

The section "Psychology of Sports and Physical Culture" highlighted the critical role of motivation and psychological well-being in the skill development of athletes across age groups and disciplines, from recreational swimming to BMX-racing and running. Participants were particularly engaged in discussing the complex culture surrounding sports fandom.

The section "Psychology in Digital Space" gathers more and more speakers every year, which is no coincidence, given

the ever-growing relevance of this area [10]. At the same time, the main focus of the reports is focused on three key areas: the impact of digital technologies on mental health and behaviour, issues of trust in the digital space, and the possibilities of mobile technologies for various forms of psychological support of the individual. Research topics in the "Psychophysiology" section covered a wide range of issues in the field of neuropsychology, including emotional responses to loss, neuropsychological aspects of behaviour and cognitive processes, the impact of stress on health and perception of the world around us.

"Social Psychology" proved to be a highly popular section, with reports addressing interpersonal communication, attachment, behavior in conflict situations, the impact of socio-demographic factors on mental health, and creativity. Separate discussions focused specifically on family and marriage and migration psychology.

"Legal Psychology and Deviant Behavior" explored topics ranging from addictive states and character accentuations to deviant behavior and psychological well-being. Young researchers emphasized the need to understand the social and psychological factors affecting vulnerable populations and proposed diverse support strategies.

"Organizational Psychology and Management" explored themes such as employee motivation, communication and decision-making processes, and the influence of the organizational environment on the individual. Participants paid particular attention to tolerance for uncertainty and the professional image of the psychologist.

"Psychology of Occupational Health and Well-Being" highlighted the factors impacting worker health, including burnout prevention, the relationship between workplace stress and physical activity, attitudes towards health and barriers to healthy behavior, and strategies for post-work recovery. These studies underscored the importance of an integrated approach to employee well-being and the role of various factors in maintaining professional activity and life balance.

The diverse field of Educational Psychology was explored across multiple sections, including "Pedagogical Psychology: School" and "Pedagogical Psychology: Secondary Professional and Higher Education". The arrangement of these sections allowed participants to better see and understand the effects of Education Psychology on schools and higher-education institutions. Key thematic areas included student well-being and emotional intelligence, academic performance and motivation, social adaptation and psychological safety, psychological aspects of school education, and skills development and preparedness for lifelong learning.

In 2024, the conference featured not only oral face-to-face presentations but also a poster session, during which the jury awarded a special prize to the best posters. Expert voting yielded the selection of the following works:

• A.E. Bannikova, T.V. Shumilov, under the supervision of A.V. Chistopolskaya, presented "Comparison of the phenomenology of the process of searching for the idea of works of conceptual art and solving insight problems" (P.G. Demidov Yaroslavl State University, Yaroslavl, Russia) [2];

• D. Fleming, under the supervision of A.L. Sburlea, presented "Vetoing mechanism: Terminating a planned movement before execution" (University of Groningen, Groningen, The Netherlands) [12];

• A.V. Kosolapova, under the supervision of T.V. Shinina, presented "Motiva-

tional aspects of deviant and delinquent behaviour on the example of the Arctic" (Moscow University of Psychology and Education, Moscow, Russia) [7].

Beyond the core scientific program, the conference also included several additional events. In particular, the presentation of the book "The ABC of Negotiations" by S.D. Gurieva attracted significant interest [4]. The round table "Young Specialists: Science Needs New Heroes" provided an opportunity for young researchers, assistants, and postgraduates from Saint Petersburg State University's Faculty of Psychology to network. The round table "Inclusive Society: Keys to Understanding" proved highly popular. Leading specialists in Special Needs Psychology discussed practical experience and new approaches to inclusivity for children with dysontogenesis and their families. Finally, the events focused on meeting and communicating with the conference participants — "Networking", the quest "Psychology of the XXI Century", and the quiz game "Develop Your Inner Psychologist" from the Centre for Modern Practical Psychology "Foresight" — received high marks from the audience.

Another highlight was the round table "Psychological Clinic Through the Eyes of Students", which brought together heads of leading psychological services, young scientists, and students. The event discussed what the university psychological services should offer, the ideal specialists to staff them, and the future opportunities these services could provide. E.V. Zinovieva, Head of the Psychological Clinic of Saint Petersburg State University, organized the event. Among the participants were E.Y. Brel, Head of the Federal Resource Centre for Psychological Service in the Higher Education System of the Russian Academy of Education, Moscow; I.V. Makarova, Director of the Centre for Psychological Counselling of the National Research University "Higher School of Economics"; and E.V. Sharapanovskaya, Director of the Medical, Psychological and Social Centre of the Saint Petersburg National Research University of Information Technologies Department of Mechanics and Optics (ITMO).

The Saint Petersburg Psychological Society held a master class "Space Between Us: the Specifics of Consulting Contact at the Beginning of Work" for participants and guests of the conference, aimed at building work with the client at the beginning of the counselling process. Another public discussion, "Group work and psychological counselling: what is it, and how to start?", focused on the practical aspects of a psychologist's work. Participants learned about the nuances of each type of work, analyzed cases from practice, and discussed the features of professional training, opportunities, and "pitfalls" that occur early in a specialist's career.

A record number of participants were registered at this year's conference at the Faculty of Psychology of Saint Petersburg State University: their number was more than a thousand people. These were the representatives of various scientific schools and areas of Psychology from Saint Petersburg, Moscow, many regions of Russia and other countries (Belarus, Kazakhstan, India, China, The Netherlands), who made presentations, visited sections, and took part in events.

At the closing ceremony, Professor A.V. Shaboltas of Saint Petersburg State University addressed the participants and thanked them for their contributions. Associate Professor N.A. Medina Braka-

monte, Chairman of the educational and methodological Commission in the field of "Psychological Sciences" of Saint Petersburg State University, announced that the bachelor's degree program "Psychology" has successfully completed professional and public accreditation. Saint Petersburg State University received a Certificate for a period of five years; according to Medina Brakamonte, this is the first such case in Russia. The Council for Professional Qualifications in the field of labor Safety, Social Protection, and Employment of the population issued the certificate, and the All-Russian Public Organization "Federation of Educational Psychologists of Russia" confirmed it. Experts confirmed that the level of teaching at Saint Petersburg State University in the bachelor's degree program "Psychology" aligns with the Professional Standard "Psychologist in the social sphere", approved by the Ministry of Labour of the Russian Federation. As part of the accreditation process, a direct assessment of students' competencies was conducted, in which final-year undergraduate students took part. The faculty of Psychology publically recognized students and awarded Commendations.

Results and conclusions

Approximately 1,000 participants attended the conference, demonstrating strong interest from students, postgraduates, and young researchers. The organizers are focused on preserving the traditions of the national psychological school. The conference incorporated innovative approaches such as interactive sessions, microformats, gamification, and real-time feedback. The atmosphere of free scientific research and cooperation between representatives of different generations provided students with opportunities to gain relevant knowledge, develop professional skills, and build a strong professional network.

The conference prepares students, postgraduates and young researchers interested in independent development in the professional community and the search for new solutions in problem-solving situations. Thus, the development of professional competencies is complemented by the development of soft skills related to organization, communication, teamwork, creating a productive scientific and educational environment, opening up new innovative approaches to events and cooperation in the professional community.

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