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ПСИХОЛОГИЯ ОБРАЗОВАНИЯ | EDUCATIONAL PSYCHOLOGY

Tolerance to Uncertainty and Superstition as Personal Resources for Solving Social Problems by Students

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The phenomena of tolerance/intolerance to uncertainty and belief in the paranormal as personal resources for solving social problems by students were examined. The relevance of the topic is due to an attempt to identify the necessary personal determinants that help to effectively cope with life difficulties in the face of the uncertainty and multitasking in the modern world. Hypotheses about the inverse correlation between tolerance to uncertainty and superstition, as well as the direct correlation between tolerance and a rational style and positive orientation, belief in the paranormal with a negative orientation, an avoidant and impulsive style of solving social problems have been put forward. The results of an empirical study conducted among university students studying at the social science, humanities and medical faculties are presented (N=252), aged 18 to 21 years. A set of diagnostic techniques was used: the questionnaire for solving social problems by M.M. Danina et al., the "Paranormal Belief Scale" by J. Tobacyk (adaptation by D.S. Grigoriev), the modified questionnaire of tolerance to uncertainty by S. Badner (adaptation by T.V. Kornilova, M.A. Chumakova). According to the results of the study, it was found that students have a low tendency towards superstition and more often use a rational style when solving social problems. They are also characterized by a predominantly positive problem orientation. The direct correlations of tolerance to uncertainty with a rational style and positive problem orientation, as well as negative connections with avoidant and impulsive styles, a negative problem orientation were found.

Keywords: personal resources; solving social problems; tolerance to uncertainty; superstition; students.

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Сачкова М.Е., Семенова Л.Э.
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Толерантность к неопределенности и суеверность как личностные ресурсы решения социальных проблем учащейся молодежью

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В статье рассматриваются феномены толерантности/интолерантности к неопределенности и веры в паранормальное как личностные ресурсы решения социальных проблем учащейся молодежью. Актуальность темы обусловлена попыткой выявить необходимые личностные детерминанты, помогающие эффективно справляться с жизненными затруднениями в условиях неопределенности и многозадачности современного мира. Были выдвинуты гипотезы об обратной связи толерантности к неопределенности и суеверности, а также прямых связях толерантности с рациональным стилем и позитивной ориентацией, веры в паранормальное с негативной ориентацией, избегающим и импульсивным стилем решения социальных проблем. Представлены результаты эмпирического исследования, проведенного среди студентов вузов, обучающихся на социально-гуманитарных и медицинских факультетах (N=252), в возрасте от 18 до 21 года. Применялся комплекс методик: опросник решения социальных проблем М.М. Даниной с соавт., «Шкала веры в паранормальное» Дж. Тобасика в адаптации Д.С. Григорьева, модифицированный опросник толерантности к неопределенности С. Баднера в адаптации Т.В. Корниловой, М.А. Чумаковой. По результатам исследования было установлено, что студенты обладают низкой склонностью к суеверности и чаще используют рациональный стиль при решении социальных проблем. Для них также характерна преимущественно позитивная проблемная ориентация. Обнаружены прямые взаимосвязи толерантности к неопределенности с рациональным стилем и позитивной проблемной ориентацией, а также отрицательные связи с избегающим и импульсивным стилями, негативной проблемной ориентацией.

Ключевые слова: личностные ресурсы; решение социальных проблем; толерантность к неопределенности; суеверность; студенты.

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Introduction

In today's ever-changing world of social instability, high demands are placed on a person's productive activity, which significantly increases the role of his or her personal resources that allow to successfully cope with the challenges of uncertainty and multitasking life and professional problems [16; 31]. Accordingly, future professional-students face the tasks not only to orient themselves in the norms and content of professional activity, but also to be able to constructively solve everyday social problems, thus preserving their working capacity, maintaining psychological well-being and positive meanings of their labor. Moreover, as one of the most active and mobile social groups, students constantly face different social problems, the specifics of orientation in which and the peculiarities of the used styles of solution can depend on their well-being, life satisfaction, the nature of activity, etc. [30; 32].

Solving social problems under conditions of uncertainty implies the presence of a number of personal resources that determine both the peculiarities of the representation of the problems themselves and the specifics of the process and ways of their solution, among which are tolerance to uncertainty (TU) and superstitiousness.

As a multidimensional construct, TU is regarded as one of the significant predictors of a person's readiness to tolerate uncertainty without discomfort and to keep openness to new experience and the ability to productive activity in ambiguous and contradictory situations [14; 37], which, according to D.A. Leontiev, allows it to be considered a condition and simultaneously an indicator of psychological maturity of a person [16]. Despite the fact that modern psychology still lacks a unified conceptualization of TU, most authors treat this psychological phenomenon as a personal characteristic. Thus, T.V. Kornilova considers tolerance to uncertainty as a personal construct and personal regulation of decision making [14]. A.G. Asmolov presents personal tolerance as “a mechanism for supporting and developing the diversity of systems ... in various unpredictable situations and their stability” [5].

Studies show that TU has a close relationship with different properties of intellectual and personal potential of a person [15], creative problem solving [39], well-being of students in the initial period of their study in higher education [27], internal locus of control, which is especially pronounced in girls [9]. It has also been repeatedly stated that TU is positively related to extraversion and openness to experience and, on the contrary, negatively related to neuroticism [33]. At the same time, some authors consider TU and the essentially opposite construct of intolerance to uncertainty (IU) as independent, relatively independent psychological formations [15]. Indirect evidence of this can be found in studies of the strong positive association of IU with neuroticism and negative association with extraversion and openness to experience [33].

In addition, studies by a number of authors allow us to define TU as a resource characteristic of personality. According to A.B. Rogozyan, personality resources include various traits, properties and attitudes that influence the regulation of behavior in tense and ambiguous situations [21]. A.N. Mospan interprets TU as a psychological resource of a personality for overcoming the challenges of uncertainty [18]. N.G. Kapustina also presents tolerance as a system of internal resources of the

personality, reflecting the readiness and ability of the individual to effectively solve the tasks of interaction with themselves and other people, forming resistance to negative environmental factors [13]. The resource component of TU consists in building a positive perspective of the future [19], the ability to cope with difficult problems, maintaining adaptive potential, constructive strategies for coping with difficult life situations [34]. At the same time, coping behavior itself is considered to be a phenomenon close to social problem solving, which, in particular, is evidenced by the existence of links between problem orientations and styles of social problem solving and coping strategies [12; 29], although it is incorrect to reduce one to the other, since social problem solving characterizes precisely the process of choosing and using strategies for coping with ambiguous problematic social situations (defining the problem, thinking about possible options for its solution, choosing and making a decision, implementing the decision) [30].

One of the forms of interaction with reality and overcoming uncertainty, especially in the case of limited possibilities of control over the situation, is superstition [1; 4], which is considered a special way of life activity, inherent even in educated people, including young people [6; 26]. Specialists consider superstitions as a peculiar form of psychological defense, a mechanism of adaptation to a traumatic situation and include among the possible coping strategies derived from superstitions magical and ritual actions, which are an important marker of human superstitiousness [23; 28]. Superstitiousness, i.e., belief in the paranormal, as an attempt to confront a problematic situation can give a person the opportunity to realize a positive rethinking of what is happening and the illusion of control over the future [2; 35; 38], thus supporting his psychological well-being and adaptive abilities, which allows us to consider superstitiousness as a personal resource, partially relevant to TU. However, according to M. Yu. Saenko, superstitiousness is one of the markers of anxiety and acts as a serious obstacle to personal growth of a person, a demotivator and demobilizer of his resources [24], while TU, on the contrary, supports activity, self-confidence and autonomy of the individual, its creative motivation and productive activity [37; 39]. In addition, unlike TU, superstitiousness is positively correlated with neuroticism and fear of new situations [3], which partially brings it closer to IU.

Superstitiousness has been found to be strongly positively correlated with a number of other coping behaviors, including social support seeking, denial and problem avoidance, as well as with external religiosity [4], and, on the contrary, negatively correlated with the level of general intelligence [17]. At the same time, there is some evidence that superstition is related to the main aspects of social problem solving. Thus, T.J. D'Zurilla and E.C. Chang found a negative association of superstitions with negative problem orientation, impulsive and avoidant styles of social problem solving and, on the contrary, a positive association with positive problem orientation [29]. However, these data do not agree with the negative role of superstition in adaptation to new conditions, in the manifestation of prosocial activity of personality, including as a demotivator, as well as superstition itself in distorting the perception of real reality, which, accordingly, prevents rational problem solving [2; 10; 24].

The revealed contradictions acted as a heuristic idea for our research, the purpose of which was to study the specifics of the relationship between solving social problems with tolerance to uncertainty and belief in the paranormal in student youth.

The study tested the following hypotheses:

1. Tolerance to uncertainty and superstitiousness as personal resources of solving social problems have a negative relationship, and intolerance to uncertainty is directly related to superstitiousness in young people.
2. Tolerance to uncertainty is positively related to positive problem orientation and rational style of problem solving in students' youth.
3. Students with high levels of belief in the paranormal have predominantly negative problem orientation and tend to have impulsive and avoidant problem-solving styles.

Sampling and Methods

Study sample. The study involved 252 students of 1-3 years of higher education in Moscow and Nizhny Novgorod, studying at the faculties of social and humanitarian (44%) and medical (56%) profiles, aged 18 to 21 years (M=18.9; SD=0.50), 70% female.

An additional comparative analysis of the results obtained by gender of respondents and profile of study was not conducted in the study, as no significant differences were found in this regard.

Research Methods. The study was conducted in an online format. Participation was voluntary and anonymous.

Data collection was carried out using the social problem-solving questionnaire by M.M. Danina, N.V. Kiselnikova, E.A. Kuminskaya [12], in which statements are evaluated on a 5-point scale: from 0 - “completely wrong” to 4 - “completely true”. In total, the methodology includes 5 scales, each of which corresponds to the main components of T.J. D'Zurilla's model of social problem solving: positive, positive, positive, positive, positive, and positive. D'Zurilla: positive problem orientation (perception of the problem as a specific task that can and should be solved, not avoided, presence of optimism and confidence in one's abilities), negative problem orientation (perception of the problem as a threat, presence of frustration and uncertainty in one's abilities), rational style of problem solving (emphasis on collecting and analyzing information about the problem, conditions and possible variants of its solution, including analysis of the results obtained), impulsive-secure style of problem solving (rashness of ideas and consequences of their implementation,

The degree of expression of superstitiousness was measured using the “Paranormal Belief Scale” by J. Tobacyk in the adaptation of D.S. Grigoriev [11]. This technique contains 7 subscales: traditional faith, psy abilities (e.g., telekinesis or levitation), witchcraft, superstition, spiritualism, extraordinary forms of life (e.g., the existence of Bigfoot), and predictions (of astrologers, psychics, and other people). Respondents were evaluated on a 7-point scale, where 1 - absolutely disagree and 7 - absolutely agree with the statement.

We also used a modified version of S. Badner's tolerance to uncertainty method adapted by T.V. Kornilova and M.A. Chumakova [15], which includes two scales: intolerance to uncertainty and tolerance to uncertainty. The statements are evaluated on a 7-point scale: from 1 - strongly disagree to 7 - absolutely agree.

Descriptive statistics, correlations between variables were calculated using the statistical package SPSS 26.0. Kolmogorov-Smirnov test and Spearman's coefficient were applied during statistical analysis.

Results

In the study, it was found that all scales of belief in the paranormal had results below the mean normative values. Based on the standardized data of the methodology they should be within the limits of 3.5 to 4 points, but only for "traditional faith" the average level was established, for the rest of the scales the indicators do not reach even 3 points out of 7 possible (Table 1). In particular, students do not believe in superpowers and have a low degree of superstitiousness. At the same time, the indicators of 1st and 3rd year students differ only in two parameters: 3rd year students believe more in witchcraft (M3=3.4 and M1=2.7, differences at the $p<0.01$ level) and extraordinary abilities (M3=3.3 and M1=2.7, differences at the $p<0.01$ level). However, even they do not reach the mean normative values of the scales of belief in witchcraft (M=4.38) and extraordinary ability (M=3.5) [10]. Thus, it can be stated that student youth are less and less oriented towards irrational forms of thinking compared to their peers 10-20 years ago [4; 22; 25], which partially agrees with modern data of sociological studies [6].

Table 1

Descriptive Statistics of the Indicators of Belief in the Paranormal, Tolerance/Intolerance to Uncertainty, and Styles of Social Problem Solving in Students Youth

Scales		minimum Min	maximum Max	mean M	stand. dev. Sd
Belief in the paranormal	Traditional religious faith	1,0	7,0	3,91	1,70
	Psy abilities	1,0	6,8	2,26	1,35
	Witchcraft	1,0	7,0	2,77	1,72
	Superstition	1,0	7,0	2,14	1,37
	Spiritualism	1,0	7,0	2,88	1,64
	Extraordinary forms of life	1,0	7,0	2,78	1,20
	Predictions	1,0	6,8	2,75	1,53
Intolerance to uncertainty		15	49	31,04	6,25
Tolerance to uncertainty		13	42	27,56	4,72
Social problem solving	Rational style	4	32	21,58	5,48
	Avoidant style	0	28	8,78	5,93
	Impulsive style	0	36	11,29	6,38
	Negative problem orientation	0	36	14,42	8,27
	Positive problem orientation	2	16	11,04	2,83

It was also found that students have slightly higher IU and slightly lower TU than the average level, which indicates that they tend to worry more than to act confidently in ambiguous situations. In comparison with the normative indicators of the methodology for respondents under 30 years of age, this is also clearly traceable: thus, the values for IU were higher by 5.3 points, and for TU - lower by 4 points [15]. At the same time, no differences between the courses were found.

Regarding the solution of social problems, the results showed that students have higher indicators of using the rational style (average level on the scale) than the impulsive and avoidant style (low

degree of expression on the scales). In particular, freshmen are inclined to this style (M1=21.9 and M3=18.4 at p<0.01). In addition, positive problem orientation turned out to be more pronounced among all students (the indicator is higher than the average normative one). In other words, it can be stated that the majority of students try to understand the social problems arising before them, analyze the ways of their solution, forecast possible consequences and monitor the results of the decisions made. Much less often students put off solving problems for later or take rash steps. At the same time, students mostly believe in their ability to cope with problems with a positive outcome. Negative orientation in problem solving is at an average level, i.e. sometimes young people may experience frustration when facing difficulties, but this is not their leading coping strategy.

In connection with the purpose of the study, we were identifying the existence of links between personal resources and social problem-solving styles. The Kolmogorov-Smirnov test was used to test for normality of distribution, the result of which showed the necessity of non-parametric methods of statistical data processing (for the IU scale p<0.01, for the other scales p<0.001).

According to the results of statistical analysis, it was found that our first hypothesis was partially confirmed, because a direct significant relationship between superstitiousness and IU was indeed found (rS=0.17 at p<0.01), but the negative relationship between superstitiousness and TU was only at the level of tendency and did not reach the necessary threshold of significance (rS=-0.10 at p=0.14).

Further, the correlations between each personal resource of students and features of solving social problems by them were analyzed (Table 2).

Table 2

Correlations of Indicators of Belief in the Paranormal and Tolerance to Uncertainty with Students' Styles of Solving Social Problems (according to Spearman, N=252)

Personal Resources (belief in the paranormal and tolerance/intolerance)	**Solving Social Problems**				
	Rational	**Avoidant**	**Impulsive**	**Negative PO**	**Positive PO**
traditional faith	-0,07	0,01	0,09	0,07	0,12
psy abilities	**-0,16****	**0,14***	**0,26*****	**0,14***	-0,14
witchcraft	-0,11	**0,14***	**0,19****	0,10	0,11
superstition	**-0,18****	**0,19****	**0,25*****	**0,22*****	-0,05
spiritualism	-0,10	**0,14***	**0,22*****	0,11	-0,10
extraordinary forms of living	-0,10	0,11	0,10	0,06	-0,03
predictions	**-0,15***	0,12	**0,21****	0,10	0,04
intolerance	0,03	0,08	0,10	0,10	0,01
tolerance	**0,19****	0,01	-0,06	-0,07	**0,20****

Symbols. * - correlation significance at the level of p<0.02, ** - at the level of p<0.01, *** - at the level of p<0.001.

Positive correlations between TU and rational problem-solving style and positive problem orientation were found in students ($p<0.01$). Thus, the second hypothesis was fully confirmed. At the same time, curiously, no correlations with IU were found for any of the problem-solving strategies.

With different indicators of belief in the paranormal, rather interesting connections with styles of social problem solving were found. Thus, the links between belief in psy abilities, witchcraft, spiritualism, predictions, and superstitiousness with avoidant and impulsive problem-solving styles were significant (only correlations at a level no lower than $p<0.02$ were considered with correction for multiple comparisons). In addition, negative problem orientation was directly related to superstitiousness ($p<0.001$) and belief in superpowers ($p<0.02$). Notably, positive orientation has no significant relationships with belief in the supernatural, with negative relationships recorded between rational style and belief in superpowers, prediction and superstition. Thus, the third hypothesis of the study is partially confirmed: really high values of some manifestations of belief in the paranormal increase the propensity to avoid or impulsively solve problems, and are also associated with negative problem orientation.

Discussion of the Results

First of all, we would like to dwell on the problem of superstitiousness of students. According to the data obtained, it is generally low, although earlier it was noted that belief in the paranormal is quite widespread among students. However, many previous studies have studied superstitions associated mainly with the period of examination sessions [22; 25], while we studied belief in the paranormal outside this context. As stated by O.P. Makushina, most students appeal to supernatural forces mainly during the preparation and passing of exams, but in other life situations they usually do not turn to magical practices [17]. It is during the period of upcoming tests that superstitions begin to play a special role in the life of students [25]. In addition, public opinion polls of Russians also indicate a trend of decreasing propensity to superstition from 2015 to 2022 [cited in: 6], so it is possible that our study reflects the same trend.

According to TU/IU indicators, the obtained results also do not correspond to the data obtained earlier [15]. Thus, T.V. Kornilova and M.A. Chumakova provide normative values for these scales, showing that at the age of up to 30 years TU values slightly exceed IU values, while higher IU values are characteristic of respondents older than 30 years. In this regard, our results may be due to the gender of the respondents, among whom girls significantly predominate, since more pronounced TU is usually demonstrated by male respondents [8; 20]. However, in general, the issue of gender specificity of TU and IU still remains open, as there are other facts [9], which are also stated in the study by T.V. Kornilova and M.A. Chumakova [15]. We believe that special studies are required to clarify this issue. At the same time, if we take into account the results of recent studies [8] that among students IU prevails over TU, our data can illustrate general trends regarding TU of modern Russian students in conditions of social instability.

Interestingly, despite the existence of various, but rather contradictory data in modern psychology regarding the nature of the correlation between superstitiousness and TU/IU and various personality variables [24; 33; 37; 39, etc.], the question of the specifics of the relationship between superstitiousness itself and TU/IU still remains open. According to our study, it is students who are intolerant of uncertainty who are more superstitious. In other words, superstitiousness and IU are co-present and support each other. However, the negative relationship between superstitiousness and TU

was not confirmed in the study, which means that the presence of TU is not always an "antidote" for irrational thinking and behavior. We believe that these data once again emphasize the fact that TU and IU are mostly independent and relatively independent psychological formations.

The presence of higher indicators of the rational style of problem solving than of the impulsive and avoiding style can be explained by the fact that modern youth prefers to lead a socially active and multitasking lifestyle. Therefore, it is difficult to count on success and efficiency in multitasking without a rational way that allows to analyze the current state of affairs and to correlate external challenges of the environment with one's resources. In our opinion, this is an indicator of psychological well-being of the majority of students, their ability to constructively overcome difficulties, because, as it was established earlier, the rational style of problem solving is positively related to life satisfaction [30]. It can be confirmed by the fact that positive problem orientation prevails among students, which is also found to be positively related to life satisfaction.

Turning to the correlations between the main aspects of problem solving and TU/IU identified in the study, it can be noted that some of them refute the previously obtained data. In particular, we are talking about the positive correlation of negative problem orientation with superstition, whereas earlier T.J. D'Zurilla et al. stated a negative relationship in this respect [29]. In contrast to the data of T.J. D'Zurilla et al. also draw attention to the presence of many positive links between avoidant and especially impulsive styles of problem solving with different manifestations of students' superstitiousness. It turns out that belief in witchcraft, spiritualism, psy abilities, predictions and superstitions leads to non-constructive ways of stress reduction, passive and dysfunctional behavior. Moreover, the rational style of problem solving is also hindered by belief in the paranormal, which is quite natural, since irrational attitudes and behaviors cannot promote deep analysis of problems and, on the contrary, generate passivity and uncritical thinking.

The absence of significant links between IU and the main aspects of social problem solving is unusual. However, we do not exclude that these results may be due to the predominance of female respondents. As for the positive correlation of TU with positive problem orientation and rational style, the explanation we can offer for understanding these links is as follows: it is the readiness of the individual to face challenges of different degrees of complexity, reflecting the essence of TU, that allows one to accept a problem as a challenge, keeping faith in one's ability to cope with it and effectively search for ways to solve it, envisioning existing options and predicting potential results.

Findings

Based on the results obtained, the following conclusions were made:

1. The majority of students of socio-humanitarian and medical faculties of higher education institutions use a rational style and are positively oriented to the solution of social problems. At the same time, their personal problem-solving resources are expressed differently: somewhat higher IU, on the average level TU and weakly manifested tendency to believe in the paranormal, especially in superstition and psy abilities.

2. Students' superstitiousness is directly related to IU, i.e. when anxiety increases in ambiguous situations, they tend to turn to magical actions based on superstitious prejudices.

3. TU, manifested in the ability to calmly perceive discomforting conditions and seek adequate ways to overcome difficulties, is directly related to positive orientation to problem solving, which determines the use of rational style as the most effective behavioral strategy.

4. Impulsive and avoidant styles of decision-making are supported by superstitiousness, belief in psy abilities, witchcraft and spiritualism. At the same time, superstitious students are most often negatively oriented towards solving social problems.

Conclusion

Modern students living in conditions of social instability, uncertainty and multitasking are often faced with the need to solve different kinds of life issues. Effective problem solving in these kinds of situations is facilitated by the presence of a number of personal resources, among which, as our study has shown, TU and the absence or weak expression of the tendency to believe in the paranormal. Only readiness to accept the unknown, lack of discomfort from the ambiguity of what is happening and at the same time low orientation to superstitious ideas allow students to "keep their hand on the pulse" and be ready to make balanced constructive decisions with different options.

However, since our study involved predominantly girls, we define the study of gender specificity of personal resources for solving social problems as a possible perspective for the further development of the indicated problem.

In addition, we believe that the number of such personal resources is not exhausted by TU and non-confidence, so the identification of new psychological determinants of effective social problem solving can become the subject of further research, including those carried out in the gender and age dimension.

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The Features of the Organization and Perception of Teamwork by Students in Distance Learning

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The article explores the features of organizing teamwork among students in the context of distance learning. The research involves an analysis of the challenges faced by both students and teachers when working in teams. An ascertaining experiment is presented, during which the experimental group received detailed instructions on organizing teamwork, which led to improved learning outcomes compared to the control group. Additionally, a study was conducted to examine students' perception of teamwork in the "Digital Forest Pedagogy" distance learning course. A total of 56 second-year students from the Higher School of Technology and Energy of SPbSUITD participated in the survey. The analysis revealed that students perceive teamwork as more complex compared to working in pairs, their assessment is influenced by prior experience. Issues related to responsibility and self-discipline, coordination and collaboration, as well as communication and feedback, were identified as the most problematic aspects.

Keywords: university education; collaborative learning; organization of teamwork; distance learning; team interaction; online–communication.

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Особенности организации и восприятия студентами командной работы при дистанционном обучении

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Статья посвящена особенностям организации командной работы студентов при дистанционном обучении. Исследование включает анализ проблем, с которыми сталкиваются студенты и преподаватели при работе в командах. Представлен констатирующий эксперимент, в рамках которого экспериментальной группе были предоставлены детальные инструкции по организации командной работы, что привело к улучшению результатов обучения по сравнению с контрольной группой. Кроме того, проведено исследование, направленное на изучение восприятия студентами командной работы на дистанционном курсе «Цифровая лесная педагогика». В опросе приняли участие 56 студентов 2 курса Высшей школы технологии и энергетики СПбГУПТД. Анализ показал, что студенты оценивают командную работу как более сложную по сравнению с работой в парах, на их оценку оказывает влияние наличие предыдущего опыта. Наибольшие проблемы вызвали вопросы, связанные с ответственностью и самодисциплиной, координацией и взаимодействием, а также коммуникацией и обратной связью.

Ключевые слова: обучение в вузе; совместное обучение; организация командной работы; дистанционное обучение; командное взаимодействие; онлайн-коммуникация.

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Introduction

Teamwork training is an integral part of the modern educational process. The advantage of cooperative and collaborative learning is that students learn and share knowledge at the same time [5]. Consideration of the issue from different points of view and exchange of ideas contribute to better assimilation of material and give a powerful impetus to the development of each participant. Teamwork always requires cooperation and collaboration, as well as the ability to dialog and distribute tasks and responsibilities. According to Bates [4], collaborative learning is applicable both online and in the classroom. Numerous studies have focused on online collaborative learning and its various aspects [3; 15; 17; 22]: the role of the instructor [14], issues related to the formation of a learning community in online collaboration and its alternation with individual work [19], attributes of successful teams [6], tools for online learning [7; 10; 12; 16; 20; 21].

Organizing the work of teams in an online environment requires ensuring communication, work sharing, information sharing and control. For each area, different tools are used in the world educational practice, as shown in Table 1.

Table 1

The Main Tools Used to Organize the Work of Teams in the Online Environment by the Area of the Tasks Solved

Area and Tasks Solved	Tools	Examples

Communication: - Discussing and planning projects - Communicating in real time and creating different channels for different topics - Collecting opinions, evaluations and suggestions from team members	- video conferencing platforms - messaging systems - internal feedback	Zoom, Microsoft Teams, Google Meet, Slack, Telegram, WhatsApp, Discord Google Forms, Mentimetr Internal forum LMS
Collaboration: - Sharing and collaborating on documents - Task structuring, tracking and process control	- cloud storage - project management systems	Google Drive, Dropbox Trello, Asana
Information sharing: - Used to create a knowledge base where the team can easily find and share information - Allow to create diagrams, maps for better understanding of the project	Wiki platforms Electronic boards	Confluence, Google Jamboard, Miro, Mindmap, Mindmaster
Task organization: - Used to schedule deadlines and other events - Helps track the time spent on a task	Calendars, tools to track time	Google calendar, Microsoft Outlook, Toggl

The choice of specific tools depends on the needs of the team and the requirements of the project. Simply gathering a group of people who want to work is not enough to make teamwork effective. It is important that all team members work cohesively. In addition, the strength of the team depends on interpersonal relationships: the higher the degree of interaction, the better the result of the work. Therefore, the educator needs to evaluate the work of the whole team at the end of the lessons. However, cooperative learning is also characterized by the fact that, despite the fact that students learn and implement projects together, the teacher must evaluate the work of each participant individually. Accordingly, the task of organizing students' collaborative work is a complex process. A certain synergy must be achieved through intragroup interaction so that the effectiveness of collaborative work is higher than in the case of individual work.

The COVID-19 pandemic forced the education system to adapt quickly to the new conditions. In this situation, issues related to the organization of collaborative work in distance learning have attracted our attention. This paper raises issues related to students' collaborative work. We aim to identify the direction of pedagogical work in translating collaborative learning into distance learning by analyzing an online course conducted within the DIGIFOR Digital Forest Pedagogy project. Three main research questions:

RQ1: How does the provision of guidelines and rules for team formation affect the process and outcomes of student teamwork in a distance learning course?

RQ2: How difficult is it for students to work in teams in distance learning compared to other modes (individual and pairs)?

RQ3: What problems have students encountered when studying distance course modules that require teamwork?

The material is presented in the following sequence: first we present the context - a real-life example from the DIGIFOR project, then a description of the research methods, the results of the questionnaire survey of students who studied the course, and a discussion of the problems of student teamwork in distance learning.

Online Teamwork: An Example from the DIGIFOR Project

A group of professors (from Finland and Russia) in the framework of the DIGIFOR project developed a course "Small Business in the Forestry Sector" consisting of 5 modules (2 c.c.) and including practical assignments that required both individual and teamwork.

In the presented study, the choice of Moodle educational platform and tools used in the course was limited by the conditions: free of charge, available in Russia and Finland, used in the participating universities earlier. The training modules and their sizes are presented in Table 2.

Table 2

Course Module Names, Sizes and Modes

Name of Training Module	Module Size, c.c.	Work Format
1. Forestry Sector in Russia and Finland	0,3	Individual
2. Small Business and Its Place in the Economy	0,5	Individual
3. Creation of a Small Business	0,5	Team
4. Business Model Canvas (BMC)	0,5	Team
5. Taxation and State Support of Small Businesses in Russia	0,2	Team

The course involves individual work on the first two modules and team work on the next three modules, i.e. each student works individually and then in a team during the course.

Initially the course was planned to be held in a mixed format. But because of COVID-19 and the transition to distance learning, the scenario had to be changed, and the course materials and organizational form of training had to be adapted to the new conditions. Already in the initial plan, the course included materials that were provided through the university's Moodle platform. This included voice-over PowerPoint presentations, as well as additional materials in the form of articles and YouTube videos. Collaborative tools such as Google Jamboard and Canvanizer were added when adapting the course for distance learning.

Research Methods

The empirical study of student teamwork in distance learning was conducted from November 2020 to April 2021 and included a formative experiment and a questionnaire survey.

Formative experiment. Two groups of students – the experimental (EG) and control (CG) - took the "Small Business in the Forestry Sector" course consecutively during the academic year. The students of both groups had already studied together for two years and were well acquainted with each other.

The control group of students was asked to independently team up and work on the course tasks, the algorithm of actions was not given in advance. The experimental group of students was instructed differently. They were offered the following sequence of actions to fulfill the tasks:

- form teams of 3-5 people at will (we placed a link in Moodle to a Google spreadsheet for signing up for teams, noting in its columns the numbers of teams where students had to sign up on their own. Students could choose with whom to work in a team, based on their own preferences and existing relationships in the group);

- choose a way of intrateam communication by creating a group chat in any messenger;

- agree on the role positions in the team and distribute the areas of responsibility. Students were asked to choose the following roles: manager (coordination of actions and distribution of tasks), analyst (collection and analysis of information), implementer (implementation of team ideas), designer (final design of the project).

The course instructors monitored: they followed the formation of teams, students' interaction, assignments and collected data on the results.

Survey. A survey was used to collect data on students' assessment of teamwork. The online questionnaire developed by the author was posted on the Moodle platform and was filled out by each student after taking the course. The questionnaire consisted of 11 questions and contained analysis and reflection of the course results as well as questions aimed at identifying areas of teamwork that needed improvement. In addition, all students were asked to compare the difficulty of completing tasks in team, paired and individual work, and to note the positive and negative aspects of teamwork (open-ended question).

Mathematical processing of data was carried out using MS Office Excel and IBM SPSS Statistics 23.0 programs.

Sample. The study involved 2nd year students of correspondence and evening forms of education of the HSTE SPbSUITD, studying under the bachelor's degree program of the training field 380302 “Management”.

The sample amounted to 56 people. The control group (N=28, men - 36% and women - 64%, age - 21-32 years, mean value - 26±2.8), experimental group (N=28, men - 46%, women - 54%, age - 21-34 years, mean value - 25.6±3.1).

EG and CG students were divided into 8 teams when studying the course modules that required teamwork.

Four instructors (2W and 2M) aged 35-60 years worked on the course. All instructors had more than 10 years of experience, including online experience of more than 1 year.

Results

A comparison of the overall course results in the two groups shows that the percentage of both teams and individual students who completed the course was higher in the experimental group who received instruction in team building and role negotiation. The percentages are shown in Figure 1 and Table 3.

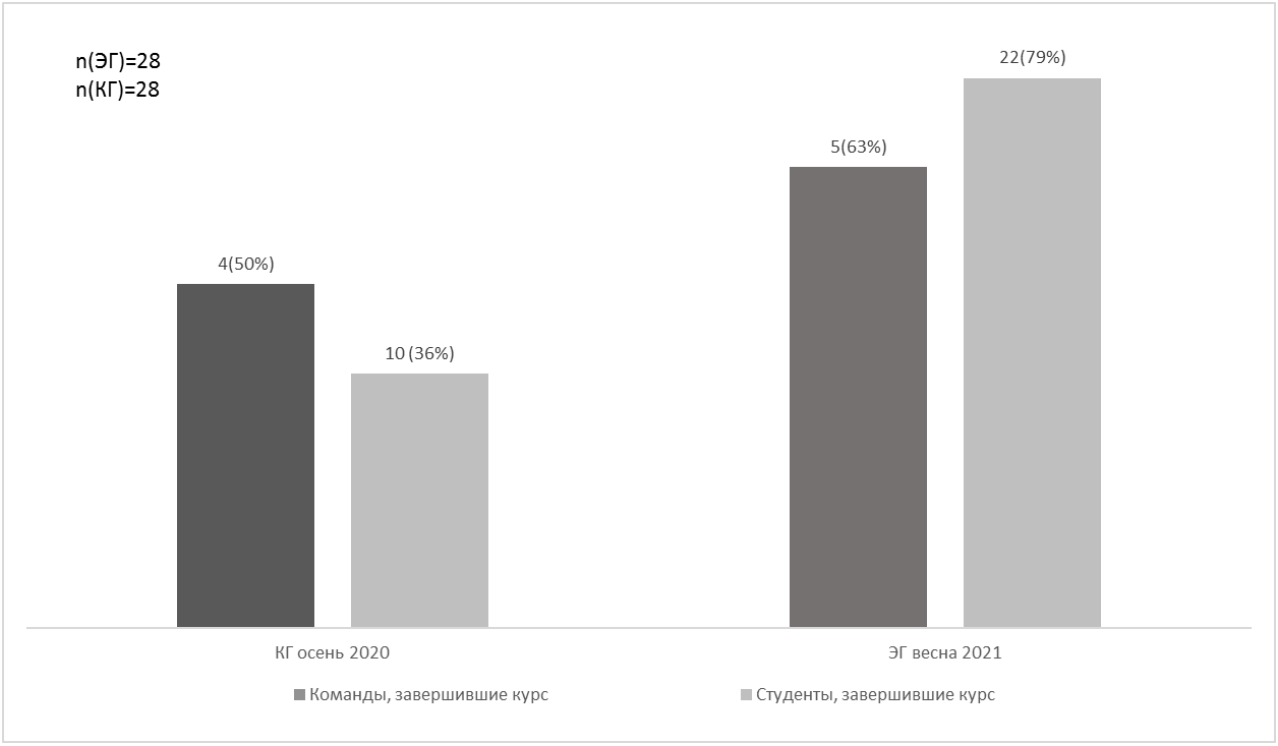

Figure 1. Comparison of completion rates in two groups taking the "Small Business in the Forestry Sector" course

Figure 1 shows the comparison of course completion rates in the control and experimental groups. In the CG, 4 teams (50%) and 10 (36%) participants completed the course, while in the EG, 5 (63%) teams and 22 (79%) individuals completed the course, respectively, as shown in Table 3.

Table 3

Students' Performance Results in Experimental and Control Groups

Factor Attribute	**Resultant Attribute**		**Total**
	Completed the course, people.	Did not complete the course, people.	
EG	22 (79%)	6 (21%)	28
CG	10 (36%)	18 (64%)	28
Total	32	24	56

The number of degrees of freedom is 1. The value of Chi-square criterion is 10.5. The critical value at p=0.01 is 6.635. The relationship between the factor and the resultant attribute is statistically significant.

Students from the experimental group were significantly more likely to complete the course and with a higher grade for the final presentation as shown in Figure 2.

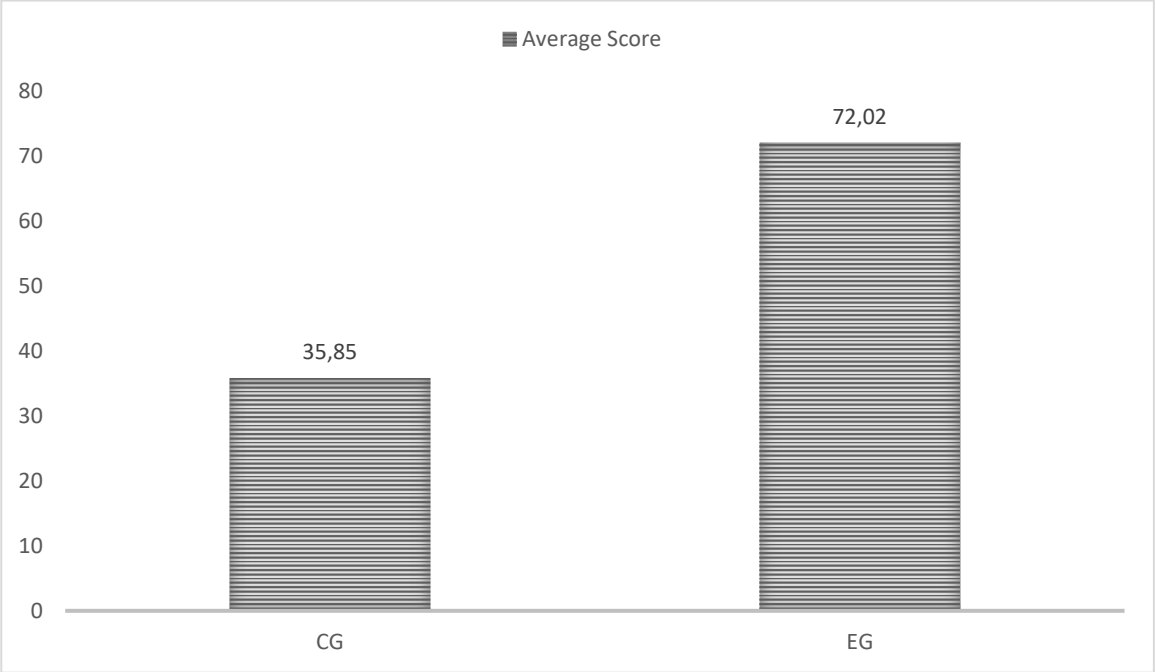

Figure 2. Average score for the final course presentation in the CG and EG on a 100-point scale

Thus, the answer to our first research question is as follows: providing students with guidelines and rules for team building in distance learning had an impact on the success of the course, a higher percentage of students with a higher final score completed the course.

When students in both groups (CG and EG) were asked to compare the difficulty of completing tasks in teams, pairs, and individually on a 5-point Likert scale based on their previous experience, the data presented in Table 4 was obtained.

Table 4

Students' Evaluation of the Level of Difficulty of Work in Different Modes

	Easy (1)	**Rather Easy (2)**	**Difficult to Answer (3)**	**Rather Difficult (4)**	**Difficult (5)**
Individual Work	8 (14%)	25 (45%)	10 (18%)	11 (20%)	2 (3%)
Work in Pairs	14 (25%)	22 (39%)	6 (11%)	12 (21%)	2 (3%)
Team Work	10 (18%)	14 (25%)	17 (30%)	8 (14%)	7 (13%)

For 3 related samples we use Friedman's test. Calculations carried out in the SPSS program show that there are 56 people in both groups, chi-square value = 7.424. The asymptotic significance is 0.024, which is less than 0.05. Hence, there are differences in the groups. We can say that students evaluate the complexity of different modes of operation in distance learning differently. We found statistically significant differences using Friedman's criterion, so pairwise comparisons can be made to identify specific differences between groups.

The results of the pairwise comparisons of individual, pair and team work evaluations using the Wilcoxon test are presented in Tables 5 and 6. The critical values (T) for the sample of 28 individuals for the chosen level of statistical significance (p=0.05 or p=0.01) are 130 and 101.

Table 5

Results of the Empirical Values of the Wilcoxon Test for the Pairwise Comparison of Students' Assessments of Work Difficulty in the Control Group

	Individual Work	**Work in Pairs**	**Teamwork**
Individual Work	x	155 (zone of insignificance)	176 (zone of insignificance)
Work in Pairs	155 (zone of insignificance)	x	69 (zone of significance)
Teamwork	176 (zone of insignificance)	69 (zone of significance)	x

The empirical value of Wilcoxon test between pair work and team work (69) is less than the critical value (101) for the level of statistical significance p=0.01. This indicates that CG students rated teamwork as more challenging compared to pair work at a statistically significant level.

Table 6

Results of Empirical Values of the Wilcoxon Test for the Pairwise Comparison of Students' Assessments of the Work Difficulty in the Experimental Group

	Individual Work	**Work in Pairs**	**Teamwork**
Individual Work	x	160 (zone of insignificance)	165 (zone of insignificance)
Work in Pairs	160 (zone of insignificance)	x	100 (zone of significance)
Teamwork	165 (zone of insignificance)	100 (zone of significance)	x

In the EG, the empirical value of Wilcoxon's test between paired and team work (100) is less than the critical value (101) for the level of statistical significance p=0.01. Thus, the EG students also rated teamwork as more difficult compared to pair work at a statistically significant level.

The relationship between assessments of the complexity of teamwork and having experience in online teams is shown in Table 7. At the same time, students in the CG and EG are equally divided by the presence/absence of such experience (50:50 - presence/absence of experience).

Table 7

Evaluation of the Degree of Difficulty of Teamwork in Distance Learning and the Availability of Similar Experience

	Very Easy (1)	**Rather Easy (2)**	**Difficult to Answer (3)**	**Rather Difficult (4)**	**Difficult (5)**
Had Experience of Online Teamwork Before	5 (18%)	11 (39%)	11 (39%)	0 (0%)	1 (4%)
No Previous Experience of Online Teamwork	5 (18%)	3 (11%)	6 (21%)	8 (29%)	6 (21%)

The results of statistical analysis show that the relationship between having experience in online teams and teamwork difficulty score is statistically significant. The Chi-square value (17.613) exceeds the critical value (13.277) for the significance level of p=0.01. Students with experience in online teams are more likely to rate teamwork as easy or rather easy. Approximately 57% of students with experience rate the work as “very easy” or “rather easy” while only 29% without experience do the same.

The results of the questionnaire regarding the problems encountered during teamwork in the CG and EG are presented in Table 8.

Table 8

Results of Answers to the Question About Intrateam Interaction in the CG and EG

Features of Intrateam Interaction	**CG**	**EG**
	«yes»	«yes»
Agreements were reached before work began	12 (43%)	28 (100%)
There was an opportunity to share ideas between team members	8 (29%)	28 (100%)
Felt supported by other participants	8 (29%)	20 (71%)
Work within the team was evenly distributed	6 (21%)	22 (79%)
Project deadlines were delayed due to a team member's failure to meet the schedule	16 (57%)	12 (43%)
Responsibility for the outcome rests with all team members	18 (64%)	26 (93%)

Students from the CG and EG face different problems and features during teamwork in distance learning. All respondents (100%) from the EG said that they were able to agree on coordination and communication within the team. However, 29% felt that they did not get enough support from other team members. Other problems such as uneven distribution of tasks (21%) and rescheduling (43%) were also encountered. These problems may indicate the need for better organization and coordination within teams.

In the CG teams, 43% of the participants were able to reach agreements before starting work, but 29% of the participants were able to share ideas and felt supported. In the CG teams, 79% had problems with the distribution of work within the team, which requires attention to the methods of task distribution and organization of teamwork.

In addition to common goals, the very concept of a team implies the responsibility of each member for the final work of the group. However, according to the questionnaire results, 36% (in the

CG) and 7% (in the EG) of respondents did not feel personally responsible for the overall achievements of the group.

The questionnaire for students also included open-ended questions about the positive and negative aspects of teamwork in distance learning. The content analysis of the results is summarized in Table 9.

Table 9

Content Analysis of Students' Answers to the Open-Ended Question of the Questionnaire: "What Positive/Negative Aspects of Teamwork in Distance Learning Can You Name?"

Respondents' Answers	**Student's Generalized Emotional Evaluation of Teamwork***	**Generalized Category**	**Frequency**
1	2	3	4
1. "On this team, you can be stubborn without anyone arguing with you" *2. "Responsibility for others"* *3. "Support of ideas"* *4. "Seeing things from different perspectives"* *5. "Help if the topic is difficult for someone in the team to understand"* *6. "Humor"*	Positive	Support and Mutual Understanding	6 (38%)
1. "No need to waste time traveling" *2. "Each student is in a comfortable working environment"* *3. "Communication in any period of time"* *4. "Ease of choice of location and time"* *5. "No need to come to a specific location"*		Comfort and Convenience	5 (31%)
1. "Efficiency of teamwork" *2. "Quickly found additional information to solve the case as everyone had computers and internet access"*		Efficiency and Flexibility	2 (13%)
1. "Expressing my thoughts and creativity" *2. "Opportunity to improve communication, brainstorming skills"* *3. "Practicing the ability to convey your thoughts and consistently argue them"*		Development of Personal and Professional Skills	3 (19%)
1. "I can't look people in the eye (video doesn't count)" *2. "Refusing to do my part of the task"* *3. "Losing the feeling of having to do*		Problems with Coordination and Interaction	6 (33%)

something rather than talking” *4. “It was hard to communicate when you can't get together and visualize your ideas, someone might be delayed in responding or not get in touch at all”* *5. “Participants refused to work, to find any information”* *6. “It is difficult to cooperate with classmates.”*	Negative		
1. “The need to take responsibility to others” *2. “Lack of interest of participants in working on the task”* *3. “Late deadlines.”* *4. “Not being able to meet the deadline.”* *5. “Not all team members can be tuned into the actual work (i.e. they are passive and don't care about the outcome)”*		Responsibility and Discipline	5 (27%)
1. “It was hard to come to one decision” *2. “Difficulty discussing and forming ideas”* *3. “With distance learning, there were problems with feedback”*		Communication and Feedback Problems	3 (17%)
1. “Lack of diligence and self-discipline of some team members” *2. “Everyone was mostly out for themselves rather than a team”*		Personal Characteristics of the Participants	2 (11%)
1. “It can be difficult to explain their ideas in the form of some kind of diagram” *2. “There may be communication and network problems, this makes it difficult to work”*		Technical Difficulties/Infrastructure Problems	2 (11%)

Note. * - emotional assessment of teamwork (positive or negative) was given by the respondents themselves during the survey.

From Table 9 we can see that the positive aspects of teamwork in distance education include support and mutual understanding (38%), as well as comfort and convenience (31%). It should be noted that more negative aspects related to teamwork in DL were listed. These included problems with responsibility, self-discipline (33%), coordination and interaction of team members (27%), and problems with communication and feedback (17%).

Discussion

Inexperienced teams can experience serious communication problems when working remotely. This slows down work and can lead to decreased motivation. At the same time, conflicts

are easier to avoid when working together online. However, the lower incidence of conflict often indicates less group discussion, which is actually necessary to create innovative solutions.

The decision-making process in a team requires more time because each participant's point of view needs to be heard. The results of Google's project "Aristotle" [8] and other studies [6] have shown the importance of such a factor for successful teamwork as "equality in the distribution of conversation sequence". However, the extra time spent on coordination and general discussions slows down work and can lead to decreased motivation. It can also lead to an unbalanced distribution of tasks within the team. These factors require faculty attention and the development of effective methods of organization and coordination within teams.

The teamwork of students in distance learning poses some challenges for instructors. Planning is affected by some purely organizational features. For example, it is necessary to control students' work in such a way that teamwork does not turn into poorly planned individual work with unbalanced workload and unfairly graded results. In general, it is more difficult to monitor the process, evaluate the contribution of each team member and give a fair assessment of their work.

At the same time, from the instructor's point of view, a number of positive aspects of teamwork in a distance format can be noted. First, teamwork promotes the development of communication skills, teaches cooperation, time management and conflict resolution. Second, it allows learners to see a problem from different perspectives, as teams include participants with different experiences and levels of knowledge, which they share when solving common problems. Third, accountability to teammates leads to greater engagement in the learning process. Increased engagement has been noted in other studies [1]. But perhaps the most important thing that distinguishes teamwork remotely is collaboration at a distance using communication technologies, which is useful in the context of today's labor market.

When planning the course, the instructors assumed that a positive aspect of teamwork in a distance course for them would be a reduction in the amount of assignment checking, which would save the educator's time. In practice, however, it turned out that a significant amount of time was spent on finding out each student's individual contribution to the teamwork, as well as assessing and monitoring the extent of their active participation. This process proved to be so resource intensive that it offset the savings that could be realized by reducing task checking.

Findings

Our experiment shows that issuing learners with guidelines and rules for team formation has a positive effect on distance course success. Students who received recommendations showed higher final grades, which confirms the effectiveness of such measures.

Students find working in teams in distance learning more challenging compared to working in pairs. This is observed both in the control and experimental groups. At the same time, students who have had similar experiences before rate teamwork as less challenging than students without experience, indicating the influence of previous experience on the perception and evaluation of the difficulty of teamwork in distance format.

The EG showed more successful results not only in achieving course outcomes, but also in reaching agreements, sharing ideas and feeling supported within the team compared to the CG. However, in both groups (EG and CG) there are problems with the distribution of tasks among participants, postponement of project deadlines, as well as problems with responsibility and self-discipline.

Conclusion

When organizing teamwork in distance learning compared to individual work, the following features can be distinguished:

1. The need for online communication, which can take place through online platforms, chats, video conferences and e-mail, which requires the development of online communication skills (key feature) [2].

2. Time management and meeting deadlines become critical. In a distance format, students often have more freedom to manage their time and can work on course assignments at different times and on different days.

3. Students must have basic skills with different tools (collaboration and communication platforms, collaborative document design) in order to successfully participate in teamwork in a distance course.

4. In teamwork in a distance course, students are often challenged to be more independent and proactive. They need to take responsibility for their work, planning and organizing tasks.

5. Conflicts may arise due to misunderstandings, different points of view and other factors. Conflict resolution skills are important for building constructive relationships in a distance mode.

6. For faculty, organizing teamwork in a distance form may require new methods of assessment and feedback. Effective ways of evaluating teamwork and ensuring fairness in evaluations for all participants must be developed.

7. Support and motivation are important. Faculty and teams may face challenges in motivating and supporting each other in a distance format.

In planning and implementing the Small Business in the Forestry Sector course, the COVID-19 pandemic brought about a major change in the teaching system when the university had to restructure its online learning processes in a matter of weeks. Since all the students of the university had to switch to distance learning format, even a part of the course could not be delivered in face-to-face format as originally envisioned. This created several challenges. Instructors had to adapt the original plan in a distance format while trying to keep students emotional, engaged, and skills assessed fairly without jeopardizing productivity.

Experts [23] predict that in the future, the demand for team competencies will be much higher than individual competencies. Skills related to intrapersonal communication such as social-emotional skills, co-creation, facilitation, and the ability to contribute to teamwork will be in the center of attention. The importance of developing student teamwork techniques in the online environment in all phases: course design, class delivery, and assessment can be noted. The research conducted provides guidelines for instructors in distance learning to optimize students' teamwork processes and ensure that they work together more effectively. I would like to direct further efforts in the study towards issues related to how instructors can evaluate the performance of each team member when working online. This includes aspects of evaluating each participant's contribution, distributing tasks evenly, and ensuring a fair evaluation.

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On the Path to Success: The Influence of Motivation and Self-Regulation Resources on the Academic Success of University Students

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Currently, the higher education system is constantly changing: the education of increasing number of students is becoming associated with the use of distance technologies, which is why it is so important to identify motivational factors that have a potential impact on the academic success of students of different forms of education. The sample of the study consisted of 114 students of different forms of education (74 extramural students with the use of E-Learning and Distance Educational Technologies and 40 full-time students). Two indicators were used to measure academic achievements: the average score for all previous examination sessions and the self-appraisal of learning scale of the questionnaire by T.V. Kornilova et al. The Academic Motivation Scale (AMS) was used to study the motivational-semantic component, the Brief Self-Control Scale and the Style of self-regulation of behavior – SSRB 2020 questionnaire were used to study the motivational-regulatory component. The Explanatory Style of Successes and Failures (ESSF) technique and the General Self-Efficacy Scale by R. Schwarzer and M. Yerusalem, adapted by V.G. Romek, were used to study the cognitive-motivational component, the persistence and perseverance scale (Grit) was used to study the integrative component. The results showed that if strong internal motivation prevails, it sufficiently determines academic success, but if motivation is lacking or is external, other components, namely self-regulation resources and the style of explaining successes and failures in achievement activities, help to increase academic success. At the same time, the influence of the form of education was not revealed.

Keywords: motivation; self-regulation resources; style of behavior self-regulation; attributive style; educational success; university; distance learning; full-time study; average score; internal motivation; external motivation; students.

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На пути к успеху: мотивация и ресурсы саморегуляции как предикторы академической успешности студентов

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В настоящее время система высшего образования непрерывно меняется: обучение все большего количества студентов становится сопряжено с использованием дистанционных технологий, поэтому так важно определить мотивационные факторы, оказывающие потенциальное влияние на академическую успешность студентов различных форм обучения. Выборку исследования составили 114 студентов разных форм обучения (74 студента заочной формы обучения с применением электронного обучения и дистанционных образовательных технологий и 40 студентов очной формы обучения). Для измерения академических достижений использовались два показателя: средний балл за все предыдущие сессии и шкала самооценки обучения опросника Т.В. Корниловой и ее коллег. Для изучения мотивационно-смысловой компоненты мотивации использовался опросник «Шкалы академической мотивации» (ШАМ), для изучения мотивационно-регуляторной компоненты – краткая шкала самоконтроля и опросник «Стиль саморегуляции поведения – ССПМ 2020», для изучения когнитивно-мотивационной компоненты – методика «Стиль объяснения успехов и неудач» (СТОУН) и опросник общей самоэффективности Р. Шварцера и М. Ерусалема в адаптации В.Г. Ромека, для изучения интегративной компоненты – опросник упорства и настойчивости (Grit). Результаты

показали, что если преобладает сильная внутренняя мотивация, то она в достаточной степени определяет академическую успешность, но если мотивации не хватает либо она носит внешний характер, то повысить академическую успешность помогают другие компоненты, а именно – ресурсы саморегуляции и стиль объяснения успехов и неудач в достиженческой деятельности.

Ключевые слова: мотивация; ресурсы саморегуляции; стиль саморегуляции поведения; атрибутивный стиль; успешность обучения; вуз; заочная форма обучения; очная форма обучения; дистанционное обучение; средний балл; внутренние мотивы; внешние мотивы; студенты.

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Introduction

The study of various factors that influence students' academic achievements does not lose its relevance, since academic achievements are related to success in the professional sphere [31]. Commonly recognized factors are intellectual and motivational [3; 6], while the importance of motivational factors is explained by their role in the regulation of activity. T.O. Gordeeva's theoretical approach, which suggests taking into account the structure of motivation and considering some motivational variables as necessary conditions and others as mediators or moderators of the influence of the first variables on academic achievement, seems promising; therefore, in this study we will rely on the structural dynamic model of motivation of achievement activity proposed by T.O. Gordeeva [4]. According to this model, four blocks of motivational variables are distinguished: motivational-semantic, motivational-regulatory, cognitive-motivational and integrative. “The first includes a hierarchy of internal and external motives that trigger activity, the second - the process of goal-setting, including planning, self-regulation and self-control in the performance of activity, the third - cognitive predictors that trigger goal-setting and perseverance and include ideas about the causes of successes and failures, means of achieving goals and the measure of their possession, and the fourth - persistence, concentration and perseverance in achieving goals and encountering difficulties and failures” [4, с. 3].

Many studies have been devoted to the relationship between motivational and semantic variables and academic success [4; 8; 9; 12-15; 18; 19], while the role and place of the other components have been less studied [1; 2; 5; 29], especially in the transition to blended or

distance learning. Currently, digital learning environments (DLEs) are becoming increasingly important as a significant number of learning environments are being implemented that are realized through digital technologies. Initially, this was largely due to the changes in the world that the pandemic caused, but many students are now consciously choosing to study using distance technology. All this entails the question of the significance of motivational-regulatory, cognitive-motivational and integrative blocks in such a learning environment, as it is necessary, among other things, to develop new skills and abilities, an important condition of which is self-regulation. It can be assumed that these blocks will play a more important role in determining academic success when elements of distance learning are introduced.

If we consider self-regulation in relation to learning activity, we can say that it is a system of self-organization by the learner of his/her actions aimed at self-learning and self-education, as well as at the effective functioning of the student in the learning process. From the point of view of E. Yu. Ponomareva [17], the system of self-regulation assumes the presence of the following components: self-analysis of personal conditions, motivation in the successful process of a certain activity, goal setting and action planning, self-correction. The presence of these components is associated by some researchers with the ability to work independently in general. In the case when we talk about distance learning, independent work is especially important, because the success of learning directly depends on the student's ability to competently organize their activities. At the same time, according to the data obtained by the researcher, learning in a digital environment, in turn, also contributes to the improvement of self-regulation in students. Based on all this, we can say that the presence of developed self-regulation allows to achieve the goals associated with the acquisition of knowledge, skills and abilities in the digital educational environment. In this case, according to V.I. Morosanova, it is extremely important for successful learning to form an effective regulatory style. Its presence can be considered as a resource for activating the necessary individual features by compensating for the style features developed to different degrees.

Self-control, being the confidence in one's ability to consciously regulate one's behavior, is related to the personality's ability to self-regulate. It should also be noted that when acquiring knowledge in a digital environment, developed self-control is a significant component of successful learning [22], especially in distance learning [26], although its links with motivation and self-efficacy have not been found [21]. The role of attributional style, as the way people explain to themselves the reasons for various events, in predicting academic success has also been emphasized in various studies [23-25], with some evidence that attributional style is very important in blended learning [30].

Meanwhile, the empirical evidence regarding the components contributing to academic success is somewhat contradictory. For example, in one of the studies, regression analysis showed that only one indicator of self-regulation (time management) was statistically significantly included in the model. Moreover, its standardized regression coefficient beta is negative and close to zero (-0.03). The highest regression coefficient (0.53) turned out to be

for the indicator "Search for support", but it is statistically insignificant [27, p. 17]. Such results can be explained by the use of the regression method with the inclusion of all measured and highly correlated indicators at once. The absence of multicollinearity test and negative standardized regression coefficients allow us to doubt the explanatory power of self-regulation resources for the mean score on the session (r2=0.54). Another study found that although goal setting was related to academic success, this relationship was not mediated by self-efficacy, engagement, and learning satisfaction in online learning [28]. An extensive review [33] noted that among 73 articles on the contribution of self-regulation to academic success of mixed and distance learning students, only 63% of studies (N=46) found a positive effect; no effect was found in 19% of studies (N=14) and conflicting results were obtained in 18% of studies (N=13) [33].

It can be assumed that when switching to blended, and even more so fully distance learning, the importance of all additional components (in addition to motivational and semantic) will increase and they will have a greater impact on learning outcomes than in face-to-face traditional learning. Thus, the hypothesis of this study was the following statement: motivational-regulatory, cognitive-motivational, and integrative components will play a more important role in predicting academic success in students using distance technologies. To test this hypothesis, students from the same institution were selected from full-time, face-to-face students and part-time, mixed-format, but predominantly distance learning students.

Method

Sampling. The study involved full-time and part-time students with the use of E-learning (EL) and distance education technologies (DET) at Maksim Tank Belarusian State Pedagogical University (BSPU). Full-time students (N=40, 90% female) were in their second year of study and never switched to distance learning at the university: both lecture and practical classes were conducted face-to-face, without the use of E-Learning and DLT (face-to-face). Distance learning students using EL and DLT (N=74, 92% female) were predominantly in the third year, which is approximately the same as the second-year full-time program. Distance learning classes were conducted on the following platforms: ZOOM, Big Blue Button, Moodle. In Moodle were developed training courses for all disciplines of the specialty, students were offered lectures, materials for practical classes, stimulating questions, tasks and practice-oriented materials, with which they could familiarize themselves both before and after classes. Knowledge was tested both orally in online classes and in the form of tests for all disciplines, which allowed for a comprehensive and unbiased assessment of the acquired competencies. Students had the opportunity to receive feedback from teachers not only during the classes, but also after them, addressing questions in Moodle and receiving answers, they closed gaps in knowledge (subject-subject interaction).

Procedure. The study was conducted at the end of the academic year (April-May). The testing was electronic (google forms), voluntary and anonymous.

Methods. To study the motivational and semantic component, we used the questionnaire "Academic Motivation Scale" (AMS) by T.O. Gordeeva et al. [7], including seven scales: three types of intrinsic motivation (cognitive, achievement, self-development motivation), three types of external

motivation of learning activity (self-esteem motivation, introjected, externalized) and amotivation. To study the motivational-regulatory component, we used questionnaires: a Brief Self-Control Scale by J. Tangney, R. Baumeister and A.L. Boon in the adaptation of T.O. Gordeeva et al. [5] and V.I. Morosanova's "Style of Self-Regulation of Behavior - SSRB 2020" questionnaire [16], designed to diagnose self-control behavior [16], designed to diagnose the development of conscious self-regulation and the profile of its style features, which are steadily manifested in various types of arbitrary activity and life situations, and allows to determine seven different aspects of self-regulation: goal planning, modeling of significant conditions for achieving the goal, programming of actions, evaluation of results, flexibility, reliability, perseverance, as well as the overall level of conscious self-regulation. To study the cognitive-motivational component, we used the Explanatory Style of Successes and Failures (ESSF) technique [6], which diagnoses the optimistic/pessimistic style of explaining successes and failures in achievement activities according to the parameters of globality, stability and controllability, and the general self-efficacy questionnaire by R. Schwarzer and M. Yerusalem in the adaptation of V.G. Romek [20]. To study the integrative component, we used the persistence and perseverance (Grit) scale by A. Duckworths et al. in the adaptation of Y.A. Tyumeneva et al. [32].

Two indicators were used to measure academic achievement: the average score for all previous sessions (10-point scale) and the questionnaire of T.V. Kornilova and her colleagues [11], which contains three scales of the original questionnaire (Acceptance of the implicit theory of "buildable intelligence", Acceptance of the implicit theory of "enriched personality", and Acceptance of learning goals), as well as an additional scale "Self-appraisal of learning".

All data is presented in the repository of psychological research and instruments of the Moscow State University of Psychology and Education RusPsyDATA [10].

Statistical analysis. A two-factor analysis of variance was used to compare the motivational profiles of full-time and part-time students for a mixed experimental design (the between-group factor was the department (full-time/part-time) and the within-group factor was the academic motivation scales). To determine the contribution of motivation to academic success, which was measured using two indicators (academic performance and self-efficacy for learning), a multiple regression analysis was conducted using the academic success indicators in turn as the dependent variable and different types of motivation (subscales of the "Academic Motivation Scale" method) as predictors. A stepwise inclusive algorithm was used. To determine whether the motivational-regulatory, cognitive-motivational, and integrative components were important for learning effectiveness, measures of self-control, self-regulation of behavior, attributive style, self-efficacy, and persistence were added to the regression model. To select the most important predictors, a stepwise inclusive algorithm was used, statistically significant predictors were selected, and then the model was recalculated using the standard method to obtain regression coefficients and coefficient of determination. The analysis was performed separately for each group of students (full-time and part-time). Calculations were performed in the STATISTICA 12.0 program.

Results

The results of the comparison of motivational profiles showed that there is a statistically significant interaction with a strong effect between the variables form of study and academic motivation scale

($F(6,672)=18.40$; $p<0.0001$; $\eta 2=0.14$), indicating significant differences between the profiles of students from different departments. Duncan's post hoc test showed statistically significant differences for all scales except the scales of self-esteem motivation ($p=0.27$) and introjected motivation ($p=0.054$). Comparisons of the mean (cf. figure) show that full-time students have more pronounced externalized motivation and amotivation (Duncan's post hoc test, $p<0.001$), while part-time students have all types of intrinsic motivation: cognitive (Duncan's post hoc test, $p<0.001$), achievement (Duncan's post hoc test, $p<0.001$) and self-development motivation (Duncan's post hoc test, $p=0.014$). The statistically significant interaction and the obtained averages indicate that intrinsic motivation prevails in part-time students, whereas extrinsic motivation prevails in inpatient students.

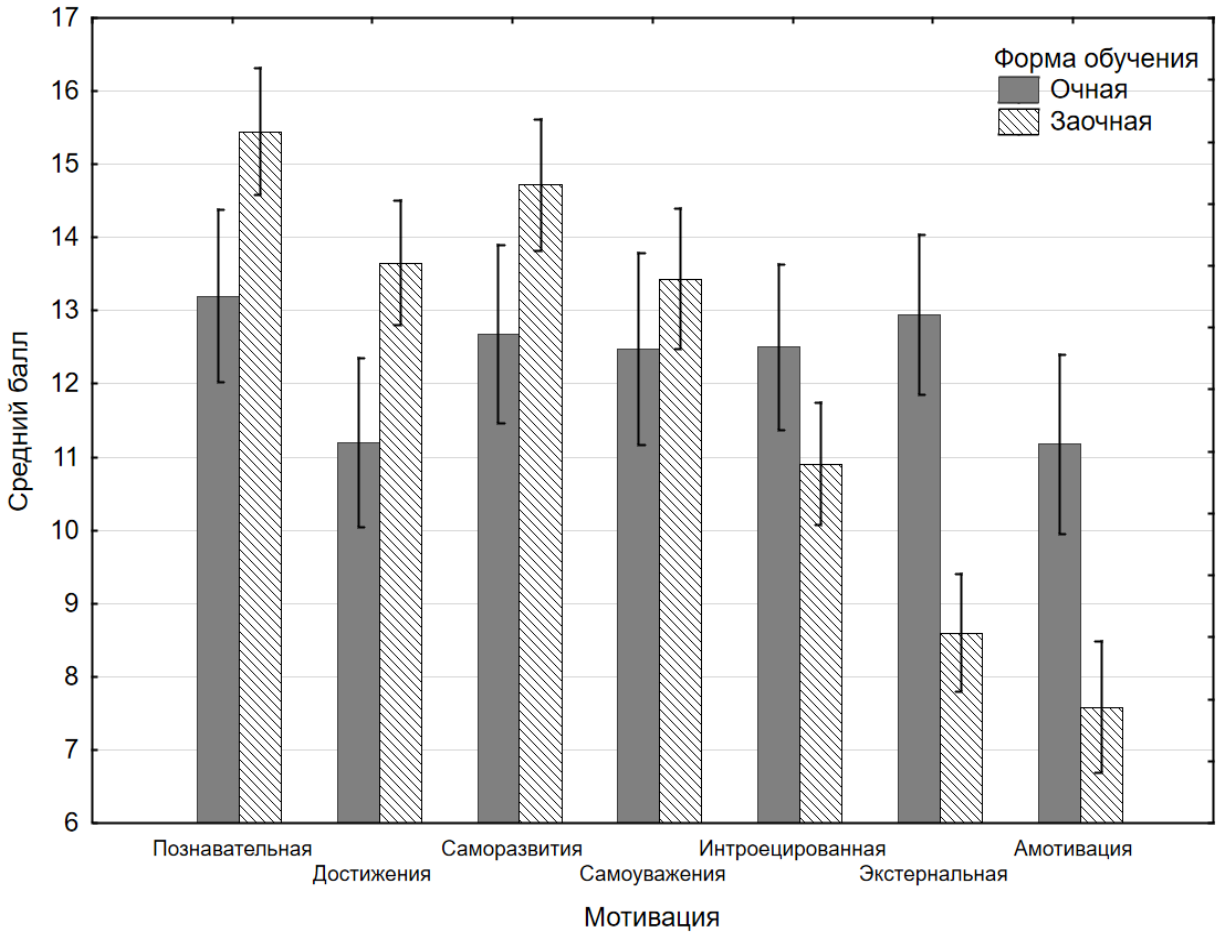

Fig. Mean values of academic motivation scales for full-time and extramural students (vertical bars indicate 95% confidence interval)

Table 1 presents the results of descriptive statistics and comparative analysis of part-time and full-time students for all other parameters used in the study (motivational-regulatory, cognitive-motivational and integrative components). It was found (Table 1) that, in general, self-regulation parameters and the level of self-control and self-efficacy are developed in students of both

departments at approximately equal levels, with part-time students being characterized only by significantly more pronounced goal planning ($t(112)=-2.09$; $p<0.05$), although the effect size is smaller than average (Cohen's $d<0.5$). It can be noted that no significant differences were found in the parameters of attributional style and level of optimism on positive and negative events, as well as in the level of stability of interests and persistence in full-time and extramural students. Based on this, we can conclude that full-time and part-time students differ mainly in academic motivation, and motivational-regulatory, cognitive-motivational and integrative components are expressed in them equally. In this regard, it is particularly interesting to test whether the contribution of these equally and dissimilarly expressed components to academic success differs with different forms of learning. Multiple regression analysis was used for verification.

Table 1

Results of Comparing the Motivational Components of Extramural and Full-Time Students: Descriptive Statistics and Student's t-test Results

Parameter	Full-Time M±σ	Extramural M±σ	t	Cohen' s d
Style of Self-Regulation of Behavior				
Goal Planning	12,3±4,11	13,8±3,59	-2,09*	0,41
Modelling Conditions	13,3±3,00	13,4±2,79	-0,30	0,06
Programming Actions	15,1±2,68	14,9±2,99	0,24	0,05
Evaluation of Results	11,4±3,08	12,6±3,61	-1,89	0,37
Flexibility	14,2±2,88	13,8±3,18	0,62	0,12
Reliability	8,9±3,71	9,8±3,46	-1,32	0,26
Perseverance	14,2±3,28	14,6±2,79	-0,61	0,12
General Level of Self-Regulation	89,4±14,1	93,1±13,44	-1,40	0,27
«Self-Control» Method				
Level of Self-Control	36,7±8,78	38,9±7,03	-1,46	0,29
General Self-Efficacy Scale				
Level of Self-Efficacy	29,8±5,33	30,5±5,48	-0,69	0,13
Adult Explanatory Style of Successes and Failures Questionnaire				
Stability Parameter	58,7±8,93	61,2±7,98	-1,54	0,30
Globality Parameter	69,4±12,46	71,3±10,45	-0,87	0,17
Control Parameter	72,8±10,31	71,2±11,55	0,76	0,15
Optimism in a situation of success	93,5±15,79	92,9±14,02	0,19	0,04

Optimism in a situation of failure	107,4±15,52	110,68±13,78	-1,17	0,23
Optimism in situations of achievement	120,1±15,58	121,0±14,00	-0,33	0,06
Optimism in interpersonal situations	80,8±10,59	82,6±10,69	-0,87	0,17
General level of optimism	200,9±24,78	203,7±21,36	-0,62	0,12
«GRIT» Method				
Stability of interests	20,5±5,55	21,5±4,29	-1,05	0,21
Perseverance	17,5±3,95	18,1±3,54	-0,86	0,17

The results of regression analysis are presented in Table 2 for extramural students and in Table 3 for full-time students. It can be seen that for students of both departments motivation (motivational-semantic component) predicts academic performance slightly lower than self-assessment of learning (r2=0.12 and r2=0.33 for correspondence students and r2=0.12 and r2=0.40 for full-time students). Self-development motivation turned out to be the main predictor for extramural students and achievement motivation for full-time students. Thus, in both cases, internal motivation is the determinant.

Table 2

Results of Regression Analysis for Predicting Academic Success (Grade Average and Self-Appraisal of Learning) by Different Indicators of Motivational-Semantic Component and by Indicators of Motivational-Semantic, Motivational-Regulatory, Cognitive-Motivational and Integrative Components for Extramural Students

Academic Success	**Performance (Average Grade)**	**Self-Appraisal (Implicit Theories and Learning Objectives Questionnaire, scale 4)**
Motivational-Semantic Component		
Predictors	Self-development motivation (0,34)	Self-development motivation (0,57)
r^2	0,12	0,33
Motivational-Semantic, Motivational-Regulatory, Cognitive-Motivational, and Integrative Components		
Predictors	Self-development motivation (0,25)	Self-development motivation (0,42)
	Evaluation of results (0,25)	Overall level of conscious self-regulation (0,32)
r^2	0,17	0,41

Note: standardized regression beta coefficients are given in parentheses ($p<0.05$).

When adding the indicators of motivational-regulatory, cognitive-motivational and integrative components for extramural students, the model included only the indicators of self-regulation of behavior (Table 2). The mean score can be predicted a little better if we take into account not only motivation but also outcome evaluation, i.e., the development and adequacy of respondents' evaluation of themselves, their actions, and the results of their activities and behavior. In addition to motivation, the general level of conscious self-regulation contributes to the prediction of learning self-appraisal. The little changed coefficients of determination (0.12 vs 0.17 for academic achievement and 0.33 vs 0.41 for learning self-appraisal) suggest that the role of self-regulation resources is not significant.

Table 3

Results of Regression Analysis for Predicting Academic Success (Grade Average and Self-Appraisal of Learning) on Different Indicators of the Motivational-Semantic Component and on Indicators of Motivational-Semantic, Motivational-Regulatory, Cognitive-Motivational and Integrative Components for Full-Time Students

Academic Success	**Performance (Average Grade)**	**Self-Appraisal (Implicit Theories and Learning Objectives Questionnaire, Scale 4)**
Motivational-Semantic Component		
Predictors	Achievement Motivation (0,35)	Achievement Motivation (0,64)
r^2	0,12	0,40
Motivational-Semantic, Motivational-Regulatory, Cognitive-Motivational, and Integrative Components		
Predictors	Achievement Motivation (0,39)	Achievement Motivation (0,53)
	Modeling of meaningful conditions (0,28)	Persistance (0,39)
	Action programming (0,48)	Globality (-0,41)
		Stability (0,55)
r^2	0,46	0,70

Note: standardized regression beta coefficients are given in parentheses ($p<0.05$).

For full-time students (Table 3), on the contrary, the coefficients of determination increased significantly when self-regulation resources were added to the model (0.12 vs 0.46 for academic performance and 0.40 vs 0.70 for self-appraisal of learning), indicating their more important role in determining academic success in this case. In addition, compared to part-time students, such resources entered the model somewhat more: modeling meaningful conditions and action programming was found to be important for predicting grade average, and persistence, globality, and stability were found to be important for predicting self-appraisal for learning.

Discussion

The results of the study demonstrated that the level and nature of motivation in learning activities are somewhat different among students of different forms of study. In particular, extramural distance education students have more pronounced intrinsic motivation than full-time students. At the same time, full-time students are more inclined to external motivation and somewhat more often demonstrate a lack of interest and a sense of meaningfulness of learning activities. It can be assumed that such differences are caused by the learning format itself, since learning through distance technologies most often implies greater student autonomy in studying learning materials, greater involvement in the learning process and awareness.

Meanwhile, the parameters of self-regulation, self-control, self-efficacy, persistence and perseverance actually have no differences among students of different forms of learning. This may indicate that, in general, the personal components responsible for the success and achievement of goals in any activity, including learning, do not undergo significant changes in the process of full-time or part-time education.

The results of regression analysis show that the hypothesis of the study was not confirmed. Contrary to the assumption that motivational-regulatory, cognitive-motivational, and integrative components would be more important in predicting academic success when applying distance learning, the study established the opposite pattern. Motivational-regulatory, cognitive-motivational and integrative components in general are significant predictors of academic success, while for full-time students the role of these motivational components is especially great (when they are added, the coefficient of determination doubles). It can be assumed that for extramural students the internal motivation itself, the desire to obtain certain knowledge is a sufficient stimulus to learning, to achieve higher results, while full-time students require additional factors (in the form of the development of self-regulation parameters, self-efficacy and self-control). Consequently, if the motivational-semantic component is strongly expressed, it sufficiently determines academic success, but if motivation is lacking or is external in nature, other components, namely self-regulation resources and style of explaining successes and failures in achievement activities, help to increase academic success.

The main limitation of this study is the small sample size, which may have affected the reliability of the results and the possibility of their extension to the general population.

Conclusions

1. Full-time students have more pronounced externalized motivation and amotivation, while part-time students have all types of internal motivation: cognitive, achievement and self-development motivation. At the same time, students of different forms of education practically do not differ in the expression of motivational-regulatory, cognitive-motivational and integrative components.

2. The contribution of motivational-regulatory, cognitive-motivational and integrative components to academic success is quite contradictory and has a different character depending on the form of education. In particular, these components make the most significant and complex contribution to the success of academic activity in full-time students, while academic success in part-time students is mostly conditioned only by the influence of motivational factors. These results may be related to the revealed specificity of motivational structure of students of different forms of education. Based on this, it can be assumed that in the absence of intrinsic interest in academic achievements, full-time students have to use additional sources in the form of self-regulation, optimism, self-control, self-efficacy and persistence.

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ПСИХОЛОГИЯ РАЗВИТИЯ | DEVELOPMENTAL PSYCHOLOGY

The Reflection of the Artistic Image of Growing Up on Boys and Girls Ideas About the Future

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The results of a study aimed at studying the ideas of growing up and the future in adolescents, boys and girls, are shown. The main purpose of the study was to identify the connection between life events that are significant for young people and their ideas about growing up, which is shown through the image of growing up in a feature film. The hypothesis was based on the assumption that the significance of life events in ideas about the future of boys/girls differs depending on the ideas of growing up based on the assessment of an artistic image. In total, the sample consisted of 1394 adolescents and young people aged 14 to 23 years (M=17; SD=2). Statistically significant differences were revealed in the ideas about the future of adolescents, boys and girls, with different types of ideas about growing up, revealed through an artistic image. Respondents who differ in the type of ideas about growing up show differences in the perspective of the future in relation to events related to "other people", "ideal objects" and the time period of the "open present". It was also found that there are differences in the significance of life events related to education, professional activity and communication among young people with different types of ideas about growing up based on an artistic image. These results may be useful for understanding the differences in the motivation of young people and for developing support and orientation programs in the process of growing up.

Keywords: emerging adulthood; boys and girls; artistic image; adolescence; the future; growing up; the idea of growing up; the idea of the future; the typology of ideas about growing up; the time perspective of the future.

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Представления юношей и девушек о будущем, раскрытые через художественный образ взросления

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Показаны результаты исследования, нацеленного на изучение представлений о взрослении и о будущем у подростков, юношей и девушек. Основная цель исследования заключалась в выявлении связи между жизненными событиями, значимыми для молодых людей и их представлениями о взрослении, раскрытыми через образ взросления, показанный в художественном фильме. Гипотеза заключалась в предположении о том, что значимость жизненных событий в представлениях о будущем у юношей/девушек различается в зависимости от представлений о взрослении, основанном на оценке художественного образа. В общей сложности выборка составила 1394 подростков и молодых людей в возрасте от 14 до 23 лет (M=17; SD=2). Были выявлены статистически значимые различия в представлениях о будущем подростков, юношей и девушек с разным типом представлений о взрослении, раскрытых через художественный образ. Респонденты, различающиеся по типу представлений о взрослении, демонстрируют различия в перспективе будущего в отношении событий, связанных с «другими людьми», «идеальными объектами» и временным периодом «открытое настоящее». Также обнаружено, что существуют различия в значимости жизненных событий, связанных с образованием, профессиональной деятельностью и общением, среди молодых людей с разным типом представлений о взрослении, основанном на художественном образе. Эти результаты могут быть полезными для понимания различий в мотивации молодых людей и для разработки программ поддержки и ориентации в процессе взросления.

Ключевые слова: становящаяся взрослость; юноши и девушки; художественный образ; юношеский возраст; будущее; взросление; представление о взрослении; представление о будущем; типология представлений о взрослении; временная перспектива будущего.

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Introduction

In the 21st century, post-industrial society provides young people with more opportunities to choose their future and places high demands on them in education, which affects the process of maturation. Changes in the socio-economic sphere lead to the disappearance of universal developmental tasks and the emergence of individualized trajectories of adulthood in young people. Modern individuals increasingly postpone social transitions such as graduation and career, marriage and parenthood, and remain financially dependent on parents often up to the age of 28 [6; 16].

In the past, financial independence and own professional activity, establishing one's own family and having children were perceived as objective indicators of adulthood [3]. Nowadays, the criteria of adulthood are becoming more subjective, researchers study the phenomenon of “delayed adulthood”, which was first described by J. Arnett. He called the transition from childhood to adulthood “emerging adulthood” [19; 20] and identified the following features of this period:

exploration of one's own identity; instability; focus on oneself; experimentation; feeling of intermediacy between adolescence and adulthood [3].

The manifestation of adulthood criteria is highly culturally dependent [25]. In countries with individualistic cultures, independent decision-making and financial independence are considered to be signs of adulthood, while in collectivistic countries the values of community are more important than achieving personal fulfillment [3]. For example, Portuguese researchers confirmed that education, work/career and family/marriage are still significant motivations in the future time perspective and change throughout adulthood. As participants age, meaningful future events are less and less related to education and more and more related to material values and family relationships [23]. At the same time, work/career appears to be the most prominent factor, the importance of which does not change with the age of the participants or with their occupational status. This indicates the centrality of paid work and occupation in this age period. It may also be related to the psychological impact of the instability of the current macroeconomic situation and relates to thoughts about one's future [23; 25]. The ability to anticipate, plan and expect certain desired future achievements plays a crucial role in well-being, motivation and behavior in adolescence.

Orientation to the future becomes the main orientation of the personality, and the subject of interests and plans of young men and women becomes the problem of choosing and achieving professional growth. Becoming an adult turns out to be such a period in the life cycle in which people are involved in planning and anticipating the future [28]. Positive orientation to the future is necessary for a person because it is closely related to personality development and is a protective factor for mental health [27]. In fact, through future orientation, young men and women strive to achieve their goals, anticipate the consequences of their actions, and realize that their present forms the basis for building the future.

Modern research studies the period of personal development from adolescence to adulthood, including in the context of the existing contradiction of the social situation of boys' (girls') development, which manifests itself in the phenomenon of "delayed adulthood". At present, the issues related to the relationship between the features of perceptions of their own adulthood and the characteristics of the time perspective of the future remain unexplored. In addition, many modern researchers talk about the possibility of using artistic images in psychological research [1; 7; 10], but artistic images have not been used in studies of young men's and girls' perceptions of the future. Art, particularly cinema, is one of the ways to broadcast sociocultural images [10], it implies that the viewers' psychological understanding of the meanings embedded in the film allows them to more deeply realize their own ideas about what they have seen. M. Bakhtin [1] pointed out the ability to form meaning through internal dialog in the mind through the perception of an artistic work [10]. The plurality of options for interpreting an artwork allows us to intensify the work on producing our own perceptions [5, p. 368]. Thus, orienting on the artwork, a boy (girl) models the semantic context of his own experience (ontological and existential) and forms personal constructs about what he has seen [7].

Accordingly, we hypothesized that the significance of life events and ideas about the future in boys/girls differs depending on the ideas about growing up based on the evaluation of the artistic image.

The Sample and Method of the Study

The total number of participants was 1,394 aged 14 to 23 years (M=17; SD=2), including 578 males (41.46%) and 816 females (58.54%). Of these, 14-year-olds were 175, 15-16-year-olds were 433, 17-18-year-olds were 417, 19-21-year-olds were 294, and 22-23-year-olds were 93. The purpose of the study was to examine the relationship between life events significant for young people, their perceptions of the future, and their perceptions of growing up in adolescence based on the evaluation of artistic images.

The projective method "Growing up" (N.P. Shilova) [17] was used to study the ideas about growing up, and the method "Past, Present, Future" (A.L. Wenger, Y.M. Desyatnikova) [2] and the Motivation Induction Method (MIM) (J. Nytten, adapted by N.N. Tolstykh) [13; 14] were used to study the ideas about the future. As part of the "Past, Present, Future" method, the study participants listed five events from the past, present, and future that were most important to them (a total of 15 events). All respondents listed 20910 events grouped by themes using content analysis. Three thematic clusters were identified as occurring most frequently (13022 events):

- activity (including professional activities and studies);
- socializing with other people;
- entertainment (including games and recreation).

The version of the Motivation Induction Method (MIM) used included 20 unfinished sentences in positive form, such as: "I want to..." and 10 in the negative: "I don't want to...", which respondents had to complete. The analysis was conducted using time and content codes, taking into account the recommendations of J. Nütten. Only the categories relevant to our sample were used. For the participants of this study, social time was formed from the periods of schooling, professional education, and the period of professional autonomy (work), and in the categories of calendar time, the "open present" was significant for them, associated with the desire of a person to have certain qualities, properties, knowledge, and skills that cannot be precisely defined in time. Within the framework of the content code, J. Nütten distinguishes four main categories of objects: "myself" (research participant); other people (relatives, friends, just people); ideal objects (freedom, science, love); and objects of nature that are significant for our sample.

The statements obtained by the "Past, Present, Future" and MIM methods were coded and converted into a dichotomous scale (presence or absence of a feature), and quantitative data showing the frequency of use of a particular feature by the respondent were used in further analysis. The range of possible scores for the "Past, Present, Future" technique is from 0 to 15, and for MIM - from 0 to 30.

The author's "Growing up" projective technique is based on M.M. Bakhtin's idea that the perception of an artistic image includes the definition of one's own attitude to the world, revealing personal meanings [1]. In our method, as an artistic image, we used fragments of V.V. Menshov's movie "Practical Joke". Menshov's movie "Practical Joke" (1976). K.N. Polivanova and M.A. Shakarova, analyzing the material of feature films, came to the conclusion that in artistic texts there is a gradual blurring of clear boundaries between childhood and adulthood, which opens the uncertainty of the future [12]. The movie "Practical Joke" for the first time explicitly illustrates this blurring of the concept of adulthood. In our methodology, three fragments of the movie lasting from 1 to 5 minutes and 11 questions[1] to them were presented on a computer screen. The received answers

[1] 1. Which of the characters' thoughts did you find interesting? (answers: 1 - about creativity, 2 - about not having enough time, 3 - about achieving success, 4 - no interesting thoughts).

were analyzed by means of content analysis. Several possible variants of answers[1] for each question were identified, which were further analyzed as nominal variables.

The statistical significance of differences in perceptions of growing up was examined using Pearson's chi-square test (SciPy 1.11.0 statistical package) and hierarchical cluster analysis using Ward's minimum variance method (R statistical package). The consistency (internal reliability) of the tasks of the "Growing Up" method was assessed by calculating Cronbach's alpha. The statistical significance of differences in the perceptions of the future of the three selected types was analyzed using the Mann-Whitney U-criterion (statistical package SciPy 1.11.0), the effect size was measured using the d-Cohen coefficient (Python 3.8.0).

Results of the Study

At the first stage of the study, the "Growing up" method was used to study perceptions of growing up. The consistency (internal reliability) of the tasks of the technique was assessed by calculating the Cronbach's alpha value. Responses of all participants to all tasks of the "Growing up" methodology were included in the assessment, and its value amounted to 0.7163. Accordingly, the consistency (internal reliability) of the methodology tasks within the framework of the conducted research is acceptable.

2. Were there any situations in your life similar to the situation of the boys? (answers: 1 - feeling of support from adults, 2 - feeling of incomprehension from adults, 3 - striving to rely only on oneself, 4 - realization of the plan despite the lack of faith of adults).
3. Have you experienced the same attitude from adults as in the 1st fragment? (answers: 1 - feeling of support from adults, 2 - feeling of misunderstanding from adults, 3 - striving to rely only on oneself, 4 - realization of the plan despite the lack of faith of adults).
4. How will the future life of the main character turn out? (2nd fragment) (answers: 1 - rejection, 2 - good, because the hero is purposeful, 3 - the hero will achieve his goal, 4 - will live an ordinary life, 5 - good, provided that he takes into account the advice of his elders).
5. How do you evaluate the ideas in the situations from the 2nd fragment? (answers: 1 - feeling supported by adults, 2 - feeling misunderstood by adults, 3 - there are no such examples, 4 - realization of the plan despite the lack of faith of adults, 5 - striving to rely only on oneself).
6. What are the similarities between the opinions of the characters in the movie and your friends? (answers: 1 - similar to Igor, 2 - similar to the teacher, 3 - presence of optimism in my friends, 4 - my friends believe that life will teach a lesson and life is a struggle, 5 - my friends discuss life success and achievements).
7. Give examples of adults voicing the same concerns as the teacher in the 2nd movie excerpt (answers: 1 - feeling supported by adults, 2 - feeling misunderstood by adults, 3 - no such examples, 4 - realizing what they had planned despite lack of adult faith, 5 - striving to rely only on themselves).
8. How are you similar to the heroes? (3rd fragment) (answers: 1 - I am like Oleg, 2 - I am like my father, 3 - I also strive for success and achievements in life, 4 - I strive to enjoy life, I don't think that achievements are the most important thing, 5 - everyone is right in their own way, both positions are close to me).
9. What is the adult attitude of the characters to life in the 3rd fragment? (answers: 1 - in defining the concepts of success/failure, 2 - in searching for the meaning of life, 3 - in getting pleasure from life/achievement, 4 - in understanding the significance of the future/now and the time of life in general, 5 - in distinguishing the concepts of childhood/adulthood).
10. What are the disagreements of the characters of the movie (Oleg and his father) in the 3rd fragment? (answers: 1 - in defining the concepts of success/unsuccess, 2 - in searching for the meaning of life, 3 - in getting pleasure from life/achievements, 4 - in understanding the significance of the future/now and the time of life in general, 5 - in distinguishing the concepts of childhood/adulthood).
11. In what ways were you/your friends' attitudes towards life similar to the 3rd fragment? (answers: 1 - in the desire to rest, 2 - in the desire to work/study, 3 - it was not, 4 - its own position unrelated to the plot, 5 - in demonstrating a more adult position than that of others).

Further, the respondents' answers were analyzed using cluster analysis. In this question, we relied on V.F. Petrenko's ideas that in psycholinguistics cluster analysis is used as a direct way of determining internal semantic relations [11]. Accordingly, it helped us at the first stage to divide all respondents into groups in which participants use similar semantic relations of words. This stage of analysis was conducted as an exploratory one, and three clusters were formed within it. The division into clusters was carried out on the basis of numerical estimates of answers to the questions of the "Growing up" method (the number of answers of a certain category given by a particular respondent). The first cluster included 377 (27%) respondents, the second cluster included 577 (41%), and the third cluster included 440 (32%).

In the next step, differences in the responses of the respondents who fell into the three clusters identified were examined. Differences were identified using standardized residuals and Pearson's chi-square criterion (see Table 1).

Table 1

Significance of Differences in the Answers to the Questions of the "Growing Up" Method (N=1394)

Question	**Types**	**Answers (standardized residuals)**					**χ^2**	**P**
		1	2	3	4	5		
1	1	3,3[1]	-3,9[1]	-4,3[1]	7,5[1]		75,15	0,000**
	2	-2,8[1]	2,1[1]	2,9[1]	-4,3[1]			
	3	-0,2	1,6	1,0	-2,6[1]			
2	1	6,7[1]	0,3	7,0[1]	-10,1[1]		139,20	0,000**
	2	-5,8[1]	0,3	-1,8	4,2[1]			
	3	-0,3	-0,6	-4,8[1]	5,3[1]			
3	1	5,4[1]	-1,5	4,4[1]	-7.4[1]		92,07	0,000**
	2	-2,2[1]	-1,5	0,8	0,9			
	3	-2,8[1]	3,0[1]	-5,1[1]	6,1[1]			
4	1	9,4[1]	8,6[1]	0,1	-5,6[1]	-4,3[1]	200,47	0,000**
	2	4,6[1]	-4,6[1]	1,0	2,2[1]	1,3		
	3	-4,1[1]	-3,4[1]	-1,1	2,9[1]	2,7[1]		
5	1	8,7[1]	-1,1	4,9[1]	-9,4[1]	-2,7[1]	169,33	0,000**
	2	-3,4[1]	-0,5	1,7	0,2	1,7		
	3	-4,7[1]	1,6	-6,5[1]	8,8[1]	0,8		
6	1	5,8[1]	10,1[1]	-2,4[1]	-9,6[1]	-9,9[1]	1303,70	0,000**

	2	8,0[1]	11,4[1]	1,0	-11,9[1]	-13,4[1]		
	3	-14,0[1]	-21,7[1]	1,2	21,8[1]	23,6[1]		
7	1	9,3[1]	-2,7[1]	6,0[1]	-10,3[1]	-1,9	183,83	0,000**
	2	-3,4[1]	2,8[1]	-0,5	1,6	1,0		
	3	-5,3[1]	-0,4	-5,2[1]	8,2[1]	0,9		
8	1	21,7[1]	1,0	-12,3[1]	-9,1[1]	-5,7[1]	498,09	0,000**
	2	11,1[1]	-1,1	-9,1[1]	4,3[1]	1,2		
	3	-9,0[1]	0,2	-5,7[1]	4,2[1]	4,1[1]		
9	1	10,9[1]	10,2[1]	-5,3[1]	-15,1[1]	-4,3[1]	372,37	0,000**
	2	-5,4[1]	-3,8[1]	4,2[1]	5,3[1]	2,5[1]		
	3	-4,6[1]	-5,7[1]	0,7	8,8[1]	1,5		
10	1	12,5[1]	11,2[1]	-3,8[1]	-10,3[1]	-10,5[1]	429,67	0,000**
	2	-6,6[1]	-4,2[1]	-0,7	4,2[1]	7,9[1]		
	3	-5,0[1]	-6,3[1]	4,4[1]	5,4[1]	1,6		
11	1	12,8[1]	-6,8[1]	1,0	-9,3[1]	-1,0	288,37	0,000**
	2	-7,3[1]	-0,6	3,2[1]	4,0[1]	-1,1		
	3	-4,5[1]	7,1[1]	-4,4[1]	4,7[1]	2,1[1]		

Symbols. ** - differences are significant at the 0.0001 level; 1 value of the standardized residual is above the borderline (-2; 2).

Table 1 shows that the differences in responses to each question are significant at the < 0.0001 level; standardized residuals allowed us to identify "excess" or "missing" values of observations in the cells of the table, indicating that there is a relationship between the variables. With a standardized residual greater than zero, we can speak of a positive association, while a negative standardized residual indicates a negative association. Accordingly, the analysis of respondents' answers that fell into three selected clusters allowed us to describe three types of ideas about growing up: type 1 - "*realization of meanings*", type 2 - "*realization of adulthood*" and type 3 - "*time awareness*".

The type "*realization of meanings*" is characterized by interest in creativity, confidence in support from surrounding adults, in the importance of purposefulness. For these respondents, adulthood and their feelings about it consist in distinguishing success/failure and searching for the meaning of life.

For the type "*realization of adulthood*" success and achievements are important, also these respondents value the possibility to enjoy life, and the distinction of these two positions is connected for them with adulthood, and also adulthood and experiences about it consist in defining the concepts of childhood and adulthood.

The type of "*time awareness*" is characterized by confidence in the lack of understanding on the part of surrounding adults, in order to achieve goals, it is necessary to take into account the advice of elders. Success and achievements are important for these respondents, and at the same time it is important for them to enjoy life. The adult attitude to life is connected for this type with the distinction of future and present and understanding of time.

At the next stage of the study, the differences in the image of the future were studied depending on the features of perceptions of adulthood, identified on the basis of the perception of the artistic image of adulthood. Descriptive statistics on the data obtained with the help of techniques studying the image of the future are presented in Table 2.

Table 2

Descriptive Statistics on Three Important Thematic Blocks of Significant Life Events According to the "Past, Present, Future" Method and According to the Criteria of Time Perspective of the Motivational Induction Method, n=1394

Indicators	Mean	Standard Error	Median	Mode	Standard Deviation	Sample Variance	Excess	Asymmetry	Minimum	Maximum	Reliability Level (95,0%)
Action	4,36	0,06	4	5	2,38	5,64	−0,07	0,29	0	14	0,13
Communication	3,26	0,07	3	3	2,45	5,99	0,01	0,64	0	12	0,13
Entertainment	1,75	0,05	1	0	1,95	3,82	5,36	1,79	0	15	0,10
Learning in Schhol	0,70	0,05	0	0	1,95	3,82	33,2	4,97	0	21	0,10
Vocational Training	1,79	0,08	1	0	2,80	7,86	10,2	2,81	0	20	0,15
Professional Autonomy	1,66	0,06	1	0	2,40	5,74	16,9	3,42	0	19	0,13
Open Present	3,88	0,07	4	4	2,75	7,58	0,6	0,76	0	15	0,15
Historical Future	0,77	0,04	0	0	1,37	1,87	10	2,8	0	10	0,07
I Myself	13,40	0,12	14	15	4,54	20,70	0,16	−0,52	0	22	0,24
Other People	3,82	0,08	3	0	2,98	8,90	1,07	0,88	0	21	0,16
Objects of Nature	0,22	0,02	0	0	0,93	0,86	245	13,2	0	19	0,05
Ideal Objects	2,03	0,06	1	0	2,14	4,59	4,98	1,76	0	17	0,11

The analysis of the obtained data allows us to state with a reliability level of 95% that the average number of statements ranged from 0.22 (objects of nature) to 13.4 (myself). The standard deviation of the distribution of the sample mean for all categories ranged from 0.93 (objects of nature) to 4.54 (myself). The coefficient of asymmetry has a positive value for all categories except the content category "I myself", which indicates the presence of right-sided asymmetry, respectively, for the category "I myself" - left-sided. The positive value of the kurtosis indicates the presence of an island shaped distribution for all categories of analysis, except for significant events in the category of business (study and professional activity). The marginal sampling error ranged from 0.05 (objects of nature) to 0.24 (myself). The range of variation in different categories of statements reached from 10 to 22.

Differences in the significance of life events between respondents depending on their perceptions of growing up based on the artistic image are presented in Table 3.

Table 3

Differences in the Significance of Life Events Between Respondents Depending on their Perceptions of Growing Up Based on an Artistic Image (N=1394)

Significant Life Events	Mann-Whitney U-test, Cohen's d-criterion					
	Realization of meanings (n=377)	Realization of adulthood (n=577)	Realization of meanings (n=377)	Time awareness (n=440)	Realization of adulthood (n=577)	Time awareness (n=440)
Study and Professional Activity	125093,5, p=0,000*** d=0,235[1]		102888, p=0,000*** d=0,396[1]		115124,5, p=0,010* d=−0,169	
Communication	122586, p=0,001*** d=0,201[1]		91874,5, p=0,007** d=0,159		129724, p = 0,545 d = 0,047	
Entertainment	112019,5, p=0,420 d=0,055		89258, p=0,053 d=0,161		120746, p=0,171 d=−0,103	

Symbols. * - differences are significant at the 0.05 level; ** - differences are significant at the 0.01 level; *** - differences are significant at the 0.001 level; 1 average effect size.

Thus, respondents assigned to the "realization of meanings" type of ideas about adulthood are less likely than others to identify academic/professional events as significant (mean: "realization of meanings" = 3.81, "realization of adulthood" = 4.38, "time awareness" = 4.76), and were also less likely than respondents of the "realization of adulthood" type to identify contacts with other people as significant (mean: "realization of meanings" = 2.93, "realization of adulthood" = 3.42).

Differences in the significance of temporal categories between respondents depending on their perceptions of growing up based on artistic imagery are presented in Table 4.

Table 4

Differences in the Significance of Time Categories Between Respondents Depending on their Perceptions of Growing Up Based on an Artistic Image (N=1394)

Categories of Temporal Perspective	Mann-Whitney U-test, Cohen's d-criterion					
	Realization of meanings (n=377)	Realization of adulthood (n=577)	Realization of meanings (n=377)	Time awareness (n=440)	Realization of adulthood (n=577)	Time wareness (n=440)
I myself	104149, p=0,337 d=0,103		76819,5, p=0,924 d=0,044		129333,5, p=0,310 d=0,067	
Other people	126950,5, p=0,000*** d=0,427[1]		100556,5, p=0,000*** d=0,516[1]		117516,5, p=0,115 d=−0,075	
Ideal objects	118171,5, p=0,000*** d=0,215[1]		95394, p=0,000*** d=0,308[1]		115326,5, p=0,037* d=−0,087	
Open present	121677,5, p=0,000*** d=0,332[1]		94737, p=0,000*** d=0,386[1]		121744,5, p=0,516 d=−0,059	
Learning in school	103259,5, p=0,326 d=0,000		77740, p=0,600 d=−0,065		126381,5, p=0,625 d=0,064	
Vocational training	111201,5, p=0,004** d=−0,026		80239, p=0,212 d=−0,076		132919,5, p=0,061 d=0,060	
Prefessional autonomy	107084, p=0,077 d=−0,082		81743, p=0,087 d=−0,097		124465,5, p=0,959 d=0,020	

Symbols. * - differences are significant at the 0.05 level; ** - differences are significant at the 0.01 level; *** - differences are significant at the 0.001 level; 1 mean effect size.

Respondents assigned to the "realization of meanings" type of ideas about growing up use the content category "other people", the content category "ideal objects" and the time category "open present", which is not limited to a certain time of life, in the temporal perspective of the future less often than others.

Discussion of the Results of the Study

Based on the data obtained, it can be said that young people's ideas about the future and significant events in their lives are related to their ideas about growing up, which are formed through the evaluation of artistic images of growing up.

The identified typology of ideas about growing up, including the following types: "realization of meanings", "realization of adulthood" and "time awareness", is based on J. Arnett's ideas that modern characteristics of growing up have become more individualistic and depend on the cultural heterogeneity and variability of this period of life.

At the same time, we show that in answering the question "how has the growing up of modern young men and girls changed?" it is important to take into account not only the influence of culture on the importance of the criteria of growing up [8; 15; 19; 20], but also the peculiarities of the perception of the cultural image of growing up that we have identified. Accordingly, the description of perceptions of growing up by modern young men and girls, given by us in the framework of the

formation of the typology, becomes an important addition. For respondents of the type "realization of meanings" adulthood and the experiences associated with it consist in the distinction of success or failure and the search for the meaning of life. For the type "realization of adulthood" adulthood and experiences about it are connected with the definition of the concepts of childhood and adulthood. The type "time awareness" connects adult attitude to life with the distinction of future and present and understanding of time.

The obtained differences in perceptions of adulthood based on the perception of the artistic image of adulthood fit logically into the studies confirming that perceptions of adulthood in adolescence are related to meaningful perceptions of adult ages [23; 26; 28; 29; 30; 31; 33].

Given that institutionalized forms of growing up in general and the ideal form as a representation of the future in particular are dissolving in the diversity of modern developmental practices [12], we understand that the life scenario no longer resembles a non-alternative "rolling rut" in which everything was in strict order: getting education, finding a job, and creating a family. In this context, the revealed links between the differences in the perceptions of growing up and the perceptions of the future in adolescence become important for understanding the motivation of modern youth. Thus, the respondents who are referred to the type of ideas about adulthood "realization of meanings" less often than others emphasize as significant events related to study and profession, and also less often emphasize the importance of contacts and communication with other people in comparison with representatives of the type "realization of adulthood".

These connections highlight the characteristics of the life path imagined in adolescence, which the researchers have already noted earlier [9], and significantly supplement their conclusions that the length of the imagined future life depends on significant life events in the professional sphere and in the sphere of family relations.

Young people who are representatives of the type of maturation, figuratively called "realization of meanings", in the temporal perspective of the future less often than others use the content categories "other people" and "ideal objects" and the temporal category "open present", which is not limited to a certain time of life. This result correlates with research showing the links between contemporary boys/girls' perceptions of growing up and their vision of their future, including the development of a temporal perspective. Approaches based on this connection aim to establish a positive vision of the present, future, and past through analyzing experiences, searching for meaning in life, and forming life plans and goals [21; 22; 24]. This means that a young man (girl) building his/her life path has determined the ultimate life meanings and has an idea of his/her future socially defined events and roles in various spheres of life (family, career, education, social life) [4; 18; 32].

Findings

As a result of the study, the following conclusions can be drawn:

1. Three types of perceptions of adulthood in adolescence based on the evaluation of artistic images were identified:

- for respondents of the type "*realization of meanings*" adulthood and experiences concerning it consist in the distinction of success/failure and the search for the meaning of life;
- for the "*realization of adulthood*" type, adulthood and feelings about it consist in defining the concepts of childhood and adulthood;
- for the type of "*time awareness*" adult attitude to life is connected with the distinction of future and present and understanding of time.

2. Respondents, for whom ideas about growing up are connected with "realization of meanings", less often than others emphasize as significant events directed to study/profession, and also less often than respondents, for whom ideas about growing up are connected with "realization of adulthood", emphasize as significant contacts with other people.

3. Respondents, for whom ideas about growing up are connected with "realization of meanings", in the temporal perspective of the future less often than others use the content category "other people", the content category "ideal objects" and the temporal category "open present", which is not limited to a certain time of life.

Conclusion

A limitation of the present study is the lack of data on the relationship of the identified phenomena with the age of the respondents. The discovered connections of the perceptions of the future with the perceptions of growing up, formed on the basis of the evaluation of the artistic image of growing up, are of value for psychologists of educational organizations developing programs of support and orientation in the process of growing up. The revealed differences in the use of the categories of time perspective and the significance of life events for one's future depending on the perceptions of growing up based on the evaluation of artistic images are a subject for further study in order to investigate the dependence of the findings on the age and gender of respondents.

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The Use of Board Games and Digital Games by Preschoolers: Results of a Survey of Russian Parents

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The article presents the results of an empirical study conducted within "The Influence of Digital Activity on the Development of Cognitive Functions in Preschool Age" project. In order to compare the data on the use of board games and digital games, a special "Contemporary Children: Digital Games vs. Board Games" questionnaire was developed (O.V. Salomatova, Yu.A. Tokarchuk, 2023), intended for the parents of preschoolers. The survey was conducted from March to September 2023 and involved parents of children aged 3 to 7 years old (N=556). It was shown that parents consider board games to be a more preferable pastime for children than digital games. According to the survey, board games in most cases involve the presence of a gaming partner, while digital games are more often an individual activity. In comparison with board games, parents more frequently use digital applications as a means of monitoring their child's behavior or as a method of reward. At the same time, according to the survey, parents less often actively participate in the process of digital gaming, allowing children to play independently or under their supervision. Board games more frequently involve parents in the gaming process.

Keywords: board games; digital game; preschool age; game applications; media content.

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Токарчук Ю.А., Саломатова О.В., Гаврилова Е.В.
Использование настольных и цифровых игр дошкольниками: результаты опроса российских родителей
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Использование настольных и цифровых игр дошкольниками: результаты опроса российских родителей

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В статье представлены результаты эмпирического исследования, выполненного в рамках проекта «Влияние цифровой активности на развитие когнитивных функций в дошкольном возрасте». С целью сравнения данных по использованию настольных и цифровых игр была разработана специальная анкета «Современные дети: цифровые игры VS настольные игры» (О.В. Саломатова, Ю.А. Токарчук, 2023), предназначенная для родителей дошкольников. Анкетирование проводилось с марта по сентябрь 2023 года, в нем приняли участие родители детей 3-7 лет (N=556). Было показано, что родители считают настольные игры более предпочтительным времяпрепровождением детей, по сравнению с цифровыми играми. Согласно опросу, настольные игры в большинстве случаев предполагают наличие игрового партнера, тогда как цифровые игры чаще являются индивидуальным занятием. В отличие от настольных игр, родители гораздо чаще используют цифровые приложения в качестве средства контроля за поведением ребенка или метода поощрения. При этом, согласно опросу, родители реже принимают непосредственное участие в процессе цифровой игры, позволяя детям играть самостоятельно или под своим наблюдением. Настольные игры чаще включают родителей в игровой процесс.

Ключевые слова: настольные игры; цифровая игра; дошкольный возраст; игровые приложения; медиаконтент.

Финансирование. Исследование выполнено при финансовой поддержке Российского научного фонда (РНФ) в рамках научного проекта от 13.01.2023 № 23-28-01204.

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Digital and Board Games in the Focus of Scientific Research

Modern childhood is increasingly referred to as “digital” childhood [9]. A variety of digital devices become available to children from early childhood, and the time of interaction with them is steadily increasing. Children are also addressed a huge array of digital content, which combines a lot of information and entertainment materials designed for use on digital devices (computer, smartphone, tablet, etc.). One of the most common types of content addressed to preschool children is digital play [3; 4; 6]. According to a survey of Russian parents conducted in 2020, 24% of children by the age of 3 can play independently in gadgets, while 48% of preschoolers spend up to 1 hour daily at the device [5].

Issues related to the influence of screen time on various aspects of preschoolers' development are actively studied in the world science. Thus, the works of domestic and foreign researchers indicate that the reasonable use of digital games and their inclusion in the educational process can have a positive impact on the level of cognitive development of children (perception, visual and figurative thinking, logical thinking, cognitive activity), train working memory and develop attention [2; 13; 22].

However, the neglect of screen time norms is becoming a worldwide problem. Excessive early exposure and/or excessive use of digital devices can have a negative impact on physical health and psychosocial health, as well as cause problem behavior and impaired cognitive development [14]. The increased screen time of today's children and their active use of digital technology can negatively affect the quality of traditional play [5; 7].

Despite the widespread use of digital games among preschoolers around the world, scientific literature in recent years has noted a trend of the increasing popularity of board games. This trend is explained, among other things, by “Internet fatigue” and the desire to diversify family leisure time [15]. A decade ago, in the English-speaking scientific discourse, one could see the opposition between digital games and non-digital or analog games. Analog games meant any type of game that did not involve the use of a digital device (computer, game console, phone or tablet). Accordingly, in a digital game, the interaction between players was mediated by a digital device or the player interacted directly with the device. Analog games included tabletop/board games, card games, and sports games [20]. The traditional attribute of board games was considered to be the presence of a playing surface (table), chips/cards/tokens, and rules. However, nowadays, the boundaries between digital and analog games are blurring, and there is a trend to include digital attributes (e.g., augmented reality or rule explanations) in board games that require the use of digital devices during a game session [12].

The impact of board games on various aspects of preschoolers' development has been much less in the field of scientists' attention than the impact of digital games. Two areas of research in this area can be distinguished [12; 21]. The first direction is represented by works covering different aspects of preschoolers' mathematical skills development (counting, arithmetic actions) [17; 18; 19; 23]. The second group includes studies related to the development of social interaction between normotypic children and between normotypic children and children with disabilities [11; 16].

In general, to date, there are not enough comparative studies on children's interaction with board and digital games; this direction needs further development. This article presents a part of the results of a study of the features of preschool children's use of digital and board games conducted on a sample of Russian parents in 2023.

Peculiarities of Preschool Children's Use of Digital and Board Games: A Survey of Parents

The empirical study was conducted from March to September 2023. As a hypothesis, it was hypothesized that there are differences in the use of digital and board games by preschool children. In order to test this hypothesis, a special questionnaire “Modern children: digital games VS board games” (O.V. Salomatova, Yu. A. Tokarchuk, 2023) was developed as part of this study. The questionnaire, created using a google form, consisted of 29 closed questions. All questions were subjected to expert evaluation before the questionnaire was administered. Parents of preschool children (N=15) and specialists in the field of child psychology (N=5) acted as experts. Parents were asked to assess:

- Whether the wording of the questionnaire questions is understandable;
- Whether the questions of the questionnaire do not cause ambiguity;
- Whether the proposed answer options are sufficient;
- Whether they would like to add something to the already proposed questions.

The task of experts was to evaluate the consistency, sufficiency, correctness and compliance of the wording of questions and answers with the objectives of the questionnaire. Based on the results of the expert assessment, the questions and answers of the questionnaire were adjusted and supplemented. The questionnaire was then distributed on the Internet (the breadth of coverage was the territory of the Russian Federation).

Parents of children aged 3 to 7 years (N=556), among whom 52.3% were boys (N=291) and 47.7% were girls (N=265), participated in the questionnaire. According to the data obtained, 94.1% (N=523) of children attend full-day preschool, 1.3% (N=7) attend short-term stay group and 4.7% (N=26) do not attend kindergarten. The characteristics of the sample are presented in Table 1.

Table 1

Characteristics of the Study Sample (N=556)

Age of the Parents

Younger than 21 years	21-30 years	31-40 years	41-50 years	Older than 50 years
0,7% (N=4)	15,5% (N=86)	65,3% (N=363)	16,5% (N=92)	2% (N=11)
Age of the Children (Full Years)				
3 years	4 years	5 years	6 years	7 years
22,5% (N=125)	19,4% (N=108)	22,5% (N=125)	22,5% (N=125)	22,5% (N=125)

The database of the study is presented in the repository of psychological research and tools RusPsyDATA [10].

Quantitative analysis of empirical data was performed using the methods of descriptive statistics, Spearman correlation coefficient, one-sample Chi-square criterion and nonparametric McNemar test for related samples. Calculations were performed in IBM SPSS Statistics V23 statistical package.

Results

Our focus was primarily on the frequency and amount of time children spent playing board games. Regarding frequency, parents indicated that 32.7% (N=182) of children play about 2-3 times a week, 27.2% (N=151) of children play once a week, 17.8% (N=99) of children play board games every day, 13.8% (N=77) play about 4-5 times a week, and 8.5% (N=47) do not play board games. Meanwhile, 38.5% (N=215) of children spend up to 30 minutes a day playing board games, 37.2% (N=207) play between 30 minutes and 1 hour a day, 10.8% (N=60) of children spend 1 to 1.5 hours a day playing board games, 4% (N=22) of children play for 1.5-2 hours a day, 1% (N=5) of children play board games for more than 2 hours a day and 8.5% (N=47) of children do not play board games.

Mostly children play board games at home, this was indicated by the majority of parents (73.9%, N=411), in kindergarten about 18.2% (N=101) of children play. Most often parents, as well as siblings are involved in the process of board games. Detailed distribution of answers to the multiple choice question: “With who does the child usually play board games?” is presented in Fig. 1.

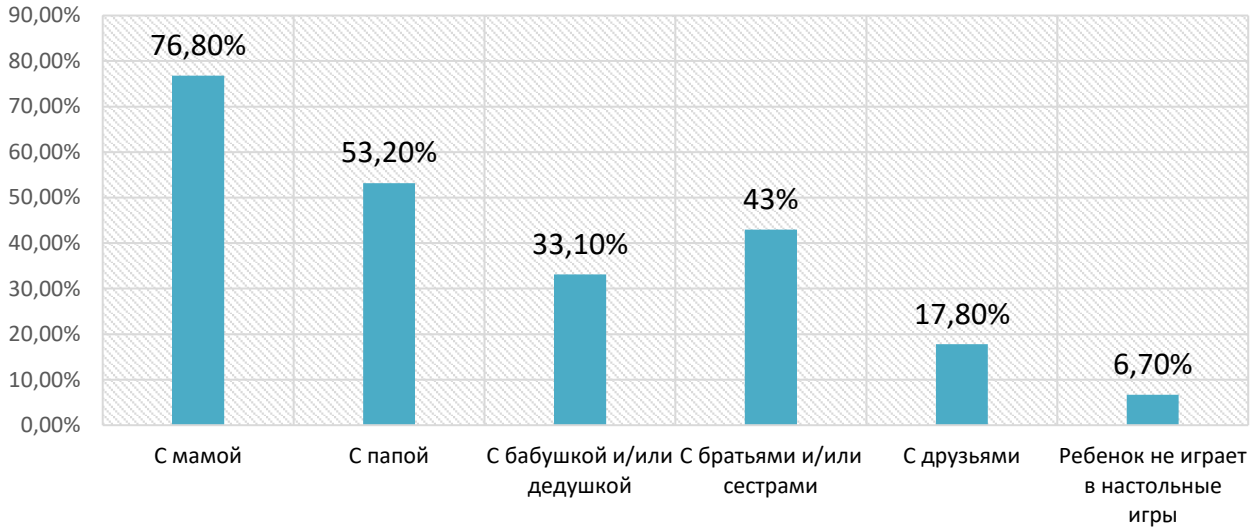

Fig. 1. Distribution of answers to the question “With who does the child usually play board games?” (N=556)

According to the survey results, 47.8% (N=266) of children play board games more often on weekends, 32.2% (N=179) of children play on weekdays and weekends equally, 11.2% (N=62) of children play more often on weekdays.

When choosing board games, 71% (N=395) of parents consider it important to match the board game to the child's age, 59.5% (N=331) of parents pay attention to the game plot, 37.4% (N=208) and 34.7% (N=193) of parents respectively choose a game based on visual design and quality of materials used. At the same time, game recommendations from teachers are important for 24.3% (N=135) of parents, recommendations from friends - for 13.1% (N=73) of parents, only 1.4% (N=8) of parents take into account the opinion of store clerks and 24.1% (N=134) of parents buy their child what he/she asks for.

Answers to the multiple-choice question “What types of board games does your child prefer? (Maximum 3 options)” were arranged according to the principle of developmental effect orientation. Thus, the most preferred among children were board games aimed at developing memory and attention (67.1%, N=373), and games aimed at developing logic (49.8%, N=277). Games teaching reading and counting skills are interesting for 37.9% (N=211) of children, 30.4% (N=169) of children prefer entertaining board games, creative games are interesting for 15.8% (N=88) of children. Some children play games aimed at developing reaction speed, their number amounted to 9.4% (N=52).

When asked about the variety of board games played by the child, slightly more than a third of parents indicated 4-6 types of board games (38.8%, N=216), a third of parents mentioned 1-3 types of board games (31.8%, N=177), a quarter of parents indicated 7 or more types of board games (23.6%, N=131).

Of considerable interest is the question about the child's behavioral strategies in case of difficulties in the process of board games. Most children ask for help from their parents: less than half of children ask to read the instructions carefully (41.9%, N=233), a small part of children ask to look up the rules for them on the Internet (3.6%, N=20). Approximately one third of children solve problems on their own in case of difficulties: they invent their own rules - 33.8% (N=188) of children, watch videos with rules on their own - 2.2% (N=12) of children. 11.5% (N=64) of children are not ready to solve arising problems, they just stop playing.

The vast majority of parents do not limit the time their child spends playing board games in any way, 68.7% (N=382) of parents indicated that their child plays whenever they want to, and 40.8% (N=227) reported that children play in their free time. About half of the children play board games when someone in the family has time (56.5%, N=314) or with their friends (18.3%, N=102). Some parents resort to board games when they need something to occupy their child (10.1%, N=56), when they need their child to be quiet (3.4%, N=19), and when parents are tired and want to rest (2.9%, N=16).

It seems interesting that almost half of the children who play board games are not interested in buying new variants (59.8%, N=333). One third of children ask their parents to buy them no more than once every 1-2 months (31.9%, N=177).

Considering the issue of playing board games together with children, it is impossible not to notice that a significant majority of parents participate in the game directly (76.6%, N=426) or join the game when the child needs help (17.8%, N=99). A small proportion of parents participate in the game indirectly - they do not play, but watch their children play (2.3%, N=13), and only a small proportion prefer children to play independently (3.2%, N=18).

The next block of questions focused on game applications on digital devices. According to the data obtained, 70.1% (N=390) of the surveyed parents have preschool-aged children playing apps, while 29.9% (N=166) of parents responded negatively. The distribution of the data regarding the choice of digital devices for play is presented in Figure 2. The obtained data fully correlate with the results of surveys previously conducted on the basis of the Center for Interdisciplinary Studies on Contemporary Childhood MSUPE, according to which preschool children most often use a phone, tablet or computer (in descending order) [8].

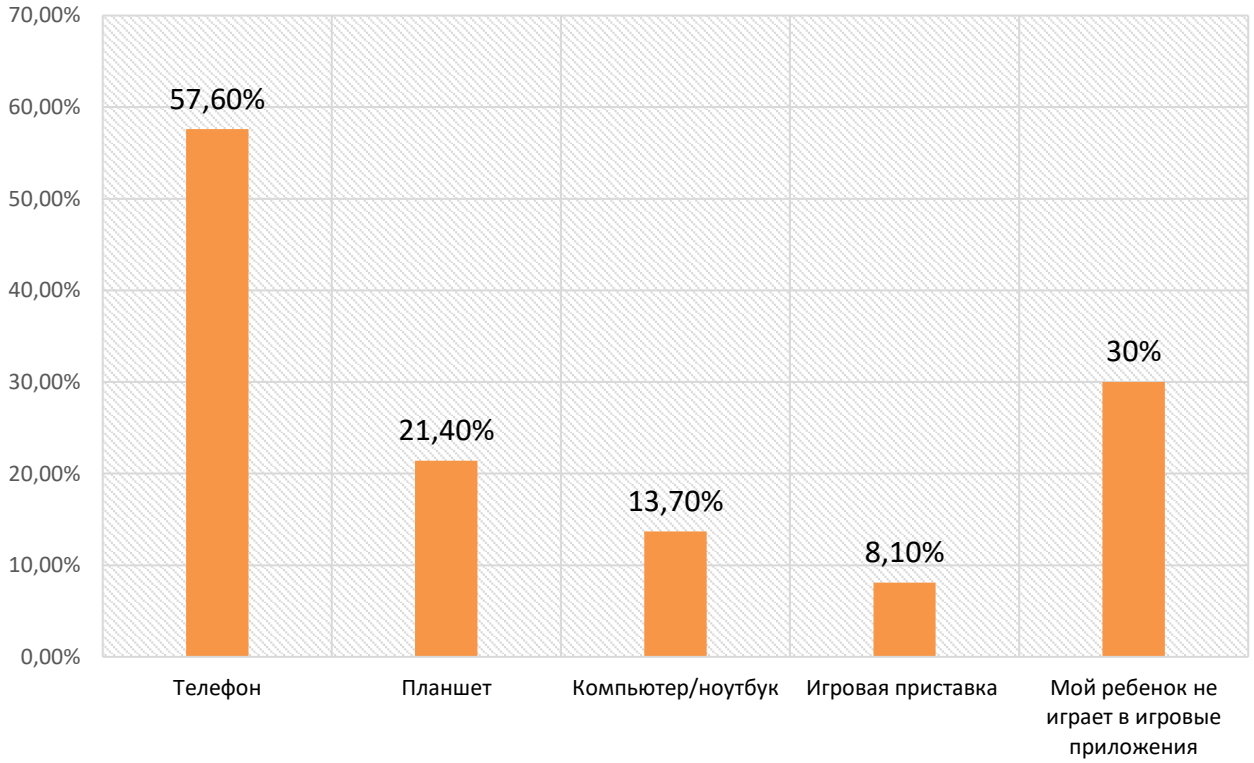

Figure 2. Digital devices on which children play game applications (N=556)

When asked about the average amount of time a child plays digital apps, parents' opinions were divided as follows:

- 22.1% (N=123) of children play every day;
- 19.4% (N=108) of children play 2-3 times a week;
- 15.8% (N=88) of children play once a week;
- 12.8% (N=71) of children play 4-5 times a week;
- 29.9% (N=166) of children do not play digital applications.

At the same time, on average, almost one third of preschool children spend about half an hour per day playing (27%, N=150), a quarter of children play between 30 minutes and 1 hour per day (24.8%, N=138), and some children play for 1-1.5 hours (9.5%, N=53). Children of 4.7% (N=26) of the parents surveyed spend about 1.5-2 hours playing digital applications, about 2-3 hours a day - 2.2% (N=12) of children and more than 3 hours a day played by 2% (N=11) of the respondents' children. In addition, a statistically significant relationship was found between the age of the child and the amount of time spent playing digital games, this applies to both the frequency of games per week ($r=0.26$; $p=0.000$) and the amount of play time per day ($r=0.15$; $p=0.01$). The results suggest that the older the child is, the more often he or she pays attention to game applications and spends more time per day playing them.

Most often parents note that children play digital applications more often on weekends, 40.1% (N=223) of respondents indicated this, almost twice as few parents do not make a

distinction between weekends and weekdays (20.5%, N=114). Some parents think that their children play more on weekdays (9.5%, N=53). The results of statistical processing showed significant differences in the choice of response categories when studying children's play activity in board games (Pearson's Chi-square=228.32; p<0.001) and digital applications (Pearson's Chi-square=112.71; p<0.001). Thus, it was found that board games were most frequently played by children on weekends (47.8%). The second most frequent answer was "play equally on weekdays and weekends" (32.2%). As for digital applications, children also most often play them on weekends (40.1%). At the same time, the second most frequent response was that children "do not play digital applications" (29.9%).

To compare the most frequent response categories for board games and digital apps, the non-parametric McNemar test for related samples was applied to test whether combinations of values of two categorical fields are equally likely. In other words, it was tested whether frequencies differed in the selection of the most popular response category when assessing children's play activity in the two conditions - playing board games and digital games. For this purpose, each type of response was coded on a "1"/"0" basis, where all responses "children play (board games/digital games) on weekends" were taken through the numerical indicator "1" and all other responses were taken through the indicator "0". The results of the analysis showed significant differences in the frequency of choosing this answer (McNemar's Chi-square=7.06; p<0.008) - that is, the choice of the answer category "children play on weekends" occurs more often in the case of evaluating board games compared to digital games. Significant differences were also established when comparing the frequencies in the choice of the answer "play both weekdays and weekends" - more often for board games (McNemar's Chi-square=20.25; p<0.001) and the answer "do not play" - more often it is chosen for digital applications (McNemar's Chi-square=75.17; p<0.001). No significant differences were found between the frequency of choosing the answer "play on weekdays" when evaluating board games and digital games (McNemar's Chi-square=0.65; p<0.42). Thus, when evaluating board games versus digital games, parents are more likely to select two categories of responses, "play on weekends" and "play both weekdays and weekends." Both answers are chosen to a greater extent in the case of board games.

As in the case of board games, parents consider age appropriateness (57.4%, N=319), game plot (39%, N=217) and visual design (19.1%, N=106) to be the most important parameters when selecting game applications. However, nearly one-third of respondents reported that their child does not play digital games at all (28.96%). The results of comparing the selection frequencies of the three most popular answers showed significant differences in favor of board games. That is, when evaluating board games versus digital games, parents are more likely to focus on factors such as age appropriateness (McNemar Chi-Square=22.39; p<0.001), story (McNemar Chi-Square=56.25; p<0.001), and visual design (McNemar Chi-Square=55.64; p<0.001). Only 12.1% (N=67) of surveyed parents rely on teachers' opinion when choosing digital games, which is 2 times less than in the issue of choosing board games (24.3%). In addition, when choosing game applications for children, parents rely on such

indicators as application rating (8.3%, N=46) and number of downloads/installations (4.7%, N=26). Relying on the child's choice to install the apps they ask for is 18.5% (N=103) of surveyed parents.

Unlike board games, among digital games, creative applications (various coloring books, applications for drawing, creating a new appearance, etc.) are the most popular; 41.4% (N=230) of children have them installed. Next, applications for memory and attention development (31.7%, N=176), entertainment applications (32%, N=178), applications for reaction speed development (23.6%, N=131) and applications teaching reading and counting skills (17.6%, N=98) were distributed by frequency.

When asked about the number of game apps installed on children's digital devices, the majority of parents reported 1 to 3 apps (37.2%, N=207), slightly fewer parents reported 4 to 6 apps (19.2%, N=107), and about a quarter of parents reported that their child uses 7 or more game apps (23.6%, N=131).

The main trend in the child's behavioral strategies when encountering difficulties with digital apps is the same as the trend found with board games: half of the children seek help from parents (49.6%, N=276). 8.6% (N=48) of children deal with the rules on their own. 6.5% (N=36) of children are not ready to cope with difficulties and stop playing immediately, and 5.4% (N=30) of children ask their parents to download another game (Fig. 3).

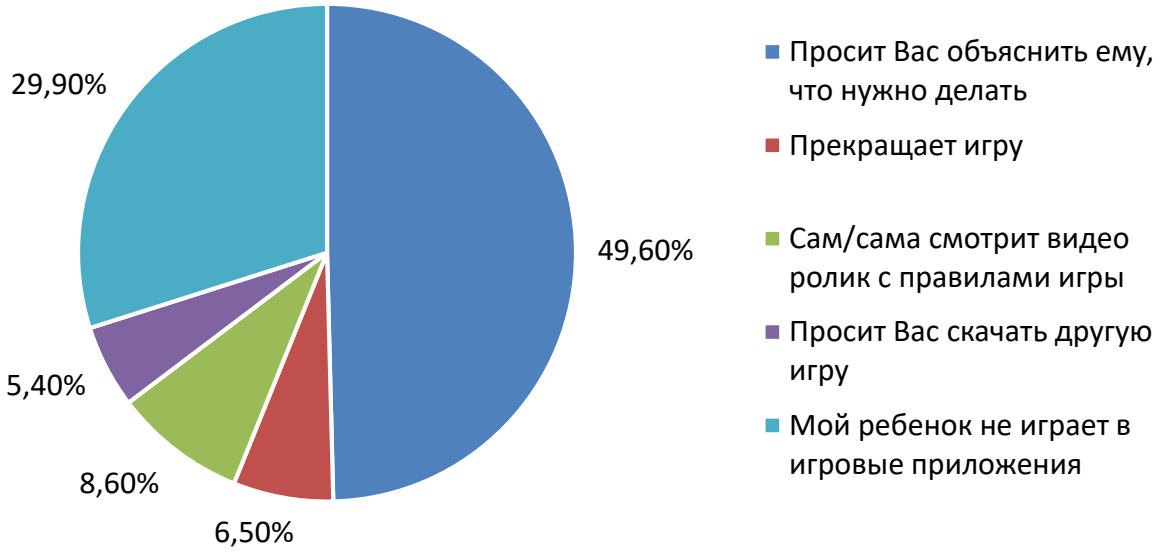

Figure 3. Distribution of answers to the question “When a child has difficulties in the game application, he/she...” (N=556)

Unlike board games, play in digital games tends to be restricted by parents. Children are more likely to play board games when they want to - this was the most frequently chosen answer by parents (68.7%). As for digital games, only 16.2% of all respondents admitted that children can play them

whenever they want. The frequency of choosing this answer is clearly different when comparing the two types of play activity (McNemar's Chi-square=255.06; p<0.001). Thus, more than two-thirds of all parents surveyed do not seek to limit their child's time playing board games, it can be assumed that board games are a more preferred pastime for children from the parents' perspective. In addition, 29% of respondents admitted that they only allow their child to play digital games when they have free time, while in the case of board games, 40.8% of parents also chose this response category. Statistical analysis also showed significant differences in the frequency of choosing this answer in the case of board games and digital apps (McNemar's Chi-square=20.59; p<0.001).

The least popular response categories regarding board games were as follows: “plays when they need to occupy the child” (10.1%), “to keep the child quiet” (3.4%), “when children are tired and want to rest” (2.9%), and “as a method of encouragement” (0.4%). As for digital apps, these response options are chosen more often by parents. Thus, 21.4% of all respondents allow their child to play digital applications to keep them quiet, 16% of parents let them play when they want to occupy their child with something. In turn, another 11.7% prefer to give digital apps to relax, and 11.9% use them as encouragement.

It is also characteristic that children are significantly less likely to play game apps with their friends (6.7%, N=37) than they are to play board games (18.3%, N=102). Thus, the survey results show that board games are more conducive to the development of cooperation in the process of playing together, while digital games are more often an individual activity.

The distribution of answers to the question about how often a child asks parents to install a new game application or buy a new board game is also noteworthy (Table 2).

Table 2

Frequency of Choice of Answers to the Question About How Often Children Ask to Buy a New Board Game or Install a Digital Application (N=556)

Board Games		**Digital Applications**	
1 every 2 months or less frequently	14%	1 every 2 months or less frequently	10,3%
1 a month	16%	1 a month	11,7%
1 every 2 weeks	2,5%	1 every 2 weeks	4%
1 a week	2,2%	1 a week	5,3%
4-5 times a week	0,3%	4-5 times a week	2%
2-3 times a week	0,2%	2-3 times a week	5,6%
Every day	1,3%	Every day	1,6%
My child plays, but does not ask to buy a new board game himself/herself	56,5%	My child plays, but does not ask to install a new app himself/herself	28,8%
My child does not play board games	7%	My child does not play game apps	29,9%

The data in the table show the frequencies in the choice of each category response when evaluating the question about asking children to buy a new board game and/or install a digital app. The results of the statistical treatment showed significant differences in response category choices for board games (Pearson's Chi-square=1411.52; p<0.001) and digital apps (Pearson's Chi-square=422.88; p<0.001). It is important to note that in both cases, the most common response is that the child does not ask to buy the game/install the app. Moreover, parents are more likely to choose this response in the case of board games than digital apps (McNemar's Chi-square=31.11; p<0.001). At the same time, the least frequent answer in relation to board games characterizes the child's request to buy him/her a game 2-3 times a week (0.2% of respondents answered). When comparing the frequency of choosing this answer in the case of board games and digital applications, we obtained significant differences in favor of the latter (McNemar Chi-square=28.03; p<0.001). That is, according to parents, the child much more often asks to install a digital application (2-3 times a week) than to buy a board game. With regard to the other indicators, no significant differences could be found. Thus, the overall results show that the majority of respondents state that children do not ask them to buy a new board game or install a new digital application.

Parents surveyed indicated that among the apps their children use are analogs of board games (21%, N=117) or similar to them (21%, N=117). Another third of parents reported that the installed game applications are fundamentally different from board games (28.2%, N=157) (Fig. 4).

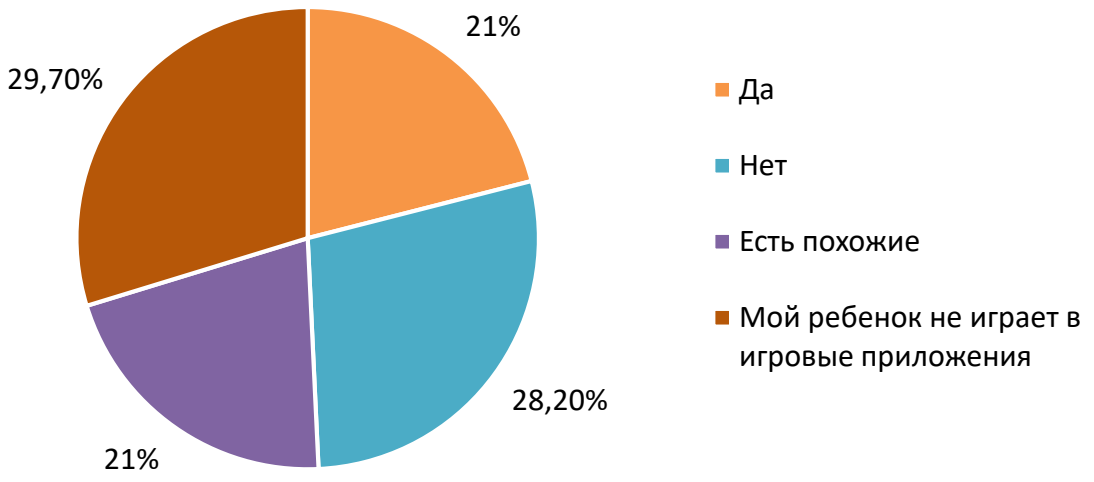

Fig. 4. Distribution of answers to the question “Are there analogs of board games among the installed game applications?” (N=556)

It is noteworthy that unlike board games, in which parents are most often directly involved, digital applications are most often played by children independently or under parental supervision.

The results of statistical processing showed significant differences in the choice of response categories with regard to board games (Pearson's Chi-square=823.64; $p<0.001$) and digital applications (Pearson's Chi-square=162.49; $p<0.001$). Thus, in the case of board games, the majority of respondents admit that they play together with their children (76.6%), while digital applications are played together with the child only by 10.6% (on the same device) and 2.0% (on different devices) of respondents. Thus, according to parents, children show more autonomy in case of using digital apps.

Discussion

The results obtained seem to be very interesting, primarily because there are not many studies currently in the scientific literature that have been targeted to compare board games and digital games.

We managed to find several works comparing the influence of digital and board games on the development of self-regulation and executive functions in preschool children.

Thus, the work of D.A. Bukhalenkova et al. presents a theoretical review on the topic of preschoolers' self-regulation development in games of different types [1]. Based on the analysis of studies, it is concluded that digital games can provide rapid development of a skill, but the effect will not be lasting in time. The author attributes the lack of a lasting effect to the fact that a child during a digital game is often alone with the gadget and does not interact with peers or adults. Board games can be used to practice skills, but unlike most digital games, they are played in small or large groups. Games with rules vary in complexity and the instructions or rules that players must follow. That is, they place different demands on a child's working memory. Games with rules, compared to digital games, can utilize a wide variety of self-regulation components in a variety of combinations and forms. In addition, games with rules have high motivational characteristics: they usually have winners and losers, and the game process itself is fun and excitement [1].

Two studies by A.N. Veraksa et al. [24; 25] examine the influence of different types of games on executive functions - processes that provide arbitrary control over thoughts and actions. Executive functions include working memory, switching between tasks, and inhibition. The results of the first study [24] showed that playing digital games affected all executive functions: switchability, auditory working memory, visual working memory, and others. The performance of these characteristics as well as behavioral and cognitive inhibition improved significantly. Board games affected switchability, auditory working memory, and visual-spatial memory [24]. The second study [25] monitored the stability of the results described in the first article: 4 months after the completion of the first experiment, a retest was conducted. The results of the analysis showed a decrease in the digital game group's scores on cognitive flexibility, verbal and visual working memory, etc. In other words, digital play does not lead to a lasting improvement in cognitive flexibility and working memory and does not seem to promote systemic changes in children's development. Rather, it trains individual mental processes without qualitative restructuring of mental structures [25].

The present study allows us to supplement the already available empirical data collected on a Russian sample regarding the use of digital and board games by preschoolers, as well as parental strategies of interaction with children in the context of board and digital games.

Conclusions

The analysis of the survey results shows that for Russian parents the most important criteria for selecting both board games and digital applications are age appropriateness, game plot and visual design. However, when choosing board games, parents are guided by these parameters much more often than when choosing digital games. At the same time, a significantly smaller number of parents follow the recommendations of teachers when choosing game applications than when choosing board games. In addition, parents more often take into account the majority opinion, focusing on such parameters of applications as rating and number of downloads/installations.

According to the findings, parents are more likely to limit the time children spend on digital games, considering board games to be a more preferred pastime for children. At the same time, parents are much more likely to use digital apps as a means of monitoring their child's behavior as well as a method of encouragement.

The presence of a fairly large number of apps similar to board games indicates that children prefer the interactive format of traditional board games. When faced with difficulties in board or digital games, children in most cases seek help from their parents. Interestingly, when encountering problems in the process of board games, children are significantly more likely to make attempts to figure things out on their own, coming up with their own rules or looking up instructions on the Internet.

Overall, the findings suggest that the majority of Russian parents practice different strategies when organizing board games and digital games. Parents are significantly less likely to be directly involved in digital games, allowing children to play independently or under their supervision. In contrast, in board games parents are actively involved in the process of playing together. The data obtained allow us to confirm the hypothesis put forward in the study about the existence of differences in the use of digital and board games.

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The Relationship Between Video Game Characteristics and the Individual Psychological Traits of Students

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This article presents a study that aims to identify the relationship between the characteristics of video games and the individual psychological traits of students. The study involved 203 people (87% women; M = 19.39 years; S.D. = 2.25), all of whom were first and second year students of the Moscow State University of Psychology and Education. The following research methods were used: a specially designed questionnaire aimed at assessing video game preferences and emotions experienced in the gaming process, J. Raven's Advanced Progressive Matrices, the Structure of Temperament Questionnaire by I.N. Trofimova and V.M. Rusalov. The study revealed that the most popular video game genres among the students are the «information games» and «action games». "Time-killers" was the least popular genre. The study also provides results indicating that there is no correlation between the preferred video game genre and temperament traits. A link is suggested between game mechanics and gaming time as well as indicators of emotional state in the gaming process.

Keywords: video games, computer games, video game genres, temperament, abstract intelligence, individual psychological characteristics of students.

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В данной статье представлены материалы исследования, целью которого В данной статье представлены материалы исследования, целью которого является выявление взаимосвязи характеристик видеоигр и индивидуально-психологических особенностей студентов. В исследовании приняли участие 203 человека (87% девушек; M=19,39 лет; SD=2,25) – учащиеся первых и вторых курсов Московского государственного психолого-педагогического университета. В качестве методов исследования использовались: специально разработанный опросник, направленный на оценку видеоигровых предпочтений и испытываемых во время игры эмоций, и опросник структуры темперамента И.Н. Трофимовой и В.М. Русалова. В результате исследования определены наиболее популярные жанры видеоигр среди студентов: игры информации и игры действия. Наименее популярным жанром являются «таймкиллеры». Также в исследовании приводятся результаты, указывающие на отсутствие связи между предпочитаемым жанром видеоигр и чертами темперамента. Выявлены взаимосвязи между игровыми механиками и временем за игрой, а также показателями эмоционального состояния в процессе игры.

Ключевые слова: видеоигры; компьютерные игры; жанры видеоигр; темперамент; абстрактный интеллект: индивидуально-психологические особенности студентов.

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Introduction

Nowadays, the world of video games has become an integral part of many adolescents' and young men's lives, having a significant impact on their psyche and behavior. The development of technology and the availability of a variety of gaming platforms have led to a variety of genres and characteristics (aspects) of video games, raising questions about the impact of these games on the individual-psychological characteristics of those who play. According to RPORC data for 2022, about 23% of Russians are fond of video games, with the main audience of players being young people [0]. Among 18-24-year-olds, up to 56% of people are fond of video games, of which 20% play daily. Compared to older groups, only 10% of Russians aged 60 and older play video games. It is noted that interest in this form of entertainment also depends on gender: men play 2.6 times more often than women (34% vs. 13%). Clearly, we are seeing an upward trend, and the number of adults and children who are passionate about video games is only growing.

A number of researchers have noted that the prevalence of video games has a significant impact on the socialization of children and adolescents [0; 0; 0]. In this regard, psychologists face the task of studying the effect of the influence of video games on the psyche of players. Thus, the attention of many authors has been directed to the relationship between computer games and the cognitive sphere: a study [0] found that video games of the “action” genre contribute to the increase of memory and attention resources in players. More recent work [0] suggests improvements in visual-spatial reasoning. Schemes for integrating video games into the educational process, particularly in conjunction with other multimedia learning formats, have also been described [0].

Another question that is often asked in connection with the proliferation of video games is their impact on the emotional sphere, in particular, the impact of violent and violent games on the level of aggression [0]. Despite evidence that suggests correlations between playing certain types of video games and a person's level of aggression [0], there are other findings regarding the emotional state of players - increased enthusiasm and the role of positive motivation and psychological well-being have been noted [12]. In addition, there are known cases of video games being used as a tool for emotional regulation [0; 0], which also indicates a positive emotional impact of a certain type of video game on the player.

It is also important to note that questionnaires and post-interviews remain the leading methods in research on the influence of video games on the mental state of adolescents and young men. However, studies using psychophysiological diagnostic methods are gaining popularity now, including the oculography method [0], which allows for a more accurate assessment of situations of social interaction during the game and individual styles of activity during the game.

Summarizing, we can note that there is no unambiguous opinion among researchers about the nature of the influence of aggressive video games on the emotional state of the subjects. Also, most studies consider video games in the aggregate, without differentiating them into genres, which can have different effects on the psychological state of players. Therefore, our study focuses on examining several research objectives:

1. To identify the actual preferences of students in choosing video games of different genres;
2. To evaluate the nature of the relationship between various characteristics of video games (genre and specific game mechanics) and individual-psychological characteristics of students.

Study design and methods

Sample. The sample consisted of 203 people (87% girls; M=19.39 years; SD=2.25) - first- and second-year students of Moscow State University of Psychology and Education in the following areas of training: psychology and pedagogical education. The students participated in the study in 2023 as part of their academic practice.

The following ***methods*** were used in the study:

1. To identify popular video games, we used a specially designed questionnaire aimed at assessing video game preferences and emotions experienced during the game. The questionnaire required respondents to answer eleven questions, including the following: “Do you play video games?” (yes/no), “At what age did you start playing video games?” (scale from 2 to 25 years old), “How much approximate time per day do you spend playing video games?” (scale from “less than 1 hour” to “more than 6 hours”), and “Do you require serious effort to stop playing?” (7 gradations from “never” to “almost always”). Study participants were also asked to list the names of the games they usually play and to indicate from a suggested list the degree of emotional reaction they experience while playing.
2. I.N. Trofimova and V.M. Rusalov's (2011) questionnaire [0; 0] was used to investigate the temperament structure. This questionnaire is a self-assessment test that measures 12 behavioral characteristics that are the most biologically determined, stable in human development and relatively independent of the situation. The results of this questionnaire were used to analyze indicators that define the following traits: motor-physical endurance, motor-physical pace, thrill-seeking, communication endurance (ability to communicate for long and/or intense periods of time), communication pace (speed of speech and reading), empathy (sensitivity to the feelings and motivations of others), plasticity (ease of switching from one activity to another and adaptability to changes in instructions or situations), tendency to think, optimism, impulsivity (initiating and initiating behavior), and temperament. Temperament was assessed to investigate the contribution of stable individual traits to game preferences.

Methods of mathematical processing: Pearson's correlation coefficient, Student's t-test for comparison of average indices between independent samples, one-factor analysis of variance with repeated changes (nonparametric variant - Friedman's test), Wilcoxon test (with Bonferroni correction for multiple comparisons) were used for mathematical processing of

data. All counts and statistical procedures were performed using R software version 4.3.0 (R Core Team 2020) (lavaan, psych, rstatix, emmeans, afex packages).

The battery of techniques was assembled into an online psychodiagnostic system using the survey and test building website "psytoolkit.org" [16; 17]. The respondents' task in our study was to complete this battery of techniques. Respondents completed this battery of techniques face-to-face in groups of no more than 10 people in order to ensure their physical comfort. Respondents were also asked to decide for themselves whether they wanted to be tested or otherwise practiced. The average time to complete the methods was 32 minutes.

This article is part of a large-scale study as part of the work of the Youth Lab investigating cognitive and communicative processes in adolescents and young men while solving game and learning tasks in digital environments of the MSUPE. In this article we focus exclusively on the data related to the relationship between video game characteristics and individual-psychological characteristics of students.

Results

The results of the study present data on: 1) the most popular video game genres among students; 2) the relationship between video game genres and students' individual psychological differences; 3) the relationship between game mechanics and students' individual psychological differences.

Our first step was to process a questionnaire aimed at assessing video game preferences and emotions experienced while playing. Table 1 shows the percentage of subjects who do and do not play video games. According to the questionnaire, 67.5% of the respondents play video games regularly.

Table 1

Number of Those Who Play and Do Not Play Video Games

Regularly Play Video Games	67,5%
Practically Do Not Play Video Games	32,5%

Table 2 presents data showing how much time respondents spend playing video games each day. One-third of respondents reported playing video games for less than one hour. This response was the most common in our sample. It is also worth noting that over twenty percent of respondents indicated that they play video games one or two hours a day. Thus, the majority of the sample spends up to two hours a day playing video games.

Table 2

Data on Time Spent Playing Video Games Per Day

Answer Option	**Percentage of Respondents**
Less than 1 hour	42,34%
1 hour	21,17%

2 hours	19,71%
3 hours	11,68%
4 hours	2,19%
5 hours	1,46%
6 hours	1,46%
More than 6 hours	0,00%

Table 3 presents data on how often respondents require serious effort to stop playing. Almost a third of the respondents (32.85%) rarely have difficulty in stopping the game. However, 5.84% of the respondents indicated that they often or almost always have difficulty in stopping the game. Thus, we can hypothesize that only 5.84% of the respondents in this sample may have a tendency to develop video game addiction.

Table 3

Data on the Distribution of Subjects' Responses to the Question of How Often They Require Serious Effort to Stop Playing Games

Answer Option	Percentage of Respondents
Never	19,71%
Almost never	27,01%
Rarely	32,85%
From time to time	14,60%
Often	4,38%
Almost always	1,46%
Always	0,00%

We would like to remind you that while filling out the questionnaire, we also asked respondents to name the video games they usually play. The respondents named a total of 589 games, including games that were named more than once. We identified the three most popular games among students as “The Sims” (38 mentions), “Genshin Impact” (26 mentions), and “Minecraft” (25 mentions). Due to the large number of games named by the respondents, there is a need to categorize them. To divide games into genres we used the modern classification of Kirizleev, which is based on the actions that the player most often does in a video game [0]. According to the classification, the following genres were identified:

1. Information games (actions most frequently occurring in a video game - collecting and processing information) (185 mentions);

2. Action games (the actions most frequently encountered in a video game are movement and manipulation of objects) (188 references);

3. Control games (the actions most commonly found in a video game - where various thinking activities of players are involved, such as planning, controlling, managing) (96 mentions) (96 mentions);

4. “Time-killers” (mobile games in which it is impossible to identify the most frequent action, as they are most often based on only one repetitive action. For example, this group included clicker games, in which the only game action is clicking on the screen. The main purpose of these games is to spend free time) (88 mentions);

5. Traditional games (chess, sudoku, board games - which are “translated” into the format of electronic applications) (32 references).

The number of mentions of games of different genres was counted for each subject. One-factor analysis of variance with repeated measures (non-parametric variant - Friedman test) showed significant differences between the number of mentions of different game genres (see the figure). Pairwise comparisons by Wilcoxon test (with Bonferroni correction for multiple comparisons) revealed that the most frequently mentioned genres were action games and information games. The most rarely mentioned genres by respondents were “time-killers”. Consequently, respondents most often preferred to play video games that require the use of cognitive abilities (such as concentration, attention allocation, reaction speed, and so on) to manipulate objects and/or process information. It is also worth noting that no correlation was found between players' temperament characteristics and their preferences in game genres or specific video games.

Our second step was to analyze the emotions that respondents experience while playing the game. It is worth noting that the respondents were asked to choose an emotion from a suggested list. This list included the following emotions: joy, excitement, excitement, anger, happiness, surprise, interest, irritation, boredom, satisfaction, apprehension. Confirmatory factor analysis was used to process data on the degree of expression of specific emotions experienced by the subjects while playing video games. According to the results of the factor analysis, emotions are combined into 4 groups: positive emotions (joy, happiness), negative emotions (anger, irritation, apprehension, boredom), intellectual emotions (interest, surprise, satisfaction) and excitement (excitement, thrill). The model showed a good fit to the data ($\chi 2(35)=47.5$, $p=0.139$, CFI=0.957, RMSEA=0.043 (90% CI 0.00-0.077).

Our next step was to conduct a correlation analysis to assess the relationships between video game genres and individual-psychological differences of the respondents, including individual indicators of their gaming activity obtained during the processing of the questionnaire of video game preferences and emotions experienced during the game (e.g., game duration, frequency of activation of serious efforts to stop the game, etc.). The following results were obtained:

1. There are no significant correlations between the frequency of mentioning a video game of a certain genre and temperament traits;

2. Frequency of mentioning information game has a significant positive correlation with intellectual emotions (r=0.26 at p≤0.001), positive emotions (r=0.21 at p≤0.01), time playing (r=0.20 at p≤0.01), and efforts to stop playing (r=0.18 at p≤0.05);

3. Control games have a significant negative relationship with experienced arousal during the game (r=-0.24 at p≤0.01).

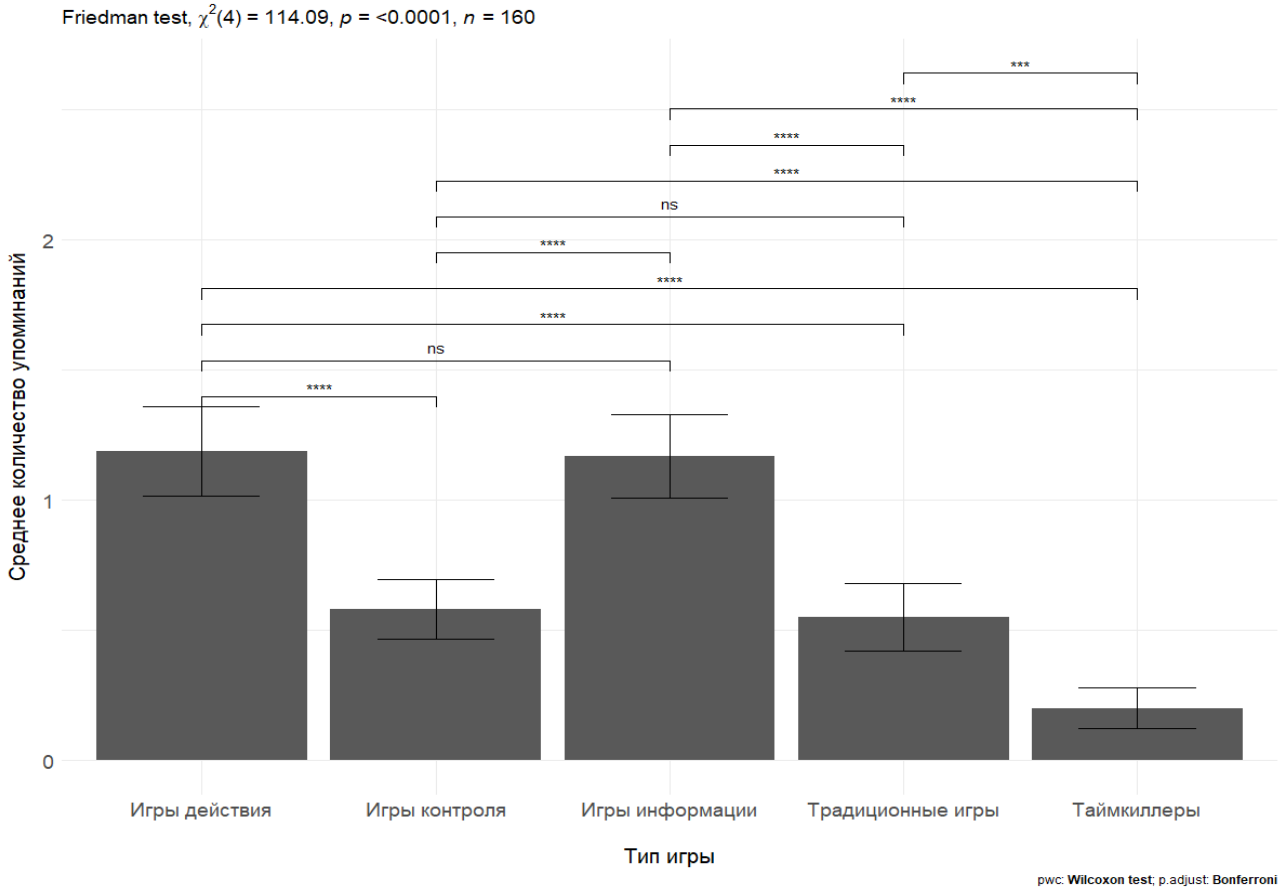

Fig. Comparative Analysis of the Popularity of Video Games of Different Genres (Kirizleev Classification, 2021).

Thus, we can conclude that the frequency of preference for the genre of video games is almost not related to individual-psychological differences, but is determined by other factors, which will be discussed further. It is also worth noting that information games are positively associated with activation of emotions (intellectual and positive) while negatively associated with efforts to stop playing, which in turn can lead to an increase in time spent playing and be a predictor of video game addiction. Information games were the only genre that showed a positive relationship with effort to stop playing.

Relying on the classification presented in the work of N. Yee [20], we divided video games according to the leading game mechanics of a video game. Game mechanics is a set of rules

and ways of player's interaction with the game world, i.e. these are the main game actions that the player performs [15]. It is also worth noting that in one video game there can be many game mechanics, so in this case we consider the main game mechanics (those actions to which the whole game is reduced). Thus, we have:

1. Achievement games (video games in which the "achievement" component is prevalent. The player needs to develop his character, improve his characteristics, improve his game result, and compete with other players) (297 mentions);

2. Social games (video games in which the "society" component prevails. The player needs to build relationships and interact with in-game characters and/or other players, most often playing with them in a team) (73 mentions);

3. Immersion games (video games in which the "immersion" component is prevalent. The player has to play a role, customize his character, and explore the in-game world) (219 mentions).

We also divided the games into two groups: violent games (games with violent actions) and non-aggressive games (games without violent actions). This division of games was carried out with the help of expert assessment of psychologists working in the field of research of video games and their influence on psychological characteristics. The expert psychologists had to analyze the gameplay of the video games named by the respondents and identify those video games whose gameplay contains violent actions of any intensity. Three expert psychologists participated in the study and discussed each game together in order to categorize it into one or another group. Thus, we found that out of 589 games named by the respondents, 261 were aggressive and 328 were non-aggressive.

Next, a correlation analysis was conducted to assess the relationship between the group data and the individual psychological differences of the respondents, including those obtained with the help of a questionnaire of video game preferences and emotions experienced during the game.

By conducting Pearson correlation analysis, we obtained the following results:

1. Achievement games have a significant direct correlation with the time spent playing ($r=0.28$ at $p\leq0.001$);

2. Aggressive games have a significant direct relationship with time spent playing ($r=0.34$ at $p\leq0.001$) and tendency to think (as a temperament trait) ($r=0.27$ at $p\leq0.01$);

3. Immersion games have a significant direct relationship with positive emotions ($r=0.21$ at $p\leq0.01$).

In connection with the above, we can conclude that the choice of video game genre is almost unrelated to individual-psychological differences, but some game mechanics contribute to the increase of time spent playing a video game (achievement games and aggressive orientation). It is also worth noting that the only temperament trait that showed an association with game mechanics was the tendency to think.

We also used Student's t-test, which showed that the propensity to think is higher in those who play aggressive-oriented games than in those who do not play them ($t=-3.35$ at

$p \leq 0.001$). This result may be explained by the fact that aggressive video games require the player to think through tactics and strategies and to orient quickly in a situation of uncertainty. It also showed that thinking stamina ($t=-2.96$ at $p \leq 0.01$) and empathy ($t=-2.68$ at $p \leq 0.01$) are higher in those who play immersion games than in those who do not play them. In turn, this may be explained by the fact that in immersion games players need to analyze a lot of information, including that related to their character's history.

Conclusions

The study focused on the relationship between video game characteristics and individual-psychological differences of students. The data were evaluated both on the total sample and with the division of respondents into groups depending on the video games they prefer to play. The results we obtained allow us to draw the following conclusions.

First, the most popular video game genres among students are information games and action games. These genres of video games require players to make quick decisions, including in situations of uncertainty, activation of cognitive functions and a certain degree of emotional immersion in the game process. The least popular genre is “time-killers”, i.e. video games with low cognitive and emotional load. Accordingly, we can conclude that students prefer video games that do not just allow them to spend their free time, but set cognitively challenging tasks for the player and evoke an emotional response (intellectual or positive).

Secondly, we found that there is no correlation between the preferred genre of video games and temperament traits, i.e. the preference for the genre of video games is determined by factors other than individual psychological traits. One such factor is game mechanics. We have shown that there are game mechanics that contribute to the increase of time spent playing (“achievement games” and aggressive games), which in turn can be a predictor of video game addiction.

Let us remind you that achievement games are games in which the “achievement” component is predominant, i.e., the player needs to constantly develop and/or compete with other players. We can assume that it is the ability to track one's development in the game, combined with the emotional excitement of the game, that contributes to the increase in time spent playing a video game.

Also, the only video game genre that has shown a relationship with effort to stop playing is information games. However, it is premature to conclude that this genre of video games is the most conducive to video game addiction, as this result may be related to the depth of immersion in the video game world and the intellectual and positive emotions experienced while playing.

The results obtained are, of course, intermediate in nature. However, we can already say that it is not the genre of the video game itself that has an impact, but the game mechanics that are embedded in the game. It is the game mechanics that show a connection with individual-psychological differences of respondents and determine the time spent playing the game.

The areas of further research could be a more in-depth study of video game mechanics. The multi-genre nature of modern video games is ensured by the inclusion of a wide variety of video game mechanics in the gameplay of a video game. The identification and study of specific video game mechanics opens up a wide range of possibilities not only for expert evaluation of video games, but also for assessing their impact on specific groups of players. It also seems to us that in the future we should focus on studying the short-term impact of video game mechanics on the emotional and cognitive state of respondents, which will allow us to obtain data, for example, on which video game mechanics facilitate the learning process, and which, on the contrary, hinder it.

Limitations of the Study

It is also worth noting the limitations of this study, which relate to the specifics of our sample. The study sample consists of first and second year students of MSUPE, and 87% of respondents are girls. In this regard, it is logical to assume that there may be gender specificity that affects the preference for video games with certain characteristics. Also, it cannot be overlooked that despite the fact that first and second year students participated in the study, there may be specificity related to individual-psychological differences of respondents entering to study to be a psychologist. Thus, we believe that the task of future research should be to specify the studied effects in the light of the study of gender differences and professional-educational characteristics of players in the relationship with their individual-psychological differences and video game characteristics.

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Features of Recognizing Images of Figures of Different Colors and Sizes by Children 3-4 Years Old Using a Noise Background

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The study is aimed at analyzing the training of early preschool children to recognize visual stimuli of different colors and sizes, based on a method we are developing, in an ordinary situation and with the introduction of acoustic interference, i.e., spoken noise presented through headphones. The materials of two empirical studies on a sample of 3–4-year-old children (3.5±0.43) from a kindergarten in St. Petersburg, of whom there were 13 girls and 17 boys, are presented. The study was conducted with an interval of 2 months. The findings showed that children took longer to recognize and select stimuli of different colors and made more perseverative errors, compared to recognizing and selecting stimuli of different sizes. The introduction of acoustic noise significantly impaired task success, which was particularly pronounced when identifying irritants from colored stimuli. It is suggested that difficulties in identifying colored stimuli may be due to the absence of a sensory reference marked by a word, and the acoustic noise slowed sensorimotor response.

Keywords: early preschool age; visual stimuli; color; size; errors; latent period; speech interference.

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Особенности опознавания изображений фигур разного цвета и размера детьми 3-4 лет с использованием шумового фона

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Работа направлена на анализ обучения детей раннего дошкольного возраста опознанию зрительных стимулов разного цвета и разного размера на основе разрабатываемой нами методики в обычной ситуации и при введении акустической помехи – речевого разговорного шума, подаваемого через наушники. Представлены материалы двух эмпирических исследований на выборке детей 3-4 лет (3,5±0,43) детского сада Санкт-Петербурга, из которых было 13 девочек и 17 мальчиков. Исследование проведено с интервалом в 2 месяца. Полученные данные показали, что для опознания и выбора стимулов разного цвета детям требуется больше времени, и они допускают больше персеверативных ошибок, в сравнении с опознанием и выбором стимулов разного размера. Введение акустического шума значительно ухудшило успешность выполнения задания, что особенно отчетливо проявилось при идентификации раздражителей из цветных стимулов. Высказывается предположение, что затруднения в опознании цветных стимулов могут быть обусловлены отсутствием сенсорного эталона, обозначенного словом, а акустическая помеха тормозила сенсомоторную реакцию.

Ключевые слова: ранний дошкольный возраст; зрительные стимулы; цвет; размер; ошибки; латентный период; речевые помехи.

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Introduction

The primary attributes of an object are shape, size, volume, and color. The rudiments of these concepts develop in ontogenesis as the brain matures and as the child gains experience in the process of developing the second signal system and interacting with real objects throughout the preschool years [5; 21]. Children with normal development of higher nervous activity recognize invariant visual images regardless of the modification of their parameters [1; 3; 10]. However, even children of 5-6 years old often have difficulty recognizing and selecting complex figures [14].

Children with intellectual disability, attention-deficit/hyperreactivity disorder (ADHD) face great difficulties in mastering incoming information due to unstable attention, weak inhibitory control over behavior, etc. [6; 11; 13; 16; 19], which requires cognitive training.

The development of learning technologies is associated with an increase in the number of child users of modern gadgets, when a child's incompletely formed brain has to perceive and process many competing streams of visual and auditory information, identify useful information and, comparing it with images (phenomena) stored in its long-term memory, make the right decision [17; 18; 22]. A serious problem becomes “noise pollution” leading to fatigue, decreased attention and performance.

In previous work [4; 9] it was shown that 3-4 year old children identify single-colored images of geometric figures of different sizes faster and with fewer errors compared to multicolored images of geometric figures of the same size.

At the moment we have not found any studies on the influence of acoustic noise on the perception of visual information by children of younger preschool age, which is relevant if children actively use computer training programs.

The following **task** was set: to find out how acoustic noise (spoken speech), put through headphones, affects the process of teaching 3-4 year old children to recognize visual stimuli of different colors of the same size and the same color of different sizes when working with this method.

Materials and Methods

Thirty children (13 girls and 17 boys) aged 3-4 years (3.5±0.43) with normal vision and hearing attending kindergarten No. 81 in St. Petersburg participated in the study with written parental permission. Classes were conducted in a separate room, where geometric figures of either the same size but different colors or different colors of the same size were presented sequentially on a touch screen monitor at its illumination of 475 lux, located at an arm's length of the child [4; 9].

In the first part of the study, 5 image blocks of 3 triangles of blue, red, or yellow color of different sizes (large 10*10 cm, medium 5*5 cm, and small 3*3 cm) were randomly presented each. The informative feature was the large triangle. Then five blocks of 3 equally sized (5*5 cm) images of circles, triangles, and squares of different colors were given. The informative feature was a stimulus of red color. Having recognized the image on the screen, the child touched it with a finger and “took” it to a conditional “house”.

It was preliminarily determined whether children knew the names of colors and geometric figures. The order in which the stimuli were presented did not affect the quality of learning. Learning was carried out by trial and error. The reinforcement was a smiling smiley face appearing on the monitor screen, which was accompanied by a sound signal (laughter). During one session 40 stimuli were presented to the child.

Two months later, the study was repeated with the same children, but the stimuli were presented against the background of “polyphony noise” of speakers (3 male and 3 female voices), presented through household headphones, with an average fundamental frequency of 164.7±53.5 Hz, with a temporal and spectral structure close to the speech signal (Fig. 1). The noise level corresponded to the average level of spoken speech (45 dB).

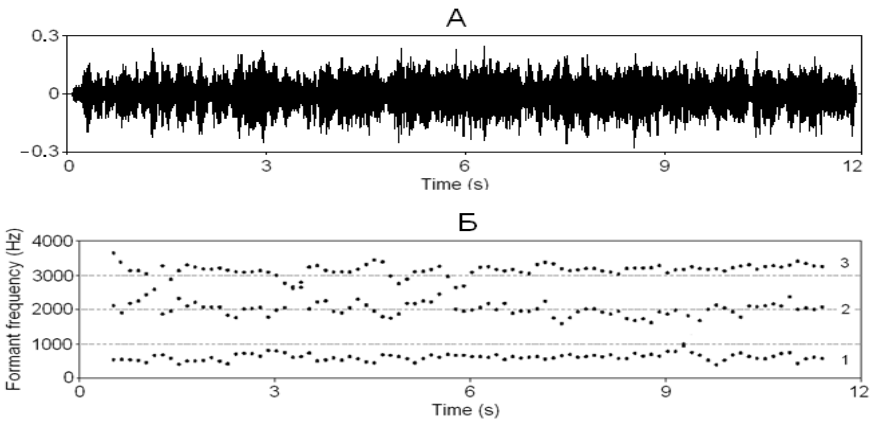

Fig. 1. Characteristics of acoustic interference - “speech noise”: A - oscillogram of the signal; horizontally - time (in sec.), vertically - amplitude (in conventional units); B - dynamic spectrogram of the signal; contours of changes of three main spectral maxima (formants) throughout the signal are shown; horizontally - time (in sec.), vertically - frequency (in Hz)

The number of wrong choices (number of errors) and the latent period (LP) of the response (time from the moment the stimulus appeared on the monitor screen to the moment the child's finger touched it) were evaluated. Results were processed using two-factor analysis of variance (2-way ANOVA) for related samples.

Results

A two-factor analysis of variance (2-way ANOVA) was used to statistically analyze the obtained data (number of errors and latent response period in selecting geometric figures by 3-4 years old children) as a function of the “trait” and “noise” factors. The results are shown in Fig. 2 and 3.

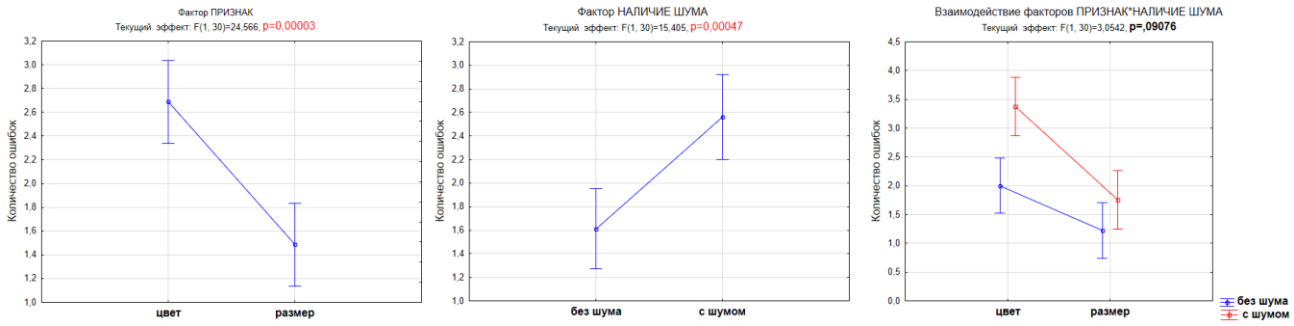

Fig. 2. Average number of errors depending on different attributes (color/size) and presence/absence of noise (vertical bars indicate 95% confidence interval)

For the number of errors, analysis of variance revealed a significant effect of the feature factor (color vs size) as well as the presence of noise factor (no noise vs with noise) on the number of training errors ($F(1,30)=24.57$, $p<0.001$; $F(1,30)=15.41$, $p<0.001$ respectively). There was no interaction of these factors ($F(1,30)=3.05$, $p=0.09$), but there was a tendency to increase the number of errors against noise when recognizing images of geometric figures of different colors of the same size compared to stimuli of figures of the same color of different sizes.

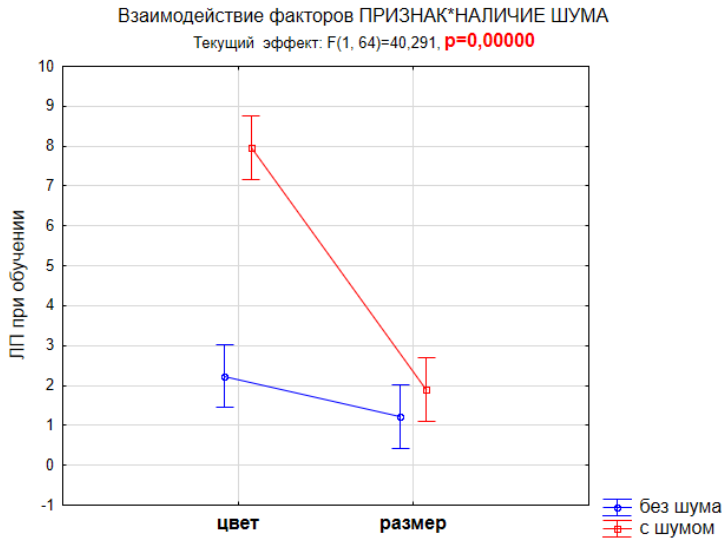

Fig. 3. Mean latent period (LP) of the response (sec.) depending on different features (color/size) and the presence/absence of noise (vertical bars indicate 95% confidence interval)

Time analysis of stimulus selection during training showed a statistically significant interaction between the factors “trait” and “noise” ($F(1,64)=40.29$, $p<0.001$). The introduction of acoustic (conversational) noise during stimulus selection for the feature “color” significantly increased LP ($p<0.001$, Tukey's post hoc test criterion), but had no effect on LP during stimulus selection for the feature “size” ($p=0.64$, Tukey's post hoc test).

Discussion

Thus, the study confirmed the results of the previous work [4], which showed that identification and selection of colored stimuli of the same size is more difficult for 3-4 years old children than selection of the same-colored stimuli of different sizes. The introduction of acoustic noise in the form of conversational speech made it even more difficult to recognize stimuli of different colors and had almost no effect on the choice of stimuli of different sizes.

The results of the two studies, from our point of view, can be explained by the fact that color recognition requires the presence of a sensory reference stored in long-term memory and a mental image denoted by a word. The presence of verbal standards reflects the maturity of the child's central nervous system. Color, unlike size and shape, is not perceived tactilely, and the formation of the image of color occurs throughout the preschool period as a result of learning [19; 20]. At the same time, red color, activating the system of emotions, reduces the selectivity of attention [12]. At the same time, due to the ontogenetic immaturity of the brain, the child's ability to concentrate and momentarily switch attention from one action or process to another is weak. The introduction of acoustic interference additionally slows it down, which can be considered the cause of perseverative errors. The obtained results are confirmed in the works of other authors [11; 21]. At the same time, a number of studies have established age differences in the development of auditory selective attention when detecting target speech signals in preschool children [2; 7; 8] and shown that “speech noise” affects the success of learning [15].

Thus, the reason for the increase in the number of errors and inhibition of the visual-motor response could be a combination of the above factors. Taking into account that the conducted work is a pilot

one and is aimed at creating a game setup for training selective attention and formation of verbal images, it is supposed to continue the study with the introduction of musical noise.

Conclusions

As a result of this experiment, it was revealed that the introduction of acoustic conversational noise had a significantly greater effect on task performance when identifying different-colored geometric figures of the same size, significantly increasing the number of errors and the LP time of the motor response. However, noise had less effect when identifying and selecting geometric figures of the same color but different size, which is probably due to ontogenetic immaturity of the brain, weakness of attention switching processes, and lack of verbal images defining color.

The obtained data can be useful both for teaching younger preschoolers to recognize geometric figures and for creating optimal conditions in the group when conducting classes. The play method we are developing can be used for training the stability of attention and the formation of color sensory standards. This methodological approach, from our point of view, has great potential for a deeper interdisciplinary study of perceptual noise resistance, selectivity of attention.

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