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Dear Readers!

We are pleased to present the fifth issue of the journal "Psychological Science and Education" (No. 5–2025). This issue includes publications that address the most important aspects of the modern educational process and the development of human cognitive functions. They are organized into our two traditional sections: "Developmental Psychology" and "Educational Psychology," as well as a new section titled "Interdisciplinary Research of Cognitive Processes."

The section "Developmental Psychology" is opened by an article examining the role of teacher interaction styles and how they influence children's motivation to learn. The theme continues with the adaptation of the Russian-language version of the FIT-Choice Scale, a methodology for studying factors influencing the choice of a teaching profession, as well as a monitoring study of practices and resources of psychological services in Russian universities. Additionally, readers will learn about the features of inclusive dispositions among educators in general and special education institutions. The section concludes with studies on gender dynamics of self-efficacy and the mediating role of academic performance in English and mathematics among secondary school students in Indonesia.

The section "Interdisciplinary Research of Cognitive Processes" features studies on the adaptation of a metacognition scale from the DAACS self-regulation questionnaire and an analysis of interactions between adolescents and young men during joint problem-solving of academic tasks using eye-tracking technology.

In the "Educational Psychology" section, readers can find information regarding predictors of the application of moral prohibitions by university students in ethically challenging situations, along with an analysis of associated personal characteristics. Additionally, the section includes a bibliometric review of Russian research studies focused on professional self-determination.

We hope that the materials presented in this issue will be valuable to researchers, practitioners, and all those interested in contemporary trends in developmental and educational psychology.

The Editorial Board

EDUCATIONAL PSYCHOLOGY ПСИХОЛОГИЯ ОБРАЗОВАНИЯ

Научная статья | Original paper

Why do children want to learn? The role of teaching styles

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Abstract

Context and relevance. Teacher is a key factor in the educational process, and students' motivation largely depends on these relationships with the teacher and teachers' interaction style. **Objective.** The aim of the study was to study the associations between four characteristic teacher interaction styles and students' intrinsic motivation and academic achievement. In line with Self-determination theory and previous research, it was hypothesized that autonomy-supporting and structuring styles would be directly related to students' academic achievement in this subject, with intrinsic motivation being a mediator of this relationship. Conversely, it was assumed that controlling and chaotic styles would be inversely related to intrinsic motivation and academic achievement. **Methods and materials.** A correlational study was conducted using a sample of Russian eighth-grade students ($N = 1732$, $MA = 13,89$ years, $SD = 0,41$) to examine the contribution of Math teachers' interaction styles to students' intrinsic motivation, persistence, and academic achievement. Students described their teacher using the Situations in School Questionnaire, which assesses autonomy support, structure, control, and chaos as four main teaching styles. Intrinsic motivation for learning mathematics, as well as mathematics performance (Algebra and Geometry) and time spent on homework, were also measured. **Results.** Structural equation modeling showed that teacher motivating interaction styles — autonomy support and structure — were directly related to students' academic achievement, with intrinsic motivation acting as a mediator of this relationship. Chaos and control were inversely related to intrinsic motivation, while chaos was also inversely related to academic achievement. **Conclusions.** In accordance with the hypotheses, teachers (de)motivating interaction styles were identified that promote and hinder students' intrinsic motivation, persistence, and performance, suggesting the necessity to train teachers to use motivating strategies.

Keywords: teaching styles (autonomy support, structure, control, chaos), intrinsic motivation, academic achievement, self-determination theory

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Supplemental data. Datasets are available on request by e-mail: osn1@mail.ru

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Почему дети хотят учиться? Роль стилей взаимодействия учителей

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Резюме

Контекст и актуальность. Учитель — ключевое условие учебного процесса, и мотивация учащихся во многом зависит от отношений с педагогом, его стиля взаимодействия. **Цель** исследования состояла в выявлении связи четырех характерных стилей взаимодействия учителей с внутренней учебной мотивацией школьников и их достижениями. В соответствии с теорией самодетерминации и ранее проведенными исследованиями выдвинута **гипотеза**, что поддерживающий автономию и структурирующий стили будут прямо связаны с академическими достижениями школьников по этому предмету, а внутренняя мотивация выступит медиатором этой связи. С другой стороны, предполагалось, что контролирующий и хаотичный стили будут обратно связаны с внутренней мотивацией и академическими достижениями. **Методы и выборка.** На выборке российских школьников восьмых классов ($N = 1732$, средний возраст — 13,89 лет, $SD = 0,41$) проведено корреляционное исследование вклада разных стилей взаимодействия учителей математики с учащимися в их внутреннюю мотивацию, настойчивость и успешность. Школьники описывали своего учителя с использованием опросника «Ситуации в школе», оценивающего поддерживающий автономию, структурирующий, контролирующий и хаотичный стили преподавания. Кроме того, измерялась внутренняя мотивация к изучению математики (познавательная и мотивация саморазвития), а также успеваемость по математике и время, затрачиваемое на выполнение домашних заданий. **Результаты.** С помощью структурного моделирования показано, что мотивирующие стили взаимодействия учителя — поддерживающий автономию и структуриру-

ующий — прямо связаны с академическими достижениями школьников, а внутренняя мотивация является медиатором этой связи. Хаотический и контролирующий стили обратно связаны с внутренней мотивацией, хаотический стиль также обратно — с академическими достижениями. **Выводы.** В соответствии с выдвинутыми гипотезами выявлены стили взаимодействия учителей, способствующие и препятствующие внутренней мотивации, настойчивости и успешности учеников, из чего следует необходимость обучения учителей мотивирующим стратегиям преподавания.

Ключевые слова: стили преподавания (поддержка автономии, структура, контроль, хаос), внутренняя мотивация, академические достижения, теория самодетерминации

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Introduction

It is well-established that the quality of school students' motivation determines their level of academic achievement (Gordeeva et al., 2017; Howard et al., 2021), and motivation itself is largely dependent on the teachers' relationship with students and teachers' interaction style (Aelterman et al., 2019; Bureau et al., 2022). Research on effective strategies to support student motivation is particularly relevant in recent years, given its decline among modern school students.

This study is based on a model grounded in Self-Determination Theory, which includes four main interaction styles: two motivating styles — autonomy-supportive and structuring — and two demotivating styles — controlling and chaotic, each of which is further subdivided into two subtypes (Aelterman et al., 2019). This classification is based on the teacher's support of students' basic psychological needs for au-

tonomy and competence in different types of interactions, and these two needs are key conditions for intrinsic motivation and well-being. This approach has received robust empirical support and is widely applied in educational practice (Guay, 2022; Reeve, Cheon, 2021).

With an autonomy-supportive style, the teacher strives to understand students' interests and preferences to support their engagement in the learning process. They use inviting language ("let's try it this way") and avoid controlling statements (e.g., "you should /must listen to me carefully and do what I said"), offer opportunities for meaningful choice and decision-making, explain the rationale behind their requirements, and acknowledge negative feelings that arise during learning process. These behaviors contribute to satisfying the basic psychological need for autonomy, i.e., the desire to be the agent of one's own actions (Reeve, Cheon, 2021), which

leads not only to higher quality motivation but also to student well-being (Vite, Patall, Chen, 2024). In Russian education, the autonomy-supportive style has active proponents: it is described as a teaching style that supports a child's independence, initiative, and self-sufficiency (Tsukerman, Obukhova, 2024).

With a pronounced controlling style, students lose their sense of agency and ownership of the learning process, as the teacher actively pressures and controls them, forcing them to act and think in a single, "right/ correct" way, disregarding the child's opinion. Control manifests both at the behavioral level (demands for obedience using rewards, grades, and punishments) and at the level of feelings and personality (psychological control), using manipulation, threats, criticism, and appeals to shame. International research shows that, overall, teachers believe the autonomy-supportive style is more effective than the controlling style and tend to consider their own teaching style as more autonomy-supportive than controlling; however, they also believe the latter is more "normal" and easier to implement, which largely explains its high prevalence among teachers in various countries worldwide (Reeve et al., 2014).

Key features of the structuring style include setting clear expectations for desired behavior and outcomes, providing clear explanations on how to achieve them, offering constructive feedback during and after activities, and presenting clear assessment criteria (Patall et al., 2023). This style supports the need for competence (the desire to feel effective and capable), which, like the need for autonomy, is a source of intrinsic motivation (Ryan, Deci, 2017).

Teachers with a chaotic-permissive style demonstrate contradictory, vague, and inconsistent demands, without pro-

viding necessary feedback and support, often assuming the role of an observer. Thereby, they prevent students from understanding what needs to be done, how to develop their competence, and how to maintain confidence in their abilities, resulting in students' frustrated need for competence.

Personal and motivational factors of teachers' interaction styles. Previous research indicates that teachers do not randomly choose and use a particular interaction style. Specifically, it has been shown that the autonomy-supportive style is associated with openness to experience and agreeableness, while the controlling style is linked to authoritarianism (Reeve, Jang, Jang, 2018). More personally mature teachers, with higher levels of responsibility, resilience, and developed systemic reflection, tend to use more constructive interaction styles (autonomy-supportive and structuring), whereas teachers with lower levels of these traits tend to use controlling and chaotic styles (Gordeeva, Sychev, 2024).

A meta-analysis has shown that teachers' autonomy-supportive style correlates with higher autonomous motivation for teaching and less pronounced controlled motivation, i.e., they enjoy the process of teaching children and interacting with them, feeling a sense of vocation (Slemp, Field, Cho, 2020). Considering all four styles, it has been shown that autonomy-supportive and structuring interaction styles are associated with teachers' autonomous motivation, while chaotic and controlling styles are associated with controlled motivation (Aelterman et al., 2019).

Consequences of interaction styles are of the greatest interest. It has been shown that students who perceive their teachers as practicing autonomy-supportive and structuring styles have

significantly higher autonomous motivation (for the subject), academic self-regulation, deeper learning strategies, planning, monitoring, and perseverance (Aelterman et al., 2019). They generally rate their teacher and teacher's communication style more highly, are willing to recommend them to others, and continue learning in their class the following year. Conversely, students who perceive their teachers as prone to controlling and/or chaotic styles had more pronounced controlled academic motivation and amotivation, were unwilling to recommend them, and did not want to continue learning with them (Aelterman et al., 2019).

A longitudinal study showed that the perceived teacher interaction style at the beginning of the school year predicted the dynamics of the quality of adolescents' (grades 7-8) academic motivation at the end of the year. By the end of the year, there was a significant decrease in the perceived motivating style (autonomy-supportive and structuring styles), as well as in autonomous motivation and satisfaction of basic psychological needs, alongside an increase in the chaotic style with a corresponding increase in the frustration of basic needs, controlled motivation, and amotivation. The results of multilevel growth curve analysis confirmed that the teacher's motivating interaction style predicts growth in students' autonomous motivation, while the demotivating style (control + chaos) predicts students' controlled motivation and amotivation, while these associations are mediated by the satisfaction/ frustration of basic psychological needs (Cohen et al., 2023).

These results are of significant interest, as research consistently shows that students' academic achievements are reliably associated with high autonomous and low controlled motivation (Howard et al., 2021). However, this problem has not been stud-

ied comprehensively. Two previous studies showed that academic motivation depends on teacher's interaction style with the class, but did not simultaneously demonstrate how different styles are related to academic achievement and student perseverance. Furthermore, in the study by Cohen et al. (2023), autonomy support and structure, on one hand, and control and chaos, on the other, were considered as a single variable. The aim of the current study is to determine the independent contribution of these styles to intrinsic motivation, homework time, and academic performance in a sample of Russian school students.

Hypothesis. In accordance with Self-Determination Theory and previous research, we hypothesized that the teacher's autonomy-supportive and structuring styles would be positively related to students' academic achievement in the subject taught by that teacher, and intrinsic motivation would mediate this relationship. On the other hand, controlling and chaotic styles would be directly or indirectly (through intrinsic motivation) negatively related to academic achievement.

In this study, the analysis of interaction style and motivation was conducted in the context of mathematics, as one of the two key subjects studied in schools and included in final assessments in Russia (OGE, EGE) and international assessments of student competency (PISA).

Materials and methods

The sample consisted of eighth-grade students ($N = 1731$, 55% girls, 43% boys, 2% did not specify gender). The average age was 13,89 years ($SD = 0,41$). Adolescents from 78 Russian schools participated in the online survey, which was anonymous.

The "Situations in School" questionnaire (Aelterman et al., 2019; Gordeeva,

Sychev, 2021), designed for teacher self-assessment of their interaction style, was used. However, in this study, the questionnaire was modified (as in one of the studies by N. Aelterman and colleagues (Aelterman et al., 2019)) so that the interaction style was assessed by the students. For example, item No. 1 "You communicate your expectations and norms of behavior for successful interaction" was changed to "The teacher communicates her(his) expectations and norms of behavior in the class to us", etc. The questionnaire assesses four main styles: Autonomy Support, Structure, Control, and Chaos. This version of the instrument showed high internal consistency coefficients (see Cronbach's α values for all scales in the table). The assessment of the four-factor model showed satisfactory fit to the data: $\chi^2 = 5345,23$; $df = 1074$; $p < 0,001$; SRMR = 0,084; RMSEA = 0,048; 90% CI for RMSEA: 0,047–0,049; PCLOSE = 0,993; N = 1721. Incremental fit indices (CFI, TLI) were not used because they are uninformative when the RMSEA of the baseline model is less than 0,158 (Kenny, 2020): in our case, it was 0,099.

To assess intrinsic motivation for learning mathematics, a scale of five items with five response options, based on the Academic Motivation Scale for school students (Gordeeva et al., 2017), was used. It includes main stem "I learn math because..." and 5 statements reflecting two main types of intrinsic motivation: cognitive (3 items, e.g., "I enjoy learning mathematics, it's interesting") and self-development (2 items, e.g., "I enjoy becoming more competent and knowledgeable in mathematics"). A one-factor model with a covariance between the items measuring self-development motivation showed satisfactory fit to the data: $\chi^2 = 37,99$; $df = 4$; $p < 0,001$;

CFI = 0,999; TLI = 0,998; SRMR = 0,004; RMSEA = 0,071; 90% CI for RMSEA: 0,051–0,092; PCLOSE = 0,042; N = 1709.

Homework time was assessed with the question "How much time per day do you usually spend on homework?" with six response options: "30 minutes", "1 hour", "1,5 hours", "2 hours", "3 hours", "more than 3 hours" coded with numbers from 1 to 6, respectively. Academic performance was assessed using final grades in algebra and geometry, reported by the children in response to the question: "What were your grades in algebra and geometry last quarter?".

Data analysis using descriptive statistics and correlations was performed in the R environment. Confirmatory factor analysis and structural equation modeling were conducted in Mplus 8 using the weighted least squares method with a polychoric correlation matrix (WLSMV). The statistical significance of mediated effects was assessed in Mplus using bootstrap analysis (5000 samples). The proportion of respondents with missing data did not exceed 5%; pairwise deletion of missing cases was used during correlation analysis and structural modeling.

Results

Descriptive statistics and correlations between the measured variables are presented in the table. As expected, intrinsic motivation for learning mathematics showed moderate positive correlations with autonomy-supportive and structuring styles and weak negative correlations with controlling and chaotic styles. At the same time, academic performance showed no significant correlation with the controlling style, while correlations with other styles were similar but smaller in magnitude. Homework time was weakly and positively correlated with intrinsic motivation,

academic performance, and the controlling style, and negatively correlated with the chaotic style.

To analyze the direct and indirect effects of teaching styles on academic performance, controlling for gender, a corresponding structural model was constructed. The final dependent variable was the average grade in algebra and geometry. Homework time, intrinsic motivation, and teaching styles were added to the model as its predictors. The factor of intrinsic motivation was formed from five items with one covariance between the items measuring self-development motivation and this factor was considered dependent on teaching styles. Homework time was considered dependent on teaching styles and intrinsic motivation. The model also included a coded "gender" variable with all possible effects on all other variables and factors. Covariances between adjacent teaching styles were allowed. After preliminary model evaluation considering modification indices, a covariance between the chaotic

and structuring teaching styles was also added, which is justified by theoretical notions of their opposite manifestations and consistent with previous research results (Gordeeva, Sychev, 2021; Aelterman et al., 2019). The model constructed in this way showed a good fit to the data (see figure): $\chi^2 = 163,08$; $df = 34$; $p < 0,001$; CFI = 0,997; TLI = 0,994; SRMR = 0,018; RMSEA = 0,047; 90% CI for RMSEA: 0,040–0,055; PCLOSE = 0,712; $N = 1693$.

The model indicates that intrinsic motivation shows the strongest relationship with mathematics performance. Homework time also makes a smaller, but statistically significant, positive contribution to performance; the contribution of the chaotic style is negative and weak.

A direct weak association with gender indicates a tendency towards slightly lower performance among boys. However, boys show more interest in mathematics and a greater desire to improve in it than girls, but they spend less time on homework, which in turn makes a statistically signifi-

Correlations of teaching styles with intrinsic motivation, homework time, and math performance

Variables	1	2	3	4	5	6	7	8
1. Autonomy support	—							
2. Structure	0,73***	—						
3. Control	0,04	0,19***	—					
4. Chaos	0	–0,26***	0,31***	—				
5. Intrinsic motivation to study mathematics	0,38***	0,41***	–0,08***	–0,22***	—			
6. Homework time	–0,04	0,03	0,06*	–0,11***	0,11***	—		
7. GPA in Algebra	0,09***	0,15***	–0,02	–0,15***	0,37***	0,17***	—	
8. GPA in Geometry	0,06**	0,13***	0	–0,13***	0,33***	0,15***	0,79***	—
9. Gender (0 — f, 1 — m)	0,16***	0,03	–0,07**	0,08**	0,12***	–0,24***	–0,05	–0,04
Mean	2,84	3,46	3,31	2,45	3,35	3,53	3,82	3,86
Standard deviation	0,85	0,74	0,65	0,76	1,13	1,52	0,72	0,73
Cronbach's alpha	0,89	0,85	0,77	0,84	0,95	—	—	—

Notes. Statistical significance: * — $p < 0,05$; ** — $p < 0,01$; *** — $p < 0,001$. Variable numbers in column headings correspond to row numbers.

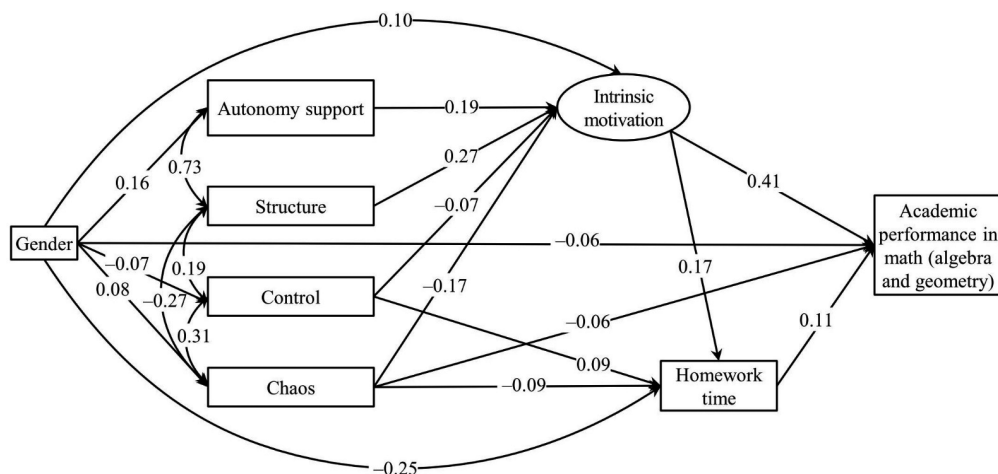


Fig. Structural model of the relationship between academic performance in algebra and geometry with homework time, intrinsic motivation, and teaching styles under the control of gender (0 — female, 1 — male): Insignificant paths and residuals are omitted for parsimony, all the coefficients are significant at $p < 0,05$

cant contribution to Math grades. The total mediated effect of gender on Math performance is very weak (0,002; $p \leq 0,05$) and opposite in direction to the direct effect, so pairwise correlations between gender and achievement show no statistical significance (see table).

Analysis of the mediated effects of interaction styles on Math achievement showed that the effects of the autonomy-supportive (0,08; $p \leq 0,01$), structuring (0,11; $p \leq 0,001$), and chaotic (-0,003; $p \leq 0,05$) styles are statistically significant. The controlling style showed no statistically significant effects on performance.

Discussion

Using a large sample of Russian school students, the proposed hypotheses were confirmed, showing that the perceived teacher's interaction style is a significant predictor of intrinsic motivation, perseverance, and academic achievement. In the context of motivation for learning math-

ematics, it was shown that autonomy-supportive and structuring interaction styles are indirectly related to students' academic achievement through intrinsic motivation. The teacher's controlling and chaotic interaction styles are negatively related to intrinsic motivation, and the chaotic style is negatively related to academic achievement. The obtained data align well with previous findings on the significance of teacher interaction styles for student motivation (Aelterman et al., 2019; Cohen et al., 2023) but provide a broader and more systemic picture of the effects of these styles on academic success and homework time as an indicator of perseverance.

In our study it was shown that autonomy supportive and structuring styles are closely related which supports previous research (Cohen et al., 2023), and which may favor considering a unified "supportive" interaction style in the future. Conversely, controlling and chaotic styles represent sufficiently independent types, arguing against merging them into a single demotivating

style variable, as was done in the study by Cohen et al. (2023). It was shown that the effects of Control and Chaos styles on intrinsic motivation, homework time, and performance differ substantially. Interestingly, the logic of distinguishing three interaction styles also aligns well with the three leadership styles identified by K. Lewin in the early 20th century and modern classifications of leadership styles within SDT (Huyghebaert-Zouaghi et al., 2023).

Regarding gender differences, the data from previous research on boys' greater interest in mathematics (Rodríguez et al., 2020) were confirmed in our study on Russian children. Nevertheless, despite their more pronounced intrinsic motivation for learning mathematics, boys do not show higher academic performance, and this phenomenon may be explained by their lower perseverance, which was measured as the time spent on homework.

Limitations and future perspectives

The main limitation of the study is its cross-sectional design, which does not allow for definitive causal conclusions about the role of interaction style in adolescents' motivation and success.

A prospect for future research is to analyze the influence and effects of teachers' teaching styles on other indicators of student academic motivation, such as goal setting and long-term perseverance, as well as on their school well-being. Another prospect involves the trainings development, including video materials, to teach Russian current and future teachers motivating teaching styles.

Practical implications

The study's results have clear practical significance, indicating the importance

of training teachers in motivating teaching styles, i.e., supporting autonomy, providing structure, and supporting children's competence as well as concrete strategies and behaviors that motivate their students. While the idea of structure and competence support is somewhat present in the discourse of Russian teachers (systematicity, consistency, praise), the idea of autonomy support is relatively new. Primarily, it includes offering a student opportunities for making own decisions (choice of tasks, solution strategies, level of difficulty, content, place to seat, etc.), explaining the rationale for requirements, showing respect and attention to the student's point of view, avoiding controlling language and threats related to grades and tests (Wang et al., 2024).

Conclusions

1. The results indicate that the perceived teacher's interaction style is a significant factor determining students' intrinsic motivation, persistence, and academic achievement.

2. Using a sample of Russian middle-school students, it was shown that perceived motivating (Math) teacher interaction styles (autonomy-supportive and structuring) are positively related to Russian students' academic achievement, and intrinsic motivation is a mediator of this relationship. Consequently, teachers should be specifically trained in such strategies that support children's desire to learn and do homework.

3. Demotivating teacher interaction styles (controlling and especially chaotic) negatively impact intrinsic motivation and academic achievement. Therefore, teachers should refrain from such practices.

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Tamara O. Gordeeva — the idea of the study, annotation, research planning, data collection, monitoring of the study, preparation of sections “Introduction”, “Discussion of results”, “Conclusion”.

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Гордеева Т.О. — идея исследования, аннотирование, планирование исследования, сбор данных, контроль за проведением исследования, подготовка разделов «Введение», «Обсуждение результатов», «Заключение».

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The authors declare no conflict of interest.

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Adaptation of the Russian-language version of the FIT-Choice Scale for studying factors influencing the choice of the teaching profession

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Abstract

Objective and relevance. This study investigates the adaptation and validation of the Russian-language version of the FIT-Choice Scale, a tool developed to assess the motivational factors influencing teaching career choices. This method is widely recognized internationally and has undergone extensive validity testing in various countries. **Methods and materials.** The study analyzed survey data from 310 first- and second-year students enrolled in teacher education programs, collected using the Russian-language FIT-Choice Scale questionnaire. Internal consistency was assessed via Pearson's correlation coefficient ($r_{xy} = 0,915$) and Cronbach's alpha ($\alpha = 0,933$). Validity was tested through correlational analysis with T.I. Ilyina's Motivation for University Studies inventory. **Results.** The Russian version of the questionnaire demonstrated high internal consistency and sufficient validity. Factor analysis revealed a 10-factor structure, and confirmatory factor analysis (PLS-SEM model) indicated model fit: SRMR = 0,074; RMSEA = 0,078; CMIN/df = 2,892; $\chi^2 = 3603,978$; IFI = 0,82; NFI = 0,711; CFI = 0,818; PNFI = 0,689; PCFI = 0,753. **Conclusions.** The FIT-Choice (Factors Influencing Teaching Choice) Scale proved suitable for the Russian sample, exhibiting high reliability and validity. The adapted version's factor structure was more concise than international counterparts: the original 18 scales were reduced to 10, with some items excluded due to insufficient discriminant validity or low factor loadings. The finalized instrument comprises two parts with a total of 49 items, offering a tailored tool for assessing career choice motivations in Russian educational contexts.

Keywords: career choice motivations, teaching profession, validation, methodology, assessment, expectancy-value theory

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Адаптация русскоязычной версии методики изучения факторов выбора педагогической профессии FIT-Choice Scale

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Резюме

Актуальность и цель. Актуальность исследования обусловлена необходимостью изучения факторов, влияющих на выбор молодыми людьми педагогической профессии, и отсутствием стандартизированного и специализированного инструментария. Целью настоящего исследования выступила проверка возможностей использования для изучения факторов выбора педагогической профессии на российской выборке опросника FIT-Choice Scale, который имеет широкую известность за рубежом и прошел неоднократную проверку на валидность в разных странах. **Методы и материалы.** Материалом исследования стали результаты опроса 310 студентов 1–2 курсов, получающих педагогическое образование, с помощью русскоязычной версии опросника FIT-Choice Scale. Степень внутренней согласованности проверялась с помощью коэффициента корреляции r_{xy} Пирсона и коэффициента альфа Кронбаха. Проверка методики на валидность осуществлялась путем корреляционного анализа с полученными данными по методике «Мотивация обучения в вузе» Т.И. Ильиной. **Результаты.** Русскоязычная версия опросника имеет высокую степень внутренней согласованности ($r_{xy} = 0,915$, $\alpha = 0,933$) и достаточный уровень валидности. Факторный анализ позволил выявить 10-факторов, подтверждающий факторный анализ (модель PLS-SEM) показал следующее соответствие данных предполагаемой структуре: SRMR = 0,074; RMSEA = 0,078; CMIN/df = 2,892; Chi-square = 3603,978; IFI = 0,82; NFI = 0,711; CFI = 0,818; PNFI = 0,689; PCFI = 0,753. **Выводы.** Методика FIT-Choice Scale («Факторы выбора педагогической профессии») подтвердила свою пригодность и для российской выборки, показав высокую внутреннюю согласованность и валидность. Факторная структура методики оказалась более лаконичной по сравнению с зарубежными аналогами: из 18 шкал исходной методики в российской версии сохранены 10, часть пунктов были исключены из опросника в связи с их недостаточной дифференцирующей силой или низкими нагрузками по факторам. Полученный вариант методики содержит две части, в которые входят совокупно 49 пунктов.

Ключевые слова: мотивы выбора профессии, профессия учителя, валидизация, методика, диагностика, теория ожиданий и ценностей

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Introduction

The problem of teacher shortage is currently relevant for most regions of the Russian Federation. A pertinent research direction is the study of factors influencing young people's choice of the teaching profession. This is evidenced by the increasing number of publications in recent years dedicated to both theoretical aspects of this problem and the results of empirical studies, which require a valid and reliable instrument.

However, a wide variety of methods are currently used for data collection: author-developed questionnaires (Bakina & Yaremtchuk, 2023; Korshunova & Beresneva, 2021); methods for studying academic motivation (Arkhipova et al., 2022); methods for studying the motivational-need sphere (Grushetskaya et al., 2024); tests of general professional readiness (Shchelina et al., 2024); and non-specific methods for choosing the teaching profession, reflecting motives for career choice in general (Moskalenko, 2024), career values (Kremen & Kremen, 2023), types of professional orientation (Dzhiga & Komarovskaya, 2023), and preferences in choosing a type of profession (Shchelina et al., 2024). This diversity of approaches to studying the factors behind the choice of the teaching profession does not allow for the generalization of data obtained by different researchers from different groups.

Meanwhile, in foreign psychology, the FIT-Choice ("Factors Influencing

Teaching Choice") questionnaire has gained widespread recognition (Watt & Richardson, 2007). Long-term research results using this methodology are presented on the project page: <http://www.fitchoice.org>. The project has gained international recognition, with the methodology being tested in various countries: Albania (Agaj et al., 2023), Iran (Eghtesadi, 2021), Korea (Kim et al., 2021), Serbia (Simic et al., 2021), China (Wang et al., 2024), and others. Researchers emphasize the high validity of the FIT-Choice methodology. The objective of the present study is to examine the applicability of the FIT-Choice Scale for studying the factors behind the choice of the teaching profession in a Russian sample.

The FIT-Choice methodology is based on Social Cognitive Career Theory (SCCT) (Lent et al., 1994) and Expectancy-Value Theory (Wigfield & Eccles, 2000). The theory is based on concepts such as self-efficacy (an individual's beliefs about their abilities, a set of convictions related to specific performance indicators in an activity), expected outcomes (personal beliefs about the consequences of certain behaviors), and personal goals (the intention to engage in a specific activity or achieve a certain outcome). Expected outcomes are formed through diverse experiences of direct and observational learning (Lent et al., 1994).

Expectancy-Value Theory explains the reasons for choosing a particular activity: attainment value (the importance for a person to perform a task at a high level), intrinsic value (the enjoyment a person derives from performing a task), utility value (the awareness of the benefits gained from a particular choice of activity), and cost (the "price" to be paid for a particular activity choice, manifested in emotional and time expenditures, limitations, etc.) (Wigfield & Eccles, 2000). Research also shows that the choice of a professional path depends not only on the presence of certain values but primarily on the expectation of success that, in the students' opinion, will be achieved in the activity.

The structure of FIT-Choice (Watt & Richardson, 2012) includes the following blocks: social influences on career

choice (positive learning experience in the role of a student, support for career choice by the social environment, dissuasion from others regarding the career choice); perception of task demand (the degree of difficulty and demand of the profession) and task return (social status, salary); intrinsic career value as interest in pedagogy and the desire to be a teacher; social utility value as the opportunity to influence the development of children and adolescents, enhance social justice, make a social contribution to societal development, and work with children and adolescents; personal utility value as the opportunity to spend time with family, the ease of finding a job, including when moving to another location; self-perceptions (perception of one's own abilities to teach children); and the motive of choosing teaching as a fallback career (Fig. 1).

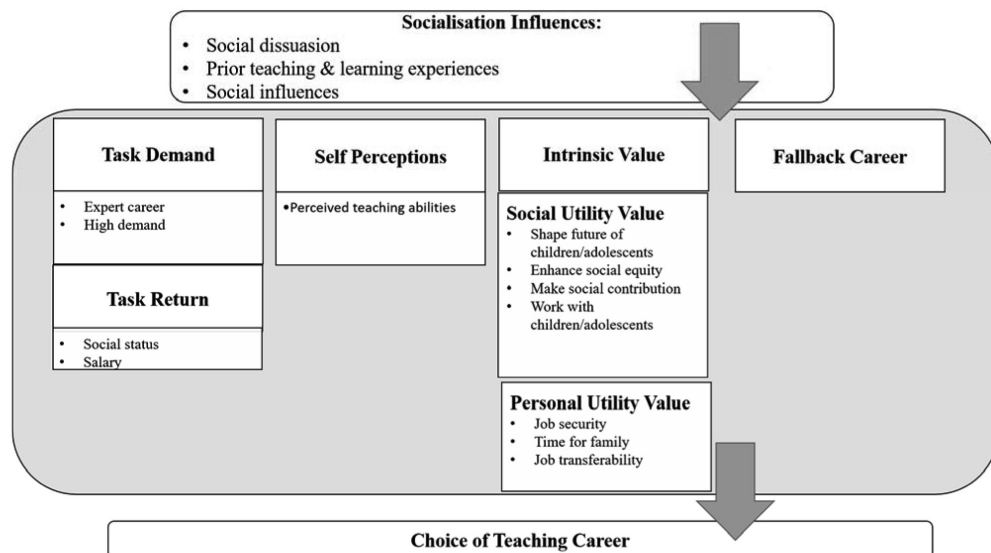


Fig. 1. Theoretical Model of the FIT-Choice Scale

Materials and methods

The English version of the FIT-Choice Scale questionnaire includes three parts of test items: B1-B54 (items directly assessing motives for choosing the teaching profession), C1-C15 (items reflecting respondents' opinions about the teaching profession), D1-D6 (items assessing the respondent's satisfaction with their choice of the teaching profession and negative reactions from their social environment). The original test comprised 58 items, with agreement with each rated on a seven-point scale.

The adaptation process of the FIT-Choice Scale questionnaire included the following stages: translation and pilot testing, assessment of item difficulty, examination of the questionnaire's factor structure, testing of internal consistency, validation, and construction of test norms.

Questionnaire translation was carried out independently by four psychologist proficient in English. The translated texts were compared, and the versions that best reflected the semantic content of the test items were selected. During translation, the last two parts (C and D) were combined under a common instruction for presentation. Items in part B were rated on a scale from 1 ("not at all important") to 7 ("extremely important"), and items in parts C and D were rated on a scale from 1 ("strongly disagree") to 7 ("strongly agree").

Pilot testing was conducted on a sample of 55 students pursuing education in the field 44.03.01 Pedagogical Education (bachelor's level) across different specializations. The testing aimed

to check the correspondence of the proposed formulations to the students' ideas about the reasons that prompted them to choose the teaching profession. After filling out the questionnaire, students were invited to suggest changes to the wording of the methodology items if necessary. The absence of suggestions indicates the correctness of the translation and its relevance to the respondents' experience.

Subsequent stages of methodology standardization were carried out on a sample of 310 first- and second-year students, of which 75 were receiving secondary vocational pedagogical education (based on 9 years of schooling), 224 were studying in the bachelor's program field 44.03.05 Pedagogical Education with two specializations, and 11 were in the master's program field 44.04.01 Pedagogical Education (master's level). Data on the sample are presented in Table 1 and reflect the general distribution of students in a pedagogical university. The survey was conducted using Yandex Forms, where all questions were mandatory, and respondents were guaranteed confidentiality.

Assessment of item difficulty was carried out by calculating the difficulty index for each statement to exclude items with low discriminant power. The difficulty index (I) was calculated using the formula: $I = M * 100 / 7$, where M is the arithmetic mean for the item. To examine the factor structure of the questionnaire, principal component analysis (PCA) with Varimax rotation, performed in STATISTICA 10, and confirmatory factor analysis (PLS-SEM model), performed using SmartPLS

Table 1

Standardization Sample Characteristics (N = 310)

Level of Education	Gender	%	Average Age	Training Profiles
Secondary Vocational Education	жен. / female	93,4	16,9	Preschool Education, Primary School Teaching, Physical Education
	муж. / male	6,6	16,6	
Higher Education (Bachelor's Degree)	жен. / female	78,9	19,4	Geography and Biology, Foreign Languages, History and Social Studies, Mathematics and Physics, Primary Education and Russian Language, Russian Language and Literature, Technology and Computer Science, Physical Education and Life Safety
	муж. / male	21,1	19,8	
Higher Education (Master's Degree)	жен. / female	63,6	28,0	Innovative Technologies and Educational Design, Pedagogy and Educational Psychology
	муж. / male	36,4	28,8	

4, were used. Internal consistency was tested using the split-half method with Pearson's correlation coefficient and Cronbach's alpha. For validity testing, data from the obtained questionnaire scales were compared with T.I. Ilyina's "Motivation for University Studies" methodology (Pearson's r_{xy} correlation). The final stage was testing the obtained scales for normality and constructing test norms using the quartile range.

Results

The assessment of item difficulty showed (Yaremtchuk et al., 2025) that most items possessed sufficient discriminant power; however, two items (C7 "Teaching requires great emotional strain" and C11 "Teaching is hard work") were excluded from the test, as the difficulty index (I = 87,8) indicated a high degree of student agreement with these statements.

The remaining test items were subjected to principal component factor analysis with Varimax rotation, resulting in the identification of 10 factors reflect-

ing different groups of motives for choosing the teaching profession, collectively explaining 68,6% of the data variance.

The first factor explained 37,1% of the variance and integrated items from 5 scales of the English version: "Teaching Abilities," "Intrinsic Career Value," "Work with Youth," "Shape Future of Children/Adolescents," and "Make Social Contribution." The first two scales in the FIT-Choice model belong to the "Self-Perceptions" block, reflecting self-assessment of one's own abilities and desires. The combination of this block with scales from the "Social Utility Value" block in the factor structure indicates a less differentiated motivational structure for career choice among Russian students compared to data from other countries and may be related to the specifics of Russian culture, where individual self-perception is integrated with the assessment of one's capabilities and self-efficacy.

The second factor, explaining 6,2% of the variance, combined items from three scales related to part C (respondents'

opinions about the teaching profession): "Expert Career" (C10, C14, C15), "High Demand" (C2), and "Social Status" (C5). The first two scales belong to the general block "Task Demand," while item C5 "Teachers are bearers of high moral values" apparently reflects the specifics of modern Russian education, where the perception of the teacher as a model of morality has transformed from an indication of high teacher status into demands placed on them by society.

Factor 3 (5,4% of the variance) also included items from block C, but related to students' perceptions of salary (C1, C3) and social status (C4, C8, C9, C12, C13) of teachers. The semantic combination of scales corresponds to the "Task Return" block in the theoretical model of the questionnaire and indicates the rewards attracting people to the profession.

Factors 4-8 (explaining 5,0%, 3,8%, 2,6%, 2,4%, and 2,1% of the variance) coincided in content with the English version of the methodology, combining items into the scales "Time for Family," "Social Dissuasion," "Prior Teaching and Learning Experiences," "Social Influences," and "Social Utility Value."

The last two factors explain 2% and 1,5% of the data variance. Factor 9 was the only one that included variables with both high positive and high negative loadings. At one pole of the factor were items reflecting students' satisfaction with their choice of the teaching profession (D1, D3, D5), and at the other — items where students agreed that they ended up in teacher education by chance, considering teaching as a "fallback career" (B11, B35). The mutual repulsion of these vari-

ables indicates that if the career choice was a fallback option, dissatisfaction with the made choice is high. Since the methodology focuses on career choice motives, we named this scale "Choice of Teaching as a Fallback Career." When processing data, the values of items B11 and B35 are considered with direct values, and items D1, D3, D5 are inverted (R) into a reverse scale.

The tenth factor, combining items from the scales "Job Transferability" (B8, B45) and "Job Security" (B27), was named "Ease of Employment" by us. We believe this name better reflects the motivation of Russian students, unlike the foreign version, which is more focused on student mobility, their orientation towards frequent relocation, and movement both within one country and between countries.

Based on the factor analysis results, seven items with low factor loadings (B14, B20, B22, B31, B38, B48) or sufficiently high loadings on several factors simultaneously (B53) were excluded from the questionnaire.

To test the factor structure of the methodology, confirmatory factor analysis (PLS-SEM model) was used, performed with the SmartPLS 4 program, which showed the following model fit indices: SRMR = 0,074; RMSEA = 0,078; CMIN/df = 2,892; Chi-square = 3603,978; IFI = 0,82; NFI = 0,711; CFI = 0,818; PNFI = 0,689, PCFI = 0,753. The use of Cronbach's alpha coefficient reflects the consistency of items within the obtained questionnaire scales (Table 2).

As a result, we obtained the following factor structure of the questionnaire (see Fig. 2).

Table 2

Cronbach's Alpha values for the FIT-Choice subscales

Factor	Subscales	Cronbach's alpha
F1	Self Perceptions	0,950
F2	Task Demand	0,838
F3	Task Return	0,889
F4	Time for family	0,855
F5	Disuasion social	0,792
F6	Prior teaching and learning experiences	0,844
F7	Social influences	0,855
F8	Social Utility Value	0,910
F9	Fallback Career	0,322
F10	Job transferability	0,817

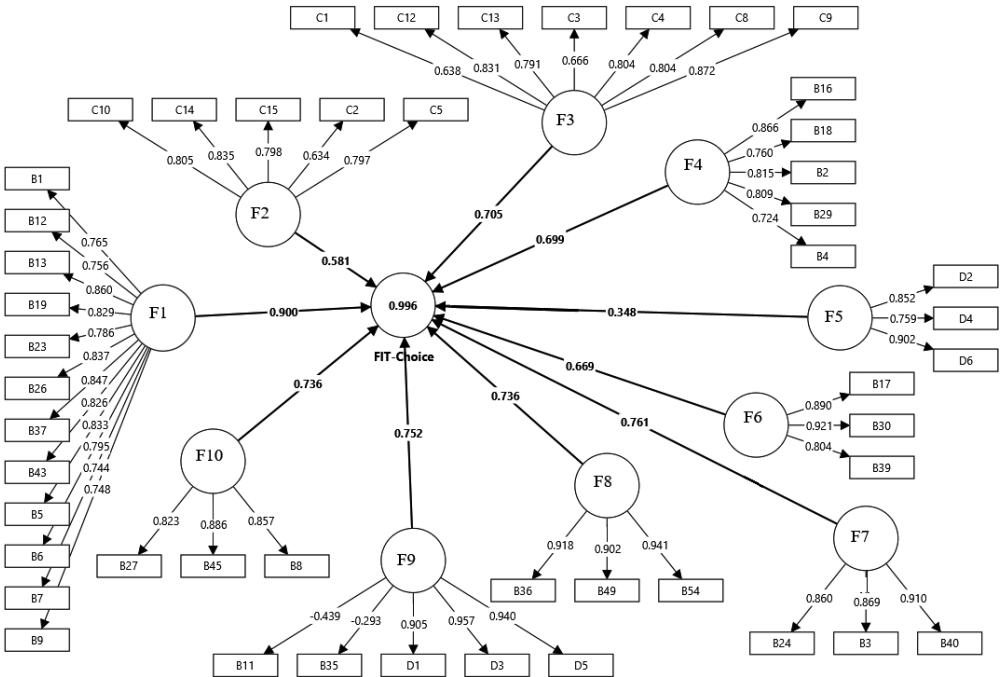


Fig. 2. Structure of the Russian version of the FIT-Choice Scale (Confirmatory Factor Analysis)

In the final version, we retained 49 items (Appendix), divided into two parts requiring different instructions. Since calculating scale scores involves a general summation of points for items

belonging to different parts, continuous numbering of items, common to part 1 and part 2, was used. Internal consistency of the questionnaire was tested using the split-half

method, dividing the test into two parts consisting of items with even and odd numbers. Consistency was checked using Pearson's correlation coefficient and Cronbach's alpha (Table 3). The calculations indicate a high degree of internal consistency of the methodology.

To test the validity of the questionnaire, the data obtained with it were compared with T.I. Ilyina's "Motivation for University Studies" methodology (Table 4). Correlation analysis shows significant relationships for almost all scales at $p \leq 0,01$, indicating the sufficient validity of the methodology.

Testing the scales for normality showed a predominant non-compli-

ance of the obtained distributions with the normal distribution, most often with a pronounced right-sided asymmetry. In this regard, the quartile range was used to construct primary norms for the scales.

Discussion

As a result of the testing, a number of test items were excluded from the methodology due to their low discriminant power and weak contribution to the substantive load of the factors. The questionnaire retained 49 out of 58 items from the version taken for adaptation. The obtained results show that instead of the 18 scales of the original methodology, grouped into six blocks, only 10 fac-

Table 3

Reliability metrics for the FIT-Choice Scale subscales

Statistical Criteria	Coefficient
r_{xy} -Пирсона / r_{xy} -Pearson	0,915
Альфа Кронбаха / Cronbach's alpha	0,933

Table 4

Correlations between FIT-Choice Scale subscales and Ilyina's Motivation Inventory (r_{xy} -Pearson)

FIT-Choice Scale Subscales	Ilyina's Motivation Inventory		
	Knowledge Acquisition Motivation	Professional Mastery Motivation	Diploma Obtainment Motivation
Self Perceptions	0,406**	0,538**	0,238**
Task Demand	0,307**	0,102	0,224**
Task Return	0,278**	0,426**	0,292**
Time for family	0,252**	0,384**	0,227**
Disuasion social	0,191**	0,217**	0,105
Prior teaching and learning experiences	0,182**	0,295**	0,168**
Social influences	0,323**	0,409**	0,184**
Social Utility Value	0,313**	0,393**	0,176**
Fallback Career	-0,374**	-0,601**	-0,231**
Job transferability	0,276**	0,425**	0,292**

** — $p \leq 0,01$.

tors are identified in the Russian sample (self-perceptions, task demand, task return, time for family, social dissuasion, prior teaching and learning experiences, social influences, social utility value, fallback career, ease of employment), constituting a general scale of motivational orientation towards pedagogical activity. At the same time, the obtained factors correspond to the theoretical model of the FIT-Choice Scale (Fig. 3) and can be logically divided into corresponding semantic groups.

The methodology showed high internal consistency of scales and items and sufficiently high validity.

Descriptive statistics data (Yaremtchuk et al., 2025) indicate that for Russian students, the most significant guideline in choosing the teaching profession is the task demand (high

professionalism and expert knowledge, high psycho-emotional load, high personal requirements), and important motivating factors are positive learning experiences in the role of a student, anticipation of ease of employment, and self-perception as capable of pedagogical activity, interested in this field, and believing in their ability to be successful in this activity and influence others through it. The least common among the surveyed sample was the choice of teaching as a fallback career. Our data are consistent with the results identified using the FIT-Choice Scale in other countries, while having their own specifics. According to our data, students pursuing a teaching profession perceive it as a profession with high demands and are motivated primarily by their positive learning experiences.

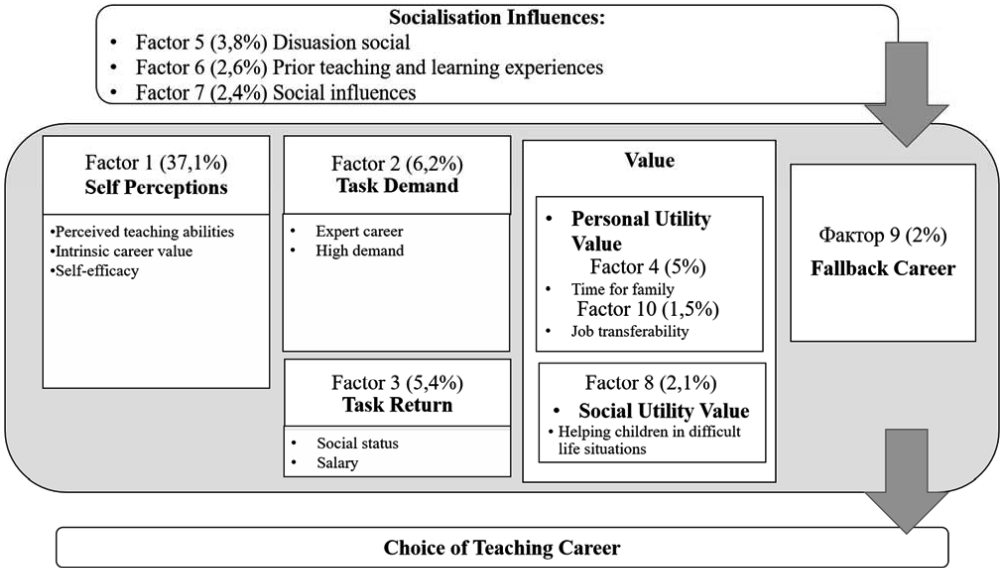


Fig. 3. Congruence of extracted factors with the theoretical model of the FIT-Choice Scale

Conclusion

The materials presented in this article show that the FIT-Choice Scale ("Factors Influencing Teaching Choice"), widely used in foreign research, has confirmed its suitability for the Russian sample, demonstrating high internal consistency and validity.

At the same time, the internal factor structure of the methodology turned out to be more concise compared to foreign counterparts: out of 18 scales of the original methodology, 10 were retained in the Russian version, and some items were excluded from the questionnaire due to their insufficient discriminant power or low factor loadings. The resulting version of the methodology contains two parts, which include a total of 49 items.

The overall structure of the methodology corresponds to the theoretical model of the FIT-Choice questionnaire, making it possible to compare data obtained with the questionnaire with data obtained in other countries. The availability of norms for the Russian sample makes it possible

to compare data obtained in different regions of the country and take the results into account when developing policies to attract young people to the teaching profession.

At the same time, testing the methodology on a sample of working teachers is required, which may result in a modified version that allows identifying the factors that keep teachers in the profession.

Limitations. The limitations of this study include the unequal representation of different genders and educational levels within the standardization sample. This constraint is partially mitigated by the fact that the respondent distribution reflects the demographic composition of a specific pedagogical university's student body. However, it does not allow for differentiating the motivation of students across diverse strata. Furthermore, the structure of motivation may exhibit regional specificity, necessitating an expansion of the study's geographical scope. Another limitation is the absence of test-retest reliability assessment for the instrument.

Приложение

Итоговая версия опросника FIT-Choice (Factors Influencing Teaching Choice) Scale (Факторы выбора педагогической профессии)

Часть 1

Инструкция: Уважаемые студенты, просим вас оценить значимость каждого пункта по шкале от 1 — совсем не важно до 7 — чрезвычайно важно.

«Я решил стать учителем/воспитателем, потому что...»

1. Мне интересна педагогика
2. Рабочий день педагога позволяет проводить больше времени с семьей
3. Мои друзья считают, что мне следует стать учителем/воспитателем
4. Педагоги имеют более длительный отпуск
5. Я обладаю личностными качествами хорошего учителя
6. Педагогическая деятельность позволит мне внести вклад в развитие общества
7. Я всегда хотел(а) быть учителем/воспитателем
8. Я всегда смогу найти работу при переезде
9. Работая педагогом, я смогу формировать ценности детей
10. Я не был уверен(а), какую профессию выбрать
11. Мне нравится учить других
12. Я хочу работать с детьми и (или) подростками
13. График работы педагога легко сочетать с выполнением семейных обязанностей
14. У меня были вдохновившие меня учителя
15. У педагога более короткий рабочий день
16. Я обладаю навыками, которые необходимы педагогу
17. Будущая работа позволит мне повлиять на следующее поколение
18. Моя семья считает, что мне следует стать учителем/воспитателем
19. Я хочу общаться с детьми и (или) подростками
20. Профессия педагога обеспечит мне надежный, постоянный доход
21. На школьных каникулах я смогу больше времени уделять семье
22. У меня были хорошие учителя, выступающие для меня образцом для подражания
23. Мне не удалось поступить туда, куда я собирался(лась)
24. Педагогическая профессия позволит мне помочь реализовать потенциал детей, оказавшихся в сложных социальных условиях
25. Мне нравится работать с детьми/подростками
26. У меня был учитель, который отлично преподавал свой предмет
27. Люди, с которыми я взаимодействовал, считают, что мне подходит профессия учителя/воспитателя
28. Профессия педагога соответствует моим способностям

29. Я везде смогу устроиться на работу
30. Педагогическая деятельность позволит мне помогать социально неза-
щищенным слоям населения
31. Работая педагогом, я смогу помочь детям из трудных семей

Часть 2

Согласны ли вы с тем, что... (1 — полностью не согласен, 7 — полностью согласен)

32. Работа педагога хорошо оплачивается
33. У педагога большая рабочая нагрузка
34. Педагоги получают достойную зарплату
35. Педагогов в обществе воспринимают как профессионалов
36. Педагог — носитель высоких моральных ценностей
37. Учитель/воспитатель — высокостатусная профессия
38. Педагогическая профессия ценится обществом
39. Знания педагога в сфере преподавания должны достигать экспертного уровня
40. Профессия учителя/воспитателя — это уважаемая профессия
41. Педагоги ощущают на себе, что их профессия имеет высокий социаль-
ный статус
42. Педагог должен иметь отличные знания методов и техник обучения и
воспитания
43. Педагоги должны хорошо владеть узкоспециализированными знания-
ми
44. Я считаю свой выбор профессии тщательно обдуманным
45. Были люди, которые склоняли меня выбрать другую профессию
46. Я удовлетворен(а) своим выбором работать педагогом
47. Мне говорили, что профессия педагога — это не самый лучший выбор
48. Я доволен/довольна своим решением стать учителем/воспитателем
49. Были люди, которые пытались повлиять на меня, чтобы я выбрал(а) дру-
гую профессию

Ключ для обработки:

Шкалы адаптированного варианта опросника FIT-Choice Scale	Пункты шкалы
Социальное влияние	
Противодействие окружающих выбору профессии педагога	45, 47, 49
Положительный опыт обучения в роли ученика	14, 22, 26
Поддержка выбора профессии педагога социальным окружением	3, 18, 27
Самовосприятие	
Самовосприятие (восприятие своих способностей и возможностей, жела- ний и интересов в сфере педагогической деятельности)	1, 5, 6, 7, 9, 11, 12, 16, 17, 19, 25, 28
Требования профессии и получаемая отдача	

Требования профессии	33, 36, 39, 42, 43
Отдача от профессии	32, 34, 35, 37, 38, 40, 41
Польза от выбора профессии	
Возможность уделять время семье	2, 4, 13, 15, 21
Легкость трудоустройства	8, 20, 29
Социальная польза	24, 30, 31
Выбор карьеры педагога в качестве запасного варианта	
Выбор карьеры педагога в качестве запасного варианта	10, 23, 44(R), 46(R), 48(R)

При обработке вычисляется средний показатель по каждой шкале.

Нормативные показатели для шкал методики FIT-Choice Scale

Шкалы опросника FIT-Choice Scale	Ниже среднего	Средний уровень	Выше среднего
Противодействие окружающих выбору профессии педагога	1–2,9	3–6	6,1–7
Положительный опыт обучения в роли ученика	1–3,9	4–6,7	6,8–7
Поддержка выбора профессии педагога социальным окружением	1–2,6	2,7–6	6,1–7
Самовосприятие	1–3,7	3,8–6	6,1–7
Требования профессии	1–4,9	5–6,4	6,5–7
Отдача от профессии	1–2,9	3–5,1	5,2–7
Возможность уделять время семье	1–2,9	3–5,2	5,3–7
Легкость трудоустройства	1–3,9	4–6	6,1–7
Социальная польза	1–3,6	3,7–6,3	6,4–7
Выбор карьеры педагога в качестве запасного варианта	1–1,9	2–4,2	4,3–7

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Valerija I. Ambrosova — planning of the research; translation and adaptation of the scale text; conducting the empirical study; control over the research.

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All authors participated in the discussion of the results and approved the final text of the manuscript.

Вклад авторов

Яремчук С.В. — перевод и адаптация текста методики; проведение исследования; применение статистических, математических или других методов для анализа данных; написание и оформление рукописи; визуализация результатов исследования.

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The authors declare no conflict of interest.

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Features of inclusive dispositions of teachers in general and special education institutions

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Abstract

Context and relevance. A well-balanced inclusive education policy, which does not imply dismantling the system of special education for children with developmental disabilities, but rather constructing its complementary interaction with the general education system, brings to the forefront the issue of forming a professional-personal foundation for such interaction. This foundation is closely related to the inclusive dispositions of teachers in both general and special education, which act as personal-meaningful premises for their collaboration. However, there is currently a lack of comparative empirical data characterizing these dispositions. **Objective.** The objective of this study was to conduct a comparative analysis of the inclusive dispositions of teachers in general and special education institutions. **Hypothesis.** The study was based on the hypothesis that both similarities and differences exist in the hierarchy of inclusive dispositions and their interrelation with other professional-personal and socio-professional characteristics of teachers working in general and special education systems. **Methods and materials.** The study involved 2106 teachers from 44 regions of Russia, including 758 teachers from general education schools and 1348 teachers from special schools. The following instruments were used for diagnostics: an original method for self-identification of a teacher's inclusive dispositions, the Wilczenski Scale for measuring attitudes toward inclusive education in an adapted Russian-language version, and an original express scale for assessing psychological readiness for inclusive education. **Results.** The hierarchy of inclusive dispositions and their correlational patterns reveal a complex interplay of general and specific features among teachers from different types of educational institutions. Notably, the status of teachers in special education institutions appears ambivalent: they exhibit more pronounced negative inclusive dispositions but demonstrate a higher level of inclusive readiness. **Conclusions.** The teaching community exhibits heterogeneity in terms of inclusive dispositions, indicating an underdeveloped cohesive personal-meaningful core within the inclusive educational environment.

Keywords: inclusive dispositions, inclusive education, teachers, general education institutions, special education institutions, children with disabilities, professional-personal characteristics, socio-professional characteristics

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Особенности инклюзивных диспозиций педагогов учреждений общего и специального образования

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Резюме

Контекст и актуальность. Взвешенная инклюзивная образовательная политика, предполагающая не демонтаж системы специального образования детей с нарушениями в развитии, а выстраивание ее комплементарного взаимодействия с системой общего образования, актуализирует вопросы формирования профессионально-личностного базиса такого взаимодействия, который связан в том числе с инклюзивными диспозициями педагогов общего и специального образования как личностно-смысловыми основаниями их сотрудничества. Однако сравнительные эмпирические данные, характеризующие эти диспозиции, в настоящее время отсутствуют. **Цель.** Цель исследования заключалась в том, чтобы дать сравнительную характеристику инклюзивных диспозиций педагогов учреждений общего и специального образования. **Гипотеза.** В качестве гипотезы в исследовании выступило предположение о наличии как сходств, так и различий в иерархии инклюзивных диспозиций и их взаимосвязи с другими профессионально-личностными и социально-профессиональными характеристиками педагогов систем общего и специального образования. **Методы и материалы.** Исследование охватило 2106 педагогов из 44 регионов России — 758 педагогов общеобразовательных школ и 1348 педагогов специальных школ. Для диагностики использовались авторская методика самоидентификации инклюзивных диспозиций педагога, шкала измерения установок в отношении инклюзивного образования Wilczenski в адаптированной русскоязычной версии и авторская экспресс-шкала диагностики психологической готовности к инклюзивному образованию. **Результаты.** В иерархии инклюзивных диспозиций и их корреляционных связях имеет место сложное соотношение общего и специфического у педагогов из образовательных учреждений разных типов, причем статус педагогов учреждений специального образования амбивалентен: у них более выражены негативные инклюзивные диспозиции, но выше уровень инклюзивной готовности. **Выводы.** Педагогическое сообщество отличает гетерогенность в аспекте инклюзивных диспозиций, что свидетельствует о несформированности целостного личностно-смыслового ядра в инклюзивном образовательном пространстве.

Ключевые слова: инклюзивные диспозиции, инклюзивное образование, педагоги, учреждения общего образования, учреждения специального образования, дети с ограниченными возможностями здоровья, профессионально-личностные характеристики, социально-профессиональные характеристики

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Introduction

In recent decades, the development of educational systems has been increasingly shaped by the philosophy of inclusion (Kharchenko, 2020). Despite the need for further elaboration of the very concept of inclusive education (Kosaretsky, 2024), as well as the asynchrony and contradictions identified in the course of its implementation (Hanssen, Alekseeva, 2024), inclusion constitutes the strategic vector of educational policy regarding persons with disabilities (Akhlan, Khimmataliyev, Qizi, 2024).

Contrary to radical approaches that present inclusive education and special education as opposing and mutually exclusive institutions (Madhesh, 2023), with special schools being subject to total closure (Mann et al., 2024), a balanced and evidence-based educational policy is grounded in the idea of complementarity between these institutions and in the necessity of ensuring their effective coexistence.

From the perspective of H. Qu, such a policy is characterized by viewing special schools as a key resource for optimizing inclusive processes and as an integral part of the broader education system interconnected with its other components, while learning in mainstream classrooms and fostering inclusivity remain the primary goal

and the foundation for the education of children with disabilities (Qu, 2024).

In this context, the functioning of special schools becomes an inherent attribute of the implementation of inclusion in education (Cumming, Jolly, Saint-James, 2024). Defining inclusion exclusively as the placement of a child with disabilities in a mainstream school is conceptually inconsistent and must be disavowed, since special schools act as “an integral part of the entire education system’s response to inclusion” (Merrigan, Senior, 2021, p. 288).

At the same time, the complementarity of inclusive and special education is determined by the collaboration between teachers from mainstream and special schools. Such collaboration ensures mutual access to the necessary knowledge, didactic, methodological, and other resources (Shemanov, Samsonova, 2019), as well as the preservation of critically important individualized professional support for students with disabilities in mainstream schools (Šćepanović, Nikolić, Mitrović, 2024). Moreover, such cooperation contributes to improving the academic performance of these students (Alhossyan, 2023).

However, not only is the issue of cooperation in the context of inclusion not a priority for mainstream and special school teach-

ers compared with other aspects of their professional activity (Smit et al., 2024), but both groups also tend to perceive inclusive education from an outdated standpoint — through the lens of their separate professional roles, for which they were initially trained — rather than from the perspective of joint work and shared responsibility (Alabdallat, Alkhamra, Alkhamra, 2021).

In addition, while teachers from both mainstream and special schools generally acknowledge the value of collaboration, they hold different attitudes as its subjects: special school teachers consider themselves primarily responsible for supporting students with disabilities, whereas mainstream teachers focus predominantly on their subject matter (Mihajlovic, 2024). Furthermore, in their interactions under inclusive conditions, both groups encounter difficulties in establishing trustful relationships (Vostal et al., 2022).

Thus, the implementation of collaboration between mainstream and special school teachers is mediated by differences in their professional-personal positions.

An important professional-personal characteristic of teachers as subjects of the inclusive educational process lies in their inclusive dispositions (ID), which reflect the personal-meaning dimension of professional pedagogical activity in inclusive settings (Kantor, Proekt, 2024). Consequently, in the context of collaboration between mainstream and special school teachers, the degree of similarity in their inclusive dispositions becomes a matter of key significance.

However, while the inclusive dispositions of mainstream school teachers have been the subject of special empirical investigation (Lukins et al., 2023), research with a similar focus has not been conducted in relation to teachers in special schools. As a result, there is no knowledge of the extent

to which the personal-meaning foundations of collaboration between mainstream and special school teachers are formed in the process of inclusive education for children with disabilities. The situation is further complicated by the fact that available data from studies of a phenomenon not identical but related to inclusive dispositions — teachers' attitudes toward inclusive education — are highly contradictory. In some cases, differences between the attitudes of mainstream and special school teachers are observed, with the latter being more positive, while in other cases no significant differences are identified (Guillemot, Lacroix, Nocus, 2022).

The present study sought to fill this gap by providing a comparative analysis of inclusive dispositions among teachers in mainstream and special education institutions.

Achieving this aim required solving complementary research tasks, which included comparative assessments of:

- the intensity of different types of inclusive dispositions among mainstream and special school teachers;

- the structure of relationships between inclusive dispositions, teachers' views on the acceptability of educating different categories of children with developmental disabilities in mainstream schools, and their psychological readiness to work under inclusive conditions;

- the extent to which inclusive dispositions of mainstream and special school teachers are mediated by their socio-professional characteristics.

The study was based on the hypothesis that the hierarchy of inclusive dispositions and their relationships with other professional-personal and socio-professional characteristics demonstrate both similarities and differences between teachers representing mainstream and special education systems.

Ultimately, the study was intended to answer the question of the degree of homogeneity within the teaching community in terms of inclusive dispositions.

The method and its features, characteristics of the sample

The study was conducted with 2106 teachers from 44 regions of the Russian Federation, who participated on the basis of voluntary informed consent. The sample included 758 teachers from mainstream schools and 1348 teachers from schools implementing adapted educational programs for students with disabilities, aged between 20 and 79 years ($M = 44,26$; $SD = 12,85$; 93,78% female). The two groups were comparable in terms of gender and age distribution, as well as in the length of teaching experience (age — M mainstream = 43,9; M special = 44,4; $t = -0,87$; $p = 0,38$; gender — $\chi^2 = 2,37$; $p = 0,12$; teaching experience — $t = -0,37$; $p = 0,71$). There were also no significant differences between groups regarding prior experience of working in inclusive settings: according to self-reports, such experience was indicated by 53,69% of mainstream teachers and 57,42% of special school teachers ($\chi^2 = 2,73$; $p = 0,10$).

The study employed the following instruments: a method of self-identification of teachers' inclusive dispositions (ID), requiring respondents to align themselves (direct identification) and the majority of other teachers (reflected identification) with psychological profiles representing different types of ID (Kantor, Proekt, 2024); an adapted version of the scale for measuring attitudes toward inclusive education, based on respondents' assessment of the acceptability of mainstream schooling for children with physical (sensory and motor), intellectual, communicative, and behavioral impairments (Wilczenski, 1992); a short scale

for diagnosing psychological readiness for inclusive education, consisting of four subscales: "beliefs," "values," "emotional acceptance," and "subjective assessment of readiness" (Kantor, Proekt, 2022).

The internal consistency of the scales was tested using Cronbach's α coefficient, yielding satisfactory results (see Table 3).

The collected empirical data were processed using descriptive, comparative, and correlational analysis. Since the distribution estimates of ID-related parameters demonstrated a deviation from normality (Anderson–Darling test values in the range $9,96 \leq A^2 \leq 109,21$; $p < 0,001$), non-parametric statistics were applied. Specifically, Wilcoxon's W test, the Mann–Whitney U test, Pearson's χ^2 test, and Spearman's rank correlation coefficient were used. To evaluate differences in correlation strength, Fisher's r -to- z transformation was applied, followed by comparison of correlation coefficients between the samples. Statistical analyses were performed using Statistica (ver. 10) and Jamovi (ver. 2.3.18).

Results

The analysis of self-identification of inclusive dispositions (ID) revealed significant differences in assessments between teachers from mainstream and special education institutions, although the overall profiles of these assessments were similar (see Table 1). Both groups tended to associate themselves with the analytical disposition, which reflects an acceptance of inclusion alongside a reflective stance toward the conditions and limitations of its implementation.

At the same time, statistically significant differences were observed in the indicators of specific IDs. Special education teachers more frequently expressed doubts and negative reactions toward inclusive education (skeptical and negative

IDs), in some cases up to outright rejection of inclusion (negative ID). Mainstream teachers, by contrast, were more likely to display an indifferent ID, yet also more frequently emphasized the significance of inclusion for the humanization of education and for the personal development of all participants in educational relations (personality-oriented ID).

Less pronounced differences were found with respect to teachers' perceptions of the professional community. In both groups, with the exception of the skeptical ID, shifts were observed between self-assessments and evaluations of the majority of teachers ($5819 \leq W \leq 10645$; $p < 0,001$ and $18928 \leq W \leq 96013$; $p < 0,001$, re-

spectively). Teachers attributed a greater prevalence of negative and indifferent IDs to the professional community than to themselves. The skeptical ID was perceived as equally characteristic of oneself and of other teachers, while the indifferent ID was the least expressed, which indicates teachers' engagement with the issues of inclusion.

According to the secondary scales of the methodology, a higher proportion of teachers in special education, compared to those in mainstream education, were characterized by a rejecting ID (529 individuals / 39,35% vs. 206 individuals / 27,13%), and this difference was statistically significant ($\chi^2 = 30,59$; $p < 0,001$).

Table 1

Descriptive statistics of the indicators of inclusive dispositions in the groups of teachers working in the educational organisations of general and special education

Disposition' type	Special education				General education				U	r _{nb}
	M	Me	S	R	M	Me	S	R		
Self-Identification										
Analytical	4,49	5	1,32	1	4,39	5	1,37	1	484097	0,04
Sceptical	4,42	5	1,38	2	4,02	4	1,46	5	421818 ^{***}	0,16
Worldview	4,14	4	1,47	3	4,19	4	1,41	2	501764	−0,01
Detocentred	4,04	4	1,54	4	4,17	4	1,48	3	484778	−0,04
System-centred	4,03	4	1,40	5	4,09	4	1,38	4	498431	−0,02
Person-centred	3,78	4	1,53	6	4,00	4	1,44	6	465637 ^{**}	−0,08
Negative	3,48	4	1,76	7	3,02	3	1,70	7	427630 ^{***}	0,14
Indifferent	2,50	2	1,56	8	2,70	2	1,48	8	450809 ^{***}	−0,11
Mirrored identification										
Analytical	4,27	4	1,29	2	4,19	4	1,29	2	412921	0,04
Sceptical	4,39	5	1,31	1	4,00	4	1,37	1	368133 ^{***}	0,17
Worldview	3,92	4	1,42	3,5	3,95	4	1,32	3,5	413102	0,01
Detocentred	3,84	4	1,47	5	3,82	4	1,37	5	412959	0,02
System-centred	3,92	4	1,36	3,5	3,95	4	1,32	3,5	429166	−0,01
Person-centred	3,63	4	1,45	7	3,79	4	1,38	6	411614 [†]	−0,06
Negative	3,78	4	1,59	6	3,29	3	1,61	7	363973 ^{***}	0,17
Indifferent	3,04	3	1,57	8	3,03	3	1,48	8	428684	−0,00

Note: M — mean; Me — median; S — standard deviation; R — rank; U — the Mann-Whitney Test; r_{nb} — rank-biserial correlation (effect size); «*» — differences are significant at the 0,05 level; «**» — differences are significant at the 0,01 level; «***» — differences are significant at the 0,001 level.

Assessments of the acceptability of mainstream schooling for children with disabilities differed between the groups only with respect to children with communication difficulties (see Table 2). Schooling in mainstream settings was viewed as least acceptable for children with behavioral disorders. The overall range of scores recorded — from 10,90 to 15,87 out of a possible 24 — rather reflects teachers' doubts about the feasibility of inclusive education for children with disabilities.

At the level of respondents' meaning-related attitudes toward themselves as inclusive teachers, significant differences were found across all examined parameters. These results indicate that special education teachers demonstrate a higher degree of readiness for implementing inclusive practices. This can be clearly attributed to the professional consciousness of special education teachers (defectologists), for whom an emotional-value attitude toward children with disabilities and recognition of their right to quality educa-

tion and social integration constitute core attributes.

An analysis of the correlational structures of ID indicators showed that a more rigid structure of interrelations was observed among special education teachers (see Table 3). For them, supportive and rejecting IDs were opposed to each other, yet strongly linked to beliefs about inclusive education, acceptance of its values, subjective assessment of readiness to work in inclusive settings, and emotional acceptance of children with disabilities.

In contrast, among mainstream teachers, the components of ID were less interrelated. In particular, meaning-related attitudes toward children with disabilities could manifest similarly both among teachers who share inclusive values and among those who reject them (correlations were not significant). At the same time, subjective assessments of readiness to work in inclusive settings and beliefs about the necessity of inclusive education were expressed by teachers characterized by

Table 2

Descriptive statistics of the indicators of meaningful attitudes towards inclusive education in the groups of teachers working in the educational organisations of general and special education

Meaningful attitudes	Special education			General education			U	r _{tb}
	M	Me	S	M	Me	S		
Toward students								
Physical	13,23	13	5,02	13,33	13	4,72	507446	−0,01
Academic	12,96	13	4,65	13,26	13	4,51	492757	−0,04
Behavioral	10,90	11	4,67	10,88	11	4,77	501764	0,01
Social	15,87	16	3,85	15,47	16	4,28	479792'	0,01
Toward oneself as a teacher								
Readiness Self-evaluation	6,46	6,64	1,41	5,77	5,73	1,48	370317***	0,28
Beliefs	5,55	5,57	1,16	5,30	5,29	1,20	446466***	0,13
Emotional adoption	5,88	6,25	1,60	5,65	5,75	1,52	451179***	0,12
Inclusion Values	7,09	7,25	1,54	6,47	6,50	1,55	386551***	0,24

Note: M — mean; Me — median; S — standard deviation; U — the Mann-Whitney Test; r_{tb} — rank-biserial correlation (effect size); «*» — differences are significant at the 0,05 level; «***» — differences are significant at the 0,001 level.

a supportive ID and who more often regarded mainstream schooling of children with disabilities as acceptable regardless of the type of developmental impairment. Overall, the group of mainstream teachers demonstrated weaker correlations between indicators of inclusive dispositions. Significant intergroup differences were found in the strength of associations between supportive ID and beliefs ($Z = 4,89$, $p < 0,001$), emotional acceptance ($Z = 2,91$, $p < 0,01$), inclusive values ($Z = 3,22$, $p < 0,001$), as well as assessments of the acceptability of mainstream schooling for children with physical impairments ($Z = 2,82$, $p < 0,01$), intellectual impairments ($Z = 3,20$, $p < 0,001$), and communication difficulties ($Z = 2,82$, $p < 0,01$).

Unlike mainstream teachers, special education teachers' ID indicators were more frequently associated with age: younger teachers displayed more positive perceptions of inclusive education. In the mainstream group, age mediated teachers' attitudes toward children with disabilities but was not related to their self-perceptions as subjects of inclusive education.

At the same time, an important factor mediating teachers' IDs was prior experience of working in inclusive settings: teachers with such experience demonstrated more positive meaning-related attitudes toward inclusion, and this applied to both groups. Emotional acceptance of children with disabilities, however, was not linked to prior inclusive teaching experience, which may indicate the greater role of teachers' personal traits — such as responsiveness and emotional competence — in fostering acceptance of such children, regardless of previous experience of interaction.

Discussion

The search for an institutional balance between mainstream and special education

systems for children with disabilities, in the context of implementing inclusion, brings to the fore the discourse on the necessity of combining the philosophy and values of inclusive education with the strategies and programs of special education. Within this context, the paradigm of inclusive special education has been proposed (Kauffman, Hornby, 2025). One of the decisive factors in achieving such a balance is the interaction and cooperation between mainstream and special school teachers, which must be grounded, among other things, in the unity of their value-meaning orientations toward inclusive education.

Existing empirical evidence concerning the attitudes of mainstream and special school teachers toward inclusion suggests the preferential status of special school teachers in this regard (Hernandez, Hueck, Charley, 2016). The findings of the present study, however, confirm a previously identified opposite tendency: due to their professional experience and deeper understanding of the educational needs of children with disabilities, teachers in the special education system, in fact, demonstrated less support for inclusive education compared with mainstream school teachers (Kutepova et al., 2021). As the results showed, special education teachers were more likely to exhibit skeptical and negative IDs. This indirectly reflects the position of the Russian scholarly tradition in defectology, according to which “however much the number of children ready for inclusion may grow, they will not constitute the majority within the group of children with disabilities; therefore, this form of joint learning and upbringing cannot be the only one,” and “inclusion is one form of integration, useful for children with disabilities whose development is close to the age norm,” whereas “other children with disabilities need a carefully dosed

Таблица 3 / Table 3
Relationship between the indicators of inclusive dispositions in the groups of teachers working in the educational organizations of general and special education

Indicators	1	2	3	4	5	6	7	8	9	10	11	12
1. Supportive Inclusive Disposition	—	-0,29***	0,41***	0,43***	0,30***	0,15***	0,42***	0,61***	0,01	0,10**	0,04	-0,02
2. Rejecting Inclusive Disposition	-0,30***	—	-0,16***	-0,15***	-0,04	-0,19***	-0,18***	-0,34***	-0,04	-0,07*	-0,13***	-0,04
3. Physical	0,51***	-0,32***	—	0,70***	0,52***	0,18***	0,27***	0,42***	0,03	0,06	0,04	-0,13***
4. Academic	0,54***	-0,25***	0,69***	—	0,61***	0,33***	0,28***	0,44***	0,00	0,05	0,12**	-0,10**
5. Behavioral	0,35***	-0,14***	0,44***	0,57***	—	0,30***	0,22***	0,31***	0,04	0,04	0,07	-0,10**
6. Social	0,27***	-0,20***	0,37***	0,44***	0,42***	—	0,26***	0,29***	0,06	0,18***	0,17***	-0,07*
7. Readiness Self-evaluation	0,43***	-0,27***	0,34***	0,35***	0,21***	0,27***	—	0,58***	0,21***	0,64***	0,25***	0,01
8. Beliefs	0,73***	-0,48***	0,55***	0,55***	0,36***	0,30***	0,59***	—	0,03	0,24***	0,10**	-0,03
9. Emotional adoption	0,14***	-0,25***	-0,01	-0,04*	-0,07*	0,06*	0,19***	0,16***	—	0,21***	0,04	0,07*
10. Inclusion Values	0,24***	-0,15***	0,17***	0,16***	0,04*	0,24***	0,65***	0,35***	0,21***	—	0,16***	0,05
11. Experience in Inclusive Settings	0,16***	-0,12***	0,15***	0,10***	0,10***	0,10***	0,27***	0,16***	-0,02	0,12***	—	0,08*
12. Age	-0,10***	0,08**	-0,22***	-0,16***	-0,10***	-0,12***	-0,06*	-0,10**	-0,03	0,02	0,001	—
Cronbach's alpha	0,85	0,84	0,90	0,88	0,91	0,83	0,92	0,86	0,73	0,72	—	—

Note: M — mean; Me — median; S — standard deviation; U — The Mann-Whitney Test; «*» — correlations are significant at the 0,05 level; «**» — correlations are significant at the 0,01 level; «***» — correlations are significant at the 0,001 level. The correlation coefficients for the general education teachers group are presented above the main diagonal, while those for the special education teachers group are shown below it.

integration corresponding to their capacities and limitations” (Kukushkina, Goncharova, Malofeev, 2023).

Thus, professional-personal barriers to ensuring complementary collaboration between mainstream and special school teachers become apparent. The revealed differences in their pedagogical culture, expressed through inclusive dispositions, may hinder such collaboration. This interpretation corresponds with empirically supported findings regarding special school teachers, highlighting their “limited willingness to collaborate with colleagues from ‘regular schools’” (Göransson et al., 2020, p. 1). Moreover, the fact that these barriers are located at the dispositional level underscores the complexity of the problem: since professional dispositions generally serve as “a mediating mechanism for building a professional strategy” (Abakumova, Savchenko, 2008, p. 30), the divergence in inclusive dispositions between mainstream and special school teachers predetermines the divergence of their professional strategies within the inclusive educational space. Furthermore, when subjective values and meanings that teachers from the two systems associate with inclusion do not align, the so-called “personal chemistry” between them is hardly possible — yet this factor has been identified as essential for fostering effective interprofessional collaboration in the implementation of inclusive education (Paulsrud, Nilholm, 2020).

At the same time, the results of this study once again confirmed the previously noted (Dignath et al., 2022) significance of inclusive teaching experience for shaping positive IDs. According to the data obtained, regardless of the institutional-educational setting in which they work, teachers with such experience demonstrated clearly positive meaning-related orientations, both in evaluating the

acceptability of mainstream education for children with various developmental impairments and in perceiving themselves as inclusive teachers. Another important characteristic is teacher age: younger teachers in special education proved to be more receptive to the ideas of inclusion and more willing to make efforts to expand the educational opportunities of children with disabilities, confirming the results of other studies (Charitaki, Kypriotaki, Alevriadou, 2023).

The analysis of correlational relationships provides grounds for raising the question of whether working in specialized educational institutions fosters more structured and less flexible conceptions of inclusion, whereas mainstream teachers are characterized by greater variability in IDs, potentially shaped by the influence of personal and organizational factors.

Conclusion

The conducted comparative empirical study of the prevalence of different types of inclusive dispositions (ID), the specific features of the correlational structures of their interrelations, and the ways in which these dispositions are mediated by the socio-professional characteristics of mainstream and special education teachers has yielded a body of new data. These findings broaden and deepen our understanding of the regularities of teachers’ professional-personal development as participants in inclusive educational relations. In light of the results obtained, additional important guidelines emerge for implementing a differentiated approach to supporting teachers of different categories in their “entry” into inclusion, which reflects the practical significance of the study.

Furthermore, the study’s findings, fully consistent with its substantive aims and

confirming the proposed hypothesis, allow the following conclusions to be drawn:

The teaching community is characterized by heterogeneity in terms of IDs, which complicates the formation of a personal-meaning basis for developing a coherent inclusive educational environment.

A complex relationship exists between the general and the specific in both the hierarchy of IDs and their interrelations with other professional-personal and socio-professional characteristics of teachers working in different segments of the education system.

From the standpoint of the institutionalization of inclusion, the professional-personal status of special education teachers is marked by ambivalence: on the one hand, compared with mainstream teachers, they display stronger IDs that hinder the implementation of the principle of inclusion in education, but on the other hand, they

exhibit greater readiness to work under inclusive conditions.

Thus, the study has provided an answer to the key research question.

In this context, one of the promising directions for further inquiry is clearly defined. It concerns the specification of understandings of the IDs of special education teachers in terms of differentiating their defectological profiles, that is, the empirical examination of these dispositions in a comparative framework with respect to teachers working with schoolchildren with developmental impairments across different nosological groups.

Limitations. The study had certain limitations due to internal disproportionality of the teacher sample in terms of gender, as well as the uneven representation of different regions. As a result, it was not possible to conduct a comparative analysis along these dimensions.

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Psychological services of Russian universities — the monitoring study of practices and resources

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Abstract

Context and relevance. Although psychological services have existed in some Russian universities for a long time, information about their number, organizational structure, and specific activities remains fragmented. **Objective** The article aims to quantitatively characterize the organization of psychological support in Russian universities. **Methods and materials.** The first nationwide comprehensive online survey of Russian universities ($n = 479$; 39% of all universities) was conducted, covering topics such as organizational models, areas of work, staff composition, and key challenges in operation. **Results.** The findings indicate that psychological services have become institutionalized in Russian higher education: as of 2022, at least 402 such departments were operational. Furthermore, 39% of universities without these services plan to establish them. The study identifies a high variability in service models and stages of development, ranging from basic setups with a single specialist to comprehensive departments offering a wide range of services and conducting effectiveness assessments. Another critical characteristic is the extent of integration with educational activities, which varies significantly across institutions. The structure and resources of psychological services are influenced by institutional characteristics. Public universities, participants of the “Priority 2030” and “Top 5-100” programs, and main campuses of universities are more likely to have well-developed services. The primary functions of these services include providing psychological support to students, conducting diagnostics, and organizing educational activities, although the scope and implementation methods differ considerably. **Conclusions.** The study underscores the need to enhance staffing levels, foster collaboration with external organizations, and establish a clearer understanding of the roles and responsibilities of psychological departments. The findings provide a foundation for evaluating the current state and tracking the development of psychological assistance systems in Russian higher education.

Keywords: psychological service, university, psychological help, effectiveness evaluation, university students, monitoring

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Психологические службы российских вузов — мониторинговое исследование практик и ресурсов

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Резюме

Контекст и актуальность. Несмотря на то, что в части вузов России уже длительное время существуют психологические службы, информация об их количестве, формате организации и специфике деятельности остается фрагментарной. **Цель.** Количественно охарактеризовать организацию психологической помощи в вузах России. **Методы и материалы.** Первое всероссийское сплошное онлайн-исследование вузов России ($n = 479$; 39% от общего числа вузов). Опрос охватывал следующие темы: организационные модели, направления работы, кадровый состав и основные вызовы в функционировании. **Результаты.** Наличие психологических служб в российских вузах является распространенной практикой: на 2022 год функционировало не менее 402 таких подразделений. Из числа вузов, не имеющих психологической службы, 39% заявили о планах по ее созданию. Выявлена высокая вариативность моделей и стадий развития служб: от начального уровня, где функции выполняет один специалист, до полноценных подразделений с широким спектром задач и оценкой эффективности. Степень интеграции с образовательной деятельностью, которая также широко варьирует, является еще одной важной характеристикой служб. Формат и ресурсы служб зависят от характеристик вузов. Государственные вузы, те, что были включены в программы «Приоритет 2030» и «Топ 5-100», и головные филиалы вузов чаще имеют более развитые службы. Основные функции служб включают психологическую помощь студентам, диагностику и образовательные мероприятия, но спектр задач и форматы реализации значительно различаются. **Выводы.** Исследование выявило перспективные направления совершенствования организации психологических служб вузов: улучшение кадрового обеспечения, налаживание эффективного взаимодействия с внешними организациями и формирование четкого понимания функций психологических подразделений. Полученные данные могут стать базой для оценки текущей ситуации и динамики развития системы психологической помощи в высшем образовании Российской Федерации.

Ключевые слова: психологическая служба, вуз, психологическая помощь, оценка эффективности, студенты вуза, мониторинг

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Introduction

University education is a period of substantial — and often challenging — change in students' lives. Numerous studies demonstrate that a high level of academic and non-academic stress is an integral part of higher education worldwide (Basyuk, Malykh, & Tikhomirova, 2022; Sharp & Theiler, 2018). In addition to adapting to new social and academic environments, many students find themselves living away from home for the first time and must cope with stress without their previous social support networks. All these factors increase the risk of mental health problems, which may lead to academic underachievement (Zhang, Peng, & Chen, 2024), mental disorders (Auerbach et al., 2018), and suicidal behavior (Mortier et al., 2018).

Institutions of higher education (hereinafter referred to as universities) have a unique opportunity to influence the health and psychological well-being of both students and university staff. One possible mechanism for achieving this is the establishment of dedicated psychological services within universities.

At present, psychological services are not mandatory structural units in Russian universities, and the provision of psychological assistance in higher education institutions — unlike in general education — is not specifically regulated by the Federal Law “On Education.” Therefore, the formats of

their operation may vary widely. A professional standard for psychologists working in higher education institutions was also absent in Russia at the time this article was prepared. Nevertheless, the Concept for the Development of a Network of Psychological Services in Higher Education Institutions in the Russian Federation (2022) outlines the implementation of state policy in developing a system of psychological support within universities. The main goal of this initiative is formulated as “the organization of qualified psychological assistance for students and employees of every higher education institution.” Thus, the long-term vision implies that psychological support services will eventually be available in every university.

Although the history of psychological services in Russia spans more than two decades (Makarova, 2017), this practice has so far been described and conceptualized only fragmentarily. Its understanding as an emerging social institution is only beginning to take shape (Metelkova, 2024).

In recent years, research has begun to focus on students' attitudes toward university psychological services, as students represent their primary potential beneficiaries. These studies show that although the demand for psychological help among students is quite high (Antonova, Eritsyan, & Tsvetkova, 2021), there are numerous attitudinal barriers that hinder help-seeking. For instance, seeking psychological assis-

tance is often perceived as a socially disapproved behavior (Eritsyen et al., 2021). Moreover, several specific biases exist toward university-based psychological services: students may perceive free counseling as low-quality or consider the university affiliation of the service a threat to the confidentiality of the information they share (Antonova, Dubrovsky, & Eritsyen, 2021).

At the same time, there is a lack of empirical data on what constitutes university psychological services in Russia — how they are organized, and to what extent specific practices and risks are prevalent within them. Experts identify a variety of organizational models for psychological services and analyze the potential risks associated with different formats (Metelkova, 2024). However, no reliable quantitative data have yet been presented that would allow for a comprehensive characterization of the current state of development of psychological services in Russian higher education institutions. A recent quantitative study provides a detailed description of the situation based on a sample of pedagogical universities (Ulyanina et al., 2024); however, it remains unclear to what extent these findings can be generalized to other types of universities.

At the same time, data obtained through regular, representative quantitative studies serve as an indispensable foundation for managerial decision-making and for improving the federal network of university psychological services (Basyuk, Malykh, & Tikhomirova, 2022). The present study aims to provide a quantitative description of how psychological support is organized in Russian universities.

Materials and methods

The first nationwide study of existing psychological services in higher education institutions in Russia was conducted by the

Ministry of Science and Higher Education of the Russian Federation in collaboration with the Russian Academy of Education during the summer and autumn of 2022 in the form of an online survey. Invitations to participate were sent directly to all accredited universities in the Russian Federation (a full census sample). The achieved sample size included 479 universities, representing 39% of all higher education institutions in the country.

The university representative most informed about the activities of the psychological service was asked to complete the online survey. The questionnaire included items regarding the organizational form of the service, its main areas of activity, available resources, and other operational characteristics. In cases where a university did not have a psychological service or its analogue, respondents were asked questions about plans or prospects for establishing one.

Statistical data processing included the calculation of simple distributions and measures of central tendency. The study statistically assessed the relationships between the organizational features of psychological services and the characteristics of the universities to which they belong — such as inclusion in the “Priority 2030” and “Top 5-100” rankings, legal status (private or public), ministerial affiliation (the Ministry of Science and Higher Education of Russia or another governing body), and institutional type (main campus or branch).

In addition, the analysis examined the relationships between the characteristics of the services’ activities and factors such as their duration of existence, degree of integration into educational activities (for example, using the service as a practicum base for psychology students), and the legal form of the service. Relationships were assessed using contingency tables (Pearson’s Chi-square test; Fisher’s exact test).

Results

The majority of universities that participated in the study (83,9%) reported that they had an operating psychological service. It is reasonable to assume that this proportion may be somewhat overestimated and may not fully reflect the actual prevalence of psychological services in Russian universities — institutions already engaged in this type of activity may have been more likely to participate in the survey, while those without such services may have ignored it due to its perceived irrelevance. At the same time, it can be concluded that as of September 2022, there already existed an extensive network of psychological services in higher education institutions across the Russian Federation, comprising at least 402 units. Psychological services were represented in universities across all federal districts of the country.

Among universities that did not have a psychological service at the time of the study, 38,9% reported plans to establish one

in the near future. Such plans were significantly more common among main university campuses than among their branch campuses (53,1% vs. 12%; $\chi^2 = 11,71$; $p \leq 0,01$).

Organizational context

The establishment of a system of university psychological services in Russia began in the 20th century (see Fig. 1). Currently, 5% of existing university psychological services were founded before 1999. Approximately 27,7% of the services have been operating for more than ten years. At the same time, there has been a marked increase in the number of newly established services in recent years: 35,8% of all university psychological services in the country were created within the five years preceding the study, and 24,6% were founded in 2021 or during the first half of 2022.

Certain characteristics of universities are associated with a higher likelihood of having a psychological service. Specifically, public universities are more likely

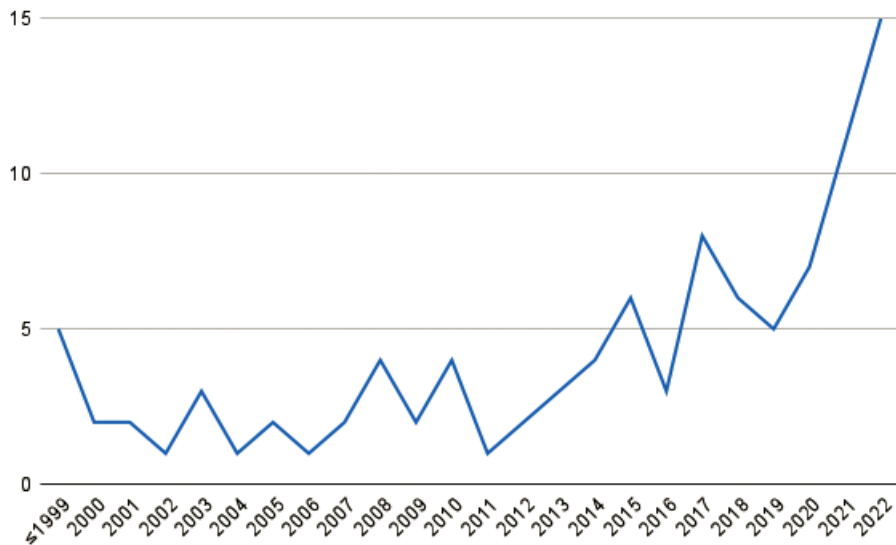


Fig. Year of establishment of psychological service, %

than private ones to have such a service (86% vs. 70,9%; $\chi^2 = 8,33$; $p \leq 0,05$), and inclusion in competitive grant programs or national rankings increases this probability (91% vs. 82,1%; $\chi^2 = 4,7$; $p \leq 0,05$). Conversely, branch campuses are significantly less likely to have a psychological service compared to main university campuses (45,7% vs. 88,6%; $\chi^2 = 58,21$; $p \leq 0,01$).

Models of organization of psychological services

University psychological services in Russia operate under various organizational models. In most cases (51%), the staff psychologists are directly employed within the psychological service itself. Somewhat less frequently (42,8%), the service is staffed by university employees who combine this work with other positions. Only in 5% of cases are the psychologists external specialists whose work is compensated based on the volume of services provided, and in 2,2% of cases the entire service is fully outsourced.

Psychological services also differ in their formal institutional structure. In one-quarter of cases (25,1%), the service is established as an independent structural unit. In 8% of cases, it functions as part of a broader institutional entity — such as a university's psychological, medical, and social service. However, every second service (51,5%) is organized in another form: for example, psychological services may be included within various university faculties or departments, youth and social policy offices, student affairs units, or university health centers. In 14,2% of cases, the psychological service has no formal institutional status, although its functions are still being performed within the university.

Activities of the services

All university psychological services are primarily focused on providing psycho-

logical assistance to students. Support for other potential recipient groups is offered much less frequently: parents or legal guardians of students — 60,2%; university administration — 51,5%; auxiliary staff — 43,5%; university alumni — 21,4%; and individuals with no affiliation to the university — 6,7%.

Most psychological services offer assistance in multiple formats. Individual counseling is provided in nearly all services (99%), while group formats are also widely available (91%). Offline support is more prevalent than online (93,8% and 81,6%, respectively), and 78% of services operate in both formats simultaneously.

The majority of services focus on short-term psychological counseling (1–3 sessions) (89,6%) or crisis intervention (80,3%). Medium-term counseling (4–10 sessions) is available in more than half of the services (64,2%), whereas long-term counseling (more than 10 sessions) is offered in only about one-third (38,8%). At the same time, most services (88,1%) have no official limit on the number of sessions per client. Psychological assistance is predominantly provided in Russian (98,8%); 13,2% of services can provide support in English, and only 4,5% offer assistance in other languages.

As a rule, university psychological services implement between one and ten main areas of activity (see Table 1).

Services formally established as independent structural units within universities are significantly more likely to carry out a larger number of activity areas (7–10) compared to services without formal institutional status ($\chi^2 = 6,67$; $p \leq 0,01$). The dominant form of work across services is psychological counseling. At the same time, among the wide range of reasons students seek psychological assistance, clinical symptomatology prevails (see Table 2).

Таблица 1 / Table 1
Directions of work of psychological services of higher education institutions, n, %

Directions of work	%	Number of universities
Psychological counseling	97,8	393
Conducting awareness-raising training activities with students	94,3	379
Psychological diagnostics	91,3	367
Psychological monitoring and identification of risk groups	86,1	346
Conducting educational training events with university employees	70,1	282
Participation in the university development program	64,4	259
Participation in the design and expertise of university programs and projects	55,5	223
Maintaining social media publics for psychological education purposes	52,0	209
Helpline	35,6	143
Creating chatbots	10,4	42

Table 2
Dominant subjects of applications to the psychological service, n, %*

Dominant subjects of references	%	Number of universities
Relieving a painful symptom	63,7	146
Normalization of interpersonal relations with students, classmates	37,1	149
Solving problems in relationships with parents	36,8	148
Assistance in self-development	34,1	137
Academic failures and issues related to university studies	33,3	134
Normalizing interpersonal relationships with a romantic partner	31,6	127
Help in adapting to living away from home and parents	17,9	72
Normalization of interpersonal relations with teachers	9,7	39
Help in planning for the future	8,5	34
Help with self-discovery	8,5	34
Other	3,2	13

Note: «*» — respondents could choose no more than three answer options.

Both underload and overload of psychological services are observed. Underload is characteristic of 12,9% of institutions, primarily those in which the services were established recently ($\chi^2 = 6,46$; $p \leq 0,05$) and in university branch campuses (41,2% vs. 12,2%; $\chi^2 = 11,71$; $p \leq 0,001$). Overload, on the other hand, is reported by every third psychological service (33,9%). This situation is more typical for universities participating in the “Top 5-100” program (73,3% vs. 32,2%; $\chi^2 = 10,86$; $p \leq 0,01$), for public universities (36,2% vs. 11,4%; $\chi^2 = 8,7$; $p \leq 0,01$), for services that serve as

practicum bases for psychology students (41,4% vs. 28,7%; $\chi^2 = 6,65$; $p \leq 0,01$), and overall for more developed services with a larger number of staff members ($\chi^2 = 10,54$; $p \leq 0,05$).

In addition to their core psychological functions, university administrations often assign psychological services other types of tasks. The majority of services (72,7%) report receiving assignments from university leadership related to educational and character-building activities, while 43% indicate that they were tasked with conducting informational or preventive campaigns

aimed at discouraging students from participating in unauthorized public actions.

Staff composition

The median number of employees in the surveyed psychological services was two (min = 1, max = 40). Approximately one-third of services employ only one staff member (35,8%), and another third have 2–3 employees (34,8%). In most cases, services have no more than six staff members (88,8%). The workforce of psychological services is predominantly female: only 19,2% of the surveyed services reported having a male psychologist on staff.

Universities set varying requirements for the professional qualifications of psychological service employees. While work experience requirements are often not specified (43,3%), in more than half of the cases (61,2%) staff members are required to undertake professional development at least once every three years, and in 16,2% of cases, annually. Professional development may be funded by the university or organized internally. In half of the cases (48,0%), universities pay for employees' continuing education in external organizations, and in one-quarter of cases (25,1%) they offer such training internally. Additionally, 16,2% of services organize supervision sessions, and 14,7% hold intervision meetings.

Personal therapy is required for staff members in only 6,5% of cases, with this requirement being more common in public universities ($\chi^2 = 7,04$; $p \leq 0,01$).

Many services lack sufficient staffing diversity, particularly in terms of specialists with different areas of expertise. Specifically, only one-third of services (33,1%) employ at least one counseling psychologist with a clinical or medical psychology specialization. Considering the predominance of quasi-clinical issues among student

requests, the absence of such specialists may negatively affect the overall effectiveness of the service.

Formalized cooperation with external mental health services (psychological or psychiatric) exists in only about one-third of universities (30,6%), while in 43,8% of cases such collaboration relies on personal contacts between staff members — an approach that may be vulnerable in the long term.

Material and technical resources

In 52,3% of cases, the facilities allocated to psychological services are considered insufficient for effective work by their staff, and 11,9% of service psychologists do not have their own designated workspace (desk/chair). The premises of every third service (39,3%) are reported to require renovation.

Evaluation and communication of psychological service outcomes

Only about half of the services (56%) conduct an evaluation of their effectiveness. In one-third of cases, effectiveness is assessed through client feedback (31,3%), and equally often through pre–post outcome measures (35,6%). Evaluation of service effectiveness is more common in universities where the service has existed for a longer period ($\chi^2 = 7,08$; $p \leq 0,05$), employs a larger number of staff members ($\chi^2 = 22,41$; $p \leq 0,01$), and is formally established as an independent structural unit (77,3% vs. 55,2%; $\chi^2 = 14,7$; $p \leq 0,01$).

Unique information about student or staff issues obtained through the work of psychological services is rarely used for further institutional analysis. Most often, such information is discussed internally within the service during intervision sessions or planning meetings (38,3%), and in one-third of cases (34%) it is submitted as an analytical report to university leadership

or staff. Only in 15,4% of cases is this information officially discussed during meetings with university administration, and in just 10,2% of cases it is shared during meetings with other university departments.

Discussion

The conducted study demonstrates that the presence of psychological services in universities is a highly prevalent practice. As of 2022, an extensive network of university psychological services was already operating across the Russian Federation, comprising at least 402 units. Such services exist in universities of all federal districts, under various ministerial jurisdictions, and of different sizes.

Although the history of university psychological services in Russia spans more than 25 years, their most rapid expansion has occurred in recent years. Moreover, more than one-third of universities that did not yet have such services at the time of the study reported plans to establish them in the near future (38,9%). This makes it especially important to clarify what is actually meant by the statement “a psychological service operates within a university.”

Based on the obtained data, it is appropriate to speak of a high degree of variability among psychological services in Russian universities. Several developmental stages of psychological services can be identified. The initial, or “zero,” stage is characterized by the absence of formal institutionalization: the service is not officially established, and its functions — typically very limited — are performed by a single psychologist. Approximately one-third of all psychological services (35,8%) were at this initial stage at the time of the study. A developed psychological service, by contrast, is characterized by the presence of multiple psychologists and administrative staff. Such a service is typically established

as an independent structural unit, performs a broad range of tasks (including analytical activities), and conducts evaluations of its own effectiveness. Another basis for classification may be the degree of integration between the psychological service and other university functions. At one pole is the hybrid model, in which the psychological service is closely integrated with educational activities and also serves as a practicum base for psychology students (33,8%). At the opposite pole is the out-sourced model (2,2%), which may operate largely autonomously from the university. This classification broadly aligns with the typology proposed by I.V. Makarova (Makarova, 2017), but introduces two distinct dimensions for subgroup differentiation: (1) the level of service development (from initial to advanced) and (2) the level of integration with educational activities. At the current stage of development of psychological services, identifying clearly distinct types of functioning appears to be difficult; therefore, a dimensional rather than typological approach to describing their variability seems more appropriate.

The diversity of organizational formats among psychological services is matched by the diversity of their activities and available resources. Although the dominant function of these services is providing psychological assistance to university students — often accompanied by psycho-educational interventions and psychological assessment — other functions and the capacity to implement them vary considerably. Therefore, any evaluation of the effectiveness of psychological services should take into account both their organizational format and the resources available to them.

It is important to note that the resources and level of development of psychological services are often associated with the characteristics of the universities themselves.

Institutions that have succeeded in competitive federal support programs and possess more advanced scientific and educational infrastructures (those participating in the Priority 2030 and/or Top 5–100 programs), as well as main university campuses, are not only more likely to establish psychological services but also to do so on a larger scale. Similar trends were previously observed in analyses of university psychological service websites (Gaete et al., 2024). Indicators such as the establishment of a service as an independent structural unit and the larger number of staff members are also more common in more developed services with broader functional profiles. At the same time, the mere duration of a psychological service's existence does not serve as a significant predictor of its size or range of activities.

Conclusion

This study represents the first step toward a comprehensive understanding of the current state of psychological assistance within the higher education system of the Russian Federation. It has made it possible to quantitatively assess the key characteristics of how psychological support functions in Russian universities.

The obtained data indicate that Russia has already accumulated substantial experience in operating university psychological services, while also revealing systemic limitations in their functioning. Priority areas for further development include strengthening material and human resources, as well as expanding opportunities for professional development and training of staff. Given the high prevalence of clinically oriented requests, another strategically important task is to ensure effective collaboration between university psychological services and the psychiatric

care system, as well as with other related institutions and agencies.

It is essential to foster a consistent understanding among university leadership regarding which functions a psychological service should or can perform, and which fall outside its professional scope. There are concerning instances in which university administrations assign educational or supervisory functions to psychological services. Such practices may have potentially negative consequences for the development of these services and may undermine students' trust in university psychological support systems.

At the time of the study, most university psychological services focused primarily on students as their main target group for support and intervention. Providing services for university staff — an approach envisioned by the Concept for the Development of Psychological Services (Gaete et al., 2024) — was implemented in a substantially smaller share of services. The accumulation and dissemination of effective practices already developed for working with university employees are therefore crucial for the further advancement of this area.

As several national projects and initiatives aimed at improving the system of university psychological services have been launched in Russia over the past few years, the data presented in this article may serve as a baseline for assessing future progress and trends in their development. Another promising avenue for further research involves studying the factors that influence the effectiveness of psychological services. What resources are essential for their successful operation? Which organizational models are most effective for universities of different types? And how can their effectiveness be objectively evaluated? These questions remain open and warrant continued investigation.

Limitations. The obtained data may potentially be biased due to several factors. First, self-selection bias is likely—universities with psychological services and/or those with more developed psychological services may have been more likely to

participate in the study. Additionally, data quality may have been suboptimal in cases where the university-level documentation of the service's activities was insufficient, and the responsible staff lacked complete information about its functioning.

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Conflict of interest

The authors declare no conflict of interest.

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Авторы заявляют об отсутствии конфликта интересов.

Ethics statement

The study was conducted in accordance with the principles of the Helsinki Declaration. All participants gave voluntary informed consent to participate in the research.

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Gender dynamics in self-resilience: evidence from junior high school students in Indonesia

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Abstract

Context and relevance. Building on previous research that highlights gender differences in adolescent resilience, this study focuses on junior high school students to provide insights that can guide targeted interventions for improving mental well-being and academic success. **Objective.** This study aims to analyze the differences in self-resilience among junior high school students in Indonesia based on gender. **Hypothesis.** There is a significant difference in self-resilience between male and female junior high school students, with one group potentially demonstrating higher resilience than the other across various dimensions. **Methods and materials.** A total of 1000 students from junior high schools in Magelang Regency participated in the study. **Results.** The results revealed that the students' overall level of self-resilience was moderate, with female students ($M = 3,52$, $SD = 0,65$) demonstrating a significantly higher level of self-resilience than male students ($M = 3,38$, $SD = 0,70$) across all dimensions ($p = 0,001$). Among the five dimensions measured, optimism had the highest score ($M = 3,61$), followed by empathy, emotion regulation, problem cause analysis, and self-efficacy. The high optimism score suggests that students generally maintain a positive outlook on the future, while the high empathy score reflects their capacity to comprehend and empathize with the feelings of others. The higher self-resilience observed among female students may be attributed to their greater emotional awareness, social connection, and empathetic tendencies, which are often nurtured through socialization and cultural expectations. **Conclusions.** The study found a significant but small gender difference in self-resilience among junior high school students, with female students exhibiting higher resilience. These findings emphasize the need for targeted interventions that consider gender differences to enhance adolescent resilience and mental well-being.

Keywords: self-resilience, gender differences, optimism, emotion regulation

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Гендерная динамика самоустойчивости: данные среди учеников старшей школы в Индонезии

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Резюме

Контекст и актуальность. На основании предыдущих исследований, выделяющих гендерные различия в уровнях устойчивости у подростков, настоящее исследование сосредоточено на анализе учащихся старшей школы с целью получения актуальной информации, которая может быть использована для разработки целенаправленных мер и программ по повышению психологического благополучия и академической успешности данной возрастной группы. **Цель.** Цель исследования — проанализировать различия в уровне самоустойчивости среди учеников старшей школы в Индонезии в зависимости от пола. **Гипотеза.** Существует значительное различие в самоустойчивости между мальчиками и девочками в старшей школе, при этом одна из групп может демонстрировать более высокий уровень устойчивости по различным измерениям. **Методы и материалы.** В исследовании приняли участие 1000 учащихся старшей школы округа Магеланг. **Результаты.** Результаты показали, что общий уровень самоустойчивости учащихся был средним, причем девочки ($M = 3,52$, $SD = 0,65$) демонстрировали значительно более высокий уровень самоустойчивости, чем мальчики ($M = 3,38$, $SD = 0,70$), по всем измерениям ($p = 0,001$). Среди пяти измеряемых аспектов наивысший балл был у оптимизма ($M = 3,61$), за ним следовали эмпатия, регуляция эмоций, анализ причин проблем и самозффективность. Высокий уровень оптимизма свидетельствует о том, что учащиеся в целом сохраняют позитивный взгляд на будущее, а высокий уровень эмпатии отражает их способность понимать и сопереживать чувствам других. Более высокая самоустойчивость, наблюдается у девочек, что может быть связано с их большей эмоциональной осознанностью, социальной связностью и склонностью к эмпатии, которые часто формируются в процессе социализации и под влиянием культурных ожиданий. **Выводы.** Исследование выявило значительное, но небольшое гендерное различие в самоустойчивости среди учащихся старшей школы, при этом девочки демонстрировали более высокую устойчивость. Эти результаты подчеркивают необходимость разработки целенаправленных мер, учиты-

вающих различия между полами, для повышения устойчивости и психологического благополучия подростков.

Ключевые слова: самоустойчивость, гендерные различия, оптимизм, регуляция эмоций

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Introduction

Adolescence is a pivotal period in human development, during which individuals experience significant physical, cognitive and psychosocial changes. Adolescent experiences, both physical and psychosocial, shape the structure and function of neural networks, affecting the development of normal and pathological behaviors (Dow-Edwards et al., 2019). Physical changes include rapid growth and significant hormonal changes, which impact the mental and physical health of adolescents. In this context, physical activity has been widely recognized for its positive impact on adolescent well-being. Research shows that regular exercise can help reduce symptoms of anxiety and depression, as demonstrated by a 12-week physical activity program that significantly alleviated these symptoms in participants (Silva et al., 2024). Similarly, exercise interventions have been found to effectively lower anxiety and depression levels in children and adolescents with ADHD (Feng et al., 2024).

Meanwhile, cognitive changes include the development of abilities such as strategic plan-

ning, suppressing unsuitable behaviors, and specific types of memory that progressively develop throughout adolescence. These advancements are supported by significant neurodevelopmental processes, including synaptic pruning and myelination, which optimize brain function and enhance cognitive abilities. Research indicates that the maturation of gray matter, particularly in the prefrontal cortex, plays a key role in improving executive functions such as decision-making, impulse control, and emotional regulation (Diekema, 2020; Squeglia, 2020). These cognitive changes interact with psychosocial shifts, such as changes in the social environment, including the move from primary school to a larger secondary school with a large and unstable social hierarchy, as well as increased time spent with friends compared to childhood (Blakemore, 2019).

Adolescence is widely recognized as a transitional stage between childhood and adulthood, during which cognitive abilities develop significantly, leading to improvements in abstract thinking, problem-solving, and decision-making skills

(Pfeifer & Allen, 2021). It is also a period during which adolescents explore ways to navigate new and often stimulating social challenges while adapting to the diverse physical, cognitive, and emotional changes occurring within them. In particular, adolescence is a period of critical transition that sets the foundation for later development and well-being. Given these significant cognitive shifts, support from both family and community is essential. As adolescents seek greater independence, misunderstandings with parents may arise, potentially leading to maladaptive behaviors such as non-suicidal self-injury (Li et al., 2023). Community involvement, including extracurricular activities, can enhance cognitive skills and provide much-needed social support, particularly benefiting disadvantaged adolescents (Pan et al., 2022). This stage is marked by notable physical, cognitive, and psychosocial transformations, including rapid physical development, alterations in facial features, voice, and body traits that vary between genders, metabolic shifts, the emergence of new drives and motivations, changes in sleep patterns and circadian rhythms, as well as a variety of social, behavioral, and emotional changes. This phase also involves sexual maturation that begins with adrenarche in mid-childhood and persists throughout puberty, a period of adjustment to social and cultural complexities. It is also the stage when gender differences in social and emotional behaviors, including gender roles, commonly become more defined (Patton et al., 2016).

When confronted with these difficulties and stresses, resilience is an essential component for adolescents to adapt positively and maintain mental well-being. Interventions that enhance individual resilience factors, family and/or social support can help reduce the likelihood of developing psychopathology after experiencing childhood adversity (Dray et al., 2017; Fritz et al., 2018). Factors including coping strategies, cognition, optimism, and self-esteem at the individual level, positive family relationships or social connections, as well as community influences like participation in school, church, or support groups, have been recognized as contributing to resilient outcomes in both adolescence and adulthood (Gartland et al., 2019). Resilience is the capac-

ity of an individual to recover from challenging circumstances, adapt to change, and manage stress effectively. According to Resilience Theory by Reivich & Shatté (2003), resilience is built upon key factors such as emotional regulation, impulse control, optimism, causal analysis, empathy, self-efficacy, and reaching out. These cognitive and emotional skills help individuals navigate adversity and maintain well-being. While Reivich & Shatté (2003) focus on specific skills that can be developed to improve resilience, Maddi (2005) perspective frames resilience as a personality disposition that influences how individuals interpret and respond to stressors. For teenagers, resilience is fundamental in coping with the stress and pressure of daily life, helping them remain focused and productive (Abdillah et al., 2023). In adolescence, this ability to adapt and thrive despite adversity, trauma, or major stressors — such as family difficulties, health challenges, and environmental or academic pressures — becomes particularly significant (Ungar & Theron, 2020). Reflecting this, Nilsson et al. (2023) found that resilience in adolescents helps mitigate trauma symptoms, with peers serving as a protective factor against interpersonal trauma and adverse childhood circumstances for males, while family played a role in buffering noninterpersonal trauma for females.

Earlier studies indicated that adolescents from single-parent households exhibited lower resilience and self-esteem, along with more depressive symptoms, compared to those living with both parents (Chung et al., 2020). As a result, it is important to allocate more attention, resources, and health services to adolescents from single-parent families. Additionally, Stratta et al. (2013) reported that gender differences in resilience and coping mechanisms following traumatic events revealed that adolescent boys exposed to the earthquake reported higher resilience scores and used problem-focused coping strategies more frequently than girls. Therefore, gender differences in stress responses and coping styles were identified. This previous research stresses the importance of resilience, as adolescents with higher levels of resilience tend to have better mental health, higher academic

achievement, more positive social relationships, and more adaptive coping skills compared to those with lower resilience. However, it also suggests that there are differences in resilience levels between male and female adolescents, with gender factors potentially influencing the development and manifestation of resilience.

Although research on adolescent resilience has been conducted, there is still limited work that specifically analyzes the self-resilience of junior high school students while considering gender aspects. In fact, a comprehensive understanding of the dynamics of resilience in junior high school students and how gender influences this process is key to creating focused interventions to improve adolescent mental well-being. Therefore, this study aims to investigate the differences in self-resilience among junior high school students based on gender. The findings are expected to provide valuable insights for schools, parents, and mental health practitioners in designing resilience-strengthening programs that meet the unique needs of adolescent boys and girls, ultimately supporting the positive development and optimal mental well-being of junior high school students.

Methods

Research design

This research is a quantitative study with a cross-sectional survey design aimed at analyzing the differences in self-resilience among junior high school students based on gender. The study was conducted with students from Magelang Regency, Indonesia. Magelang Regency was selected as the study location due to its demographic diversity, with schools spread across both urban and rural areas, as well as a variety of school types (public and private junior high schools). This diversity allows for an analysis of self-resilience in different educational contexts. Junior high school students were chosen as the target group because this is a critical period in adolescent development (Fengjun et al., 2022), during which they experience significant physical, cognitive, and psychosocial changes and face various adaptation challenges that require resilience.

Participants

The population consisted of all junior high school students in Magelang Regency. The sample was selected through a cluster random sampling method, considering the representation of public and private schools, as well as geographical location (urban and rural). The sampling process resulted in a total of 1000 students, with 500 male students and 500 female students. The selection of 1000 students with a balanced composition of males and females aimed to obtain representative data for analyzing gender differences in self-resilience.

Instruments

The instrument used is a self-resilience scale constructed based on the resilience theory of Reivich and Shatté (Reivich & Shatté, 2003), which consists of seven dimensions: emotion regulation, impulse control, optimism, analyzing the cause of the problem, empathy, self-efficacy, and reaching out. This scale uses a Likert response format with five answer choices: Perfect Fit (5), Fit (4), Quite Fit (3), Not Appropriate (2), and Very Mismatched (1). The detailed framework of the self-resilience instrument is presented in Table 1.

Validity and reliability of the instrument

Content validity was evaluated through expert judgment involving two experts as validators. The first validator is a PhD in Developmental Psychology, specializing in adolescent development and psychosocial adaptation, with over 5 years of experience in adolescent development research and in creating instruments for measuring psychological variables in adolescents. The second validator is a PhD in Guidance and Counseling, specializing in adolescent psychological assessment, with over 5 years of practical experience in adolescent problem management and the development of school-based intervention programs. The validators assessed the relevance of the items with respect to theoretical constructs, linguistic accuracy, and cultural and developmental appropriateness for adolescents, using a structured assessment format with a scale of 1–4 for each item. The validation results confirmed

Table 1

Self-resilience scale grid

No.	Dimension	Indicator	Item code	Number of items
1.	Emotion regulation	Ability to stay calm under pressure	ER1, ER2, ER3	3
		Ability to regulate emotions	ER4, ER5, ER6	3
2.	Impulse control	Ability to control desires	IC1, IC2, IC3	3
		Ability to delay gratification	IC4, IC5, IC6	3
3.	Optimism	Looking at the future positively	OP1, OP2, OP3	3
		Confidence in problem-solving skills	OP4, OP5, OP6	3
4.	Analyzing the cause of the problem	Identifying the cause of the problem	CA1, CA2, CA3	3
		Finding a solution to a problem	CA4, CA5, CA6	3
5.	Empathy	Understanding the feelings of others	EM1, EM2, EM3	3
		Provide appropriate responses	EM4, EM5, EM6	3
6.	Self-efficacy	Confidence in one's own abilities	SE1, SE2, SE3	3
		Courage to face challenges	SE4, SE5, SE6	3
7.	Reaching out	Ability to seek help	RO1, RO2, RO3	3
		Willingness to learn from experience	RO4, RO5, RO6	3
Total				42

that all items were relevant and aligned with the measured constructs, with only minor language adjustments made to enhance readability for junior high school students.

Subsequently, a pilot test was conducted to further assess the instrument's validity and reliability. Construct validity was evaluated using confirmatory factor analysis (CFA) with LISREL 8.80 software. The CFA results indicated that the self-resilience measurement model, comprising seven dimensions (emotion regulation, impulse control, optimism, problem cause analysis, empathy, self-efficacy, and reaching out), exhibited a good fit with the data (CFI = 0.97, TLI = 0.96, RMSEA = 0.04). All items demonstrated significant factor loadings ($p < 0.05$), ranging from 0.52 to 0.87, confirming the validity of the items in measuring their corresponding dimensions of self-resilience.

Additionally, the reliability of the self-resilience scale was tested using the internal consistency method, with Cronbach's alpha coefficient. The results indicated that the self-resilience scale showed high reliability, with a Cronbach's alpha of 0.92. The reliability coefficients for each dimension were also deemed good, ranging from 0.78 to 0.86.

Data analysis

The gathered data were analyzed using both descriptive and inferential statistical methods. Descriptive statistics were applied to outline the overall level of self-resilience among students, as well as by gender. Inferential statistics, specifically the independent t-test, were employed to analyze the differences in self-resilience between male and female students. Prior to conducting the t-test, the assumptions of normality and homogeneity of variance were assessed. If these assumptions were violated, non-parametric tests were used instead. A significance level of 0.05 was applied for all statistical analyses.

Results

Respondent characteristics

Based on Table 2, the respondents in this study are evenly distributed by gender, with 50% being male and 50% female. Regarding school type, the highest proportion of students are from public junior high schools (31.0%), followed by private junior high schools (28.9%). Private Islamic junior high schools account for 25.1%, while public Islamic junior high schools represent 15.0% of the sample. Regarding age, most of the respondents are 13 years old (38.5%),

followed by 14 years old (28,0%) and 12 years old (27,5%), with the smallest proportion being 15 years old (6,0%). Most respondents identify as Muslim (85,0%), while smaller proportions identify as Christian (9,0%) or Catholic (6,0%). Lastly, slightly more respondents attend schools in rural areas (54,2%) compared to urban areas (45,8%). This distribution reflects a diverse representation across key demographic and contextual variables.

Students’ self-resilience level

This section presents the results of a descriptive analysis to examine students’ overall self-resilience levels and its dimensions. These findings provide an overview of students’ self-resilience, forming the basis for further discussions on gender-based differences and the implications for designing targeted interventions. The analysis indicates that students’ self-resilience is at a moderate level ($M = 3,45$, $SD = 0,68$). Table 3 provides the descriptive statistics for the overall self-resilience level.

Based on Table 4, the optimism dimension has the highest mean score ($M = 3,61$, $SD = 0,75$), indicating a generally positive outlook among students. This is followed by

empathy ($M = 3,59$, $SD = 0,74$) and emotion regulation ($M = 3,52$, $SD = 0,79$). Moderate scores are seen in analyzing the cause of the problem ($M = 3,47$, $SD = 0,81$) and self-efficacy ($M = 3,40$, $SD = 0,77$), while lower scores are noted in impulse control ($M = 3,38$, $SD = 0,82$) and reaching out ($M = 3,28$, $SD = 0,85$). In summary, the findings indicate that while students demonstrate strengths in optimism and empathy, there are opportunities for improvement in areas like impulse control and seeking support, which suggests a need for targeted interventions to enhance overall self-resilience.

Gender differences in self-resilience

Before conducting the difference test, prerequisite analyses were performed. The normality test, performed using the Kolmogorov-Smirnov test, yielded a significance value of $p = 0,200$, which is greater than 0,05 (Table 5). Therefore, the self-resilience data can be considered normally distributed, meeting the assumption of normality. Additionally, the homogeneity test using Levene’s Test produced a significance value of $p = 0,382$ (Table 6). Since this value is greater than 0,05, it can be concluded that the data variance between the groups is homogeneous.

Table 2

Respondent characteristics (N = 1000)

Characteristic	Category	Frequency (f)	Percentage (%)
Gender	Male	500	50,0
	Female	500	50,0
School type	Public Junior High School	310	31,0
	Private Junior High School	289	28,9
	Public Islamic Junior High School	150	15,0
	Private Islamic Junior High School	251	25,1
Age	12 Years	275	27,5
	13 Years	385	38,5
	14 Years	280	28,0
	15 Years	60	6,0
Religion	Islam	850	85,0
	Christian	90	9,0
	Catholic	60	6,0
School location	Urban	458	45,8
	Rural	542	54,2

Table 3

Descriptive statistics of overall self-resilience level

Variable	N	Mean	Std. deviation	Min.	Max.
Self-Resilience	1000	3,45	0,68	1,25	5,00

Table 4

Descriptive statistics of self-resilience dimensions

No.	Dimensions	Mean	Std. deviation	Min.	Max.
1.	Emotion regulation	3,52	0,79	1,00	5,00
2.	Impulse control	3,38	0,82	1,00	5,00
3.	Optimism	3,61	0,75	1,00	5,00
4.	Analyzing the cause of the problem	3,47	0,81	1,00	5,00
5.	Empathy	3,59	0,74	1,00	5,00
6.	Self-efficacy	3,40	0,77	1,00	5,00
7.	Reaching out	3,28	0,85	1,00	5,00

Table 5

Normality test results

Variable	Test statistic	Sig. (p-value)	Normality conclusion
Self-Resilience	Kolmogorov-Smirnov	0,200	Normal (p > 0,05)

Table 6

Homogeneity of variance test results

Variable	Levene statistic	Sig. (p-value)	Homogeneity conclusion
Self-resilience	0,845	0,382	Homogenous (p > 0,05)

Based on Table 7, there are significant differences in self-resilience scores between male and female students across all dimensions. Female students scored higher than male students in all seven dimensions of self-resilience, as indicated by the negative t-values. The dimensions showing significant differences include emotion regulation ($t = -2,84$, $p = 0,005$), impulse control ($t = -2,38$, $p = 0,017$), optimism ($t = -2,58$, $p = 0,010$), analyzing the cause of the problem ($t = -2,40$, $p = 0,016$), empathy ($t = -3,46$, $p = 0,001$), self-efficacy ($t = -2,49$,

$p = 0,013$), and reaching out ($t = -2,28$, $p = 0,023$). All p-values are less than 0,05, suggesting that the differences between male and female students in these dimensions of self-resilience are statistically significant. However, Cohen's d values ranging from 0,08 to 0,11 suggest a small difference in self-resilience scores between male and female students across all dimensions. Thus, although gender-related differences in self-resilience scores are statistically significant, their practical impact is limited.

Table 7

Comparison of self-resilience score based on gender

No.	Dimensions	Male	Female	t	p-value	Cohen's d
1.	Emotion regulation	3,45	3,59	-2,84	0,005	0,10
2.	Impulse control	3,32	3,44	-2,38	0,017	0,08

No.	Dimensions	Male	Female	t	p-value	Cohen's d
3.	Optimism	3,55	3,67	−2,58	0,010	0,09
4.	Analyzing the cause of the problem	3,41	3,53	−2,40	0,016	0,09
5.	Empathy	3,51	3,67	−3,46	0,001	0,11
6.	Self-efficacy	3,34	3,46	−2,49	0,013	0,09
7.	Reaching out	3,22	3,34	−2,28	0,023	0,09

Note: The negative t-value indicates that female students scored higher than male students on the dimensions; A p-value < 0,05 signifies a substantial difference between male and female students across the dimensions.

Discussion

This study indicates that the self-resilience levels of junior high school students in Magelang Regency fall within the moderate category. This finding aligns with previous research, which suggests that adolescents generally exhibit moderate to high levels of resilience (Dray et al., 2017; Fritz et al., 2018). Zhou et al. (2024) emphasized that resilience is a dynamic process rather than a fixed trait, developing through successful socio-emotional adaptation and creating a foundation of resilience resources for future challenges. The moderate level of self-resilience observed in this study highlights the potential for further development through appropriate interventions. Among the dimensions of self-resilience, optimism had the highest mean score. Adolescents with higher levels of optimism tend to experience better psychological well-being, demonstrate more adaptive coping skills, and achieve higher academic performance (Hill et al., 2021). Therefore, fostering optimism through psychosocial interventions may serve as an effective strategy for enhancing adolescent resilience (Zukerman et al., 2024).

In contrast, the reaching-out dimension had the lowest mean score in this study. Reaching out refers to the ability to seek support and resources from others when facing difficulties (Hjemdal et al., 2006). Low scores on this dimension may indicate challenges adolescents face in seeking help, such as stigma, limited availability of services, or social norms discouraging help-seeking behavior (Radez et al., 2021). Overall, the moderate level of self-resilience observed in this study underscores the need for targeted interventions to enhance resilience. Schools are well-positioned to lead these efforts through a whole-school approach that involves teachers, staff, families, and

communities (Ungar & Theron, 2020). In this context, school-based programs that foster resilience are increasingly recognized as essential in education, helping students manage stress, navigate difficulties, and enhance emotional well-being. Social-emotional learning initiatives, such as the social-emotional and ethical learning curriculum and the sources of strength program, have been shown to improve emotional regulation, empathy, and interpersonal skills, leading to positive behavioral and academic outcomes (Min et al., 2024; Valido et al., 2023). Additionally, incorporating culturally sensitive and gender-responsive approaches can significantly enhance the relevance and effectiveness of these programs (Wilson et al., 2017).

The results also reveal a meaningful difference in self-resilience between male and female students, with female students demonstrating higher levels of self-resilience than their male peers. This finding aligns with previous studies suggesting that women generally exhibit higher resilience compared to men (Nishimi et al., 2021; Tomas et al., 2021). Several factors may explain these gender differences. Variations in gender socialization and coping strategies likely play a role, as females are more inclined to seek social support and express emotions, whereas males are more prone to internalize their struggles. Additionally, contextual factors such as family, school, and community environments may influence resilience. Nilsson et al. (2023) found that resilience in adolescents reduces trauma symptoms, with peer support protecting males from interpersonal trauma and adverse childhood experiences, while family support helped females cope with noninterpersonal trauma. These insights underscore the importance of considering

gender roles and social contexts when designing interventions to enhance adolescent resilience.

These findings emphasize the need for designing interventions to enhance adolescent resilience with consideration for gender differences. Gender-sensitive programs should address specific protective and risk factors relevant to both males and females (Dray et al., 2017). For instance, interventions for boys could focus on enhancing adaptive coping strategies and reducing internalizing behaviors, while programs for girls might prioritize strengthening social support networks. Given the crucial role of family and school environments in fostering resilience, family resilience has been identified as a strong predictor of mental health in university students (Fan et al., 2024). Likewise, a supportive school atmosphere, characterized by positive peer relationships and teacher-student interactions, significantly contributes to students' resilience (Yang et al., 2022). Recognizing and addressing these gender differences allows interventions to more effectively equip adolescents with the resilience needed to overcome challenges and flourish.

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Conclusion

This study examined gender differences in self-resilience among junior high school students in Magelang Regency, Indonesia. The results revealed that students' overall level of self-resilience was moderate, with female students demonstrating significantly higher self-resilience across all dimensions. However, this difference has a small effect size, as indicated by Cohen's *d* values; therefore, its practical impact is limited. Among the dimensions, optimism had the highest average score, while reaching out had the lowest. These findings provide important insights for designing targeted interventions to strengthen students' self-resilience, taking into account gender differences and aspects that need further focus. Future research should investigate the factors contributing to gender differences in adolescent self-resilience and explore the development of culturally sensitive and gender-responsive interventions that support the positive development and mental well-being of junior high school students.

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Contribution of the authors

Taufik Agung Pranowo — ideas; conceptual; annotation, drafting; writing and design of the manuscript; planning of the research; control over the research.

AlHalik AlHalik — ideas, application of statistical methods for data analysis; conducting the experiment; data collection and analysis.

All authors participated in the discussion of the results and approved the final text of the manuscript.

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Тауфик Агунг Праново — идеи; концептуализация; аннотация, составление черновика; написание и оформление рукописи; планирование исследования; контроль за проведением исследования.

АльХалик АльХалик — идеи; применение статистических методов для анализа данных; проведение эксперимента; сбор и анализ данных.

Все авторы участвовали в обсуждении результатов и одобрили окончательный текст рукописи.

Conflict of interest

The authors declare no conflict of interest.

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Role of mathematics academic performance and attitude towards mathematics: the mediating role of english learning achievement

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Abstract

Context and relevance. Mathematics academic performance, attitude, and English learning achievement are essential components of 21st-century education, shaping students' cognitive and problem-solving abilities. Although existing studies have explored the relationships between these domains, research on their interconnected impact remains limited, highlighting the need for further investigation. **Objective.** This study examines the relationship between English learning academic performance, attitudes towards mathematics, and mathematics achievement among Indonesian college students.

Hypothesis. (1) There will be a positive relationship between English learning achievement and mathematics academic performance among Indonesian students. (2) There will be a positive relationship between attitude towards mathematics and mathematics academic performance among Indonesian students. (3) English learning achievement will mediate the relationship between attitude towards mathematics and mathematics academic performance among Indonesian students. **Methods and materials.** The participants included 381 mathematics students, with an average age of 19,82 years and $SD = 0,55$ from four universities in Indonesia. The study employed self-report measures to assess English learning and mathematics achievement, as well as an attitudes towards mathematics questionnaire. Structural equation modeling was applied for data analysis. **Results.** The study found significant links between English proficiency, attitudes toward mathematics, and math performance among Indonesian college students. Higher English skills were associated with better math achievement, while negative attitudes toward math and lower socioeconomic status negatively affected performance. Additionally, English learning achievement mediated the relationship between math attitudes and performance. **Conclusions.** The results revealed that there were significant associations between these variables, highlighting the importance of considering multiple factors in understanding academic success. These implications underscore the importance of creating inclusive and supportive learning environments that cater to the diverse needs of students, ultimately fostering academic success in mathematics.

Keywords: attitudes towards mathematics, mathematics achievement, english learning academic performance, university students

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Роль академической успеваемости в математике и отношение к математике: опосредующая роль учебных достижений в изучении английского языка

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Резюме

Контекст и актуальность. Академическая успеваемость по математике, отношение к ней и достижения в изучении английского языка являются важнейшими компонентами образования XXI века, формирующими когнитивные и аналитические способности студентов. Несмотря на то, что существующие исследования изучают связь между этими областями, комплексное воздействие данных факторов пока недостаточно изучено, что подчеркивает необходимость дальнейшего исследования. **Цель.** Данное исследование рассматривает связь между академической успеваемостью в изучении английского языка, отношением к математике и достижениями по математике среди студентов университетов Индонезии. **Гипотезы:** (1) Предполагается наличие положительной связи между достижениями в изучении английского языка и академической успеваемостью по математике среди студентов Индонезии. (2) Предполагается наличие положительной связи между отношением к математике и академической успеваемостью по математике среди студентов Индонезии. (3) Предполагается, что достижения в изучении английского языка опосредуют связь между отношением к математике и академической успеваемостью по математике среди студентов Индонезии. **Методы и материалы.** В исследовании приняли участие 381 студент математического направления из четырех университетов Индонезии, средний возраст которых составил 19,82 года (SD = 0,55). Для оценки достижений в изучении английского

языка и по математике использовались методы самоотчета, а также был применен опросник, оценивающий отношение к математике. Для анализа данных использовалось моделирование структурных уравнений. **Результаты.** В исследовании выявлены значимые связи между уровнем владения английским языком, отношением к математике и успешностью в математике среди студентов университетов Индонезии. Более высокий уровень английского языка был связан с лучшими результатами по математике, тогда как отрицательное отношение к математике и более низкий социально-экономический статус оказывали негативное влияние на успеваемость. Кроме того, достижения в изучении английского языка выступали медиатором в связи между отношением к математике и результатами обучения. **Выводы.** Результаты показали, что существуют значительные связи между этими переменными, что подчеркивает важность учета множества факторов при анализе академической успешности. Данные выводы акцентируют внимание на необходимости создания инклюзивной и поддерживающей образовательной среды, учитывающей разнообразные потребности студентов и способствующей достижению успехов в обучении математике.

Ключевые слова: отношение к математике, учебные достижения по математике, успеваемость по английскому языку, студенты университетов

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Introduction

The educational process is a fundamental aspect of academic development (Mallarangan et al., 2024). Important components, such as individual behavior and academic achievement, play a crucial role in shaping future opportunities for individuals (Arumugam et al., 2021; Russell et al., 2020). Within the realm of education, English learning achievement (ELA) and mathematics achievement are two key domains that

have garnered significant attention. Proficiency in English has become increasingly important in our globalized world, enabling individuals to communicate effectively and access a wide range of academic and professional opportunities. Mathematics, on the other hand, provides a foundation for logical reasoning (Graafsma et al., 2023), problem-solving (Supriadi et al., 2024), creative thinking skills (Suherman & Vidákovich, 2024), and critical thinking skills (Hwang et al., 2023) that are essential in various

fields, including science, technology, engineering, and finance.

Previous research has explored the individual relationships between ELA, attitude toward mathematics (ATM), and mathematics academic performance (MAP). Several studies have demonstrated a positive correlation between ELA and mathematics achievement. For example, a study by Stoffelsma & Spooren (2019) found that a significant positive relationship between English reading proficiency and academic achievement in science and mathematics. Students with higher English reading proficiency demonstrated higher academic achievement in these subjects compared to those with lower English reading proficiency. This finding suggests that proficiency in the English language, which is often the medium of instruction in science and mathematics courses, plays a crucial role in students' academic success. Empirical studies, such as those by Thompson et al. (2022) Cuevas (2019) and Beal et al. (2010), have demonstrated that students with strong English skills are better equipped to grasp complex scientific and mathematical concepts, leading to higher achievement. Additionally, English proficiency was found to significantly predict math achievement among Latino and Asian immigrant students (Barrett et al., 2012). Students with higher English proficiency demonstrated better math performance compared to those with lower proficiency levels.

Moreover, the role of ATM has been extensively studied in relation to mathematics achievement. Research by Hwang & Son (2021) found a positive relationship between students' ATM and their mathematics achievement. Students who reported higher levels of interest, enjoyment, and perceived value of mathematics tended to have higher academic performance in the subject. Conversely, students with negative attitudes may experience difficulties in understanding mathematical concepts and lack the motivation to succeed in the subject (Peteros et al., 2019).

While there is a substantial body of literature examining the relationships between English learning achievement, attitude toward mathematics, and mathematics achievement, limited research

has explored the interplay between these factors. Understanding the combined effects and potential mediating role of attitude toward mathematics in the relationship between ELA and mathematics achievement is crucial for a comprehensive understanding of students' academic performance.

Therefore, this study aims to bridge this research gap by investigating the relationship between English learning achievement, attitude toward mathematics, and mathematics achievement. By examining the mediating role of attitude toward mathematics, we can gain insights into the mechanisms through which English learning achievement influences mathematics achievement. Additionally, exploring any reciprocal relationship between attitude toward mathematics and English learning achievement can provide a more comprehensive understanding of the dynamics between these variables.

The findings of this study will contribute to the existing body of knowledge on the relationship between English learning achievement, attitude toward mathematics, and mathematics achievement. The results can inform educators and policymakers in developing effective strategies to promote students' success in both English and mathematics. By understanding the role of attitude toward mathematics as a potential mediator, interventions can be designed to enhance students' attitudes and motivation, thereby positively impacting their mathematics achievement. Furthermore, the reciprocal relationship between attitude toward mathematics and English learning achievement can shed light on the bidirectional influences between these variables and inform educational practices aimed at optimizing.

Literature review

Mathematics academic performance and attitude towards mathematics

Mathematics achievement in term of mathematics academic performance and ATM have been extensively studied in the field of education, as they play crucial roles in students' learning and performance in mathematics. Previous research has extensively examined the relationship between mathematics achievement and ATM,

shedding light on their interplay and significance in the field of education. Recber et al. (2018) reported that self-efficacy, ATM, and mathematics achievement were positively correlated, indicating that students who had higher levels of self-efficacy and positive attitudes toward mathematics tended to achieve better in the subject. Similarly, a study conducted by Kiwanuka et al. (2022) indicated a bidirectional relationship between attitude toward mathematics and mathematics achievement over time. On one hand, positive attitudes toward mathematics were found to be a significant predictor of higher mathematics achievement in the future. Positive attitudes, encompassing various dimensions, contribute to students' motivation, engagement, and success in the subject (Everingham et al., 2017; Singh et al., 2002). These findings underscore the importance of promoting positive attitudes toward mathematics through effective instructional strategies, engaging learning environments, and supportive teacher-student interactions.

MAP and ELA

The relationship between mathematics achievement and English academic performance has been the focus of several studies aiming to understand the interplay between these two domains of learning. Previous research has shown a significant correlation between mother tongue proficiency and mathematics achievement (Perez & Alieto, 2018). The researchers observed that students who had a higher level of proficiency in their mother tongue performed better in mathematics. This suggests that a strong foundation in the mother tongue language positively influences students' mathematics skills and academic performance. At the same time, Trakulphadetkrai et al. (2020) study indicated that general language ability, specifically oral language proficiency, played a significant role in mathematics achievement. Additionally, English proficiency was found to be a significant predictor of math achievement among Latino and Asian students (Barrett et al., 2012). Students with higher levels of English proficiency demonstrated better math performance compared to those with lower proficiency.

ELA as a mediator of relationship between ATM and MAP

The relationship between attitude towards mathematics and mathematics achievement can be influenced by various factors. Previous research has examined the mediating role of English academic performance in the relationship between ATM and mathematics achievement. Students who held positive ATM demonstrated higher levels of achievement in the subject compared to those with negative or indifferent attitudes (Dan'inna, 2017). Similarly, the study conducted by Rivera & Waxman (2011) examined the attitudes of resilient and nonresilient Hispanic English language learners (ELLs) towards their classroom learning environment in mathematics. The study found that resilient ELLs, who exhibited positive adaptation and academic success despite facing adversity, generally had more positive attitudes towards their classroom learning environment in mathematics compared to nonresilient ELLs. These studies suggest that ELA can mediate the relationship between attitude towards mathematics and mathematics achievement, indicating the importance of considering students' language skills and performance in understanding their overall academic success in mathematics.

Research aims and hypothesis

The aim of this study is to examine the relationship between ELA, ATM, and MAP among Indonesian students. The following hypotheses are followed:

H1: There will be a positive relationship between english learning achievement and mathematics academic performance among Indonesian students.

H2: There will be a positive relationship between attitude towards mathematics and mathematics academic performance among Indonesian students.

H3: English learning achievement will mediate the relationship between attitude towards mathematics and mathematics academic performance among Indonesian students (Figure 1).

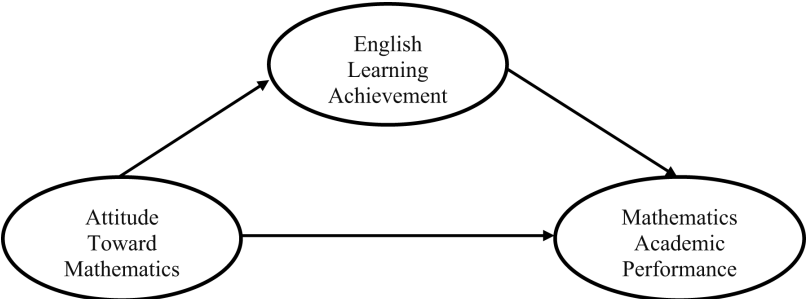


Fig. 1. The Hypothesis of the role of English academic performance as a mediator relationship attitude towards mathematics and mathematics academic performance

Material and methods

Participants

This cross-sectional study was conducted at four universities in Indonesia with 381 mathematics students (mean age 19,82 years, *SD* = 0,55). Participants were randomly selected to reduce bias, with 56,4% female. All students had completed

real analysis courses, studying about 2,5 hours weekly, and had taken a basic English course. Demographic details are presented in Table 1.

Instruments

Attitude towards mathematics. The instrument used to measure ATM in this study was

Table 1

Summarized of the participants

Demographic characteristics	Frequency	Percent
Gender		
Female	215	56,4
Male	166	43,6
Age		
19 years	98	25,7
20 years	253	66,4
21 years	30	7,9
Students Place		
City	287	75,3
Urban	94	24,7
Mother education		
Elementary education	124	32,5
Secondary education	50	13,1
High school education	142	37,3
Higher education	65	17,1
Father education		
Elementary education	84	22,0
Secondary education	74	19,4
High school education	185	48,6
Higher education	38	10,0

developed by Suherman & Vidákovich (2022). The instrument was expanded to capture a comprehensive assessment of ATM among the participants. Consisting of four subscales, such as Self-Perception of Mathematics (i.e., “I can tell if my answers in math make sense”), Value of Mathematics (i.e., “I feel confident in my ability to solve mathematics problems”), Enjoyment of Mathematics (i.e., When I have to do math homework), and Perceived Mathematics Achievement (i.e., “My friends think that I am successful at Math”). The total items, was 26 items with each statement requiring participants to select from the following response choices for positive items: 1 = Strongly Disagree, to 5 = Strongly Agree. Conversely, for negative items, the response choices were reversed, with 1 = Strongly Agree, to 5 = Strongly Disagree. The validity of the four-factor structure of the original items was assessed using confirmatory factor analysis (CFA). The results indicated a good model fit ($\chi^2 = 853,768$, $df = 291$, $p < 0,000$), with acceptable fit indices including CFI = 0,918, TLI = 0,908, RMSEA = 0,062, and SRMR = 0,056. Reliability and validity values were also calculated for the four subscales of the instrument using the Cronbach's alpha coefficient ($Crb\alpha$) and the composite reliability (ω), ranged between 0,79 and 0,89.

We also conducted a pilot study of the instrument, which showed factor loadings ranging from 0,34 to 0,91. Discriminant validity, assessed using the Heterotrait-Monotrait (HTMT_{.85}) criterion, ranged from 0,24 to 0,61, below the recommended threshold of 0,90, confirming validity (Hair et al., 2010; Henseler et al., 2015). Cronbach's alpha values were 0,67 for Self-Perception of Mathematics, 0,71 for Value of Mathematics, 0,71 for Enjoyment of Mathematics, and 0,86 for Perceived Mathematics Achievement. Composite reliability (ρ_c) ranged from 0,65 to 0,87 across scales. Although AVE values (0,32 to 0,53) were slightly below the standard cutoff, composite reliability above 0,60 supports construct validity (Fornell & Larcker, 1981). Overall, these results confirm the instrument's reliability and validity for further analysis.

In this study, students self-reported their performance in English (ELA) and Mathematics (MAP) courses, including English for Academic Purposes, Basic English, Introduction to Real Analysis, and Advanced Real Analysis. Scores were reported on a 1 to 7 scale and verified against university records. Official grading categories ranged from 0 to 100 across seven levels (80–100, 73–79,99, 65–72,99, 60–64,99, 55–59,99, 49–54,99, and 0–48,99), serving as benchmarks for academic achievement in both subjects.

Design and data analysis

The study was conducted in four phases. In the first phase, researchers developed a questionnaire to assess psychological and pedagogical factors influencing students' learning. Participants were enrolled in an advanced Real Analysis course taught entirely in English, having completed prerequisite courses in basic English and English for Academic Purposes to ensure effective engagement with the material and reliable data collection at semester's end.

The second phase involved administering the questionnaire at the conclusion of the semester to gather data on students' attitudes toward mathematics (ATM), English language ability (ELA), and mathematical academic performance (MAP). This yielded a comprehensive dataset for examining relationships among these variables.

In the third phase, the questionnaire data underwent initial analysis. Validity and reliability were assessed using SPSS Version 29 and SmartPLS 4, with Confirmatory Factor Analysis (CFA) establishing construct validity. Model fit was evaluated using indices such as the Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). Internal consistency confirmed the reliability of subscales, while descriptive statistics summarized data distributions.

The final phase focused on testing the hypothesized relationships among ATM, ELA, and MAP. Descriptive and correlation analyses explored general trends, and Partial Least Squares Structural Equation Modeling (PLS-SEM) evaluated the model's fit and relationships. The

R statistical package was also used to analyze students' self-reported English and mathematics performance.

Results

Statistic descriptive
and correlations among variables

The descriptive statistics for the study variables are shown in Table 2. The mean attitude toward mathematics score was 3,94 ($SD = 0,30$), mathematics achievement averaged 6,07 ($SD = 0,79$), and English learning achievement had a mean of 5,37 ($SD = 0,58$). Table 3 presents the correlations among these variables. Data normality was confirmed, with skewness ranging from $-0,23$ to $-1,24$ and kurtosis between $-0,33$ and $1,45$. Multicollinearity was also not a concern, as variance inflation factor (VIF) values ranged from $1,012$ to $1,967$, well below the critical value of 10 (Bell et al., 2004).

Table 3 shows the relationships between study variables. Value of Mathematics had a

weak positive correlation with Self-Perception of Mathematics ($r = 0,193^{**}$) and Perceived Mathematics Achievement ($r = 0,024$). Enjoyment of Mathematics correlated more strongly with Self-Perception ($r = 0,390^{**}$) and slightly with Perceived Achievement ($r = 0,106^{*}$). Academic performance in introductory and advanced Real Analysis courses was strongly correlated ($r = 0,701^{**}$). Moderate positive correlations were found between English Academic Purposes and both advanced Real Analysis performance ($r = 0,295^{**}$) and English Basic and introductory Real Analysis performance ($r = 0,309^{**}$), linking enjoyment of mathematics with English academic achievement. Correlations were considered significant at $p < 0,01$ and marginally significant at $p < 0,05$.

Figure 2 illustrates student performance in English and Mathematics by gender. In Mathematics (MAP1 and MAP2), mean scores are similar for females ($M \approx 85,3-86,1$) and males ($M \approx 84,8-85,5$), but males show greater score

Statistical descriptive of the data and normality data

Table 2

Variables	M	SD	Skewness	Kurtosis
Attitude towards mathematics	3,94	0,30	-0,23	0,68
Mathematics academic performance	6,07	0,79	-0,51	-0,33
English learning achievement	5,37	0,58	-1,24	1,45

Statistics, descriptive, and correlations among variables

Table 3

	SPM	VOM	EOM	PMA	MAP1	MAP2	ELA1	ELA2
SPM								
VOM	0,193**							
EOM	0,390**	0,219**						
PMA	0,024	0,018	0,106*					
MAP1	0,098	-0,059	-0,038	-0,031				
MAP2	0,049	-0,060	-0,024	-0,071	0,701**			
ELA1	0,096	0,046	0,011	0,059	0,254**	0,295**		
ELA2	0,284**	0,108*	-0,026	-0,044	0,309**	0,209**	0,249**	

Note: SPM: Self-Perceptions of Mathematics; VOM: Value of Mathematics; EOM: Enjoyment of Mathematics; PMA: Perceived Mathematics Achievement; MAP1: Mathematics Academic Performance in Introduction to Real Analysis course; MAP2: Mathematics Academic Performance in Real Analysis Advance course; ELA1: English Learning Academic course of English Academic Purposes; ELA2: : English Learning Academic course of English Basic. **. Correlation is significant at the 0,01 level (2-tailed); *. Correlation is significant at the 0,05 level (2-tailed).

variability and a bimodal distribution, indicating distinct performance clusters. In English assessments (ELA1 and ELA2), females have slightly higher and more consistent mean scores ($M \approx 87,4-88,0$) with lower variability, while males exhibit a wider score range. Violin and boxplots confirm that females' performance is more uniform compared to males.

SEM performance

In our study, the model was analyzed using PLS-SEM to test our hypothesis, as illustrated in Figure 3. Initially, we assessed the model fit of the hypothesis, and the results indicated a good fit: Chi-Square = 739,664, $df = 28$, $p < 0,001$, RMSEA = 0,07, CFI = 0,98, TLI = 0,98, SRMR = 0,03. These findings suggest that the proposed model effectively explains students' achievement.

Regarding the influence of MAP on ELA, we found a significant positive association ($\beta = 0,374$, $p < 0,001$). This suggests that higher levels of measured achievement in mathematics analysis tasks are associated with increased ELA among participants. However, the relationship between ATM and MAP was not statistically

significant ($\beta = -0,041$, $p > 0,05$). Thus, there is no strong evidence to support a direct influence of measured achievement in mathematics tasks on analytical thinking measures. Additionally, we examined the influence of ELA on ATM. The results indicated that the association between ATM and ELA was statistically significant ($\beta = 0,271$, $p < 0,05$).

Moreover, we controlled the variables with socioeconomic status (SES) variables, including the education levels of mothers and fathers. The results showed that SES had a significantly positive influence on ATM ($\beta = 0,021$, $p > 0,05$). While, the SES to MAP was ($\beta = 0,001$, $p > 0,05$).

Furthermore, the study explored whether the impact of attitude on mathematics performance is completely mediated by English performance, utilizing bootstrapping with 5000 iterations (see Table 4). The results revealed that the influence of attitude towards mathematics on mathematics performance was indirectly mediated by English performance ($\beta = 0,102$, $p < 0,001$). ATM has a significant positive effect on ELA ($p < 0,05$). Additionally, ELA strongly predicts MAP ($p < 0,001$). The indirect effect of ATM on MAP through ELA

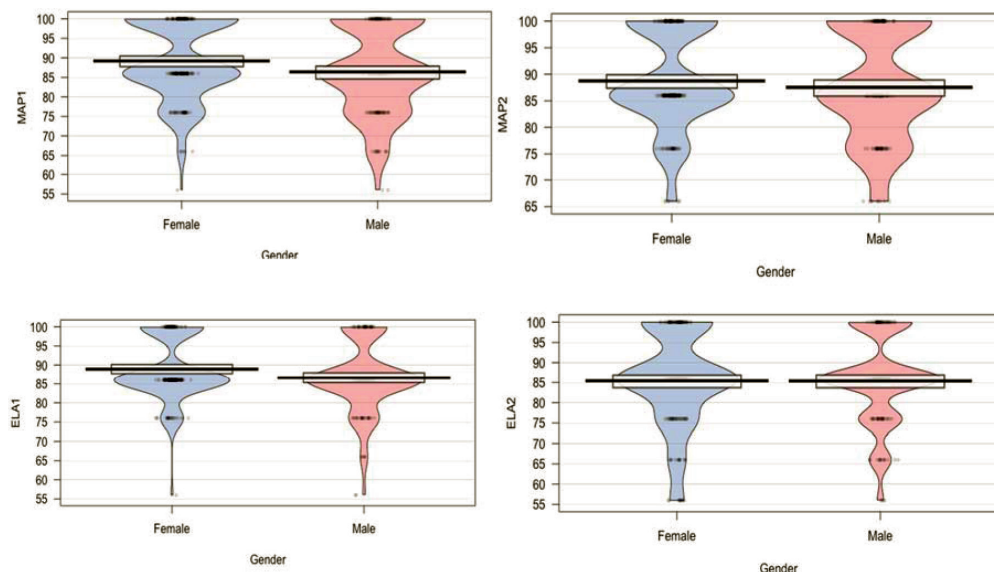


Fig. 2. Pirate plot of English and Mathematics academic performance owing gender

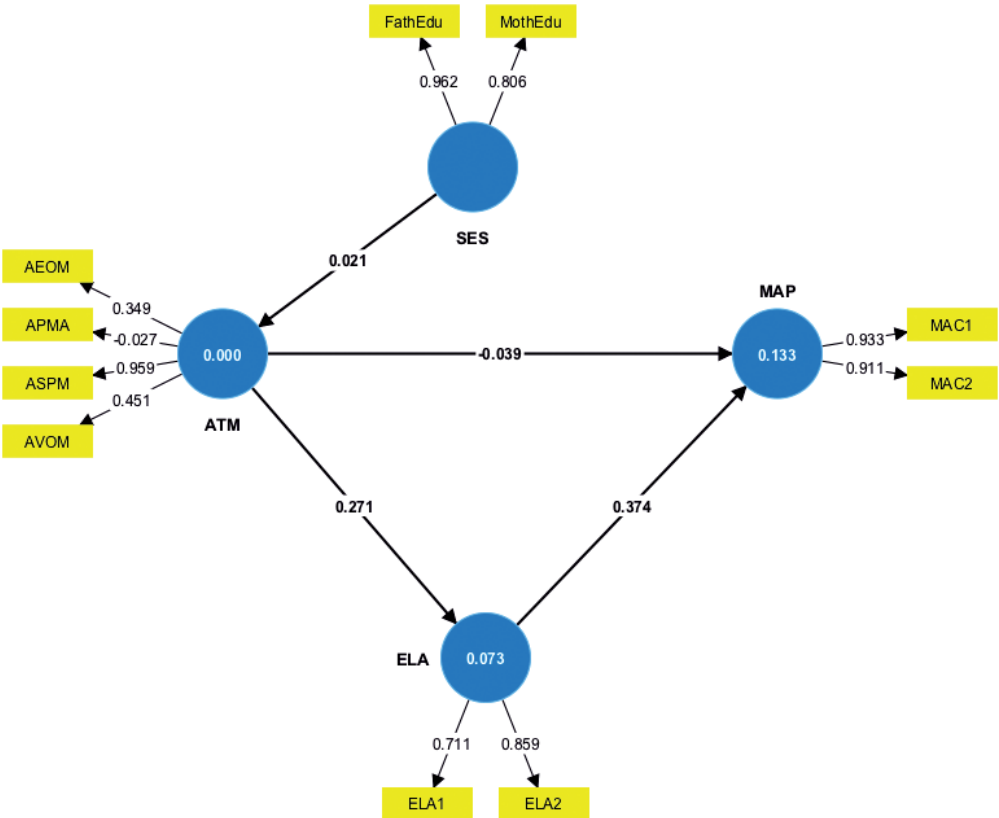


Fig. 3. Model SEM among variables with control variable

is also significant ($p < 0,05$), indicating that English achievement mediates the relationship between attitude toward mathematics and mathematics performance. The effect size for ELA,

ATM, and MAP were $d = -0,18$, $d = -0,09$, and $d = 0,79$, respectively. These results emphasize the crucial role of language proficiency in mathematics success.

Table 4

Total indirect and direct effect among variables

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (IO/STDEVI)	P
ATM -> ELA	0,271	0,250	0,132	2,058	< 0,05
ATM -> MAP	-0,039	0,056	0,091	0,683	> 0,05
ELA -> MAP	0,374	0,373	0,064	5,808	< 0,001
SES -> ATM	0,021	0,005	0,081	0,255	> 0,05
SES -> ELA	0,006	0,004	0,022	0,253	> 0,05
SES -> MAP	0,001	0,001	0,009	0,144	> 0,05

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (IO/STDEVI)	P
ATM -> ELA -> MAP	0,101	0,095	0,050	2,019	< 0,05
SES -> ATM -> ELA	0,006	0,004	0,022	0,253	> 0,05
SES -> ATM -> MAP	-0,001	0,000	0,007	0,123	> 0,05
SES -> ATM -> ELA -> MAP	0,002	0,001	0,008	0,250	> 0,05

Discussion

In our study, hypothesis testing and model fit assessment showed that the proposed model fits the data well, effectively explaining students' achievement. Consistent with Barrett et al. (2012), we found a significant positive relationship between MAP and ELA. This suggests that success in mathematics is linked to better performance in English, supporting the idea that achievement in one subject can enhance performance in another. Additionally, our results revealed a positive impact of English learning achievement on mathematics performance, aligning with Sandilos et al. (2020). This relationship may be due to language proficiency enabling better access to educational resources such as textbooks, online materials, and academic journals. Students with stronger English skills can therefore more effectively engage with mathematical content, improving their understanding and problem-solving abilities.

Students with positive attitudes toward mathematics generally achieve higher scores, and higher achievement often fosters more positive attitudes. However, this study found that anxiety and lack of confidence can negatively impact performance by reducing engagement. Mathematics anxiety impairs cognitive processing and problem-solving, leading to avoidance and lower achievement. Socioeconomic status (SES) also negatively affects attitudes and performance, as students from lower-income backgrounds face limited resources and increased stress. To address these issues, interventions should focus on reducing math anxiety through growth mindset promotion, personalized learning, mindfulness, and cognitive reframing. Targeted support for low-SES students and teacher training to recognize anxiety are also vital. These findings align with prior research showing how negative

attitudes and anxiety hinder math performance (Ashcraft & Kirk, 2001; Nardi & Steward, 2003; Skagerlund et al., 2019).

Although our study found a negative impact of attitude on mathematics achievement, the reciprocal relationship observed in Kiwanuka et al. (2022) suggests that attitude and achievement can influence each other over time. Additionally, this finding aligns with another meta-analysis on the relationship between attitude toward mathematics and academic performance, which also reported a negative correlation (Ma & Kishor, 1997). This suggests that students' attitudes toward mathematics tend to decline as they grow older, often becoming negative by high school. Furthermore, previous research found no significant correlation between attitude toward mathematics and mathematics achievement (Phonguttha et al., 2009). However, negative attitudes toward mathematics may still contribute to reduced motivation and engagement, ultimately leading to lower performance. Research suggests that addressing negative attitudes early is essential to prevent students from developing poor problem-solving skills in the future (Shah et al., 2023). Since attitudes are crucial, mathematics educators can implement strategies to shift negative perceptions and reinforce positive ones to improve students' performance (Kiwanuka et al., 2022). Given that problem-solving skills are crucial for handling everyday challenges, fostering a positive mindset is vital for academic success. Students who maintain a positive attitude toward mathematics are more likely to excel in their studies (Papanastasiou, 2000).

This study found that socioeconomic status (SES) significantly affects students' attitudes toward mathematics and their academic performance, consistent with prior research showing that higher SES is linked to more positive at-

titudes and better outcomes (Papanastasiou, 2002). Students from lower SES backgrounds often face resource barriers that hinder motivation and engagement (Jury et al., 2017). Importantly, the impact of attitudes toward mathematics on math performance was fully mediated by ELA, highlighting that attitude influences math success through English proficiency (Dan'inna, 2017; Trakulphadetkrai et al., 2020). This underscores the need for integrated educational strategies that improve both language skills and mathematical understanding to support students' academic achievement (Suherman & Vidákovich, 2024).

Limitations and future research

While this study offers valuable insights, several limitations should be noted. The sample was limited to college students from four Indonesian universities, which may restrict the generalizability of the findings. Including more diverse populations across different educational contexts would improve external validity. The study focused on ATM, ELA, and MAP while controlling for socio-economic status, but omitted factors such as cultural background, language proficiency, mother tongue, and prior education. Future research should examine these variables and their interactions. The cross-sectional design also limits causal interpretations, highlighting the need for longitudinal studies to track changes over time. Intellectual and cognitive development, key to academic success, were not assessed, potentially overlooking important influences on learning. Including these measures and exploring students' course preferences could provide deeper insights. Additionally, teacher practices and classroom environments may significantly affect attitudes and performance, warranting further investigation. The

unexpected negative impact of attitudes toward mathematics on performance calls for more research with larger, diverse samples, considering factors like grade level, age, subject knowledge, and teaching quality. Addressing these limitations will enhance understanding of the complex links between attitudes and achievement, guiding effective strategies to support student success in mathematics and English.

Conclusions

In conclusion, the results found significant associations between ELA, ATM, and MAP among Indonesian college students. The findings highlight the important role of language proficiency in supporting mathematical understanding and problem-solving skills, as students with higher English proficiency tended to perform better in mathematics. Conversely, attitudes toward mathematics showed a negative impact on mathematics achievement, suggesting that emotional and psychological factors beyond academic ability influence student performance. Additionally, socio-economic status (SES) was negatively correlated with both attitudes and achievement, indicating that external factors may also affect students' academic outcomes. Importantly, English learning achievement served as a mediator between attitudes toward mathematics and mathematics performance, underscoring the interconnectedness of these variables.

These findings highlight the important link between language proficiency, attitudes toward mathematics, and academic achievement. They suggest that educators should integrate language and math teaching, promote positive attitudes toward math, and address language barriers. Targeted interventions can support students' overall success, providing useful guidance for improving education and student outcomes.

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Appendix

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The authors declare no conflict of interest.

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МЕЖДИСЦИПЛИНАРНЫЕ

ИССЛЕДОВАНИЯ КОГНИТИВНЫХ ПРОЦЕССОВ

Научная статья | Original paper

Adaptation of the metacognition scale from the DAACS self-regulation survey on a sample of Russian adolescents

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Abstract

Context and relevance. Metacognition is the control over one's thoughts. There is a lack of a reliable survey measuring metacognition of schoolchildren in Russia. **Objective.** The goal of this article is to report on the adaption of the metacognition survey on a sample of Russian adolescents. **Hypothesis.** The adaptation of the metacognition scale from the DAACS self-regulation survey will allow overcoming the lack of reliable instruments to measure metacognition of Russian adolescents. **Methods and materials.** The study included 1167 secondary school students (55,27% girls), with an average age of 14,4 years. The metacognition survey from the DAACS self-regulation questionnaire (Lui et al., 2018) was adapted in this study. A school burnout survey and domain specific scales for self-efficacy were used to test correlations with other constructs. In this study, we present validity evidence of the metacognition survey based on: 1) the internal structure of the survey using confirmatory factor analysis (CFA); 2) reliability by checking the internal consistency of the survey; 3) correlations with other constructs by presenting discriminant validity; 4) response processes using Rasch modeling. **Results.** The CFA results confirmed the three-factor structure of the metacognition survey in a sample of Russian adolescents and showed high internal consistency of the questionnaire ($\alpha = 0,92$; $\beta = 0,86$). Evidence based on the discriminant relations with other variables has shown that metacognition correlates positively with domain-specific self-efficacy and negatively with burnout. In addition, the response processes based on Rasch modeling show that most of the items are understandable for students with an average level of metacognition, and many students (71%) have chosen average responses on a Likert-type scale. **Conclusions.** Despite some limitations of the study (examining convergent and longitudinal validity), the available results show that the adapted survey has good psychometric properties and is recommended for use with students in middle schools.

Keywords: metacognition, planning, monitoring, reflection, reliability, validity, factor analysis, Rasch modelling

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Адаптация шкалы метапознания из опросника саморегуляции DAACS при участии российских подростков

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Резюме

Контекст и актуальность. Метапознание — это контроль над своими мыслями. На данный момент нет ни одного надежного инструмента, измеряющего навыки метапознания у российских подростков в школьном контексте. **Цель.** Адаптировать и валидизировать шкалу метапознания при участии российских школьников. **Гипотеза.** Адаптация и валидизация шкалы метапознания из опросника саморегуляции DAACS позволит получить психометрические характеристики методики, необходимые для преодоления дефицита современного надежного инструментария, измеряющего навыки метапознания у российских подростков. **Методы и материалы.** В исследовании приняли участие 1167 учащихся средних школ (55,27% девочек), средний возраст — 14,4 лет. В исследовании адаптировался *Опросник метапознания* из инструмента саморегуляции DAACS (Lui et al., 2018). Для проверки связей с другими конструктами использовались опросник выгорания школьников и шкалы предметно-ориентированной самооценки. В работе подтверждается валидность инструмента на основе: 1) внутренней структуры опросника, используя конфирматорный факторный анализ (КФА); 2) надежности через проверку внутренней согласованности опросника; 3) корреляций с другими конструктами путем представления дискриминантных связей; 4) ответов респондентов с применением Раш-моделирования. **Результаты.** Результаты КФА подтвердили трехфакторную структуру опросника метапознания на выборке российских подростков и показали внутреннюю согласованность опросника ($\alpha = 0,92$; $\beta = 0,86$). Валидность на основе дискриминантных связей показала, что метапознание поло-

жительно связано с предметно-ориентированной самоэффективностью и отрицательно связано с выгоранием. Ответы респондентов на основе Раш-моделирования демонстрируют, что утверждения опросника понятны школьникам со средним уровнем метапознания, и большинство респондентов (71%) выбрали средние ответы по шкале Ликерта. **Выводы.** Несмотря на некоторые ограничения исследования (проверка конвергентной и лонгитюдной валидности), имеющиеся результаты позволяют сделать вывод, что адаптированный опросник обладает хорошими психометрическими характеристиками и рекомендован к использованию со школьниками для измерения метапознания.

Ключевые слова: метапознание, планирование, мониторинг, рефлексия, надежность, валидность, факторный анализ, Раш-моделирование

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Introduction

The Federal State Educational Standards define the development of meta-subject skills as one of the learning outcomes. Meta-subject skills include the ability to set goals, select and use strategies to achieve goals, and the capacity to analyse academic successes and difficulties. These skills reflect the concept of self-regulated learning (Akhmedjanova, 2024), and the skills of goal setting, monitoring, and reflection correspond to the scientific understanding of metacognition (Winne, Azevedo, 2014).

Metacognition is the understanding and control of one's own thoughts (McCormick, 2003). Metacognition may be considered in the context of declarative, procedural, and conditional knowledge (McCormick, 2003; Schraw, Dennison, 1994; Winne, Azevedo, 2014). Declarative knowledge implies that a person knows facts. Procedural knowledge means that students know how to

perform a task, i.e., how to apply declarative knowledge. Conditional knowledge assumes that students understand when and where to apply declarative and procedural knowledge to complete tasks (Winne, Azevedo, 2014).

Another perspective on metacognition characterizes it as a form of thinking within the framework of self-regulated learning (Akhmedjanova, 2024; Winne, Azevedo, 2014). Ph. Winne and R. Azevedo (2014) note that for successful learning, it is not enough to possess only declarative, procedural, and conditional knowledge. It is also necessary to analyze one's knowledge and compare it with task performance results, monitor one's understanding, and the ability to overcome difficulties to achieve learning goals.

In this study, we examine metacognition through the lens of the theoretical framework of self- and social regulation of

learning (Akhmedjanova, 2024). The theoretical framework (Figure) integrates three domains: self-regulated learning (C-I, L-N), socially regulated learning (A-B, J-L), and culture (O) (Akhmedjanova, 2024). Social regulation of learning includes learning methods (A-B) and formative assessment practices (J-K).

Research on metacognition

Research on metacognition shows positive effects of teaching metacognitive strategies to students. There is evidence of positive links between teaching metacognitive strategies and academic achievement in mathematics (Muncer et al., 2022) and general academic performance (De Boer et al., 2018; Ohtani, Hesasaka, 2018; Perry, Lundie, Golder, 2019), including findings from longitudinal studies (He et al., 2024). Students with more developed metacognitive skills typically learn more effectively, demonstrate higher motivation, and utilize a broader range of strategies to achieve

their learning goals (Winne, Azevedo, 2014). Metacognition also receives significant attention in Russian literature (Byzova, Perikova, 2022; Karpov, Skityaeva, 2005; Perikova, Byzova, 2022; 2020).

Various methods exist for measuring metacognition, but questionnaires remain the most common approach (Perikova, Byzova, 2022; Schraw, Dennison, 1994; Winne, Azevedo, 2014). The most well-known among these is the Metacognitive Awareness Inventory (MAI) (Schraw, Dennison, 1994), developed by G. Schraw and R. Dennison. It measures metacognitive knowledge and metacognitive regulation using 52 items.

The first adaptation of this inventory on a Russian sample was conducted by A.V. Karpov and I. M. Skityaeva (2005), followed by E. I. Perikova and V. M. Byzova (2022), who refined the factor structure and proposed a shortened version (32 items) of the "Metacognitive Involvement in Activity" inventory. The shortened version of the in-

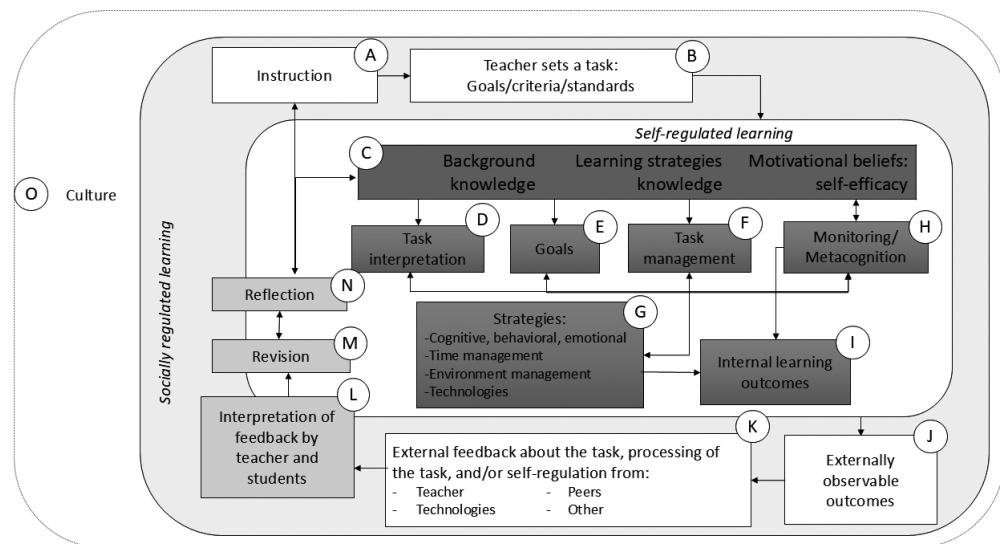


Fig. Self- and socially regulated learning

ventory demonstrates acceptable internal consistency values ($\alpha = 0,42$ to $0,83$).

Another self-regulation survey that includes a metacognition scale is the questionnaire developed for the Diagnostic Assessment and Achievement of College Skills (DAACS) project (Lui et al., 2018). The DAACS self-regulation survey includes 47 items on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The survey demonstrates good psychometric properties ($\alpha = 0,79$ to $0,91$).

As evident from the description above, numerous instruments exist for measuring metacognition, but most were developed and adapted using samples of adults or university students (Perikova, Byzova, 2022; Schraw, Dennison, 1994).

The research gap of this study is the lack of a reliable and validated instrument measuring metacognitive skills in Russian adolescents. Consequently, the goal of this study is to adapt and validate the metacognition scale from the DAACS self-regulation survey on a sample of Russian school students.

Validity and reliability

In this study, the psychometric properties of the metacognition scale were established based on the theoretical framework of construct validity (Kane, 2006), which includes validity based on the instrument's content, response processes, internal structure, correlations with other constructs, consequences of test results, and reliability (AERA, APA, NCME, 2014; Kane, 2006).

To assess the validity and reliability of the metacognition scale, we address the following research questions:

1. What is the validity of the metacognition scale based on:
 - a. the internal structure?
 - b. the reliability?

- c. correlations with other constructs?
- d. response processes?

We present the validity of the metacognition questionnaire based on: 1) the internal structure of the scale using confirmatory factor analysis (CFA); 2) reliability through testing the internal consistency; 3) correlations with other constructs by presenting discriminant relationships; 4) response processes using Rasch modelling.

Materials and methods

Design: The study was conducted as a cross-sectional survey in the spring of 2023 in the Yaroslavl region.

Sample: The study involved 1167 middle school students (55,27% girls), from the seventh ($n = 345$; 55,07% girls), eighth ($n = 514$; 55,44% girls), and ninth ($n = 308$; 55,19% girls) grades. The average age of the students was 14,4 years ($SD = 0,91$). The recommended sample size should have a minimum of 407 participants to achieve 80% statistical power at $p = 0,05$. The sample in this study exceeds the recommended size twofold and has sufficient power for statistical analysis.

Instruments: The metacognition survey is an adaptation of the metacognition scale from the DAACS self-regulation survey (Lui et al., 2018). The original instrument includes three scales: planning (5 items; $\alpha = 0,71$), monitoring (6 items; $\alpha = 0,79$), and reflection (3 items; $\alpha = 0,73$). It uses a Likert response scale ranging from 1 — strongly disagree to 5 — strongly agree. The DAACS self-regulation survey has good psychometric characteristics and internal consistency ($\alpha = 0,89$), as well as acceptable model fit indices: $\chi^2(1020) = 19988,706$, $p < 0,001$, CFI = 0,868, RMSEA = 0,053, SRMR = 0,051, $\chi^2/df = 19,597$ for a sample of higher education students ($n = 6644$) (Lui et al., 2018).

To examine relationships with other constructs, the School Burnout Inventory

(Bochaver, Mikhailova, 2023) and domain-specific self-efficacy scales (Akhmedjanova, 2024) were used.

The School Burnout Inventory (Bochaver, Mikhailova, 2023) includes nine items across three subscales: exhaustion, cynicism, and sense of inadequacy. The response scale ranges from 1 — strongly disagree to 6 — strongly agree. Results from a study on a sample of students aged from 10 to 18 ($n = 3197$) showed high model quality indices: $\chi^2(24) = 244,648$, $p < 0,001$, CFI = 0,981, TLI = 0,971, RMSEA = 0,055 [0,049; 0,061], SRMR = 0,026, and internal consistency, $\alpha = 0,67, 0,76, 0,85$ (Bochaver, Mikhailova, 2023).

The Self-Efficacy Scales (Akhmedjanova, 2024) comprise five separate surveys for all key school subjects: mathematics (4 items; $\alpha = 0,8$; $\omega = 0,83$), reading (4 items; $\alpha = 0,79$; $\omega = 0,81$), foreign language (5 items; $\alpha = 0,93$; $\omega = 0,94$), physics (5 items; $\alpha = 0,93$; $\omega = 0,95$), and biology (4 items; $\alpha = 0,88$; $\omega = 0,9$). They use a Likert response scale ranging from 1 — cannot do at all to 4 — can do very well. Results from a study on a sample of students from primary ($n = 972$) and secondary ($n = 584$) schools indicated that the questionnaire has good psychometric characteristics: $\alpha = 0,79 — 0,93$; $\chi^2(98) = 292,02$, $p < ,000$, CFI = 0,99, TLI = 0,99, RMSEA = 0,04, SRMR = 0,04 (Akhmedjanova, 2024).

Data collection: The metacognition scale was translated from English into Russian by an expert in educational psychology. Two experts in psychology and pedagogy then independently evaluated the translation. Additionally, we presented the translated items to five 10th-grade students from a Moscow school. Discrepancies in the translation, based on recommendations from the experts and the students, were resolved through discussions among the experts. After discussing the response

scale with the students, we decided to use a shortened response scale from 1 (almost never) to 4 (almost always) to simplify comprehension for the students. Some researchers recommend against using long response scales, as data analysis often requires merging similar response categories (Colvin, Gorgun, 2020).

Parents of the students provided a signed informed consent, and the children gave their assent to participate in the study. We did not collect any personal data from the students to ensure the confidentiality of their responses.

Data analysis: Data analysis was conducted in the R program using the `lavaan` (Rosseel et al., 2024) and `psych` (Revelle et al., 2024) packages for CFA, Spearman's correlation coefficient, and the non-parametric Mann-Whitney and Kruskal-Wallis tests. These tests allowed us to identify differences in metacognition scores based on student gender and grade level. CFA was used to test the factor structure, while the calculation of Cronbach's alpha and Guttman's beta was used to determine the reliability of the scale. Rasch modelling was performed using the Winsteps software (version 5.2.3.0) (Linacre, 2012) and allowed for checking the quality of each item. Missing data analysis was conducted using the `VIM` package (Templ et al., 2023).

The missing data analysis was performed on the sample of students from grades 7 to 11 ($n = 1469$) and revealed varying degrees of missing data depending on the variable (gender, grade = 0%; self-efficacy for foreign languages = 20% in grades 10 and 11). Pearson's chi-square test was statistically significant, indicating no association between missingness and student gender or grade. The results showed that the data were missing completely at random (MCAR). Therefore, after removing 302 observa-

tions with missing data, the sample size was reduced to 1167 observations from students in grades 7–9, which were used for all subsequent analyses.

Results

Descriptive statistics was used to check the data for normality and to determine the average level of metacognition and differences in metacognition among students based on gender and grade.

The results of the Shapiro-Wilk test indicate a deviation from normal distribution for all variables of interest. Subsequent results are based on non-parametric analysis (see Tables 1-3 in the Appendix).

Results from the Mann-Whitney test showed no statistically significant differences in the overall level of metacognition, or its subscales, between boys and girls (Table 1 in the Appendix). Results from the Kruskal-Wallis test revealed significant differences in overall metacognition depending on grade: $\chi^2(2) = 9,83$, $p < 0,001$. Ninth-graders showed higher metacognition

results than students in seventh and eighth grades (Table 2 in the Appendix). Based on these results, it can be concluded that the majority of students in this sample demonstrate a basic level of metacognition (Table 3 in the Appendix).

Validity of the metacognition scale based on internal structure

To determine validity based on the internal structure of the metacognition scale (14 items), CFA was conducted. The results revealed excellent fit indices for the three-factor structure: $\chi^2(74) = 550,15$, $p < 0,001$, CFI = 0,94, TLI = 0,93, RMSEA = 0,07, SRMR = 0,04, $\chi^2/df = 7,43$. These indicators correspond to the recommended thresholds for such indices (Hu, Bentler, 1999). In Table 1, standardized factor loadings indicate that all items are moderately or strongly correlated with latent factors of planning, monitoring, and reflection (0,55–0,82).

The metacognition survey demonstrates the internal consistency and reliabil-

Table 1

Results of the confirmatory factor analysis (standardized factor loadings) and reliability estimates

Sub-scale	Items	Standardized factor loadings	α	β	Variance
Planning	1	0,65	0,79	0,71	0,43
	2	0,72			
	3	0,55			
	4	0,75			
	5	0,61			
Monitoring	6	0,75	0,88	0,83	0,54
	7	0,78			
	8	0,75			
	9	0,74			
	10	0,71			
	11	0,73			
Reflection	12	0,81	0,81	0,71	0,59
	13	0,79			
	14	0,72			

ity of each of the scales (Table 1) based on the Cronbach alpha (0,79–0,88) and Gutmann beta (0,71–0,83) indices, and the overall reliability of the entire scale: $\alpha = 0,92$; $\beta = 0,86$.

To examine relationships with other constructs, Spearman's correlation coefficient was used to assess the correlations between metacognition, burnout, and domain-specific self-efficacy.

The metacognition scales showed positive and statistically significant correlations with student self-efficacy across all subjects (Table 2). However, all correlations were relatively weak, indicating that the metacognition and self-efficacy surveys measure distinct constructs. The correlation between the metacognition scales and burnout was negative and weak — the higher the metacognition, the lower the burnout among students. The results of the correlation analysis indicate divergent relationships between the constructs of metacognition and self-efficacy,

as well as between metacognition and student burnout.

Validity of the metacognition questionnaire based on response processes

Rasch modelling allowed for determining the quality of each item and the response scale.

The mean-square (MNSQ) statistic for all 14 items identified participants' response patterns (Linacre, 2012). Based on Bond and Fox's (2013) recommendations, MNSQ values between 0,6 and 1,4 are considered acceptable, while values below 0,6 and above 1,4 indicate misfit. The values in Table 3 demonstrate that the infit statistics range from 0,75 to 1,52, which falls within the acceptable range for the majority of items. Items 3 (Infit MNSQ = 1,52, ZSTD = 9,90) and 5 (Infit MNSQ = 1,40, ZSTD = 8,81) show misfit, meaning respondents answered these items inconsistently. The same pattern is observed for these

Table 2

Spearman correlation coefficients for metacognition, self-efficacy and burnout scales ($n = 1167$)

Sub-scales	1	2	3
1. Planning	–		
2. Monitoring	0,66	–	
3. Reflection	0,61	0,71	–
4. Self-efficacy math	0,19	0,19	0,17
5. Self-efficacy Russian	0,24	0,27	0,22
6. Self-efficacy literature	0,24	0,24	0,22
7. Self-efficacy foreign language	0,21	0,21	0,22
8. Self-efficacy biology	0,23	0,19	0,24
9. Self-efficacy physica	0,22	0,22	0,21
10. Exhaustion			
11. Cynicism	–0,17	–0,13	–0,16
12. Feeling of inadequacy	–0,14		–0,11
Среднее (CO) / Mean (SD)	2,75 (0,63)	2,79 (0,66)	2,68 (0,74)

Note: All estimates are significant at $p < 0,001$.

two items in the outfit statistics (Table 3), confirming greater variation in participants responses.

The item difficulty measures range from –0,60 (Item 1) to 1,49 (Item 3) logits. According to Rasch measurement guide (Linacre, 2012), items with measures greater than 2,0 logits are considered difficult, while those below -2,0 logits are considered easy (Linacre, 2012). Most respondents are expected to fall between 0 (the mean value) and +2 logits. The items from the metacog-

nition scale do not exceed these boundaries; rather, they are clustered around the average metacognition level of the respondents (between 0 and 2 logits) and are well-suited for measuring the metacognitive skill of the respondents in this sample.

Item 3 is somewhat more difficult for respondents than the other items, which is associated with its demand for a more complex skill of reflection and awareness before starting to read texts. Items 2 and 4 may be easier, as they indicate basic

Table 3

Infit and outfit estimates of responses for each item of the metacognition scale

Item	JMLE ¹ measure	Infit MNSQ ¹	Infit ZSTD ³	Outfit MNSQ	Outfit ZSTD	Exact match Obs% ⁴	Exact match Exp%
3	1,49	1,52	9,90	1,56	9,90	44,5	55,1
5	–0,38	1,40	8,81	1,38	8,09	53,2	59,3
1	–0,60	1,05	1,26	1,12	2,67	62,6	59,7
14	0,48	1,07	1,63	1,08	1,91	61,6	59,7
4	–0,09	1,07	1,75	1,07	1,66	60,8	58,6
2	–0,51	1,04	0,90	1,04	1,05	58,9	55,8
10	0,12	0,90	–2,45	0,95	–1,19	64,5	57,8
6	–0,33	0,92	–2,12	0,91	–2,32	67,3	59,3
8	–0,33	0,90	–2,57	0,90	–2,40	65,6	59,3
13	–0,08	0,87	–3,44	0,86	–3,46	65,9	58,5
11	0,08	0,86	–3,73	0,86	–3,46	66,7	57,9
12	0,13	0,83	–4,49	0,82	–4,60	65,8	57,8
9	–0,01	0,79	–5,56	0,80	–5,28	68,1	58,4
7	–0,05	0,75	–6,67	0,75	–6,50	68,2	58,5
Mean	0,00	1,00	–0,48	1,01	–0,28	62,4	58,3
St. Dev.	0,50	0,21	4,77	0,22	4,67	6,4	1,3

¹ Joint Maximum Likelihood Estimation (JMLE).

² Mean Square Statistics (MNSQ).

³ Standardised Z Score (ZSTD).

⁴ The Exact Observation Match Percentage (OBS%) shows the proportion of data points that match the expected values within a 0,5-point range. The Expected Percentages (EXP%) reflect the theoretical proportion of responses predicted by the Rasch model. On average, the OBS% exact match across all items was 62,4% (SD = 6,4), while the average EXP% was 58,3% (SD = 1,3). This indicates that the observed match generally aligned with expectations. However, the spread of OBS% values was higher than that of EXP%, suggesting variations in fit at the individual item level. The consistency of the EXP% values indicate good calibration of the Rasch model for the metacognition items. Nevertheless, some items (for example, Items 3 and 5) may require refinement.

metacognitive skills — thinking about how to approach learning tasks.

Analysis of the response scale showed that its categories increase monotonically, meaning respondents utilized the entire range of the answer scale. Specifically, 9% of respondents chose answer 1 (almost never), 27% chose answer 2 (rarely), 44% preferred option 3 (often), and 20% chose answer 4 (almost always). The response scale is considered balanced, as 71% of respondents selected options 2 (rarely) and 3 (often).

Discussion

The goal of this study was to adapt the metacognition scale from the DAACS self-regulation survey for a sample of Russian school students.

Finding 1: CFA confirmed the three-factor structure of the metacognition scale, including planning, monitoring, and reflection subscales, consistent with the original instrument (Lui et al., 2018). This confirms the internal structure of the metacognition scale (RQ1.a).

Finding 2: Internal consistency indices based on Cronbach's alpha and Guttman's beta coefficients indicate high reliability for the three individual sub-scales and overall metacognition scale. This result is consistent with the estimates of the original questionnaire (Lui et al., 2018) and addresses RQ1.b.

Finding 3: The correlation coefficients of metacognition with the constructs of self-efficacy and burnout confirm validity based on divergent relationships and indicate that all three instruments measure distinct constructs (RQ1.c). Thus, metacognition is positively related to self-efficacy: the higher the metacognition, the higher the self-efficacy for school subjects. Similar relationships between metacognition and self-efficacy (Ohtani, Hisasaka, 2018; Winne,

Azevedo, 2015) and burnout (Maricutoiu, Silea, 2019; Rahmati, 2015) have been identified in numerous studies.

Finding 4: Participant responses demonstrate that the items of the metacognition scale are comprehensible to students with an average level of metacognition (RQ1.d). Furthermore, the majority of respondents (71%) selected mid-range answers on the Likert scale. Items describing strategies such as asking questions before reading texts or predicting potential questions on future tests appeared slightly more challenging for the students in this sample. Respondents from this sample may either not use these strategies or use them ineffectively.

Based on the results, the main conclusion is that the adapted metacognition scale has good psychometric characteristics and is recommended for use with school students in the context of Russian general education.

Conclusion

Metacognition is one of the skills recommended for development in the general education curriculum at the federal level. However, there is a shortage of valid and reliable tools for measuring such skills.

The study presented here successfully confirmed the three-factor structure of the metacognition scale from the DAACS self-regulation survey on a sample of Russian school students. The results of this study demonstrate the high internal consistency of the scale, indicate divergent relationships of metacognition with student self-efficacy and burnout, and show that the questionnaire items are comprehensible to students. Accordingly, the metacognition scale is recommended for use with middle and high school students. It can become one of the tools for determining metacognition

levels in different groups of students and, in the future, for developing educational programs to support and foster metacognition in school contexts.

Limitations. Despite the high psychometric properties of the adapted metacognition questionnaire, this study has some limitations. Within the unified validity theory framework, it is necessary to establish not only divergent but also convergent

relationships with other constructs (for instance, by using another metacognition questionnaire, such as the "Metacognitive Involvement in Activity" inventory (Perikova, Byzova, 2022)). It is also recommended to establish the consequential validity of the metacognition scale results and to verify longitudinal and test-retest validity to determine the reliability of the questionnaire in the Russian context.

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Appendix A

Metacognition Scale

We would like to know how and where you do homework and study. Please, respond honestly. The task does not have correct or incorrect responses, and you will not be graded on this task.

Please respond to each item:

Sub-scale	Item
Planning	1 I think of several ways to solve a problem and choose the best one.
	2 I think about what I really need to learn before I begin a task.
	3 I ask myself questions about assigned readings before I begin.
	4 I think about the best ways to complete assignments before I begin them.
	5 When I study for a test, I think about the types of questions that might be on it.
Monitoring	6 I ask myself periodically if I am meeting my goals.
	7 I find myself analyzing the usefulness of my study strategies while I study.
	8 I ask myself questions about how well I am doing while I am learning something new.
	9 I consider several alternatives to a problem before I answer.
	10 I find myself pausing regularly to check my comprehension.
	11 I ask myself if what I'm reading is related to what I already know.

Sub-scale	Item
Reflection	12 I ask myself if I learned as much as I could have once I finish a task.
	13 I ask myself how well I accomplished my goals once I'm finished.
	14 I summarize what I've learned after I finish.

Thank you for responding to all items!

Keys: Likert-type response scale: 4 — almost always, 3 — often, 2 — rarely, 1 — almost never. Minimal score = 14, maximum score = 56. Based on the results of this study, the following cutoff scores are recommended:

1. Developing level: 14–32 points,
2. Below basic level: 33–38 points,
3. Basic level: 39–43 points,
4. Expert level: 44–56 points.

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Contribution of the authors

Diana R. Akhmedjanova — ideas; annotation, writing and design of the manuscript; planning of the research; control over the research.

Adewunmi N. Okunola — application of statistical, mathematical or other methods for data analysis; data analysis; visualization of research results.

All authors participated in the discussion of the results and approved the final text of the manuscript.

Вклад авторов

Ахмеджанова Д.Р. — идеи исследования; аннотирование, написание и оформление рукописи; планирование исследования; контроль за проведением исследования.

Окунола А.О. — применение статистических, математических или других методов для анализа данных; анализ данных; визуализация результатов исследования.

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Conflict of interest

The authors declare no conflict of interest.

Конфликт интересов

Авторы заявляют об отсутствии конфликта интересов.

Ethics statement

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Analysis of interactions between adolescents and young adults in the process of jointly solving an educational task using eye-tracking technology

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Abstract

Context and relevance. The article presents a multi-user logic online game “Interference in the Air”, developed within the framework of the project “Study of Cognitive and Communicative Processes in Adolescents and Young Men when Solving Game and Educational Tasks in Digital Environments”. The theoretical and methodological basis of this game is the theory of educational activity by V.V. Davydov and the socio-genetic method by V.V. Rubtsov. **Objective.** Identification of the features of oculomotor activity in participants of joint activities at various stages of the formation of their interaction methods. **Methods and materials.** An experimental study using the developed online game was conducted with the use of the video oculography module NTrend-ET500. The research sample consisted of 30 adolescents and young men aged 13 to 20 years ($M = 17,11$, $SD = 2,00$, 67% female) from Moscow. **Conclusions.** The data on oculographic activity of participants in joint activities can, firstly, be significant indicators of cognitive processes arising among the participants and related to the analysis and evaluation of patterns according to which the participants transform the subject field of the task. Secondly, they can act as indicators of changes in the very ways of interaction between the participants. Thirdly, they make it possible to distinguish between individual and joint forms of organizing the participants' activities. The conducted research reveals new prospects in the field of objective study of features, structure, dynamics of formation and development of interaction methods that arise in various types of activities.

Keywords: learning activity, socio-genetic method, collaborative-distributed form of activity, problem solving, online game, eye tracking, joint attention, adolescence

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Анализ взаимодействий подростков и юношей в процессе совместного решения учебной задачи с применением технологии Eye-tracking

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Резюме

Контекст и актуальность. В статье представлена разработанная в рамках проекта «Исследование когнитивных и коммуникативных процессов у подростков и юношей при решении игровых и учебных задач в цифровых средах» многопользовательская логическая онлайн-игра «Помехи в эфире», теоретико-методологической основой которой послужили теория учебной деятельности В.В. Давыдова и социально-генетический метод В.В. Рубцова. **Цель.** Выявление особенностей oculomotorной активности участников совместной деятельности на различных этапах формирования их способов взаимодействия. **Материалы и методы.** Экспериментальное исследование с использованием разработанной онлайн-игры проводилось с применением модуля видеоокулографии NTrend-ET500. Выборку исследования составили 30 подростков и юношей от 13 до 20 лет ($M = 17,11$, $SD = 2,00$, 67% девушки) из г. Москвы. **Выводы.** Данные окулографической активности участников совместной деятельности могут, во-первых, быть значимыми показателями возникающих у участников когнитивных процессов, связанных с анализом и оценкой закономерностей, по которым участники осуществляют преобразование предметного поля задачи; во-вторых, могут выступать показателями происходящих изменений в самих способах взаимодействия участников; в-третьих, позволяют различать индивидуальные и совместные формы организации деятельности участников. Проведенное исследование обнаруживает новые перспективы в области объективного изучения особенностей, структуры, динамики формирования и развития способов взаимодействия, возникающих в различных видах деятельности.

Ключевые слова: учебная деятельность, социально-генетический метод, совместно-распределенная форма деятельности, problem solving, онлайн-игра, eye tracking, совместное внимание, юношеский возраст

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Introduction

In the context of modern educational policy, as reflected in the Federal State Educational Standards (FSES) across all levels of education, the issue of organizing joint learning activities acquires particular importance. The FSES for primary, basic, and secondary education (NOO, OOO, SOO) all explicitly highlight the system of universal communicative actions as a component of interdisciplinary learning outcomes. These include students' abilities to formulate and adopt a common goal, collectively plan actions to achieve it, distribute roles (considering the preferences and abilities of all participants), negotiate, discuss both the process and the outcomes of joint work, plan the organization of collaboration, and choose appropriate methods of joint action (On Amendments to the Federal State..., 2022; On the approval of the Federal State..., 2021a; On the approval of the Federal State..., 2021b).

In the FSES for basic general education, it is specifically noted that "mastery of the system of universal communicative learning actions ensures the development of social skills and emotional intelligence in students" (On the approval of the Federal State..., 2021b). As V.V. Rubtsov and I.M. Ulanovskaya point out, "social interdisciplinary outcomes... are simultaneously both a result and a condition for the development of the basic (communicative-reflexive — author's note) abilities characteristic of this (primary school — author's note) age" (Rubtsov, Ulanovskaya, 2022). This position directly continues L.S. Vygotsky's ideas, which maintain that higher forms of human activity "are initially realized through social interactions and as modes of interaction between subjects engaged in joint activity" (Ageev et al., 2023).

The interconnection between social interaction and learning, and the role of spe-

cially organized joint activity in learning and development, have been most thoroughly and consistently developed in the Russian psychological school of V.V. Davydov — V.V. Rubtsov. According to the principles of this school, the process of setting and solving a learning task is associated with the formation of a specific cognitive-learning action directed at identifying a significant relation or a general principle underlying the structure of an object or phenomenon. A necessary condition for the emergence of such an action is the purposeful organization of joint educational activity, in which the subject content is introduced through a system of shared learning actions: coordination, planning, and structuring of interaction between students and adults, and among students themselves; transformation of adult-directed actions; and modeling of new forms of joint action.

It is particularly important that the "discovery" of essential relationships within the subject domain is mediated by the modeling of possible modes of interaction and the integration of individual participants' actions into the structure of collective activity. As demonstrated by V.V. Rubtsov and A.V. Konokotin (Rubtsov, Isaev, Konokotin, 2022; Konokotin, 2023), this process has its own dynamics, progressing from a "pre-learning obschnost" (characterized by a focus on situational or partial features of an object/phenomenon and on possibilities for individual action) to a true "learning obschnost," where participants orient themselves toward uncovering essential relations and regularities governing the studied object or phenomenon. This occurs through analyzing modes of interaction, revealing interdependencies among individual actions, and designing pathways to solve a class of problems by building collective action (Rubtsov, Isaev, Konokotin, 2022).

Further development of this problem involves identifying the qualitative characteristics of interactional processes that constitute the internal (integral) features of joint activity — such as mutual understanding, reflection, and communication (Rubtsova, 2020; Salminen-Saari et al., 2021). Of particular interest in this context are studies of the phenomenon of joint attention.

Joint attention is defined as the capacity to concentrate on an object of another person's attention, as well as the ability to direct another's attention toward a particular object (Pys-Tarhonen et al., 2021). The scientific community has long moved away from a simplistic, mechanistic view of joint attention as a “relatively elementary process of visually following another's gaze,” emphasizing that “... the orientation of the head and eyes of another individual is an insufficient source of information about their object of attention” (Zotov, Andrianova, Voyt, 2015).

In a broader sense, joint attention is understood as the ability of two individuals to focus simultaneously on the same external object or event. This basic definition implies that the presence of a triad — “individual 1 — individual 2 — object of attention” — is sufficient for the emergence of joint attention, even in the absence of direct gaze exchange. For instance, P. Mundy emphasizes in his review that joint attention is a fundamental socio-cognitive capacity that involves coordinated concentration of two people on a shared external referent (object or stimulus), forming the basis for shared understanding in communication (Mundy, 2018). Thus, joint attention may take on various forms and levels of complexity, and should not be reduced solely to the classical “triangle” model involving alternating eye contact and shared focus on an object.

In particular, the framework proposed by B. Siposova and M. Carpenter (Si-

posova, Carpenter, 2019) presents a typology of joint attention as a spectrum of hierarchically related states or levels of “jointness” in attention. The authors argue that joint attention should not be understood as a discrete, binary state (present or absent); instead, it encompasses multiple gradations of attentional engagement — from simple simultaneous looking (common attention) to fully shared attention characterized by mutual awareness. These levels differ in the degree to which partners are aware of each other's attentional focus and in the nature of the “common knowledge” between them. For example, at a basic level, two individuals might be looking at the same object without being explicitly aware that the other is doing the same — this can be considered common attention without overt communicative coordination. Nevertheless, even such a situation meets the criteria of joint attention, as both individuals are engaged in a shared perceptual field.

Building upon these theoretical positions allows for a broader conceptualization of the joint attention phenomenon. For instance, in a study by S. Schroer et al. (Schroer et al., 2024), using dual eye-tracking in naturalistic environments, it was shown that “parent–child” dyads are able to coordinate attention to the same objects without exchanging deliberate signals. The authors demonstrate that joint attention arises from the dynamics of sensorimotor interaction, rather than solely from intentional cues. These findings align with the view that joint attention during online interaction is manifested through the synchrony of gaze directed at shared objects.

Currently, two types of joint attention are commonly distinguished:

- Bottom-up joint attention, where “the localization of another person's attentional focus is influenced by gaze direction, body

position, and the presence of visually salient objects” (Shevel, Falikman, 2022);

- Top-down joint attention, where “the key factor is information about events experienced by the person, regardless of visual salience in the field of view” (Shevel, Falikman, 2022). That is, top-down joint attention relies on “contextual knowledge relevant to the communication situation, such as awareness that a given object is new or significant to the interlocutor” (Zotov, Andrianova, Voyt, 2015; Smirnova, 2020). This idea is further developed by A. Shvarts, who explicitly notes that the emergence of joint attention is closely linked to the construction of a shared semantic foundation for joint action (Shvarts, 2018; Shvarts, Abrahamson, 2024).

As T.M. Shevel and M.V. Falikman point out, “the mechanism of joint attention forms the basis for sharing common information and goals during collaborative tasks, as well as for understanding the intentions and desires of the other person; therefore, its interpretation may also become decisive in identifying the focus of the other’s attention” (Shevel, Falikman, 2022).

A review of studies on social interactions using the eye-tracking method, conducted by A.V. Konokotin, N.Ya. Ageev, I.A. Dubovik, and G.I. Kalina (Ageev et al., 2023a), showed that, first, oculomotor activity data can serve as a meaningful indicator of the emergence and dynamics of reflection and mutual understanding among participants in joint activity. Second, joint attention, as recorded through oculomotor analysis, may be used as an indicator of participants’ inclusion in the shared semantic context of collaborative activity — signaling their transition to a new level of interaction, coordination, and planning of joint actions in the process of solving a common task.

In this regard, the main goal of the present empirical study was to investigate

the characteristics and dynamics of oculomotor activity among participants engaged in collaborative activity at different stages of the development of educational interactions.

Multiplayer online game “Ether Noise”

The multiplayer online game “Ether Noise” is based on the concept of a diagnostic methodology for assessing the ability to design collaborative actions, originally implemented in the group task “Perimeter” (Akopova, Glazunova, Gromyko, 2020).

According to the storyline, a team of players (available in two versions—2-player or 4-player mode) receives the following instruction upon entering the game:

“Your team has landed on the planet NIBIRU. The planet’s inhabitants are extremely aggressive and hostile. Your team must quickly construct a protective perimeter around the base. Each team member starts building from their own corner of the future perimeter. Communication is temporarily unavailable...”

The participants are tasked with building a protective rectangular perimeter around the base using geometric shapes. The working interface of “Ether Noise” consists of an 8x12 rectangular game board displayed on the computer screen. In the center of the board is a pool of 144 geometric shapes, differing in color, shape, size, and animation (Fig. 1).

Each team member is also assigned a unique individual task, which is not known to the other participants. These individual tasks are distributed randomly and require each player to construct the perimeter based on a specific rule known only to them (such as the sequence of figures by color, size, shape, or animation).

A key organizational and functional feature of the “Ether Noise” game is its jointly-

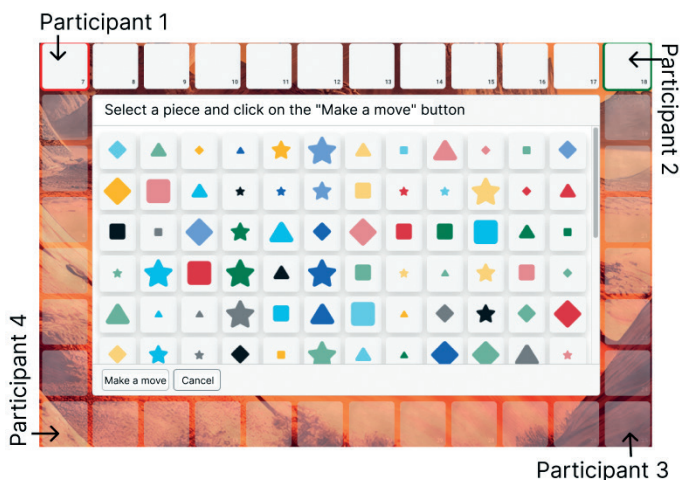


Fig. 1. The game board layout of the multi-user online game “Interference in the Air”

distributed form of activity. The gameplay conditions place participants in a situation where the actions of one player are constrained by the actions of another (Fig. 2). Thus, the goal can only be achieved through coordinated teamwork. This creates a special task for the players: to explore ways of organizing collaborative activity, find grounds for dividing tasks, and then integrate and coordinate their efforts within a shared endeavor (Ageev et al., 2023b).

The basis for combining shapes and determining their order relies on identifying genus–species relationships. Participants are not merely asked to perform a classification based on comparing objects and assigning them to predefined categories. Rather, they are expected to reconstruct the essential (genus–species) relationships that govern the coordination and alignment of object properties, in order to form new categories whose properties are defined by the activity’s internal logic. This aspect makes the task inherently educational: its content is the concept of genus–species relations, and the game itself becomes a

model of activity-based technology for developing digital educational (and diagnostic) tools.

This organizational and conceptual feature of the game creates a kind of dual-layered situation. The learning-cognitive task of identifying grounds for comparison is mediated by a new challenge — organizing interaction with a partner. The conceptual structure being formed — “genus–species” — is embedded in the system of collaborative interactions.

At the beginning of the task, each player can only see their own section of the game board. They are able to observe the movement of the highlighted grid frames representing other players, but they cannot see the shapes placed by them. Moreover, communication between players is initially blocked. Once a player reaches the corner — where their moves intersect with those of another participant — they gain access to the chat window and are also allowed to see the figures placed by others in the room. If one player reaches the corner first and places a new shape, the updated figure becomes visible to

According to participant 4's task, there should be a black figure here, and its **size** does not matter.

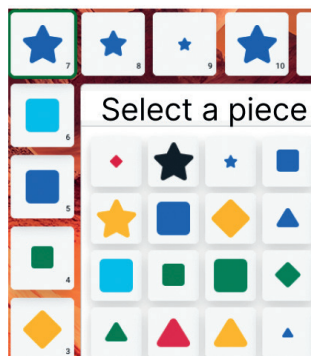


Fig. 2. Participants' encounter with a conflict situation at the intersection of working areas

others only once they too cross into the shared area.

The game has a 60-minute time limit, monitored via a countdown timer. If the team believes they have completed the task before the time expires, they can press the "Propose to End Game" button. Once all players confirm, the system verifies the perimeter construction and notifies the team of the outcome: *Mission accomplished* or *Mission failed*.

Study design and sample

The experiment involving the use of the online game "Ether Noise" was conducted between June and August 2024 at the Center for Career Guidance and Pre-University Education "PRO PSY." The study sample included 30 adolescents and young adults aged 13 to 20 years ($M = 17,11$, $SD = 2,00$; 67% female) from Moscow. Social status was not additionally considered.

Participants were grouped into pairs based on age: 4 pairs of adolescents (ages 13–15 inclusive) and 11 pairs of young adults (ages 16–20 inclusive).

During the game, participants' oculomotor activity was recorded using the NTrend-ET500 video-based eye-tracking module. This system calculates gaze direction through frame-by-frame analysis of video

recordings, enabling tracking of head position, eye movement, and pupil size.

Eye movement was recorded binocularly at a frequency of 500 Hz with an accuracy of $0,4^\circ$, at a distance of 50–80 cm from the screen. Calibration was performed before each recording using a 9-point grid. Eye-movement data (fixations, saccades, and blinks) were exported in .xlsx format separately for each participant. These files included the start and end times of each event, as well as the gaze coordinates during fixations (and for saccades, the gaze coordinates at the beginning and end of each event) on the screen (area width: 1920 px, area height: 1080 px) for both eyes. Data processing was carried out using Microsoft Excel, RStudio, and Jupyter Notebook.

To detect the occurrence of joint attention, a custom R script was developed that identified fixations located no more than one grid cell apart, and separated in time by no more than 1 second. The script iterated through one participant's fixations and searched for corresponding fixations from their partner that met the spatial and temporal proximity criteria. A pair of fixations was marked as synchronous if the spatial distance between their coordinates was within the threshold and the time gap

between the end of the first and the start of the second was ≤ 1000 ms. The script also accounted for overlapping fixations (i.e., those occurring at the same time), which were automatically marked as joint if spatially aligned. This procedure resulted in a quantitative list of all joint attention episodes. The approach was based on existing methods in dual eye-tracking studies (Yu, Smith, 2017; Olsen et al., 2017).

Fixations on the inner perimeter of the game interface — containing individual task instructions, chat windows, and figure selection panels — were excluded from analysis. These areas changed dynamically upon clicking the “Make a Move” button, which made it impossible to reliably track joint attention fixations and rendered them irrelevant to the experimental task. Only fixations located on the outer perimeter cells were analyzed.

To visualize joint attention fixations, a heatmap-based visualization method was used, highlighting areas of elevated attention. Each heatmap displayed color-coded blobs representing all joint attention fixations during various stages of gameplay within a pair. The color gradient (from blue to red) indicated the frequency of joint fixations in a given area, while the blob diameter reflected fixation duration. The heatmaps were generated using a custom Python 3.12 script. The set of figures displayed along the perimeter and side representations during individual stages did not reflect the actual fill-in for each pair, but rather served as an example.

Quantitative data analysis was performed using IBM SPSS Statistics software. The following statistical methods were applied:

1. Descriptive statistics (mean, median, standard deviation);
2. Wilcoxon non-parametric t-test (for within-sample comparisons under non-normal distributions).

The version of “Ether Noise” used in this experiment was designed for 2 players. All participants used identical ASUS monitors with a resolution of 1920×1080 px connected to desktop computers. Once equipment installation, participant positioning, and eye tracker calibration were verified, participants were not allowed to leave their seats, move their heads, or communicate verbally. According to the experiment protocol, communication was only allowed via the in-game chat, which became accessible after participants reached the corner of the perimeter.

Analysis and discussion of research findings

The analysis of the dynamics of joint action formation (i.e., different modes of interaction) between participants during the collaborative problem-solving process in the multiplayer online game “Ether Noise” was conducted through a qualitative examination of screen recordings. These recordings allowed for tracking the actions performed by participants while constructing the perimeter (i.e., placing geometric shapes on the field), as well as their communication through chat messages.

The problem-solving process for each participant pair was divided into two stages:

1. *Individual Stage*, which combines pre-organizational and pseudo-organizational modes of interaction (in line with the typology of V.V. Rubtsov and A.V. Konokotin). This stage is characterized by a specific subject of communicative interaction — the search for a solution based on the possibilities of individual action. At this stage, the partner's actions are not perceived as contributing to the solution of the task. Essentially, this phase involves solving the “object-related task” (i.e., constructing the perimeter) exclusively on the basis of the

individual rule assigned to each participant at the beginning of the game.

2. *Joint Stage*, which combines organizational and reflexive-analytical interaction modes. This stage is marked by the emergence of a shared goal focused on the planning and organization of joint activity (interaction), and the coordination of individual actions within a structure of collaborative action aimed at solving the common problem — constructing the perimeter by integrating individual rules.

Following this division into individual and joint stages, the oculomotor data of each participant pair were analyzed separately for each stage. The table presents data on the number, median duration, and frequency of joint attention fixations observed.

A comparison was made between the frequency and median duration of joint attention fixations for each pair during the individual and joint stages of the task (see

Fig. 3 and Fig. 4). The fixation duration parameter allowed us to demonstrate that the observed phenomena were not merely random artifacts or express fixations (i.e., shorter than 150 ms) (Theeuwes, Burger, 1998; Radach, Heller, Inhoff, 1999; Velichkovsky et al., 2000; Pannasch et al., 2001; Godijn, Theeuwes, 2002), but instead represented fully legitimate oculomotor events, reflecting the cognitive activity and its dynamics within the participants.

The diagrams reveal that:

- In 13 out of 15 participant pairs, the frequency of joint fixations increased during the joint stage.
- In 14 out of 15 pairs, the median duration of joint fixations on the same area of interest also increased at the joint problem-solving stage.

It was found that during the individual stage, participants exhibited processes of reflection related to understanding the rule their partner was using to construct their

Table

**Parameters of joint fixations for the individual and joint stages
of the game for each pair of players**

Pairs	Median duration of joint fixations, ms		Frequency of joint fixations, units per minute	
	Individual stage	Joint stage	Individual stage	Joint stage
M1M2	154,0	226,0	8,2	13,9
A3Э4	190,0	226,0	4,7	32,1
Д5Э6	182,0	185,0	2,	14,9
Д7И8	192,0	229,0	5,1	4,6
В9А10	196,0	214,0	8,1	2,7
Е11М12	203,0	236,0	3,9	4,2
Э13Е14	252,0	262,0	6,5	16,3
Е15А16	222,0	225,0	3,5	12,3
В17А18	210,0	237,0	0,4	1,4
Д19А20	232,0	256,0	2,8	9,9
Е21Н22	218,0	222,0	4,4	9,1
С23И24	239,0	202,0	2,4	15,4
А25М26	240,0	280,0	6,1	10,4
В27В28	148,0	204,0	1,3	1,6
Л29В30	193,0	270,0	1,8	16,5

own sequence of geometric figures. Their gaze direction moved between several key areas:

- The partner's working area;
- Their own working area;
- The area of their individual task.

For example, in pair A3E4, whose “starting sides” were located on opposite long sides of the perimeter, fixations during the individual stage—including the lon-

gest ones—were concentrated in the area where participants encountered their partner's rule (see Fig. 5).

In pair E21H22, whose “starting sides” were on adjacent edges (bottom and left), the longest fixations were again located in the area of overlapping activity (see Fig. 6).

These patterns provide substantial evidence that the fixations reflect participants' awareness of the difficulty arising

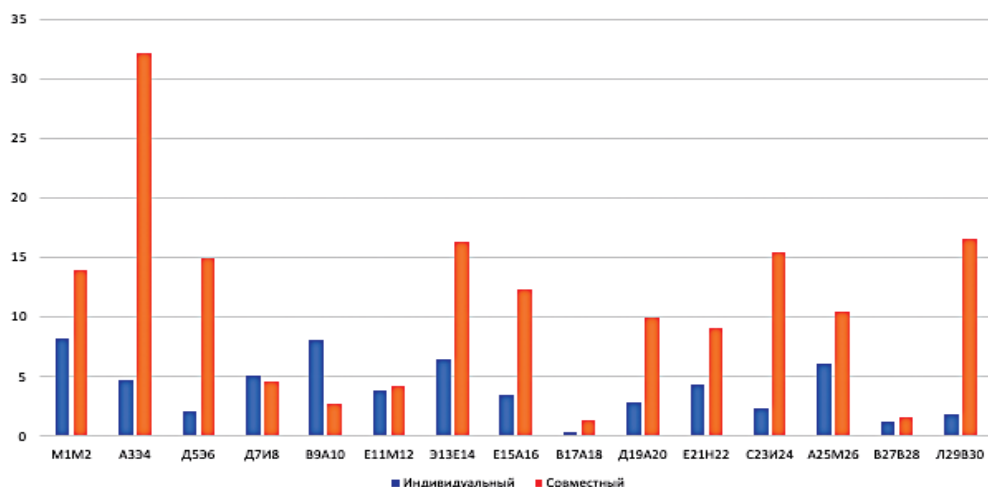


Fig. 3. Comparison of the frequency of joint attention fixations in pairs at individual and joint stages

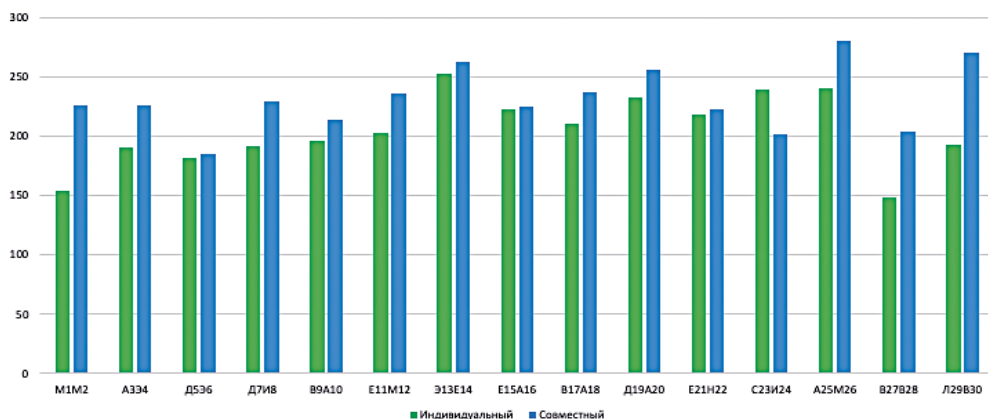


Fig. 4. Comparison of the median duration of joint attention fixations in pairs at individual and joint stages



Fig. 5. Heat maps of pair A3E4 fixations at the individual stage:
participant A3 is on the left, participant E4 is on the right

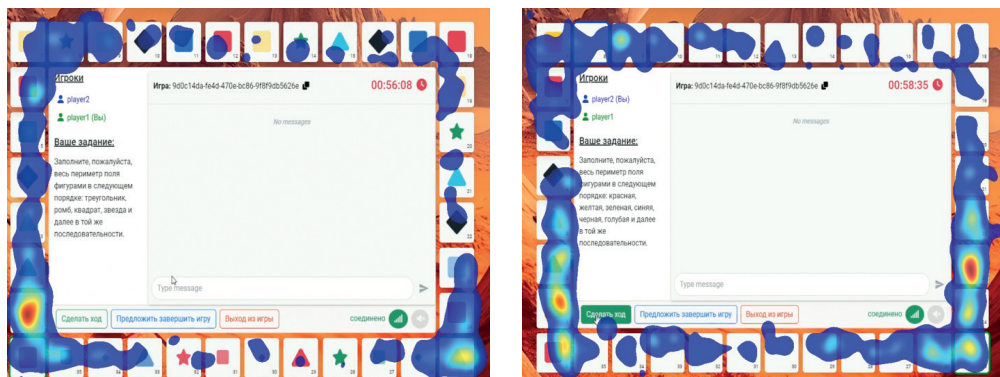


Fig. 6. Heat maps of pair E21H22 fixations at the individual stage:
participant E21 is on the left, participant H22 is on the right

during task execution and their attempts to overcome it by analyzing the principles upon which each participant builds their sequence of shapes. Furthermore, during this period, communication begins to emerge, with participants explicitly drawing one another's attention to these difficulties (Husnutdinova et al., 2023), which is accompanied by the appearance of joint fixations.

At the same time, it is important to note the relatively low frequency of joint fixations at this stage, despite their comparatively long durations (see Fig. 7 and

Fig. 8). This suggests, on the one hand, that participants were still primarily acting individually and planning based on their own representations of how to solve the task; and on the other hand, that a gradual transition was underway — from solving the individual problem to joint planning of actions and coordination in pursuit of a common goal.

Similar to individual fixations, joint fixations at the individual stage tended to concentrate in areas where one participant's actions began to disrupt the

rule used by the other participant. These were the moments where they would “encounter” one another and begin to negotiate interaction, establish a shared goal, model a collaborative solution, and coordinate their individual efforts (see Fig. 7 and Fig. 8). Thus, joint fixations at the individual stage were closely linked to reflective processes, aimed at understanding both one’s own and the partner’s grounds for action in the context of collaborative work.

Further quantitative analysis of the data revealed the following:

- The mean frequency of joint attention fixations per pair during the individual stage was 4,08, whereas during the joint stage it reached 11,02;
- The mean median duration of joint attention fixations per pair during the individual stage was 204,7 ms, increasing to 231,6 ms during the joint stage.

Statistical analysis using the Wilcoxon signed-rank test revealed significant differences in both the frequency of joint attention fixations per minute and the median fixation duration between the individual and joint stages ($T = 10,5$, $p \leq 0,01$). These results indicate the emergence of stable joint attention in participant pairs during

the transition from the individual to the joint stage of the task.

It is important to emphasize that the emergence of joint attention in the context of distributed collaborative activity arises, on the one hand, as a consequence of participants encountering constraints on their individual actions, which lead to processes of reflection, communication, and action exchange. On the other hand, it becomes the very foundation for further development of these processes, as well as for planning, modeling, and coordinating new modes of interaction through sustained mutual understanding (Rubtsova, Ulanova, 2014).

This idea is further supported by the qualitative analysis of heatmaps during the joint stage (see Figs. 7, 8, and 9).

Here, joint fixations appear across the entire perimeter, exhibiting a continuous rather than fragmented pattern. They reflect a shared tracking process, where both participants follow the same perimeter zones throughout the task. We also observed variability in the “patterns” of joint fixations across different participant pairs. According to qualitative video analysis, discontinuous joint attention patterns (as in Fig. 8) were typical of pairs that implemented a cooperative mode of interaction.

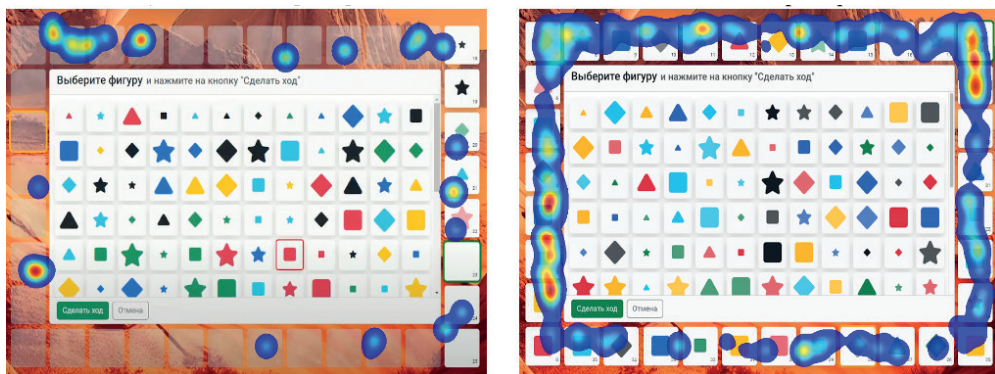


Fig. 7. Heat maps of joint attention fixations in pair A3E4

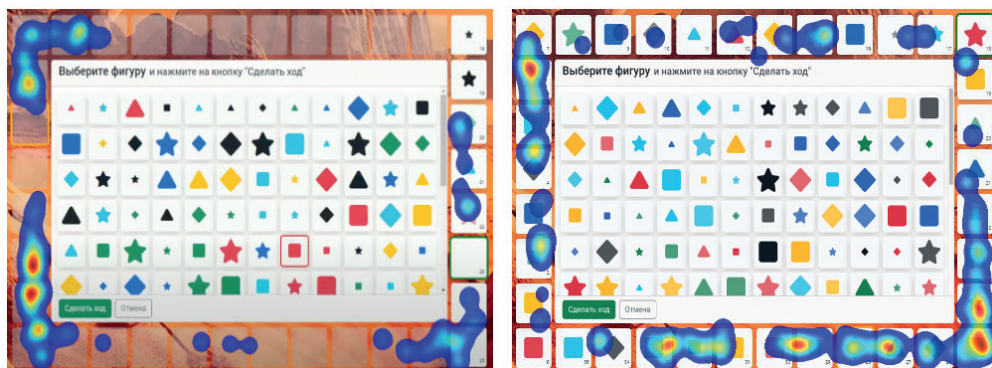


Fig. 8. Heat maps of joint attention fixations in pair E21H22

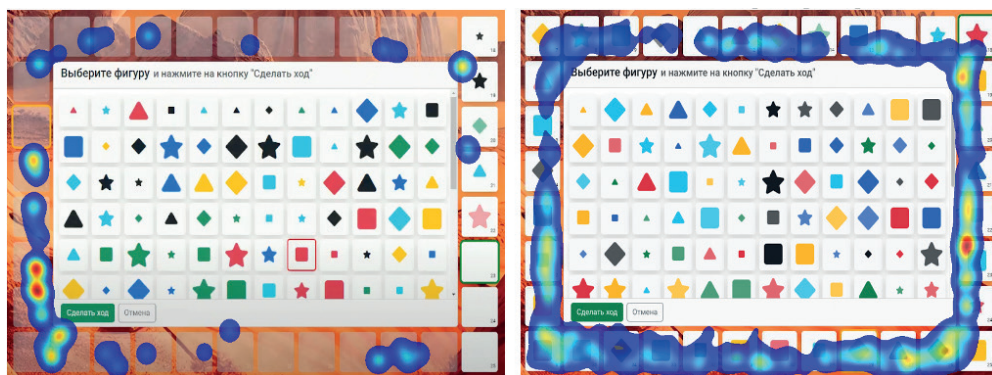


Fig. 9. Heat maps of joint attention fixations in pair E13E14

Conversely, pairs engaging in reflexive-analytical interaction — where individual operations were integrated into a shared structure — tended to show more coherent and sustained joint fixations (as in Fig. 9).

However, we found no consistent correlation between the type of joint activity organization and the structure of joint fixations displayed in the heatmaps. Nor was there a reliable association between the frequency or duration of joint fixations and the mode of interaction (organizational vs. reflexive-analytical). This may be due to the fact that modes of interaction are complex formations, or what V.V. Rubtsov and

A.V. Konokotin describe as “emotionally-meaningful unities”, which cannot be fully captured through psychophysiological indicators alone, such as eye movement data.

What truly matters is the subject of communicative interaction — that is, the basis on which collaborative action emerges: either as cooperative alignment of operations, or as modeling of joint action through analysis of the relationship between task content and interaction structure.

Nevertheless, oculomotor data did prove useful in distinguishing between individual and joint forms of activity, allowing us to identify forms of jointness based on

differences in the emergence and structure of joint attention. This indicates that various modes of participant interaction indeed form a kind of functional unity that requires complex cognitive processes: planning, modeling, organizing, coordinating, and monitoring collaboration as the means for solving the shared task.

Additionally, a focused analysis was conducted on video recordings from two pairs (B9A10 and D7I8) in which a decline in joint attention fixation frequency was observed during the transition from individual to joint stages. In both cases, the participants adopted a cooperative mode of interaction. They identified a common task (comparing individual action rules), exchanged their task texts via chat, and agreed to proceed “together.” However, their cooperation took the form of sequential individual execution, as shown in the following exchange:

“I’ll do my task... You just change my pieces to the color you need.”

“Ok, go!”

Based on the above, we can conclude that oculographic data collected during participants’ collaborative activity — specifically, the duration and frequency of joint fixations, as well as the spatial areas of gaze concentration — can serve as informative indicators, first, of the cognitive processes emerging during task performance (primarily reflection), which are related to analyzing and evaluating the principles and regularities guiding participants’ transformation of the task’s problem space; and second, of the transformations in the very modes of interaction employed by participants throughout the course of their joint activity.

Conclusion

Based on the quantitative data analysis and the qualitative interpretation of heat-

maps reflecting joint attention fixations during different stages of the educational task (individual and joint) in the multiplayer online game Ether Noise, the following conclusions can be drawn:

1. The emergence of joint attention between participants engaged in distributed collaborative activity — centered on solving a cognitively significant task — occurs primarily in situations where individual actions are limited by task constraints. This prompts reflective and communicative processes aimed at overcoming these constraints through analyzing the task content and developing new modes of interaction. These interactions involve coordinating individual operations within an evolving shared structure of joint action.

2. Joint attention functions as the foundation for the development of new forms of interaction between participants. It enables the emergence and maintenance of stable mutual understanding, which is grounded in a shared conceptual grasp of the learning task and allows for effective joint planning and execution.

3. Oculomotor indicators — specifically, the frequency and duration of joint fixations, as well as the spatial distribution of gaze — can serve as meaningful markers of underlying cognitive processes, particularly reflection. These indicators also provide insight into dynamic changes in the forms of interaction employed by participants during collaborative work.

4. Eye-tracking data offer a reliable basis for distinguishing between individual and joint forms of activity organization, especially in the process of internalizing and mastering the conceptual content of a learning task. These distinctions are critical in identifying shifts in cognitive engagement and collaboration.

The “Ether Noise” multiplayer online game demonstrates significant potential

(pending appropriate standardization and validation procedures) as a diagnostic tool for assessing universal communicative learning actions in adolescents and young adults at the basic and secondary educational levels.

This potential stems from the structural-functional properties of the instrument itself: the game does not offer a static “snapshot” of individual abilities (as is often the case with traditional questionnaires and self-report methods aimed at assessing social skills), but rather provides a dynamically

unfolding process, in which a specialist can directly observe how communication, action exchange, reflection, and mutual understanding develop in a real-time educational context.

Such a setting allows researchers and practitioners to access and support the students’ zone of proximal development, as conceptualized in cultural-historical psychology, by providing opportunities for observing and guiding emerging processes of joint meaning-making and collaboration (Konokotin, 2021).

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Yulia A. Tokarchuk — research ideas; planning and organization of the study; data collection; experiment implementation; qualitative data analysis; visualization of research results; writing and manuscript preparation.

Andrei M. Tokarchuk — research idea; supervision of the development of the “Ether Noise” online game; oversight of the experimental process.

Ksenia G. Povorova — data analysis; application of statistical, mathematical, or other formal methods for data analysis; visualization of research findings.

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Predictors of the use of moral prohibition by university students: the context of an ethically loaded situation and personal characteristics

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Abstract

Context and relevance. The study is devoted to the study of the factors of the application of moral prohibition in ethically loaded situations. The relevance of the work is determined by the insufficient study of the interaction of personal characteristics and parameters of the situation in the application of moral prohibition, as well as its practical significance for the development of training programs for university students to make morally relevant decisions, taking into account the contextual specifics of moral choice. **Objective.** This study aims to evaluate the extent to which personal characteristics contribute to the imperative, completeness, reasonableness, and consistency of applying moral prohibitions, considering variations in context and the focus of the moral agent's actions. **Methods and materials.** Sample: 195 students (M age = 20,02, SD = 1,34). The author's situational methodology is applied, which models realistic scenarios of the application of prohibition in different subject contexts (legal, medical, everyday) with an egocentric (the student acted as a moral agent himself) and an allocentric (the application of prohibition from the perspective of Another, anonymous moral agent) focus of action. Personal characteristics were measured by a selected package of diagnostic techniques. The main method of analysis is regression analysis. **Results.** It has been established that: a) the predictive effect of personal characteristics manifested itself in the medical context and in situations with an egocentric focus of action; b) for the same criteria of moral prohibition, different personal predictors were identified in different contexts; c) the ethical position and sociomoral reflection that are already ingrained in the structure of students' moral personality make the greatest contribution to the application of moral prohibition. **Conclusions.** The subject context of an ethically loaded situation can both negate the role of personal characteristics in mediating the application of a moral prohibition, and, on the contrary, strengthen it. The data obtained in this study may be important for changing the university's educational environment through the application of research practices aimed at identifying predictors of morally relevant decisions.

Keywords: moral prohibition, criteria for the application of moral prohibition, ethically loaded situation, context of the situation, focus of action of a moral agent, personal predictors

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Предикторы применения морального запрета студентами вуза: контекст этически нагруженной ситуации и личностные характеристики

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Резюме

Контекст и актуальность. Исследование посвящено изучению факторов применения морального запрета в этически нагруженных ситуациях. Актуальность работы определяется недостаточной изученностью взаимодействия личностных характеристик и параметров ситуации в применении морального запрета, а также практической значимостью для разработки программ обучения студентов вузов принятию морально релевантных решений с учетом контекстуальной специфики морального выбора. **Цель.** Оценить вклад личностных характеристик в императивность, полноту, аргументированность и согласованность применения морального запрета при варьировании контекста и фокуса действия морального агента. **Методы и материалы.** Выборка: 195 студентов (M возр. = 20,02, SD = 1,34). Применена авторская ситуационная методика, моделирующая реалистические сценарии применения запрета в разных предметных контекстах (правовой, медицинский, житейский) с эгоцентрированным (в качестве морального агента студент действовал сам) и аллоцентрированным (применение запрета с позиции Другого, анонимного морального агента) фокусом действия. Личностные характеристики измерялись подобранным пакетом диагностических методик. Основной метод анализа — регрессионный анализ. **Результаты.** Установлено: а) предсказательный эффект личностных характеристик проявился в медицинском контексте и в ситуациях с эгоцентрированным фокусом действия; б) для одних и тех же критериев морального запрета в разных контекстах выявлены различные личностные предикторы; в) наибольший вклад в применение морального запрета вносят уже

укоренившиеся в структуре моральной личности студентов этическая позиция и социоморальная рефлексия. **Выводы.** Предметный контекст этически нагруженной ситуации может как нивелировать роль личностных характеристик в опосредствовании применения морального запрета, так и, напротив, усиливать ее. Полученные в настоящем исследовании данные могут быть важными для изменения образовательной среды университета путем применения исследовательских практик, обращенных к выявлению предикторов морально релевантных решений.

Ключевые слова: моральный запрет, критерии применения морального запрета, этически нагруженная ситуация, контекст ситуации, фокус действия морального агента, личностные предикторы

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Introduction

A number of events of the twenty-first century, which caused a wide public discussion, painfully and vividly highlighted the role of moral prohibitions in regulating individual and social lifestyles. In order to realize their inevitability, the modern student no longer needs to turn to fictional moral dilemmas. Everyday life in society turns into an arena of moral choice, moral contradictions, and conflict of moral values. This implies that young people should be able to relate their ethical principles to the conflicting demands of the situation and make decisions based on moral prohibitions.

Student years are an important period for the development of social normativity competencies. Young people deeply analyze themselves and their identity, entering into new relationships, expanding their worldview in acquaintance with different cultures through the reflexive development of ethical aspects of the application

of knowledge, through which consensus is reached in social dilemmas and moral issues (Rest, Thoma, 1985).

Despite this, only a few works study the development of moral decision-making processes by students, considering the circumstances of moral choice that are significant for their social and professional development. Studies provide contradictory data. On the one hand, it is recognized that young people understand why it is necessary to act morally rather than immorally, are able to take into account the moral point of view, even if they do not act in accordance with it, consistently focus on moral norms, and consider universal norms as relevant and key in resolving moral contradictions (Gorbacheva, 2013; Molchanov, Markina, 2014; Derryberry et al., 2005; Santos, 2024). On the other hand, it is noted that this is typical for the initial stage of university studies, and at subsequent stages students do not acquire new moral competencies and even show less moral matu-

ality and willingness to be guided by moral prohibitions (Levkova et al., 2019; Myrsky, Juuj rvi, Pessoa, 2013). Discrepancies were found in the moral values they declared and the decisions they made (Lezhneva, 2022; Jarrar, 2013; Vadher, Vajpayee, Sanghani, 2023). Researchers point to the moral differentiation of students, traditionally associating a heterogeneous level of maturity of moral judgments with personal qualities (Liao, Mironenko, 2021; Aybek, Cavdar, ayku , 2015; Jarrar, 2013). The role of specific individual and personal characteristics in resolving moral contradictions is still debatable. It is no coincidence that the "repertoire" of values and personality traits correlated with moral judgments is constantly expanding (Pogozhina, Sergeeva, 2024; Reig-Aleixandre, 2024).

Despite the postulated stable relationship between personality and the nature of reasoning in situations of moral choice, indicators of the contribution of certain personality characteristics to the moral quality of conclusions are inconclusive, which is confirmed by the fact that the quantitative parameters of such a relationship hardly reached the required level of significance (Bollich et al., 2016; Lee et al., 2021; Van den Berg, Kroesen, Chorus, 2022).

Using the criteria of universality or, on the contrary, the relativity of moral requirements in unrelated hypothetical scenarios of "sacrificial" dilemmas, young people each time find themselves in separate "moral universes" far from the real circumstances of their lives. No, this is not my opinion, but it is important that the moral decisions taken are not aimed at leading to serious consequences for the state and society. civic experience (Bostin, Roets, 2022). Despite attempts to make classical "sacrificial" dilemmas more realistic and thus provide the required external validity, for example, by using immersive virtual re-

ality or including more exciting and understandable details of the situation (Carron, 2024; Wang, Chen, 2021), sets of dilemmas suggesting two solutions — deontological or utilitarian — are still perceived as poorly contextualized (Kerner, German, 2023; Shaina, 2020) or overly simplified and not taking into account key contextual factors (Carron, Blanc, Brigaud, 2022; Carr, Hannikane, 2022).

The specificity of moral choice in realistic scenarios is such that it is carried out in a normatively heterogeneous context in which social norms, including ethical standards and rules of moral behavior, correlate with universal moral values and moral principles. In our opinion, such situations can be categorized as ethically loaded. The use of this term to denote a situation of moral choice is dictated by an attempt to contrast the dilemmas of the sacrificial (trolley) type, where the subject needs to make a choice between two obvious alternatives (deontological and utilitarian), with realistic dilemmas based on real situations of social interaction. The study of the application of prohibitions in moral issues that are important for students' orientation, which have to be solved in realistic scenarios of their activities, can provide a better understanding of the relationship between their moral thinking and personal characteristics than the research models traditionally used in moral psychology.

Methodology and research methods

In ethically loaded situations (hereinafter referred to as ELS), depending on their context, the moral prohibition each time takes on a characteristic format of actions implemented as a response to specific "challenges" of the context of the situation. The application of a moral prohibition is revealed through the criteria characterizing it. Imperativeness reveals

how categorical a decision is made under the conditions of different moral norms of universal and socially conventional orders. Completeness reflects the degree of exhaustion of the structural description of the composition of the moral contradiction (the conditions under which moral choice is made). Argumentativeness shows which arguments (moral, non-moral, or hybrid) are used to justify a decision to follow or evade a moral prohibition. Consistency reveals the measure of sustainability of a decision and its justification in the changing context of the ELS. The analysis of the manifestations of the application of the indicated criteria of moral prohibition was carried out by us from a functional point of view. Namely, we have consistently used the concepts of "norms of ethics, morality, and morality," given that they all set standards for reasoning and behavior and serve as a guide for decision-making, that is, they act as regulators of the application of moral prohibition.

In order to better understand the mechanisms underlying the manifestations of prohibition criteria, it is important to study them in connection with personal characteristics that meaningfully characterize value-oriented aspects of moral thinking. When substantiating the theoretical model of the application of moral prohibition, the following personal characteristics were attributed (Gorbacheva, Kabanov, 2024): moral orientation of the individual, socio-moral reflection, ethical position, moral identity, reflexivity, and the formation of ethical concepts, and these last two characteristics represent the personality in terms of its moral functioning and the development of moral guidelines. They are dispositional in nature and therefore cannot be considered as a basis for a moral prohibition but indicate the likelihood of its application.

Of course, it is impossible to expect with full confidence that all of them, or at least most of them, will be able to perform a predictive role in relation to the meaningful fulfillment by students of all their criteria. Determining the expediency of considering personal characteristics as predictors of the application of prohibition in individual moral thinking, we will proceed from the fact that thinking in the moral sphere and the personal properties of a moral personality are significantly interrelated, since both develop and acquire psychological maturity in prosocial interactions (Volovikova, 2012).

The purpose of the research presented here is to evaluate the contribution that personality characteristics and their aggregates make to the realization of the imperativeness, completeness, argumentativeness, and consistency of the application of moral prohibition when varying the contextual conditions of their joint action. To study how students apply moral prohibition, a situational methodology was developed. In each situation, the acting character, under pressure from the moral values of the general (universal values) and the group level (moral rules and socio-conventional norms of communities), decides to violate the moral prohibition presented in different subject contexts (legal, medical, everyday). The scenarios for the situations were borrowed from interviews with representatives of the medical and legal professions, as well as real-life cases shared by participants or witnesses on social media. The mentioned interviews are usually structured as follows. Participants are asked to talk about one or more ethically difficult situations that they have encountered in their professional activities. At the same time, what exactly is considered an ethically difficult situation is deliberately not specified by the researchers, which allows the interview participants to determine for themselves what they

consider ethically difficult. The purpose of such interviews is to get as detailed stories as possible. Therefore, interviewers try not to interrupt the respondents' narration or distract them from their thoughts. If interviewees find it difficult to reflect on the events they recall and relate on their own, researchers can ask questions aimed at clarifying the respondents' thoughts, feelings, and actions (Torjuul, Nordam, and S rlie, 2005). Thus, the hero of the situation himself, either without the help of the interviewer or with the help of his leading questions, focuses in his story on what caused him moral tension in the situation he was presenting. Thus, the received interview texts reflect the ethical load vectors that act on the hero of the real situation, and which we have preserved and considered when designing ethically loaded situations for our research. In addition, in selecting from many situations that we constructed based on the stories of real people about real cases from our practice, we sought to take into account the drawback noted by some authors of using realistic-type dilemmas, which lies in the style of presenting dilemmas. Namely, "when some dilemmas are written in colorful language and contain many emotionally loaded adjectives, while others are filled with technical vocabulary and abstract reasoning, there is reason to believe that moral decisions, emotional arousal, and underlying neural activity will be caused by the style of presentation rather than conceptual differences between dilemmas" (Christensen, Gomila, 2012). Indeed, in the stories of individual subjects, which they shared in their interviews and which we used to construct our stimulus material, there are expressive statements that convey their emotional attitude to the situation and, therefore, of course, can affect the recipient, for example, causing sympathy for the victim. Therefore, when

creating our own situations, we tried to eliminate emotionally loaded vocabulary while maintaining only the vector of emotional tension (what the hero of the real situation was worried about, but not how intensely he did it).

The methodology included 12 situations (4 for each subject context). Half of them were formulated in such a way that the student seemed to act on his own (egocentric focus of action), the other half assumed an allocentric focus of action (the decision is made on behalf of the acting character). The subjects were asked, firstly, to evaluate the correctness of the decision made by the protagonist in each of the proposed situations and, secondly, to justify their assessment. Examples of situations and instructions for them are illustrated in Fig. 1.

The first instruction was accompanied by an evaluation scale (a seven-point Likert scale with gradations from unambiguous non-application to unambiguous application), which would allow us to judge the degree of imperative with which the respondent suggests following the moral prohibition actualized by him. The scoring was carried out inversely: the more "weight" the imperativeness of the moral prohibition received, the less the subject agreed with the decision made by the hero of the ELS (respectively, the scores were distributed from 1 point — violation of the moral prohibition — to 7 points — following it).

The second instruction provided a justification for its assessment. In accordance with the previously developed and tested coding categories and units of content analysis (Gorbacheva, Kabanov, 2024), the following were measured: completeness of the structural description of the situation (covering the main components of the moral contradiction underlying the ELS: the values of the heroes of situations and the motives to follow them, as well as the

Instruction. You are invited to familiarize yourself with 6 situations and answer 2 questions that express your opinion on each situation.

LEGAL	
Terrorist attack The Terrorist investigation department received information from an informant that an explosion would take place at one of the city's facilities in a day. The exact time of the explosion and the location are not known, besides, a holiday is taking place in the city, and if the criminals are not neutralized, there will be significant casualties. A man suspected of having links with terrorists was detained the day before. Interrogations do not yield anything, the defendant is confident and does not respond to threats and persuasions. We can't delay any longer, because hundreds of human lives are at stake. The investigator decides to use forceful methods of inquiry so that the detainee, under torture, would give up his accomplices as soon as possible.	Bank robbery You are investigating a robbery at a bank. A huge amount of money has been stolen, and there are dead and injured people. They managed to detain only one of the gang members, a local resident, who, despite long and grueling interrogations, denies his involvement in the robbery and does not give out his accomplices, who, as the investigation knows, lived in his house for several days. It is possible that the seventeen-year-old son of the defendant, to whom he is noticeably attached, has information about where the gang is hiding. You decide to arrest the young man, and warn the uncooperative criminal that if he does not give the necessary testimony during the day, his son will be put in the same cell with the "scumbags", from whom you can expect anything.
MEDICAL	
Urgent surgery The doctor works in the intensive care unit, where all the beds are occupied by very old patients. On his shift, a middle-aged man enters the department in critical condition and needs immediate surgery, but there is no room in the department. The surgeon urgently needs to make a decision, postpone the operation and wait until a bed is available or transfer one of the elderly patients to another department, which can seriously damage the quality of medical care for the latter. He decides to abandon the operation and leave everything as it is.	Organ transplantation You work in a clinic that specializes in organ transplantation, and for the first time you come across the fact that an available organ is medically suitable for two of your patients who are in your clinic, and therefore equidistant from it. You are aware that the recipient is selected only in accordance with medical indications that take into account the severity of the patient's condition, his immunological and genetic characteristics. At the same time, the priority of donor organs should not be determined by identifying the advantages of individual groups and special financing. Therefore, if the organ is almost equally suitable for two recipients, and they are both in critical condition and cannot wait long, then the doctor should give preference to the one who "got on" the "waiting list" earlier. You have been contacted by relatives of the second patient, who are major benefactors of the clinic, help with the supply of equipment and ask for an organ transplant, indicating that they can financially help your clinic. You agree to perform surgery on the second patient in line, citing the immunological incompatibility of the first patient.
EVERYDAY	
A young couple The couple has been dating for several years, and finally decided to formalize their relationship by setting a date for submitting an application to the registry office and informing their parents of their desire to marry. But the young man begins to doubt more and more that this is really his woman, and that marrying her will make him happy. More and more, he is inclined to believe that it is better for them to break up. He's even glad that she doesn't come to him or call. Two days later, the girl's mother calls him and informs him that her daughter has been in an accident and she is going to have a serious operation. He rushes to the hospital and makes sure that the girl has really suffered serious injuries. Despite the suffering and pain, she rejoices at his arrival, thanks him for his support, asks him to call the registry office and reschedule the wedding, which they have been waiting for. The young man decides not to postpone an unpleasant conversation for both of them and informs them that he has changed his mind, and there will be no wedding.	Friend-counselor For many years, you have been traveling as a counselor to a children's health camp. Over the years, you have established yourself as a qualified specialist, and before the next shift, the camp director asks for your help in selecting counselors for her. Your friend was inspired by your impressions of working with children in camps, and studied at the courses of leadership skills. He was active in the classroom, successfully passed all the final tests and asks you to recommend him to the camp director. However, you know that a friend has a behavioral disorder: he has a short temper, can be rude in the heat of the moment, often makes sarcastic remarks that offend other people, occasionally loses self-control, during which he can push someone or break something. This behavior starts abruptly, ends very quickly, and although he regrets what happened after it, he is unable to control it. You know that one of the main requirements for counselors is balance, and a counselor is an authority for children, a reference carrier of information about the norms of behavior and relationships between people. After much thought, you decide not to betray your friend to the director.
Evaluate how correct the decision is on a scale from 1 to 7, where 1 is absolutely wrong and 7 is absolutely correct. Circle the corresponding number. 1 2 3 4 5 6 7 Provide arguments supporting your assessment of the decision: _____ _____ _____	

Fig. 1. Stimulus material and instructions for the situational technique
 "The application of moral prohibition in an ethically loaded situation"

moral principles limiting them) (a scale from 0 was used up to 1,5, depending on the number of mentions of the mentioned components of the moral contradiction); argumentativeness, that is, the relevance of attribution of the moral agent's action, which was assessed on a scale from 0 to 2 points: 2 b — the moral prohibition is considered in its essential characteristics (as a universal value: for example, any life is inviolable); 1 b — the moral prohibition is considered in terms of moral arguments in accordance with the ethical principles of local corporate standards of behavior (for example, to demonstrate respect for a superior person or follow the rules of corporate ethics); 0,5 b — hybrid attribution using moral and non-moral arguments; 0 b — only non-moral attribution. Consistency in the application of a moral prohibition was defined as consistency in: imperativeness, completeness of structuring, and the nature of argumentation in justifying a moral prohibition, and its indicator was calculated as the ratio of the percentage of points received for similar responses to the total score for each of the measured indicators, brought to a single scale (from 0 to 100).

The following techniques were used to identify personal characteristics.

1. Methodology for the diagnosis of reflexivity of thinking (O.A. Anisimov) (Anisimov, 1994). The overall score on the scales was calculated as the level of *reflexivity*.

2. The questionnaire of D.R. Forsyth's ethical positions adapted by A.A. Fedorov and I.V. Badiev (Fedorov, Badiev, 2018) was used to assess the severity of ethical positions represented by two orthogonal factors — *relativism and idealism*.

3. The test of the formation of ethical concepts (E.Y. Zhidkova) (Zhidkova, 2013) is aimed at determining the measure of the formation of ethical generalizations. The general indicator of the formation of ethical

concepts of *justice, altruism, and honesty* was taken into account.

4. Methodology of moral identity (E.I. Gorbacheva, E.A. Zykova). The analysis included the severity of *positive moral identity and indeterminate moral identity*.

5. Situational test "Moral choice" (E.I. Gorbacheva) (Gorbacheva, 2013) establishes the level of normative acceptance in the moral sphere, indicating the *moral orientation* of the individual.

6. Methods of diagnosis of sociomoral reflection (J. Gibbs, K. Basinger and D. Fuller) adapted by A.A. Khvostov (Khvostov, 2001). The level of sociomoral reflection was determined, correlated with the *stages of moral maturity* of the individual.

The research was aimed at testing hypotheses: 1) the relationship between personal characteristics and criteria for the application of a moral prohibition and the features of these relationships in different contexts of situations, both substantive and setting different focuses of the moral agent's action; and 2) that both common and different personality predictors will be identified for the criteria of moral prohibition, and none of them, as well as their totality, will have sufficient power to predict the results of applying a moral prohibition that meets its criteria of imperativeness, completeness, argumentativeness, and consistency. The main method of data analysis has become the method of multiple linear regression. A linear relationship was modeled between explanatory (independent) variables (personality characteristics) and response variables (dependent), represented by indicators of the application of moral prohibition.

A two-part research strategy was used. During the first series, 220 students were offered a block of 12 ELS, in which situations with different subject contexts (law, medicine, and everyday situations) are

randomly arranged. Among them were situations with different focuses of action (allo- and egocentric). In the next series, after discarding incomplete and partially completed response forms, 195 respondents were left with whom methods were conducted to identify the above-mentioned personal characteristics, which, according to theoretical justification, could to one degree or another mediate the application of a moral prohibition.

The results of the study

Multiple regression analysis made it possible to identify the most significant personal characteristics that are in direct interaction with one or another indicator of moral prohibition. A multiple linear regression was performed, in which the criteria for the application of moral prohibition and eight personality characteristics, more or less associated with the implementation of moral thinking, were simultaneously introduced into the model as predictors. 20 such models were constructed (for each of the four criteria of moral prohibition in each of the three contexts (legal, medical, and everyday) and two focuses of action of moral agents (egocentric and allocentric)). Predictors in all models were personality characteristics: reflexivity, ethical position — relativism, ethical position — idealism, formation of ethical concepts, positive moral identity, indefinite moral identity, moral orientation of the individual, and sociomoral reflection. The table shows the results of regression analysis, which make it possible to judge the correspondence of the obtained models to the hypotheses put forward, and provides a brief description of regression models and their results, which make it possible to assess the cumulative impact of personal predictors on the modeled indicators of moral prohibition — imperativeness, completeness, argumenta-

tiveness and consistency in changing ELS contexts. The standard method of multiple linear regression (Ordinary Least Squares, OLS) was used. All independent variables were included in the model simultaneously, without using step-by-step selection (direct or reverse). This approach corresponds to the standard multiple linear regression without additional procedures for selecting variables.

According to the Darbin-Watson criterion, the factors unaccounted for in the model do not have a unidirectional effect on the dependent variables: all values of the criterion (DW) are in the range of 1,5–2,5, which indicates that there is no bias in the estimates of the regression coefficients. Based on the results shown in the table (these are the values of the coefficients of determination (R^2) and, above all, the adjusted R^2 , indicating a small, and in most cases extremely small, proportion of variance in the indicators of the application of the moral prohibition), it can be seen that the constructed regression models have weak predictive power, and none of them can be considered as confident proof that there is a single pattern of personality characteristics that are highly likely to identify whether all indicators of the application of the moral prohibition will be fully implemented. At the same time, their statistically proven predictors were identified for individual indicators of moral prohibition. In an ELS with an egocentric focus of action, personal characteristics collectively contribute to the implementation of the imperative ($F(8,1054) = 2,39$; $p = 0,01$), argumentativeness ($F(8,1021) = 2,77$; $p = 0,005$) and consistency ($F(8,171) = 2,83$; $p = 0,01$) of the application of moral prohibition. In an ELS with a medical context, for the sake of completeness of the structural description ($F(8,859) = 2,21$; $p = 0,02$)

and the argumentativeness of the moral prohibition ($F(8,861) = 3,71$; $p = 0,000$) established a significant condition for interaction with personal characteristics.

Fig. 2 and Fig. 3 show all the significant responses in the application of the moral prohibition caused by personal predictors in different contexts and focuses of action, with standardized regression coefficients (β) indicating their statistical significance.

In Fig. 2, it is easy to see that the predictive effect of a larger number of personality characteristics was manifested mainly in medical ELS. It is noteworthy that different personality predictors have been identified for the same criteria of moral prohibition, depending on the context of its application.

In the models of the completeness of prohibition in the legal context, the interactive interaction of this criterion of moral prohibition, the ethical position of idealism, the formation of ethical concepts has been revealed, whereas in medical ELS, a reliable response of completeness to both this ethical position and reflexivity has been established. In the models of argumentativeness of prohibition in the medical context, predicted conditions of interaction of this criterion were found for a greater number of personal characteristics (sociomoral reflection, ethical position, idealism, and moral orientation of the individual) than in a similar model constructed for legal ELS.

In the model of consistency of moral prohibition for everyday and medical con-

Table

Brief characteristics of regression models and their results, revealing the cumulative contribution of personality predictors to the variability of indicators of the application of moral prohibition

Regression model		R ²	Adj R ²	SE	df	F	p-value	DW
Imperativeness	Legal ELS	0,004	−0,005	6,333	8–882	0,484	0,868	2,16
	Medical ELS	0,006	0,003	6,287	8–877	0,712	0,681	2,35
	Everyday ELS	0,006	0,003	6,216	8–878	0,655	0,731	2,40
	Egocentric ELS	0,018	0,010	2,051	8–1054	2,395	0,015	1,98
	Allocentric ELS	0,012	0,005	2,07	8–1052	1,613	0,117	1,86
Completeness	Legal ELS	0,015	0,006	0,613	8–862	1,617	0,116	2,15
	Medical ELS	0,020	0,011	0,591	8–859	2,214	0,025	1,97
	Everyday ELS	0,007	0,002	0,636	8–854	0,768	0,631	2,16
	Egocentric ELS	0,013	0,006	0,370	8–1019	1,733	0,087	1,79
	Allocentric ELS	0,008	0,0001	0,383	8–1025	1,01	0,427	2,11
Argumentativeness	Legal ELS	0,009	−0,0001	0,770	8–862	0,996	0,437	1,99
	Medical ELS	0,033	0,024	1,16	8–861	3,709	0,000	2,05
	Everyday ELS	0,006	−0,003	1,11	8–856	0,668	0,719	2,03
	Egocentric ELS	0,021	0,014	0,723	8–1021	2,77	0,005	1,86
	Allocentric ELS	0,006	−0,002	0,592	8–1027	0,80	0,603	2,02
Consistency	Legal ELS	0,033	−0,012	11,75	8–171	0,732	0,663	2,17
	Medical ELS	0,068	0,024	12,66	8–171	1,548	0,144	1,93
	Everyday ELS	0,063	0,019	13,21	8–171	1,435	0,185	2,06
	Egocentric ELS	0,117	0,076	18,68	8–171	2,832	0,006	2,02
	Allocentric ELS	0,036	0,010	14,56	8–171	0,787	0,615	1,99

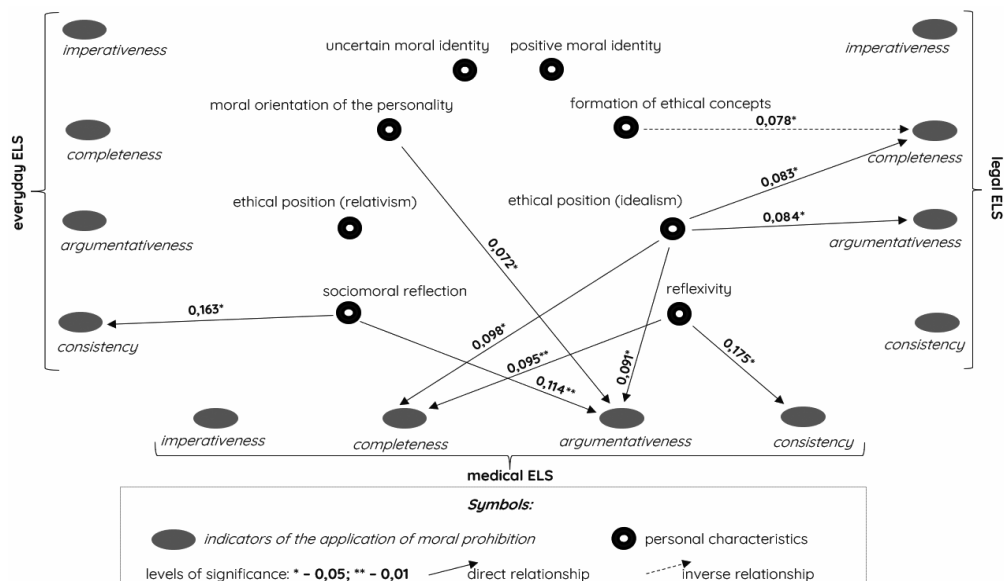


Fig. 2. Personal characteristics as predictors of the implementation of criteria of moral prohibition in situations with different subject contexts

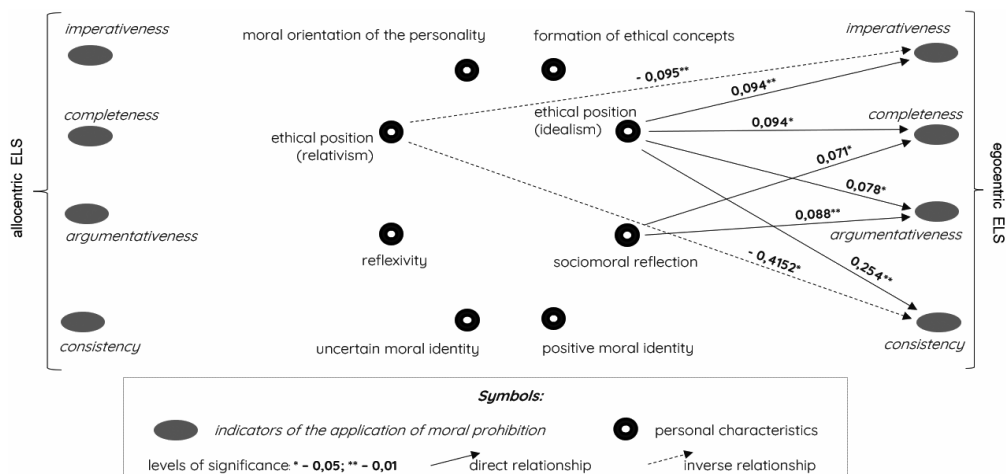
texts, various effects of personal predictors have been established. In the model constructed for medical ELS, consistency was determined by reflexivity, whereas in the everyday context, the coordinated application of a moral prohibition was indicated by sociomoral reflection.

Fig. 3 schematically shows that the regression models for allocentric situations do not reveal the effects of the interaction of the application of moral prohibition and personal characteristics. In the ELS with an egocentric focus of action, predicted conditions of interaction with personal characteristics were found for all criteria for the application of the ban.

Discussion of the results

The results of the study show that in all the regression models constructed, only weak or very weak connections were found between personal characteristics and spe-

cific indicators of the application of moral prohibition. Overall, the largest effect (adjusted R^2) found in linear regression models was 0,08, while the clear majority of effects were significantly less than 0,02. Many of them turned out to be statistically insignificant even at the 5% level. These results show that the personality characteristics we study do not predict moral decision-making well in the ELS. This confirms the expectations arising from the conceptual justification that the personality characteristics under consideration, or at least most of them, will not be able to fulfill a predictive role in relation to the meaningfully relevant implementation of all its criteria in students. They also agree well with recently published empirical evidence that both shared moral values (Van den Berg, Kroesen, Chorus, 2022) and personality traits are poor predictors of a particular moral decision (Abbasi-Asl, Hashemi, 2019).



One explanation for the weak predictive role of these characteristics lies in the specifics of the application of moral prohibition in changing contexts. Thus, a more noticeable influence of personal characteristics on the consistency of the moral prohibition was found when students evaluated and argued its correctness in egocentric situations in which they were psychologically involved, compared with their allocentric counterparts.

Situations with a medical context elicited a statistically significant, albeit weak, personal response to the criteria of moral prohibition. All predictors included in the model (except for moral identity) significantly determined the completeness, argumentativeness, and consistency of its application with one force or another. Perhaps this is because the simulated contradictions not only reflected the real moral choices of medical professionals, but also caused strong emotional reactions among the study participants in connection with the recent spread of the COVID-19 pandemic and the widespread coverage of the

moral aspects of overcoming it at all levels of life. Ideas about the heroism and moral responsibility of doctors fighting against it, the moral stability of the personality of patients and their family members, government officials, etc. They could not but be actualized in the minds of students, thereby encouraging them to value perception and analysis of the medical situation as a responsible moral choice. It is also important that, despite the specificity of the tasks solved in medicine, the moral attitude towards a person as an unconditional value is clearly the basis for the application of a moral prohibition in them.

In the legal context, even such a weak effect of personal characteristics turned out to be completely insignificant. Perhaps this is because the loss of the depth of moral reflection and its personal correlates in decisions is influenced by such a contextual variable as the availability of professionally stereotyped decisions and standards of intra-organizational behavior for argumentation. In legal ELS, in which the prescriptive role of regulatory regulators is presented

more "prominently", the external guidelines of moral choice themselves can emphasize the role of imperativeness and consistency in the application of moral prohibition. At the same time, in these situations, legal and moral values are interrelated — they simultaneously presuppose joint implementation and at the same time mutually exclude each other. In order to substantiate the predominantly moral orientation of the decision in its correlation with the recognition of the legal assessment of illegal behaviors and their danger to both an individual and society, it is necessary to act from a position of one's own involvement in the situation of moral choice (egocentric focus of action), which will strengthen the influence of personal predictors.

The contribution of personal characteristics turned out to be insignificant in everyday situations and manifested itself only in terms of consistency, which was indicated by an ethical position and socio-moral reflection. In this type of situation, as a rule, the usual schemes of its analysis and moral heuristics are involved, which are developed in detail within the framework of models of ethical compromise and moral justification (Molchanov, 2019; Gino, Norton, Weber, 2016). Although moral norms are also prescriptive in everyday situations, their violation or fulfillment is regulated informally, through traditions, customs, etc. They allow for great opportunities for argumentation, which makes it possible to justify the rejection of a moral prohibition by the indefinite consequences of an immoral action. At the same time, the imperative of duty may not be taken into account if it is difficult to trace the long-term consequences of the moral choice made.

All this indicates that the subject context of the ELS can both negate the role of personal characteristics in mediating the

application of moral prohibition and, on the contrary, strengthen it.

It would be too hasty to draw conclusions about the specific role of personal characteristics in the implementation of the criteria for the application of the ban. In this empirical study, we used the data and data collection methods that were available to us. First of all, the sample included sophomore students who have a number of moral personality traits that are just taking shape (an ethical position or a certain moral identity), and the low variability of the indicators could lead to weak relationships, which could not but affect the quality of the models.

The weak effect found between personal characteristics and moral decisions may be due to the phenomenon of "moral disengagement" (Bandura, 2002). As explained above (in the section "Methodology and research methods"), respondents' assessment of the criteria of a moral prohibition could be based on a deliberate rejection of it in favor of a pragmatic or necessarily convenient course of action. This means that the decision that was supposed to be moral in the situation might not be perceived by the respondents as such. If young people considered prohibitions accepted from themselves or from the position of someone else as situationally conditioned, without associating them with their moral qualities, the results could not detect the effect of personality interaction and the implementation of criteria for moral prohibition. Indeed, even before the intention is realized in the decision being made, the young man must realize that in a situation his moral qualities are being tested.

To our knowledge, no work has explored the role that personal development can play in changing subject contexts of moral decision-making. Considering that many of the personal characteristics pre-

sented in the study have not yet been considered in terms of the contribution they make to the process of applying moral prohibition, and that it is these characteristics that are most open to change during the student period, this work acquires a certain scientific perspective.

Equally important for further research of predictors of the application of moral prohibition is the factor of inclusion in professionally oriented educational discourse, possibly reinforcing the impact of the context of the ELS. At the same time, the contribution of personal characteristics to the variability of indicators of moral prohibition will be able to manifest itself with greater demonstrativeness than it was shown in this study. The verification of this assumption will form the basis of future research.

Conclusion

Today's young people have access to different points of view and experiences like never, which allows them to broaden their moral horizons and develop more

subtle ethical views. But these opportunities will not be realized without the ability to make informed judgments and make morally responsible decisions. Education at all levels, from elementary school to university, plays a vital role here. It is not only about teaching ethics or moral psychology as a separate subject, but also about integrating ethical knowledge and psychologically sound models of their functioning and development into all areas of education and professional activity. In our opinion, the data obtained in this study may be important for changing the university's educational environment through the application of research practices aimed at identifying predictors of morally relevant decisions. The approaches introduced in universities to the in-depth study of issues related to the application of moral prohibitions are unlikely to contribute to the development of moral thinking without understanding the role of contexts of situations of moral choice, considering the implementation of its criteria and associated personal characteristics.

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Kirill V. Kabanov — planning and control of research, data collection and analysis, visualization of research results, design of the manuscript.

Alexey V. Khavylo — calculation of statistics for data analysis.

All the authors participated in the discussion of the results and agreed on the final text of the manuscript.

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The authors declare no conflict of interest.

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Personal professional self-determination: bibliometric analysis of Russian research

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Abstract

Context and relevance. This article reviews the literature on professional self-determination (PSD). Professional self-determination is a relevant issue in the context of modern society, where human resources become a key factor in development. Research on PSD, originating from the works of 20th-century scholars, encompasses philosophical, sociological, and psychological aspects, emphasizing its role in social adaptation and personal development. **Objective.** The main aim of this article is to present materials and findings related to the systematization of knowledge in the field of PSD, as well as to identify potential directions for future research. **Methods.** To achieve these objectives, bibliometric and systematic literature analysis methods were employed. **Results.** Six thematic clusters were identified, each centered around different research archetypes. **Conclusions.** This study expands existing knowledge on PSD, highlights fundamental differences between approaches to PSD in domestic and international academic literature, and identifies potential future research directions that have not yet been explored in scholarly works.

Keywords: professional self-determination, psychological readiness for professional self-determination, bibliometric analysis

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Профессиональное самоопределение личности: библиометрический анализ российских исследований

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Резюме

Контекст и актуальность. Профессиональное самоопределение личности (ПСЛ) — актуальная проблема в условиях современного общества, где человеческий ресурс становится ключевым фактором развития. Исследования ПСЛ, берущие начало в трудах ученых XX века, охватывают философские, социологические и психологические аспекты, подчеркивая его роль в социальной адаптации и личностном развитии. **Цель.** Основная цель данной статьи — представить материалы и результаты работы по систематизации знаний в области ПСЛ, а также выделить потенциальные направления исследований. **Методы.** Для достижения поставленных целей использованы методы библиометрического и систематического анализа литературы. **Результаты.** Было выявлено шесть тематических кластеров, в центре которых — разные исследовательские архетипы. **Выводы.** Проведенное исследование расширяет существующие знания по тематике ПСЛ, раскрывает фундаментальные различия между подходами к ПСЛ в отечественной и зарубежной научной литературе, а также определяет потенциальные направления будущих исследований ПСЛ, которые еще не были изучены в академических трудах.

Ключевые слова: профессиональное самоопределение, психологическая готовность к профессиональному самоопределению, библиометрический анализ

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Introduction

In the context of modern society, professional self-determination (PSD) becomes one of the key issues requiring in-depth study and analysis. In the age of modern technologies, human resources become the driving force of any enterprise, and consequently, work aimed at forming a person's readiness for professional self-determination should be a key focus of activity for educational organizations, the state, employers, and the individual alike.

Alongside the exponential growth in the number of scientific publications on the topic of PSD, the number of sources systematizing other works does not demonstrate such rapid growth. The aim of the research presented in this article was to systematize existing knowledge, as well as to identify potential research directions in the field of PSD. The key research questions were:

- 1) What is the current state of knowledge about PSD in domestic science?

- 2) How has PSD been studied in domestic science and what results have been obtained?

- 3) What lessons can we learn from the available knowledge and what is lacking in it?

To answer the questions posed, a bibliometric and systematic literature analysis was conducted, with a detailed description of the research protocol to increase its reliability and validity. Thanks to a comprehensive model for studying PSD, the research expands the scientific discourse by identifying understudied aspects of PSD and suggesting possible directions for further research.

Materials and methods

To systematize existing research on the phenomenon of PSD, a systematic and bibliometric literature analysis was conducted. The OpenAlex citation database was used

to collect publications. A list of keywords for searching the database was compiled: *professional orientation, vocational guidance, vocational guidance work, vocational guidance activities, personal professional self-determination, readiness for professional self-determination, career trajectory, career choice, professional choice*. The results were limited by publication type (articles in peer-reviewed scientific journals).

As a result of the database search, 460 articles that met all the above search criteria were collected. The articles cover the period from 2000 to 2024, with almost 80% of publications falling within the last 5 years.

For the bibliometric analysis, VOSviewer 1.6.20 software was applied, which allows for the analysis of co-occurrence of keywords used in the articles. The threshold for the minimum number of keyword occurrences was set at 4, resulting in 65 out of 517 keywords meeting this criterion. Keywords not related to the research topic were removed: "youth", "honesty", "pandemic", etc. The largest set of connected keywords consisted of 43 items.

Results

The bibliometric analysis of keyword co-occurrence allowed for the identification of six thematic clusters, characterized by clear intra-cluster connections, as well as significant inter-cluster relationships (Fig. 1).

Fig. 2 displays the keyword visualization map highlighting the thematic clusters obtained as a result of the bibliometric literature analysis.

Cluster 1: Digital educational technologies

The research presented in the first cluster considers the phenomenon of PSD from the perspective of educational technologies, with particular attention paid to digi-

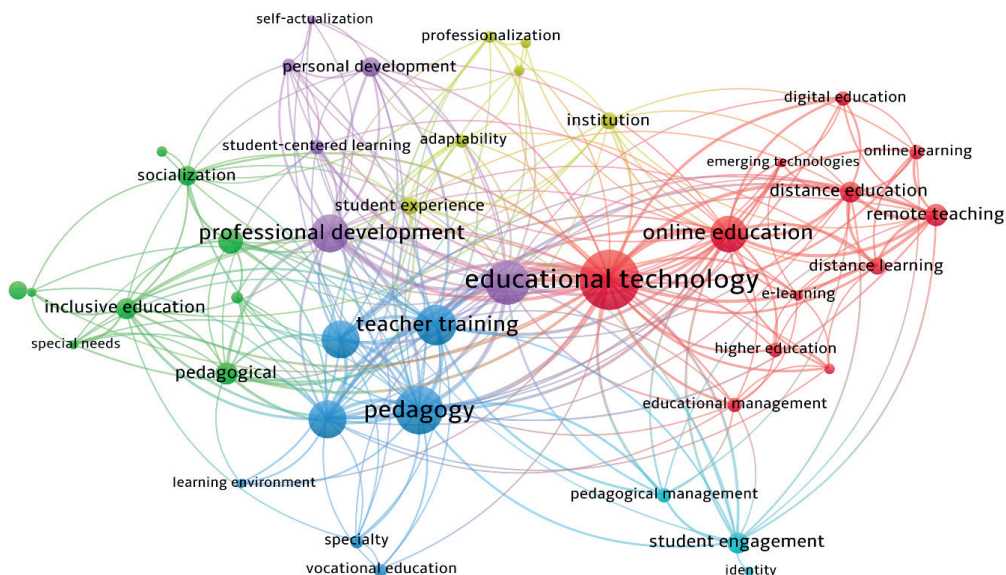


Fig. 1. Keyword visualization map from the bibliometric literature analysis

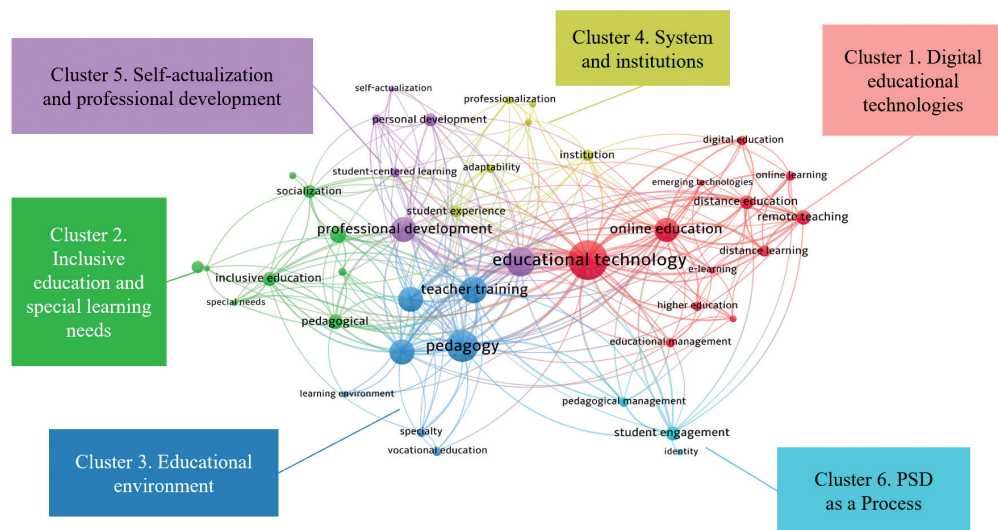


Fig. 2. Keyword visualization map with thematic cluster highlighted

tal technologies. This research direction is among the most recent works, dated after 2021 (Fig. 3).

One of the basic concepts of the first cluster is the phenomenon of transprofessionalism. Definitions of transprofession-

alism encompass not only the multidimensionality and multitasking of a person's professional activity but also include the ability to quickly adapt to changes, find and implement new ideas (Zeer, 2018; Zeer, Tretyakova, Zinnatova, 2020), the ability to solve multiple tasks simultaneously (Dorofeeva, Latypova, Ziganshina, 2015), combine different directions or perform several types of activities (Yalalov, 2015).

Cluster 2: Inclusive education and special needs of learners

The second cluster, identified as a result of the bibliometric literature analysis, is formed around the issues of inclusive education.

The most important topic addressed in the research of the second cluster is the formation of so-called “subjectness” in learners with special educational needs, i.e., “an integrative property of the personality, reflecting its ability and readiness for self-determination of its professional and personal development” (Bairamov et al., 2018). Scholars consider subjectness as a determinant not only of professional but also of personal self-determination of students with disabilities (Bonkalo, Tsygankova, 2015). The substantive elements of subjectness positively correlate with indicators of the effectiveness of students' professional self-determination: formed professional identity, internal motives for professional activity, choice of profession under the influence of one's own inclinations, abilities, life plans, etc. (Bairamov et al., 2018). Researchers conclude: “assistance to children with disabilities in professional and personal self-determination should be oriented towards finding personal meaning in professional (labor) activity” (Belyavsky, Solovieva, 2016).

Cluster 3: Educational environment

The third cluster is dedicated to the educational environment of PSD, i.e., all elements that accompany a person on the path of building their professional and educational trajectory.

The most common theme of such research is the study of approaches to career guidance that can ensure a sufficiently high level of student readiness for professional self-determination. Scholars note the complex nature of career guidance work as an integral element of the modern educational environment, striving to form students' motivation for creative self-realization (Shatyr, 2017). Some researchers operate with the concept of the “motivational complex of the personality”, which consists of three types of motivation: internal, external positive, and external negative motivation (Lavrenteva, Ignatenko, 2015).

Cluster 4: System and institutions

The fourth cluster, identified during the bibliometric analysis, encompasses a global understanding of professional self-determination from the perspective of the system and its constituent institutions.

The most frequent conclusion of the scientific works in this cluster boils down to the necessity of “combining the efforts of all levels and types of education and other interested parties (family, employers, state authorities, etc.)” (Gulyumova, Sichinsky, 2022; Kolesnikova, 2016). A separate emphasis is placed on the need to consider the specifics of each region when building a state support system for PSD, as well as on the specific stage of self-determination at which a person currently finds themselves (Gulyumova, Sichinsky, 2022; Shatova, 2023).

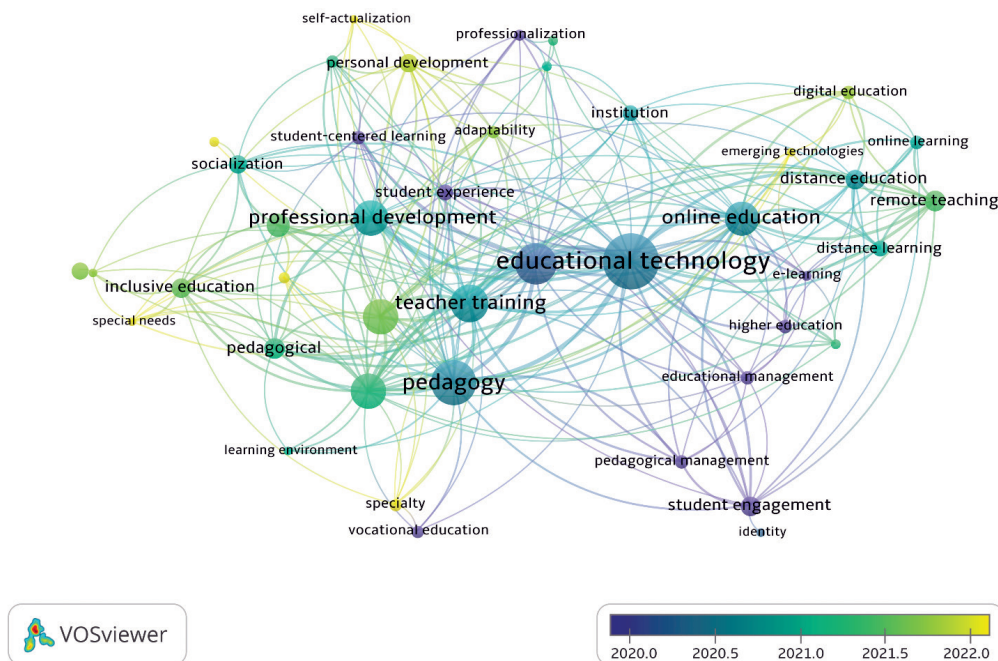


Fig. 3. Keyword visualization map on a timeline

Cluster 5: Self-actualization of a person and their professional development

Unlike all other clusters, the research included in the fifth cluster is united by a human-centric approach, striving to highlight personal self-actualization as the most important element of PSD.

Self-actualization is understood by the authors as the realization of one's own potential, the highest step in the hierarchy of human needs (Maslow, 1997), "the desire to become everything one is capable of becoming" (Antsupov, 2006).

Researchers note that the process of PSD can be interpreted from the perspective of "the integration of two opposite tendencies: towards adaptation and the actualization of one's own self" (Rokitskaya, 2010). The process of adaptation is aimed at professional development, enrichment,

and complication of various aspects of the personality, such as intellect, motives, values, character traits, self-concept, etc. The process of self-actualization, however, lies in the fact that a person builds their professional trajectory according to their unique characteristics, including character, temperament, self-perception, attitudes, and personality orientation (Rokitskaya, 2010).

Cluster 6: PSD as a process

The last thematic cluster considers PSD from the perspective of a continuous process. Representatives of the cluster define PSD as "an internal, self-flowing process of sequential independent choices made by a person as a result of correlating their internal resources with the requirements of the professional and labor future" (Chebrovskaya, Chebrovsky, 2022).

All blocks of a person’s psycho-emotional well-being are involved in the PSD process: “general life satisfaction, sense of life meaningfulness, presence of life goals, self-acceptance”, etc. Researchers assert that to form a positive psycho-emotional background at each stage of the PSD process, it is necessary to organize a correct form of psychological and pedagogical support: career enlightenment — transferring knowledge about the world of professions and labor; career information — assisting in orientation among various options of labor activity; career counseling — providing

scientifically based psychological and pedagogical recommendations for assessing one’s capabilities when choosing a professional field; career adaptation — supporting the process of a person’s adaptation to performing professional tasks and interacting in a work collective (Chebrovskaya, Chebrovsky, 2022).

Discussion

The results of the study reveal significant potential for researching the topic of PSD. The table displays the research gaps identified in each of the six clusters.

Table

Research gaps within the PSD topic

Research gaps	Sources
1	2
CLUSTER 1: DIGITAL EDUCATIONAL TECHNOLOGIES	
Defining the criteria of transprofessionalism and “indicators of the development of information competence as a transprofessional one”.	(Zeer, Tretyakova, Zinnatova, 2020; Tabachuk, 2021)
Studying the “factors and conditions for the formation of an educational space ecosystem in the context of digital transformation of leading economic sectors and professional self-determination of learners”.	(Atamanova, Emelyanova, Khramova, 2021; Gritskevich, Reshotka, Rozhdestvenskaya, 2019)
Identifying changes occurring in the role of the teacher and students in the context of PSD.	(Ivanova, Knyazkova, Somova, 2021; Pasechkina, 2022)
Improving the content and technologies used in gamification methods for PSD.	(Alexandrova et al., 2021; Yakovleva, Goltsova, 2022)
CLUSTER 2: INCLUSIVE EDUCATION AND SPECIAL NEEDS OF LEARNERS	
Updating the career guidance activities of educational organizations according to the special needs of learners.	(Bairamov et al., 2018; Belyavsky, Solovieva, 2016; Bonkalo, Tsygankova, 2015)
Resolving contradictions arising in the PSD process at the stage of pre-university training for persons with disabilities.	(Medvedeva, Olkhina, 2018)
Developing programs to assist the employment of persons with disabilities in universities; distinguishing between the “technologies”, “tools”, etc. of employment assistance for persons with disabilities; differentiating the university’s functions within the framework of employment assistance initiatives and post-graduation support for persons with disabilities.	(Nikolaeva, 2019)
Developing and providing theoretical substantiation for a system of psychological support for the professional self-determination of persons with disabilities in the process of general education; determining the conditions for the effective implementation of the system; developing criteria for the formation of professional self-determination of persons with disabilities.	(Ansimova, Chuprova, 2017)

Developing diagnostics for the degree of psychosocial well-being and the level of autopsychological competence of persons with disabilities.	(Samokhvalova, 2013; Osmuk, Melnikova, 2019)
CLUSTER 3: EDUCATIONAL ENVIRONMENT	
Developing and implementing a systematic, comprehensive approach to career guidance in general education organizations.	(Lavrenteva, 2015; Shatyr et al., 2017)
Studying tools for combining acmeological and competence-based approaches in organizing the educational process with the aim of forming students' readiness for professional self-determination.	(Knyazeva, Manukhov, Shcheveleva, 2015)
Developing and implementing into the educational environment methods for working with parental attitudes in dynastic families, which are characterized by high rates of professional continuity.	(Valiakhmetov, Turakaev, 2020; Shamanin, 2019)
CLUSTER 4: SYSTEM AND INSTITUTIONS	
Developing mechanisms for involving regional educational authorities in the system of continuous support for professional self-determination of learners.	(Gulyumova, 2022; Kolesnikova, 2016; Shatova, 2023)
Studying tools for the "optimal development of all psychological components of the social situation of development of high school students <...> as the main determinant of the success of their professional self-determination".	(Aron, 2013; Shtumpf, Ansov, 2023)
Studying and developing ways to meet the requirements of educational customers regarding the professional self-determination of graduates in the conditions of vertical integration of education.	(Lukashenko, 2002; Sergeev, 2017)
Scientific and methodological support for the process of successful socialization of learners.	(Trubina, Zeer, Mashchenko, 2017)
Empirical and theoretical substantiation of models of professional self-determination of learners within the ideology of socially-oriented education.	(Zakharova, 2021)
CLUSTER 5: SELF-ACTUALIZATION OF A PERSON AND THEIR PROFESSIONAL DEVELOPMENT	
"Researching and forming the readiness of older adolescents for professional self-determination"; identifying differences in the degree of readiness of learners for professional self-determination and determining the factors underlying such differences.	(Kuznetsov, Kuvshinova, Zhilinskaya, 2023)
Developing mechanisms for improving the information (digital) competence of teachers in educational organizations and forming integrative psychological formations ("self-determination, self-actualization, and self-personalization") within the framework of applying a personalized approach to education.	(Zeer, Symanyuk, 2021)
Studying the influence of a personalized approach to education in the conditions of digitalization of learning on "the development of professional consciousness and self-awareness of the subject of labor, on the processes of self-determination".	(Rudenko, Kovalenok, 2022)

CLUSTER 6: PSD AS A PROCESS	
Developing programs for "training teachers in matters of professional studies, the socio-economic situation of the region, technologies for diagnosing the psychophysical and personal properties (abilities) of a person".	(Chebrovskaya, Chebrovsky, 2022)
"Developing technologies for forming new, foresight methodology-based professional competencies of future teachers".	(Panfilov, Panfilova, 2022)

Conclusion

This study is dedicated to reviewing contemporary scientific literature by domestic authors on the topic of PSD, with the aim of understanding the current state of knowledge about the phenomenon under consideration, understanding the perspectives through which PSD is analyzed, and identifying potential directions for future research. According to the results of the bibliometric and systematic literature analysis, six thematic clusters were identified based on keywords, each representing a distinct research direction in the field of PSD.

From a theoretical perspective, this study makes an important contribution to the academic discourse on PSD. Firstly, as a result of the bibliometric analysis, a keyword visualization map used in scientific works dedicated to PSD was formed, which allowed for determining the current state of academic works on the topic under consideration. According to the analysis results, PSD is considered by domestic scholars from the perspectives of digital educational technologies, inclusive education and special needs of learners, educational environment, systems and institutions, self-actualization of a person and their professional development, as well as a continuous process. Secondly, this study allowed for identifying the results obtained by the authors of works on the topic of PSD to date, as well as research gaps that had not been properly analyzed before. The

identified research gaps represent the foundation for further research dedicated to the topic of PSD.

The results of the study contribute to career guidance work from the perspective of various stakeholder groups. The conclusions of the work can be used at the federal, regional, or municipal levels of education when developing programs and courses aimed at students forming their professional trajectory. Based on the identified trends in the study of PSD, educational materials can be created that take into account modern approaches to professional self-determination at psychological-pedagogical, institutional, systematic, and other levels. The results of the study can be useful for employers and HR specialists, who can use this information to develop personnel selection strategies, considering the latest research in the field of professional self-determination. This will allow companies to attract employees who best meet their requirements and expectations, as well as create conditions for their further development and career growth. Finally, the obtained conclusions can be useful for the subjects of professional self-determination themselves. Thanks to the identified factors that most favorably affect the effectiveness of career guidance activities, the optant has the opportunity to build and, if necessary, adjust their educational and professional trajectory with the aim of forming readiness for professional self-determination.

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