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Russian Psychological Journal

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Role of Psychological Resources in Overcoming Difficult Life Situations Among Educational Migrants

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Abstract

Introduction. The paper examines a number of psychological characteristics of educational migrants associated with their success in overcoming difficult life situations. The relevance of the study is due to the need to study the processes of internal and external educational migration. Their study will make it possible to find more effective approaches to training highly qualified personnel, and on the part of universities, to more effectively build a system of psychological support for visiting students. **Methods.** The study involved 482 students from universities in Ekaterinburg, Tomsk and Rostov-on-Don. 382 students are educational migrants, 100 students live in the region of study and form the control group ("non-migrants"). **Methods used:** "Resilience" by S. Maddi, adapted by D. A. Leontyev and E. I. Rasskazova; "Tolerance of Uncertainty" by D. McLane, adapted by E. G. Lukovitskaya; "Psychological Well-Being Scale" by K. Rieff, adapted by N. N. Lepeshinsky; the author's questionnaire, with the help of which the specifics of living in difficult life situations were determined. **Results.** Between the general sample of educational migrants and non-migrants, differences were identified in the resilience test scales – "Control", "Risk" – and the total indicator of resilience ($p = 0.001$). External educational migrants have statistically significantly higher scores on tolerance to uncertainty compared to non-migrants ($p \leq 0.05$), but they also have lower scores on general psychological well-being compared to internal educational migrants. Educational migrants who coped less successfully with the experiences of difficulties in their studies are statistically significantly less inclined to take risks ($p \leq 0.05$). **Discussion.** International students have higher levels of resilience than internal migrant and non-migrant groups. Perhaps young people with an initially higher level of personal resources decide to migrate for education, and external migrants have

to overcome more difficulties than internal and non-migrants, which helps to increase their personal resources.

Keywords

educational migrants, students, difficult life situations, resilience, tolerance for uncertainty, psychological well-being, personal resource

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Introduction

Effective adaptation of migrants to new living conditions largely depends on the personal characteristics of migrants that promote or hinder successful adaptation. Educational migration is migration associated with obtaining an education, which involves temporary residence in another region of one's country or in another country. Educational migration is temporary and limited to the period of obtaining education, involves moving to another region or country and is predominantly voluntary and typical, as a rule, for a certain age group.

Traditionally, in domestic science, educational migration is studied on a sample of foreign students or, conversely, the migration sentiments of Russian students are studied. In socio-economic studies, educational migration is considered with an emphasis on the integration of the experience of foreign education systems into one's own (Shpet, 2015) and the emerging "market of educational services" (Trofimov and Trofimov, 2017) in the economic and social development of the state, as well as as a source of influx of highly qualified personnel in the Russian Federation (Apanovich, 2015).

Adaptation of educational migrants

Migrant students adapt to new living conditions better than other categories of migrants (Mitin, 2010). Compared to labor migrants, educational migrants (due to the specifics of educational activities at a university) have the opportunity to build communications with other students (representatives of the host population and other migrants) in the process of training, internships and extracurricular university events. Ample communication opportunities create the basis for comfortable and psychologically safe socio-psychological adaptation (Ovchinnikov, Sultanova, Lazurina & Sycheva, 2018). The systems of psychological support for first-year students in universities allow students,

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including migrant students, to quickly and more successfully adapt to new sociocultural conditions and experience "cultural shock" (Krasnoshchechenko, Kovdyuk, 2015; Voronaya, Pronenko, 2022; Voronaya, Pronenko, 2023).

At the initial stage of socio-psychological adaptation to the place of their study, educational migrants undergo acculturation stress, which can lead to negative psycho-emotional manifestations (maladaptation, aggression, depressive states) (Krasnoshchechenko, Kovdyuk, 2015; Murasheva, 2019). Migrant students must adapt to a large number of new characteristics of the region of study: the conditions of studying at a university, living in a dormitory, the social situation of the environment, the absence of relatives, communication in a different language (for foreigners). The level of perceived stress is higher than normative values (24 points) in the group of both adapted (29.44 ± 6.69) and less adapted students who are external migrants (Sultanova, Tagiltseva, Stankevich, 2021). Researchers associate increased levels of stress with the difficulty of adapting to the culture of the environment and the difficulty of communication due to language barriers.

The problems that migrant students encounter have a pronounced nature of national, ethnic, cultural, social and everyday characteristics (Abakumova, Kagermazova, Generaldukaeva, 2016). Students studying in another country need psychological support in communicating, in understanding a different socio-ethnocultural environment (Kagermazova, 2014; Abakumova, Kagermazova, 2016).

Personal characteristics of educational migrants

Educational migrants are characterized by a higher level of adaptability (compared to other migrants and non-migrants), initiative and willingness to gain new experience and openness to knowledge, a high level of sociability (Leonov, Khasan, 2019; Mitin, 2010). The identified psychological characteristics of migrants lead us to the question of the success of educational migrants' adaptation to new living conditions and the psychological factors influencing the success of this process.

In the study by Pokrovskaya, Smolnikova, Larionova (2014), the success of socio-psychological adaptation of educational migrants is considered depending on the degree of familiarity with the host culture, the characteristics of the migrant's interaction with carriers of the culture of the host society (Konstantinov, 2018; Murasheva, 2019), as well as on the prevailing strategies coping behavior of the migrant himself (Leonov, Khasan, 2019).

Resilience

Resilience as the individual's readiness to transform unfavorable living conditions to suit himself is considered by most authors as one of the central constructs in understanding the process of personal adaptation to situations of uncertainty and stress (Maddi, 2006;

Stetsishin, 2008; Leontyev, 2016). Resilience ensures the stability of the individual in difficult life situations and allows the subject to remain active and make decisions based on their beliefs and attitudes (Maddi, 2006; Leontyev, 2016; Kudinov, 2015). Factors that influence a person's vitality include socio-economic status, age, and region of residence (Postnikova, Miklyaeva, Sivrikova, Regush, 2022).

Many studies have shown the connection between resilience and indicators of psychological well-being among students: resilience in this context is understood as the ability of an individual to withstand situations of uncertainty and difficult life situations and adapt to them without reducing the effectiveness of activities (Bokhan, Shabalovskaya, Terekhina, Ulyanich, 2021; Kiseleva, Ovchinnikov, Sultanova, 2016; Bacchi & Licinio, 2017; Li & Hasson, 2020, Nikolaev, Lazareva, Yakubov, 2021).

Tolerance of uncertainty

The situation of educational migration requires a high tolerance for uncertainty. G. U. Soldatova and co-authors (2008) consider tolerance as a set of psychological stability, a system of positive attitudes, individual qualities and a system of personal and group values (Pavlova, Chupryaeva, 2020). T. V. Kornilova (2011) introduces the concept of "accepting uncertainty and risk" "as a reflection of a generalized personal property, meaning the desire for change, novelty and originality, the willingness to follow untrodden paths and prefer more complex tasks, to be able to be independent and go beyond the accepted restrictions" (p. 69).

Purpose of the study

The purpose of the study is to study the characteristics of the personal resource of educational migrants in difficult life situations. In this study, by personal resource we understand psychological resources, which include resilience and tolerance for uncertainty. We also establish a connection between indicators of psychological well-being, resilience, and tolerance for uncertainty in groups of educational migrants from different regions, external migrants and non-migrants.

The object of the study is educational migrants, **the subject** is personal resources in difficult life situations among various groups of educational migrants.

Methods

Sample characteristics

The study involved 482 students studying at the universities of Ekaterinburg, Tomsk and Rostov-on-Don (students' age: 18–22 years).

- 382 students came to these cities to receive higher education, that is, they are "educational migrants";

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- 100 students studied in the city of their permanent place of residence and formed a control group ("non-migrants"). In the total sample, the share of non-migrants was 21%. The non-migrant group included only students who were either born in the city in which they are studying at the university or have lived in it for at least 15 years. We have identified 2 types of educational migrants:
 - internal: people who moved from their home region to another region of Russia to study at university. In the total sample, the share of internal migrants was 58% (90 people studied in Yekaterinburg, 92 people in Tomsk, 100 people in Rostov-on-Don)
 - external: people who came from another country to Russia to study at the university. In the total sample, the share of external migrants was 21%.

Research methods

In accordance with the purpose of the work, the following research methods were selected:

1. Test "Resilience" by S. Maddi (1997) adapted by D. A. Leontyev and E. I. Rasskazova (2006);
2. Scale "Tolerance of Uncertainty" by DL McLain, (1993) (Multiple Stimulus Types Ambiguity Tolerance Scale-I) adapted by E. G. Lukovitskaya (1998);
3. Questionnaire "The Scale of Psychological Well-Being" by C. Ryff (1989) (The scales of psychological well-being) adapted by N. N. Lepeshinsky (2007).
4. The author's questionnaire, with the help of which the specifics of the respondents' experience of difficult life situations were determined.

The "Resilience" test diagnoses the resource of resilience as a basic parameter of a personal resource that ensures the stability of an individual in difficult life situations, as well as the mediating influence of stress factors on a person's health and the success of his activities. The test that served as the basis for the Russian version was originally developed by Salvatore Maddi, in the original known as the "Hardiness Survey. We used an adaptation of this technique performed in 2006 by D. A. Leontyev and E. I. Rasskazova (2006). The Russian version of the full version of the Resilience test includes 45 questions and 3 scales: involvement, control and risk.

Another element of a personal resource is, in our opinion, tolerance for uncertainty. To diagnose it, we used the "Tolerance of Uncertainty" scale. It was developed by D. McLane and was originally called Multiple Stimulus Types Ambiguity Tolerance Scale-I; in 1998 it was translated and adapted by E. G. Lukovitskaya (1998). The scale measures a person's ability to act in ambiguous, difficult-to-understand situations, in conditions of receiving uncertain and contradictory information. Moreover, to act quite successfully, due to personal readiness to take part in such uncertain situations.

The methodology "The scales of psychological well-being" was developed by K. Ryff, we used its modification by N. N. Lepeshinsky (2007), this version is aimed at young people

aged 17–26 years, which corresponds to age participants in our study. The questionnaire consists of 84 points, an integral indicator of psychological well-being and indicators on 6 scales are calculated: "Positive relationships with others", "Autonomy", "Management of the environment", "Personal growth", "Goals in life", "Self-acceptance".

Author's questionnaire on difficult life situations (Appendix 1)

The author's questionnaire contained questions about the degree of satisfaction of the study participants with the past period (year), their general assessment of it as "difficult" or "uncomplicated" on a 7-point scale, as well as about the difficult life situations they experienced. The methodology of the author's questionnaire is based on an assessment of the satisfaction of overcoming a particular difficult situation, which consists of a combination of several factors: 1) an indication that a difficult life situation is present in the experience of the research participant, 2) an assessment of the overall degree of satisfaction of a person with the past period. For example, if a study participant rated the past year as difficult (ratings 5–7 on a 7-point scale), but had a high degree of satisfaction with the past period (similarly: ratings 5–7 on a 7-point scale), then we took into account such a respondent as in generally successfully and with a sufficient degree of satisfaction overcame a difficult life situation.

Conversely, the respondent's unsatisfactory coping with a difficult life situation was noted on the basis of the overall degree of dissatisfaction with the past period (scores 1–3 on a 7-point scale), as well as a note on the total complexity of the past period or the attribution of a particular situation that occurred during the specified period to categories of complex.

Respondents who noted an intermediate value of either the degree of difficulty of the period lived, or assessment of satisfaction with it, or both at the same time, were excluded from further analysis.

Results

Figures 1 and 2 present the results of a study of personal resources (indicators of resilience and tolerance to uncertainty) in the studied groups: 1) non-migrants, 2) external migrants, 3) internal migrants studying at universities in Ekaterinburg, Tomsk, Rostov-on-Don.

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Picture 1

Data from all groups of respondents using the “Resilience” method

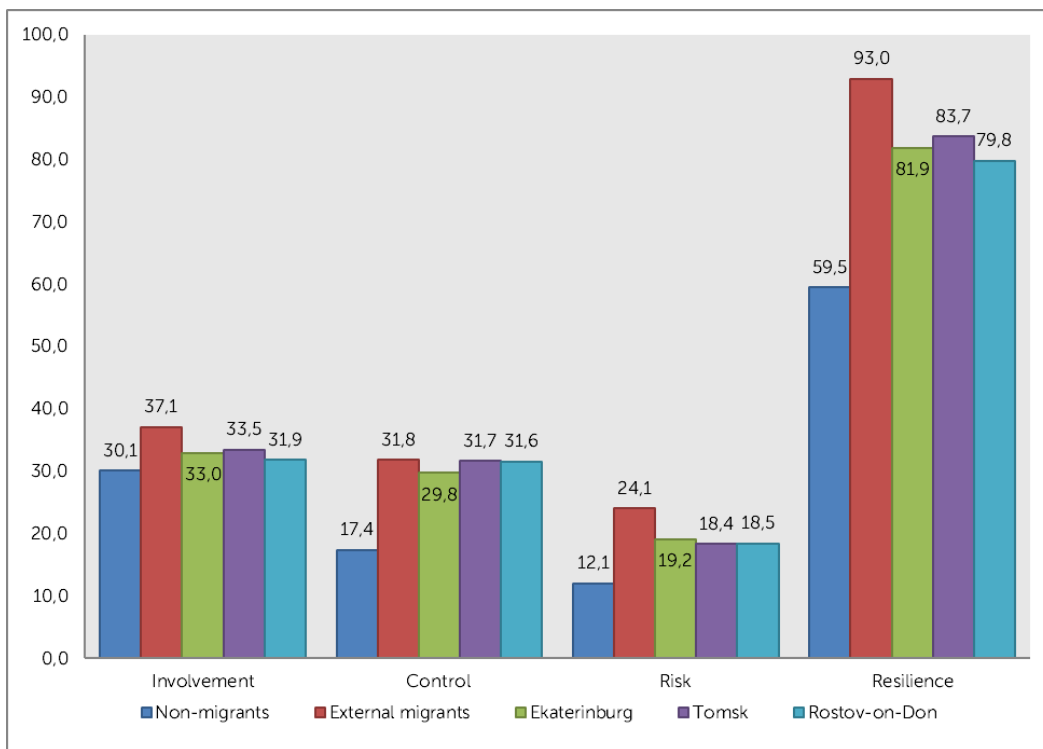
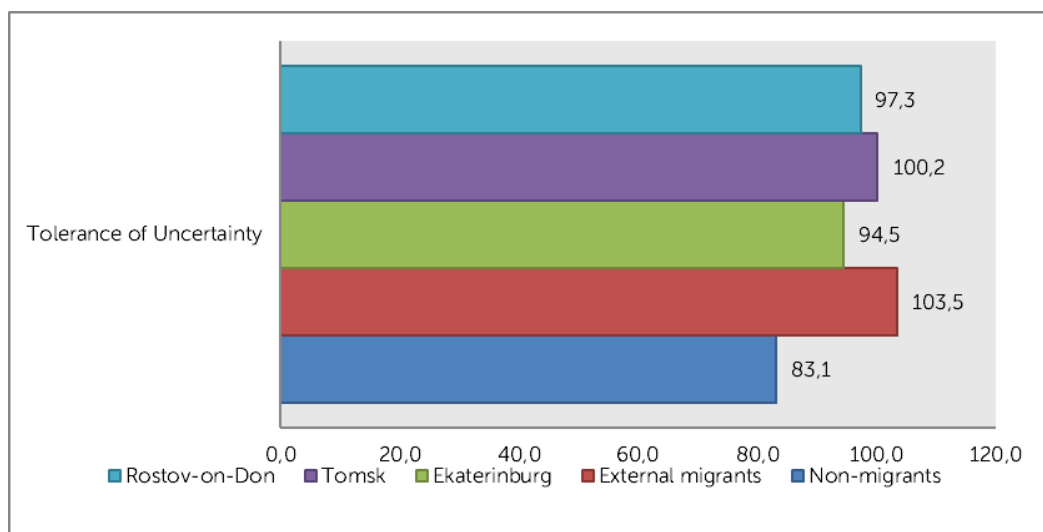


Figure 2

Data from all groups of respondents using the “Tolerance of Uncertainty” method



The students who took part in this study have indicators close to the normative ones.

To test the significance of differences between study samples, we used the Student t-test for independent samples. The test was carried out both between the group of non-migrants and the general sample of educational migrants, and between groups of educational migrants studying in different regions.

When checking for the reliability of differences in the severity of personal resource indicators between the general sample of educational migrants and non-migrants from among the studying youth, significant differences were identified only on the vitality test scales: "Control", "Risk" and the total indicator of vitality ($p = 0.001$). This allows us to assert that students studying in higher educational institutions in their place of original residence or place of birth perceive themselves to a lesser extent as being able to control the events occurring in their lives, show high motivation to search for ways to influence their lives, and also act outside of guarantees future success.

A comparison of personal resource indicators in a sample of non-migrants and external educational migrants showed the presence of significant differences in the resilience indicators "Control" and "Risk" ($p = 0.001$), indices "Involvement" and tolerance to uncertainty ($p \leq 0.05$). Thus, students who go to study in another country are much more likely to exercise control over the events of their lives and be involved in them, are ready to take risks and act in situations with unclear conditions.

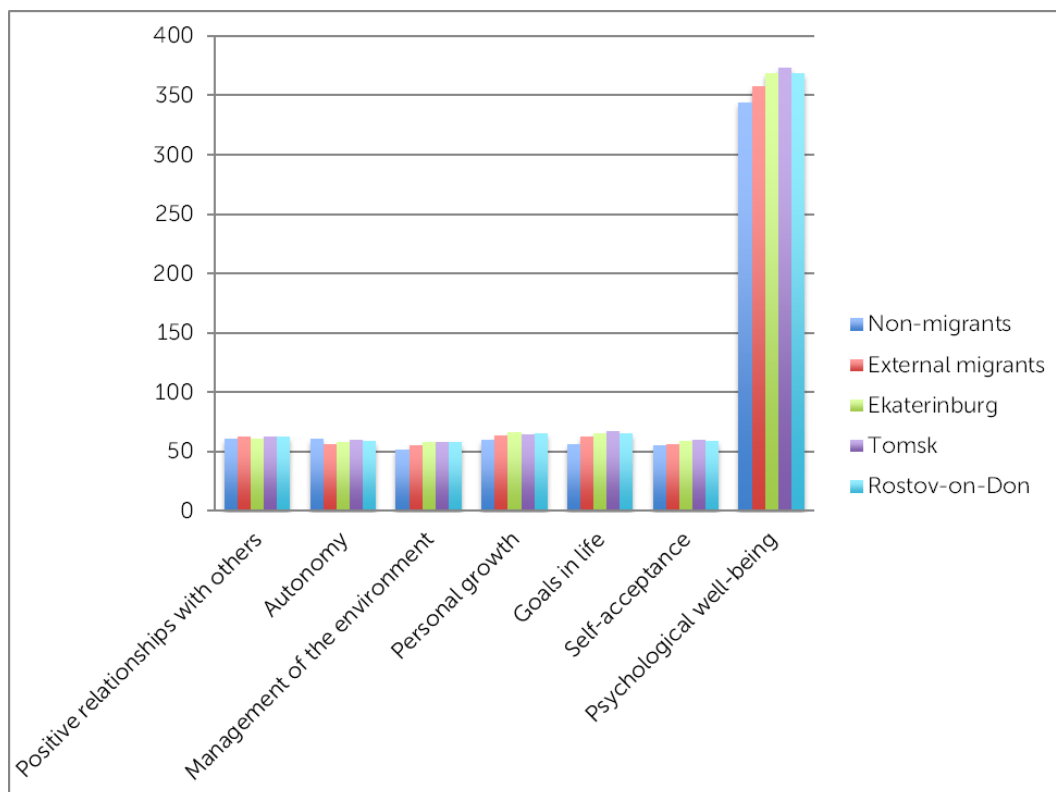
It should be noted that, just in case, we verified the similarity of the personal resource indicators of the group of non-migrants from Yekaterinburg and similar ones from Tomsk and Rostov-on-Don. Analysis of variance of the three subgroups showed no significant differences between their data.

Turning to descriptive statistics data on samples of educational migrants, we note that these groups of respondents have sufficient resources to withstand difficult life situations and uncertainty, are able to see new opportunities in life's difficulties and are quite effective in self-organizing their activities, skillfully using various methods and techniques of self-organization. In general, all indicators of personal resources in these samples are within normative values.

The indicators of all groups of respondents in terms of psychological well-being are within the normative values, in some cases approaching extreme values (Figure 3). Values indicating lower levels of performance are found only in the non-migrant group. External educational migrants have lower overall levels of psychological well-being compared to internal educational migrants.

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Figure 3
 Data from all groups of respondents using the “Psychological Well-Being Scale” method



Analysis of variance

Non-migrants, compared to the group of internal educational migrants, are significantly more likely to obey external demands and instructions ($p \leq 0.05$); they have lower indicators on the “Environmental Management” ($p \leq 0.01$), “Personal Growth” and “Personal Growth” scales. Goals in life” ($p \leq 0.001$), and the general level of psychological well-being ($p \leq 0.001$). Statistically significant differences were found in the indicator of self-acceptance between non-migrants and internal educational migrants living in Tomsk ($p \leq 0.05$); non-migrants show self-acceptance to a lesser extent. In addition, statistically significant differences were found between non-migrants and external educational migrants in the presence of goals in life ($p \leq 0.05$) and the desire for self-development ($p \leq 0.01$).

In turn, the group of external migrants has statistically significant differences in indicators of psychological well-being with the group of internal educational migrants living in Tomsk, as well as less clear and meaningful goals in life ($p \leq 0.05$).

Study of personal resource in the context of difficult life situations

Next, we analyzed the data from the author's questionnaire on the respondents' assessment of their difficult life situations.

We found that the level of satisfaction with their lives of all studied groups of respondents is at a fairly high level. All study participants tend to feel satisfied with how the analyzed 2020 went, which brought quite a lot of difficulties. Moreover, the indicator of overall satisfaction with the current year is slightly different from the overall indicator of satisfaction with life as a whole (5.24 points compared to 4.36) (Table 1).

Table 1

Average values for the questions of the author's questionnaire aimed at assessing difficult life situations

Questions from the author's questionnaire	Average values	Standard deviation
How satisfied are you overall with your life (on a scale of 1 to 7)	5.24	1.060612
Has your perception of life changed in 2020 (on a scale of 1 to 4)	2.86	1.212351
How satisfied are you with your life in 2020 (on a scale of 1 to 7)	4.36	1.561789
On a 7-point scale, how difficult do you rate the past year as difficult for yourself personally (on a scale from 1 to 7)	4.88	1.171777

Problems such as the threat of coronavirus infection, cancellation of trips, problems in personal life were perceived as difficult for 30% of respondents, difficulties with studying and worries about the health of loved ones were difficult for 80% of study participants. The situation of the threat of coronavirus disease by students themselves is not difficult for many of them, as was shown in our previous work (Klimenko, Grishina, 2021). Table 2 provides more detailed data on the quantitative distribution of respondents.

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Table 2

Prevalence of various difficult life situations in samples of people with different migration experiences

Types of SGS	Non-migrants	OM Ekb	OM Tomsk	Ext. OM	OM Rostov	Total for SGS
Disease (including coronavirus)	25	23	27	thirty	25	130
Failed trip	17	26	21	19	24	107
Difficulties with studies	98	89	77	90	92	446
Concerns about the health of loved ones	89	79	72	71	91	402
Everyday difficulties	76	58	54	67	54	255
Problems in personal life	54	36	37	46	36	309
Nothing special	1	1	0	3	1	6
Total by group	360	312	288	326	323	1655

Next, we identified 2 groups of respondents:

- respondents assessing the year as difficult (choosing values 6 and 7) – 84 (22.1%) respondents; that is, those who have not completely successfully overcome various life difficulties;
- respondents who assessed the past year as relatively uncomplicated (those who chose values 1 and 2) – 18 (4.7%), that is, these are those who were able to successfully overcome certain difficulties.

Among those who were worried about the health of their loved ones, the group who overcame this difficult situation is characterized by a less pronounced “Vedomosti” scale ($p \leq 0.05$), which indicates that they are less inclined to focus on external tasks and opinions when overcoming such a life situation and making decisions in it. Respondents who experienced a failed trip with varying degrees of success have differences on the

“Personal Growth” scale ($p \leq 0.01$). Respondents who coped less successfully with the experiences of difficulties in their studies were statistically significantly less inclined to take risks ($p \leq 0.05$).

Correlation analysis

Next, a correlation analysis of indicators of personal resource and psychological well-being was carried out. The indicators on the sample of educational migrants who were able to satisfactorily overcome the situation of a difficult life period have the following relationships.

The indicators of the psychological well-being scale have statistically significant correlations:

- The autonomy indicator has a negative weak relationship with the level of control (-0.361; $p = .026$) and risk taking (-0.328; $p = .045$), the general indicator of resilience (-0.378; $p = .019$);
- The level of self-acceptance has statistically significant negative correlations of weak strength with the level of control on the resilience scale (-0.373; $p = .021$);
- The level of the “Goals in Life” scale has a statistically significant positive weak relationship with the level of risk taking (0.362; $p = .025$);
- The general level of psychological well-being has a statistically significant negative weak relationship with the level of control on the resilience scale (-0.341; $p = .036$).

Indicators on a sample of educational migrants who were unable to satisfactorily overcome the situation of a difficult life period have the following relationships.

- The self-acceptance indicator has a positive weak relationship with the level of control (0.24; $p = .050$);
- The personal growth parameter has a positive weak connection with the general level of resilience (0.274; $p = .025$), which means that resilience is a resource for self-development of subjects;
- The indicator of goals in life on the scale of psychological well-being has a statistically significant positive weak relationship with risk taking (0.283; $p = .020$) and the total indicator of resilience (0.276; $p = .024$). A high level of resilience and a willingness to act without hope of success become a resource for setting independent goals and developing a willingness to follow them.
- The general level of psychological well-being has a statistically significant positive weak relationship with the level of control on the resilience scale (0.284; $p = .020$) and with the total resilience indicator (0.27; $p = .027$).

Discussion

Academic performance has a positive effect on integration into the host society, while cultural distance has a negative effect on academic performance and integration, which was found by Jieyi, Kiu, & Baojian (2022). Education performs the functions of integrating a migrant into the host society. When cultural distance is large, the function of education for social integration is reduced (Jieyi, Kiu, & Baojian, 2022). The authors also show the role of higher education in strengthening the mental health of educational migrants (Oddy, Harewood, Masserano & Lounasmaa, 2022).

Our study found a number of connections between psychological well-being and indicators of personal resources. Among educational migrants who successfully cope with difficult life situations, the indicator of autonomy has a negative weak relationship with the level of control and risk taking, with a general indicator of resilience. Similar results are present in the study by Prasath, Xiong, Zhang & Jeon (2022) - psychological well-being mediates the relationship between psychological capital and stress, in particular, it reduces stress levels. The results of this study allowed the authors to formulate recommendations for universities to mitigate the psychological stress experienced by international students during the COVID-19 pandemic and beyond, which proposes to focus efforts and resources on two aspects: (a) promoting positive mental health and improving the level of psychological well-being and (b) identifying and developing positive psychological capital (Prasath et al., 2022).

External educational migrants have higher indicators of personal resources, namely: higher indicators on the "Control", "Risk", "Involvement" scales, as well as a higher overall indicator of resilience and tolerance for uncertainty (compared to internal migrants and non-internal migrants). These data can be explained from two perspectives:

- 1) people with an initially higher level of personal resources and tolerance for uncertainty are ready for external migration;
- 2) external migrants have to overcome more difficulties than internal and non-migrants, because of which their personal resource indicators increase due to the need to overcome these difficulties.

The study by E. L. Nikolaev, E. Yu. Lazareva, R. E. Yakubov (2021) shows that in a group of foreign students, high resilience characteristics are more often associated with psychological well-being and the desire to gain new experience. Among non-migrant students, high levels of resilience are more closely related to mental health, psychological well-being and pronounced stress resistance (Nikolaev, Lazareva, Yakubov, 2021).

Postmigration stressors are important correlates of migrants' mental health (Chen, Hall, Ling, & Renzaho, 2017). In a study of the adaptation process of Syrian refugees in the Netherlands by HF Rahim et al., it was shown that higher exposure to migration risk factors was associated with more psychological symptoms (anxiety, depression, PTSD). However, more potentially traumatic and stressful life events were associated with higher

levels of cultural identity conflict and greater severity of psychological symptoms (Rahim et al., 2023). At the same time, AM Mahasneh (2022) found a strong relationship between subjective well-being and social support. It is quite possible that it is lower social support that explains the lower level of psychological well-being among study participants – external educational migrants compared to internal ones.

Conclusion

Our research is devoted to educational migrants - young people who come to another region because there is a university where they plan to receive higher education in their chosen specialty. Migrant students, in the process of adapting to life in a new place, are faced with various situations that may be perceived as difficult by them. We asked ourselves: how successfully do educational migrants cope with difficult situations and what psychological resources determine the effectiveness of this process?

Based on the results of the study, we can give the following answers:

1. Educational migrants have fairly high levels of personal resources (in particular, such components as resilience and tolerance for uncertainty) compared to those who study in their native region.
2. On average, educational migrants cope quite successfully with difficult life situations, even those that were experienced in the objectively difficult 2020 due to the COVID-19 pandemic. The data obtained can be used to reorganize higher education in connection with new complex conditions, for example, in connection with the increasingly tense geopolitical situation in various regions of the world (Kalimullin, Koinova-Zollner & Vasilieva, 2021).
3. Those people who came from another country (external educational migrants) have higher levels of personal resources (level of resilience and level of tolerance for uncertainty) compared to those who came from other regions of the same country (internal educational migrants). At the same time, external educational migrants have a lower level of psychological well-being compared to internal educational migrants. That is, they have greater resources to solve problems, but they feel less prosperous.
4. Correlation analysis showed an unexpected result: for those educational migrants who successfully coped with difficult life situations, the level of psychological well-being is negatively related to the level of resilience, and for those who coped unsatisfactorily, this relationship is positive.

Limitations of the Study

Limitations may include the following circumstances: 1) situations that occurred during the abnormally challenging year of 2020 were assessed, 2) the participants in the study were students who came to study in Russia and internal educational migrants within Russia.

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Studying students in new geopolitical conditions and obtaining data from educational migrants coming to other countries can significantly enrich the understanding of the psychological characteristics of this group of university students.

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Annex 1

Author's questionnaire

Instructions: Please answer the following questions, marking the answer that best reflects your life situation and your attitude towards it. For the elapsed period, please refer to the period of 1 year (12 months).

Rate how satisfied you are with your life overall on a 7-point scale (7 – Completely satisfied; 1 – Absolutely dissatisfied; 4 – difficult to answer)	1 2 3 4 5 6 7
Has your perception of life changed in 2020?	Changed for the better Minor changes Everything as usual Changed for the worse
Rate how satisfied you are with your life in 2020 on a 7-point scale (7 – Completely satisfied; 1 – Absolutely dissatisfied; 4 – difficult to answer)	1 2 3 4 5 6 7

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From the list below, select those that you have experienced as personal difficult life situations over the past period (multiple answer options are acceptable).		
Coronavirus	Yes	No
Failed trip	Yes	No
Difficulties with studies	Yes	No
Family health	Yes	No
Everyday difficulties	Yes	No
Personal life	Yes	No
Nothing special	Yes	No
On a 7-point scale, how difficult do you rate the past year as Difficult (7 – Very difficult; 1 – not difficult at all; the remaining numbers are intermediate values)	1 2 3 4 5 6 7	

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Author Contribution

Viktor Aleksandrovich Klimenko – concept and design of the study, selection of diagnostic techniques, data collection.

Anastasia Vasilievna Grishina – analysis of literature on the research topic, preparation of sections “introduction” and “discussion of results”.

Evgeny Aleksandrovich Pronenko – preparation and design of the article text, writing annotations and conclusions.

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Conflict of Interest Information

The authors declare no conflict of interest.

Mitigating Emotion Dysregulation in Adolescents: The Effectiveness of Vipassana Meditation

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Abstract

Introduction. Mood swings, hypersensitivity, stress, and frustration intolerance are only the tip of the iceberg when it comes to the problems adolescents have in properly controlling and regulating their emotions. Their relationships, ability to make decisions, and general happiness may all suffer because of their difficulties with emotional regulation. Vipassana meditation (VM) promotes awareness of the need for change, enhances mental focus, and opens the door to more introspective thought. **Methods.** The purpose of this research was to examine the impact of vipassana meditation (VM) on adolescents' (n = 60) inability to control their emotions. Participants were randomly assigned in groups: vipassana meditators (those who practise meditation daily) or non-meditators (those who don't practise any form of meditation). A measure of emotional dysregulation, the DERS-36, was administered concurrently to both groups. **Results.** A statistically significant difference was discovered between the two groups using SPSS-27, suggesting that vipassana meditators have better than non-meditators at keeping their emotions in check. The effect size of vipassana meditation was also investigated, and researchers found it to be 197.136 which indicates a strong impact of vipassana meditation. Overall, vipassana meditation has good impacts 77.9% of variance on the level of emotion dysregulation among adolescents. **Discussion.** The statistics show that people struggle to keep their feelings in check, suggesting that VM could be helpful. Young people have a better chance of thriving as adults if they are helped when they are struggling.

Keywords

adolescents, breathing technique, emotion dysregulation, emotion reactivity, meditation, mental health, vipassana meditation

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Introduction

Our lives are deeply influenced by our emotions. Each day has its own unique set of highs and lows for everyone. Some of these are easy to manage, while others are more complex. It's acceptable to be down in the dumps occasionally, because we've all been there. Having difficulties controlling your emotions for a lengthy period might have a negative impact on your mental health. Emotional dysregulation is the inability to keep one's feelings in check for extended periods of time. This is what occurs whenever someone is experiencing extreme difficulty: anxiety, sadness, personality disorders, and psychosis all have well-established psychological roots. If they struggle to control their own emotions, they are more likely to experience mental health issues. Problems with cognition, mood, and behaviour are common in young adults. Right through this period, a lack of emotional regulation impairs the ability to make reasonable decisions in daily life. Both suppressing feelings expressively and reappraising them mentally are methods of emotion control. Acceptance (not trying to change the emotions, accepting them) and cognitive reappraisal (re-examining the emotions) are often more adaptive coping mechanisms for managing emotions than suppression (the control of one's emotional state and its display), avoidance (the act of evading unwanted circumstances), and non-acceptance (negative emotions that arise as a result of the primary negative emotion) (Gross & John, 2003).

A growing collection of evidence shows that difficulties controlling one's emotions contribute to many forms of potentially high-risk disruptive behaviour. Emotional dysregulation is common in the non-clinical population and is a severe clinical concern in a wide range of psychiatric, somatic, and medical conditions. Clinically relevant behaviour and psychological problems, such as intentional self-harm, have been linked to emotion dysregulation (Gratz & Roemer, 2008). According to research by Yang, Wang, Elhai & Montag (2022), the level of emotional dysregulation among adolescents is correlated with their problematic use of technology. There was also a strong correlation between emotional dysregulation and other factors (such as anxiety, depression, low self-esteem, etc.). Those who believe they can effectively control negative emotions are more likely to procrastinate, according to research by Rebetz et al. (2018). Reducing thought avoidance provides insight into the connection between trait mindfulness and enhanced emotion regulation, with young people having a stronger meditative pathway than older ones, as reported by Prakash, Whitmoyer, Aldao & Schirda (2017). Schreiber, Grant & Odlaug (2012) reported that two subscales of impulsivity were substantially higher in the high emotion dysregulation group as paralleled to the low emotion dysregulation group.

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Adolescents' social functioning (including their peer relationships, prosocial behaviour, and social competence) depends on their ability to regulate their emotions, and difficulties with regulation have been linked to the development and amelioration of psychiatric disorders like anxiety, depression, and aggression (McLaughlin, Hatzenbuehler, Mennin & Nolen-Hoeksema, 2011). In a nonclinical sample of college women, Messman-Moore, Walsh & DiLillo (2010) found that emotional dysregulation was significantly related with hazardous sexual conduct in the prior six months. Changes in the brain's social and emotional system (dopaminergic system) lead to greater emotional reactivity, risk taking, and impulsive conduct, as reported by Steinberg (2008). Emotional distress may be a risk factor for the emotional and behavioural issues of all people if any developmental stage is stress sensitive. Therefore, we must prioritise a universally successful prevention programme to teach emotion control skills to all, not just those at higher risk of difficulties, as part of a comprehensive social and emotion management skills.

Vipassana Meditation

Vipassana Meditation (VM) which is founded on the principles of awareness was first taught by Buddha (Bhikkhu, 2011). VM is currently being taught in India and many other countries following in the footsteps of Vipassana's main instructor, S. N. Goenka. To accomplish lasting behavioural changes, it promotes awareness of the need for change, enhances mental focus, and opens the door to more introspective thought. Vipassana, from its original Pali, means "insight." Most of the Pali words and phrases used in Vipassana are also taught alongside their English translations. Morality (sila), mental focus (samadhi), and the purifying power of insight (panna) are the three pillars of the Eightfold Path to Enlightenment (Goenka, 2001). Goenka's method of Vipassana practise is currently being taught and preached at various Vipassana centres across the world, and meditators are using Goenka's recorded teaching sessions to guide them through 10-day and longer periods of silent practise. Vipassana's main purposes are to purify the mind and alter one's character drastically. In order to better embody more human virtues like universal generosity and compassion, as well as a stronger feeling of empathy, humility, and inner calm, persons who practise Vipassana Meditation seek to purge their minds of their more illogical inclinations. This is achieved scientifically through the practise of Right Mindfulness and non-reactivity, which entails training oneself to pay close attention, without any mix of subjective judgements or reactions, to whatever is going on in one's entire body, with all five senses and the mind operating within and through it.

The Effectiveness of Vipassana Meditation

Goenka (2001) says that by practising Vipassana, meditators may oversee their minds, behave according to their morality, and still remain equanimous, providing further evidence that Vipassana meditation is about increasing insight inside meditators (Marques & Dhiman, 2009). Consistent practise of Vipassana meditation leads to an

increase in both awareness and serenity. According to Goenka (2001), there are three causes of unhappiness in life that can be remedied by Vipassana practise: raga/lobha (Craving), dosa (Aversion), and moha (Ignorance) from the Pali language. In keeping with Goenka's teachings, (Marques & Dhiman, 2009) stated that the most crucial aspect of Vipassana meditation is to maintain equanimity and non-judgment towards the sensations and to neither like nor detest their observation. Otherwise, meditators risk erecting barriers in their own minds rather than removing them. (Bhargava & Srivastava, 2019) concluded that Vipassana meditation obviously increases mental stability, will strength, and makes a person less worried, sad, furious, and tense. Also, it has been discovered to be an extremely powerful short-term meditation practise that may affect practically every aspect of one's life. Studying the impact of Vipassana meditation on workers' happiness, Pradhan & Vadaki Vethhi., (2019) discovered that meditating workers report more happiness in their lives, regardless of their demographics. The findings also provide credibility to the practise of Vipassana meditation as a remedy in the workplace. Emotional processing, including emotion intensity, memory formation, and emotional attention biases, can be enhanced with brief mindfulness meditation (Wu et al., 2019). Agarwal & Dixit (2017) looked at 100 Indian youths between the ages of 17 and 24 to see if there was a link between meditative habits and contentment with life. With consistent practise, they discovered that Vipassana meditation improved practitioners' ability to deal with the stresses of daily life and raised their levels of happiness and self-esteem. They concluded that regular Vipassana training can boost meditators' happiness and contentment. After reviewing the literature, researchers, Szekeres and Wertheim (2015) found that participants who took a Vipassana course reported greater feelings of well-being, self-kindness, and heightened awareness. A study by Pradhan & Vadaki Vethhi (2019) looked at the effectiveness of vipassana meditation (VM) as an intervention for psychological well-being (PWB) of employees. The results demonstrated that demographics, intervention, or VM usage had no bearing on the outcomes of meditation. This demonstrates how meditating can bring about a change on the inside by fostering the growth of inherent qualities. Present-moment awareness and non-judgmental acceptance training have been shown to increase sensitivity to affective and incipient emotional signals (Teper, Segal & Inzlicht, 2013), which in turn increases one's repertoire of affective coping mechanisms and foreshortens the onset of negative emotions like anger. Equanimity can be attained from both the inside and the outside through the practise of Vipassana meditation. While it is true that regular practising of Vipassana meditation has many benefits, the most profound insights and realisations typically occur during a silent, multi-day meditation practice (Pagis, 2008).

Emotion regulation is a major factor in psychological research. While there is a plethora of studies demonstrating their value, few of them focus on emotion regulation in an Indian context. There is a lack of studies focusing solely on Vipassana meditation. Further research is needed into the effects of Vipassana on young people, who should be made aware of India's cultural past was argued by Gairola and Mishra (2020). Fewer studies have concentrated on the present evidence relating to the variable and Vipassana

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meditation, despite the growing interest in emotion regulation research and clinical connections between meditative practises and individual quality of life. In the disciplines of mental health and health psychology, the findings of this study may contribute to a deeper understanding of these factors and their role in treatments based on mindfulness meditation Vipassana meditation may be the one good way for this.

After examining the existing literature, the following **research gap** was found:

- There is a scarcity of research examining the effects of Vipassana meditation on adolescents' emotional dysregulation. The unique developmental needs and challenges encountered by adolescents may necessitate a separate examination, as the majority of studies on Vipassana meditation tend to focus on adult populations.
- In numerous existing studies on Vipassana meditation and emotional dysregulation, appropriate comparison groups are lacking. Comparative studies with control groups receiving alternative interventions or no intervention at all can help establish the specific effects of Vipassana meditation on adolescents' emotion dysregulation.
- Vipassana meditation can be taught and practised in a variety of methods, resulting in implementation differences between studies. It is difficult to compare findings and reach definitive conclusions due to the lack of standardisation in meditation protocols. More research is required to investigate the effects of specific Vipassana meditation techniques or variations on adolescents' emotional dysregulation.

The **goal of this study** is to see if there is a link between vipassana meditation and emotion dysregulation, and if VM can help people overcome inner conflicts about how to feel and respond positively. Most people regulate tough emotions in one or two ways: they express them through words or actions, or they conceal them, which leads to maladaptive behaviours such as high impulsive behaviour, violence, and so on. This study investigates the impact of vipassana meditation by first defining the type of emotion dysregulation and then determining the relationship between vipassana meditation and emotion dysregulation.

Methods

Aim

The current study's aim is to examine the level of emotion dysregulation in adolescents and the effect of vipassana meditation on meditators.

Objectives

Following objectives are investigated in this study:

1. To determine the level of emotion dysregulation in adolescents.

2. To find out the gender difference in emotion dysregulation in adolescents.
3. To study the differences in the level of emotion dysregulation between vipassana meditators and non-meditators in adolescents.
4. To investigate the effectiveness of vipassana meditation on emotion dysregulation in adolescents.

Hypotheses

H1: There will be high level of emotion dysregulation in adolescents.

H2: There will be no gender difference in emotion dysregulation in adolescents.

H3: There is significant difference in the level of emotion dysregulation in vipassana meditators and non-meditators in adolescents.

H4: Vipassana mediation has effect on emotion dysregulation in adolescents.

For the present study, **60 adolescents** having difficulties with emotion regulation from the age of 15–18 years were selected from Delhi/NCR., India. The sample was chosen using a purposive sampling technique. Two groups were named as vipassana meditators and non-meditators. Two participants dropped out after two weeks due to personal and health issues, so the final study was done on 58 participants, 30 in the vipassana meditators group and 28 in the non-meditators group. The individuals were drawn from a non-clinical population. Prior to the start of the study, the researchers received informed written and verbal agreement from all participants and parents.

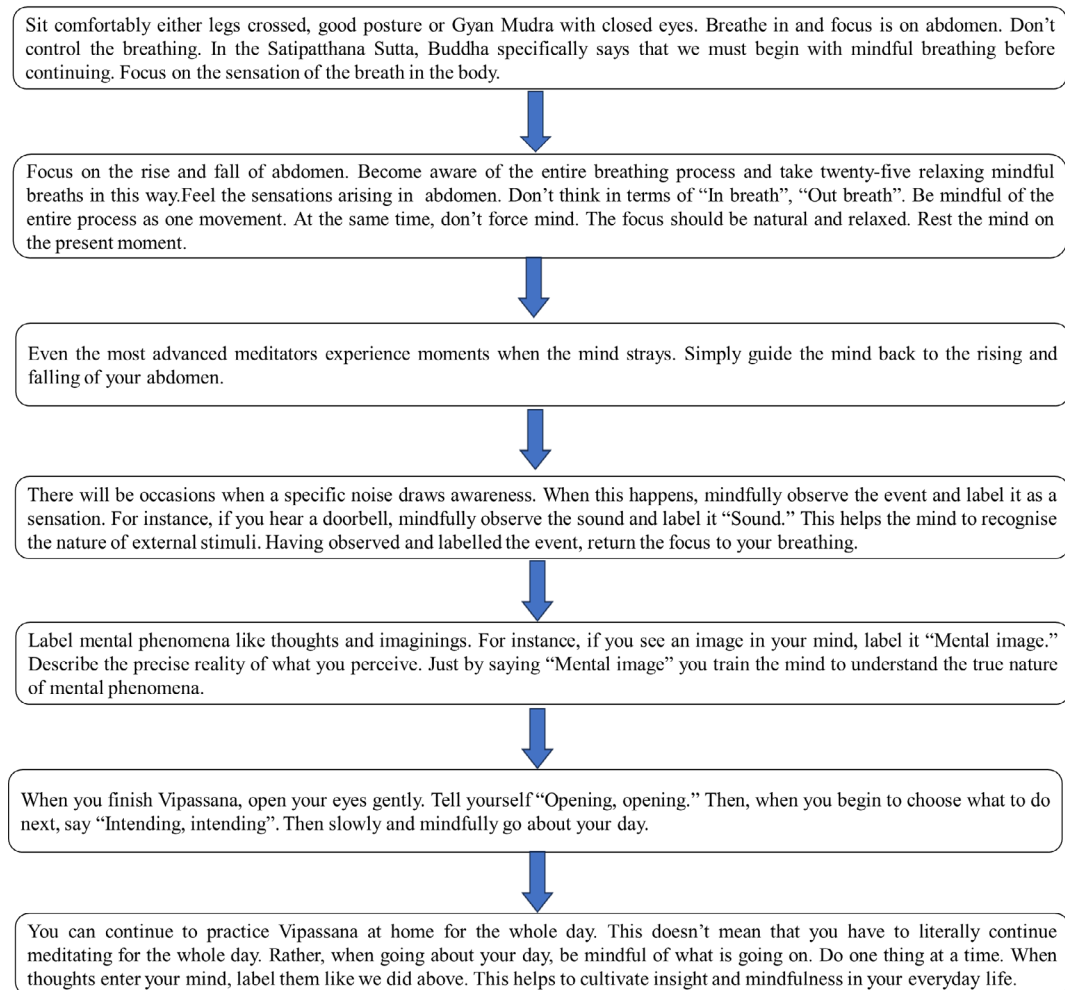
1. **Inclusion Criteria:** Adolescents having high level of emotion dysregulation; who practice meditation at least five days a week and have done minimum three course of vipassana meditation(ten-days); Willing to participate in the research and fluent in English language.
2. **Exclusion Criteria:** Symptoms of psychosis or any other clinically suggested mental disorder; Alcohol or drug abuse; Any delays in the development and Individuals who have been given any other therapy or treatment within one year of period.

Description of Vipassana Meditation

The description of Vipassana Meditation is shown in Figure 1.

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Figure 1
The description of Vipassana Meditation



Research design

This research is intended to be descriptive in nature and follows a cross-sectional research design. The participants or samples were sorted according to meditation practice; so, there were two separate groups, one of which did and one who didn't get into the habit of any kind of mediation.

Measures

Difficulties in Emotion Regulation (DERS-36): Individuals' levels of emotion dysregulation are measured across six areas with the Difficulties in Emotion Regulation Scale, a 36-item self-report psychological tool (Gratz & Roemer, 2004). The DERS was shown to have a high degree of test-retest reliability of 0.88 as well as adequate conceptual and predictive validity. The items were recoded to reflect greater emotion dysregulation if the sum is high. Internal consistency was found to be good in the current sample (.81). Six dimensions of DERS-30 are: Non-acceptance, Goals, Impulse, Awareness, Strategies and Clarity. For scoring, total scores and scores of each domain will be taken into consideration. The higher the score, the more challenging it is to regulate one's emotions.

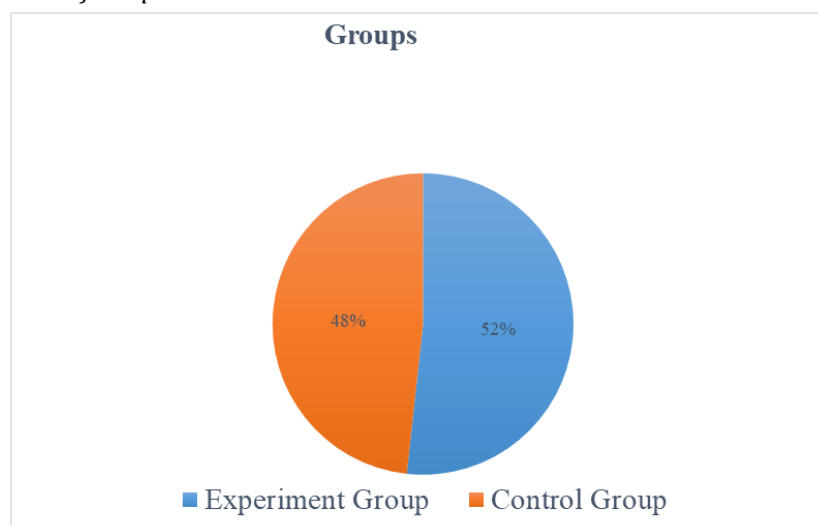
Results

The following techniques were employed to analyse and illustrate the results. The frequency and descriptive statistics were used for graphical presentation of the sample distribution. The descriptive analysis provides quantitative data on the construct measure of the study. Independent t-test reveals the difference between the groups on the level of construct. The linear regression analysis is utilised to demonstrate the impact of therapy on the dependent variable. SPSS-27 was used to do the calculations. The analysis and interpretation are presented in the following sections.

Figure 2 showcases the group distribution of the sample in the present study in two categories: experiment group consisting 52% of the sample while control group 48% of the sample i.e., 30 and 28 sample in each group respectively.

Figure 2

Group distribution of sample



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Table 1 depicts the descriptive scores of emotion regulation. The mean score for emotion regulation in total was 100.38 with SD of 22.02 where the SD score of all suggested the value of deviation of the score from its respective mean scores.

Table 1
Mean and Standard Deviation of emotion dysregulation among adolescents

Variable	Mean	Std. Deviation
Non-acceptance	16.47	3.724
Goals	14.69	3.983
Impulse	16.78	4.272
Awareness	15.59	3.559
Strategies	22.24	5.407
Clarity	14.62	4.099
Difficulties in Emotion Regulation (DERS-36)	100.38	22.02

Table 2 shows the difference between the scores of the level of emotion dysregulation in males and females, where it was .598 and .596, which was not significant at any level of confidence, suggesting that there is no significant difference between genders.

Table 2
Differences in mean of vipassana meditators and non-meditators on the level of emotion dysregulation on the basis of gender

Variable	Groups	N	Mean	SD	t	p-value	Lower Limit	Upper Limit
Emotion Dysregulation	Males	30	98.70	21.278	.598	.552	-15.137	8.180
	Females	28	102.18	23.044	.596	.554	-15.175	8.218

Table 3 illustrates the difference between the means scores of the level of emotion dysregulation in vipassana meditators and non-meditators among adolescents shows that emotion dysregulation is more in non-meditators as compared to vipassana meditators. All the values show the significant difference with the mean difference.

Table 3
Differences in mean of vipassana meditators and non-meditators on the level of emotion dysregulation among adolescents

Variable	Groups	N	Mean	SD	t	p
Emotion Dysregulation	Vipassana Meditators	30	81.77	8.123	-14.041	<.001
	Non-Meditators	28	120.35	12.475		

For this calculation in Table 4, a dummy variable was calculated on SPSS as there is one variable considered in the research. The F statistic for emotion dysregulation was found to be 197.136 which indicates a strong impact of vipassana meditation. Overall, vipassana meditation impacts 77.9% of variance on the level of emotion dysregulation among adolescents.

Table 4
Regression coefficients of vipassana meditation on the level of emotion dysregulation among adolescents

Variable	Coefficient β -value	T	p value	F	R square
(Constant)	120.321	60.926	<.001	197.136	.779**
Vipassana Meditators	-38.555	-14.041	<.001		

Discussion

In the current scenarios of society, mental health issues during the phase of adolescence are quite prevailing additionally physical health issues for the longer period will also lead to consequences as mental health problems (Mittal, Mahapatra & Ansari, 2022). To deal with such concerns, lost but valuable meditation has been rediscovering its place. Mindfulness has not been a new pop-up in ancient Indian history, but it is a relatively new idea in psychotherapy, and it has captivated the attention of scholars and therapists alike in recent decades. It assists individuals in focusing on the current moment, comprehending their personal experiences, establishing a non-judgmental attitude toward them, acknowledging their thoughts and feelings, trying to limit their responses to them, and managing them effectively.

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The purpose of the study to explore the role of emotion dysregulation and effect of vipassana meditation on it within a sample of non-clinical background. The hypothesis 1 of the research was to assess the level of emotion dysregulation among adolescents. The mean scores of 100.28 suggest that adolescents are facing difficulties in emotion regulation. Another hypothesis 2 stated that difference between the scores of the level of emotion dysregulation in males and females, where it was .598 and .596, which was not significant at any level of confidence, suggesting that there is no significant difference between genders.

The first hypothesis (*Table 1*) of the study was to determine the level of emotion dysregulation among adolescents. The mean score of 100.28 indicates that teenagers are struggling with proper regulation of emotion. Another hypothesis i.e., H2 (*Table 2*) claimed that the difference in the levels of emotion dysregulation in males and females was .598 and .596, respectively, which was not significant at any level of confidence, implying that there is no significant difference between genders. It's safe to say that males and females progress at around the same rate. Results may have been different as contextual factors including meditation experience, socioeconomic background, academics, had not been taken into account. However, somewhat related to this it was found in a study (Yaremtchuk, Bakina & Sityaeva, 2021) that females of the age range 18–22 experience lesser happiness and life satisfaction in comparative to male though it is associated with increase in the lifeworld's difficulty.

Research have proved the efficacy of mindfulness therapy on emotion regulation and other related dimensions. Brockman et al. (2017) discovered a correlation between mindfulness and suppression of .49 (95% CI = .43.54), indicating that daily mindfulness was associated with lower levels of daily emotion suppression ($r = .28$, $t(3025) = 4.24$, $p < .001$). In the study, *Table 3* (Hypothesis-3) clearly showed that the difference in the level of emotion regulation between in vipassana meditators and non-meditators among adolescents was significant at 0.001 level of confidence, proposing that there is a significant difference between the two groups. The mean scores of the groups were 81.77 and 120.35, with t-value of -14.041 which clearly states that participants who practices vipassana meditation are able to regulate their emotion more properly than the non-meditators. In support of this, MehdiNejad (2020) discovered a significant difference between the study sample's mean DERS-SF score of 20.33 and the community sample's mean of 33.57 ($t = -20.01$, $p < .001$). According to the data, Vipassana meditation practitioners have a stronger ability to regulate their emotions than the normative group. However, *Table 4* (Hypothesis 4) showed the impact level of vipassana meditation or can say effectiveness of it by depicting the F score to be 197.136 and R square was .779%. It illustrates that vipassana meditation did have an impact. Empirical data has shown how it has effectively treated other psychological difficulties, such as in a study by (Bjureberg et al., 2016) study's findings, as Vipassana meditators had much lower DERS-SF scores than a population sample of 482 participants, which had an average DERS-SF score of 33.57. Whereas this study adds to the expanding body of knowledge about emotion

dysregulation and vipassana meditation, there are a few limitations to consider. It is crucial to emphasise that the measure of emotion dysregulation utilised in this study correlates strongly with behavioural measures of emotion control and readiness to suffer emotional pain. Nonetheless, future research on emotion dysregulation would benefit from include non-self-report (e.g., behavioural, physiological) measurements, as many studies rely only on self-report measures, which may be influenced by participants' willingness or uncontrollable circumstances. Additionally, the sample size is low because in India finding adolescents who practice vipassana meditation was not easy. The authors have limited the locale of sample for this research.

Despite these limitations, this study's findings add to a growing body of research emphasises the importance of emotion dysregulation and the efficacy of VM as a blessing. Since impulsive behaviour and substance abuse are just two of the many psychological issues linked to emotion dysregulation (Najavits, 2002), more study is needed to see if this treatment mitigates these problems by reducing emotion dysregulation.

Conclusion

Mindfulness practise has a lot of power to help young people grow up healthy by helping them in reducing stress, promoting wellness, and suggesting those positive strategies for emotional regulation. In conclusion, the effectiveness of Vipassana meditation in mitigating emotion dysregulation in adolescents holds great promise. Emotion dysregulation is a common and significant challenge faced by many adolescents, and its negative impact on their well-being and overall functioning cannot be understated. Traditional approaches such as psychotherapy and medication have shown some success, but there is a growing recognition of the need for complementary and alternative interventions. Vipassana meditation, a mindfulness-based practice, has emerged as a potential solution for emotion dysregulation in adolescents. The practice involves non-judgmental awareness of one's thoughts, emotions, and bodily sensations, allowing individuals to cultivate a deeper understanding and acceptance of their inner experiences. Numerous studies have investigated the effects of Vipassana meditation on emotion regulation, demonstrating its positive impact on reducing emotional distress and enhancing emotional well-being. Additionally, more rigorous research is needed to establish the long-term effectiveness of Vipassana meditation and its comparative efficacy when compared to other interventions. Also, continued research, along with the integration of Vipassana meditation into comprehensive treatment approaches, can further contribute to its understanding and application in clinical and educational settings, ultimately benefiting the emotional well-being of adolescents.

Future implications

The study on mitigating emotion dysregulation in adolescents through Vipassana meditation provides valuable insights into the potential benefits of this mindfulness

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practice. As we look to the future, there are several implications arising from this research that could have significant implications for both the field of psychology and the well-being of people and welfare of society:

- The effectiveness of Vipassana meditation in mitigating emotion dysregulation among adolescents suggests the importance of integrating mindfulness-based interventions into existing therapeutic approaches. This integration can help promote mental well-being and foster emotional resilience during this critical developmental stage.
- The study's findings pave the way for the development of targeted mindfulness programs specifically designed for adolescents. Researchers and practitioners may explore the adaptation of Vipassana meditation techniques to make them more accessible, engaging, and tailored to the unique needs of this age group. These programs could be implemented in schools, community centers, and mental health settings, providing adolescents with practical tools to regulate their emotions effectively.
- Examining the long-term impact will help determine whether the benefits observed during the study endure over time or require ongoing practice. This would provide valuable information for developing comprehensive and sustainable intervention strategies.
- Further investigations could delve into the underlying mechanisms through which Vipassana meditation exerts its positive effects on emotion dysregulation in adolescents. Neuroscientific studies, for example, could explore the neural correlates of meditation practice in this population, shedding light on the specific brain regions and processes involved. Understanding these mechanisms could enhance our understanding of mindfulness interventions and contribute to the development of more targeted and effective treatments.
- Cultural Adaptation and Global Implementation: Vipassana meditation has its roots in ancient Indian philosophies and practices. Future research could explore the cultural adaptation of mindfulness interventions to suit diverse populations and contexts worldwide. This could involve studying the effectiveness and acceptability of Vipassana meditation within different cultural, ethnic, and socio-economic groups, ensuring that the benefits of mindfulness interventions are accessible to all adolescents globally.

The study on mitigating emotion dysregulation in adolescents through Vipassana meditation holds promising implications for the future. By integrating mindfulness practices, developing targeted programs, conducting long-term follow-up studies, exploring mechanisms of action, and promoting cultural adaptation, we can build upon this research to enhance the well-being of adolescents and inform evidence-based interventions.

Main conclusions

- Adolescence is the phase of life which effects all the other phases positively or negatively;
- Emotion regulation difficulties can lead to serious mental and physical health problems in adolescents;
- Vipassana meditation (VM) is one of the lost gems of India in the field meditation, indeed it is gaining back its place as VM makes the individual feel the present, accept the past and aware in all the moments;
- The proper guidance to learn the vipassana meditation is always suggested.

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Author Contributions

Santwana Mani came up with the idea of carrying out this study as she herself had done courses of vipassana meditation and interpreted the need of study to the co-authors. Author collected the data. The author came up with the study design idea and have done the data processing. The first draft of the paper was made. At last, the final version of the manuscript was made.

Dr. Roopali Sharma helped in data collection. Improvised the study design and helped in data-analysis. Changes made in the draft.

Dr. Navin Kumar helped in data collection. Re-analyzed the data and helped in interpretation of result. Finalize the draft.

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Conflict of Interest Information

The authors have no conflicts of interest to declare.

Constructive Potential of Anxiety and Approaches to its Study

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Abstract

Introduction. Today there is a there is a tendency towards reduction, medicalization and pathologization of the phenomenon of anxiety, caused by the increased focus of research interest mainly on destructive manifestations of anxiety. However, it is the constructive aspects of anxiety that potentiate the development of personality and the formation of subjectivity, being a driving force that plays a significant role in the transformation of the objective world. Despite the presence of many voluminous and multifaceted studies devoted to the issues of anxiety and its various characteristics, modern theoretical ideas about this phenomenon are scattered and mosaic in nature, which determines the need for additional comprehension and systematization of the accumulated knowledge.

Theoretical justification. Constructive anxiety (adaptive, normal) implies the ability of a person to respond adequately to stimuli that lead to the solution of actual problems, causing the experience of anxiety, as well as the ability to differentiate real threats from phobic and obsessive tendencies. The constructive aspect of existential anxiety consists in maintaining an optimal level of intrapsychic tension of the subject, playing the role of a necessary adaptive resource of the personality in a stressful situation. The level of anxiety, effective from the point of view of the implementation of activity in general, is in the zone of the nearest development of the personality, while being potentially beneficial in relation to the success of intellectual activity in particular. **Discussion.** The systematization of the analytical base allows us to introduce a generalizing definition of the constructive potential of anxiety: an individual personality characteristic reflecting the maximum accessible level and unique pattern of anxiety experience, contributing to effective development, self-actualization and subjective well-being. The problem of humanity and the expediency of revising traditional approaches to understanding

anxiety, reassessment of established normative thresholds, the dilemma of primacy of occurrence and causal uncertainty are serious challenges for contemporary researchers of anxiety and personal anxiety. Attention to the constructive potential of anxiety in scientific, practical, educational and outreach activities may be one of the key resources in the course of humanity's adaptation to the rapidly changing, poorly predictable and highly stressful conditions of the modern world.

Keywords

anxiety, personal anxiety, constructive anxiety, normal anxiety, situational anxiety

For citation

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Introduction

R. May referred to the second half of the twentieth century as the "age of anxiety", while defining anxiety as a natural part of human life (Ratner, 2019). Numerous clinical and statistical grounds suggest that the "era of anxiety" continues, being probably at a new peak (Dzhafarova, Ivanova, Shabanova, 2020; Merkin et al., 2021; Koretskaya, Denisov, 2021; Trukhan, Kravchenko, 2022; Ebzeyeva, Polyakova, 2022; Kovalev, 2022). The tense epidemiological, political, economic situation of recent years, accompanied by a constant background fear of possible threats to life and health, inevitably actualizes existential experiences, among which anxiety comes to the fore. The information environment in which modern man is immersed actively induces anxiety not only due to the abundance of aggressively and disturbingly colored content, but also because of the high speed, invasiveness and enormous volume of incoming data (Tarabrina et al., 2017).

There is some fragmentation of theoretical understandings concerning anxiety and worry, caused by the uncertainty and multivalence underlying the phenomena themselves. However, the fundamental understanding of the essence of anxiety is universal enough to allow specialists of different theoretical views to reach a certain mutual understanding and outline a recognizable cross-disciplinary contour (Prikhozhan, 2004). Clinicians and researchers are more often interested in the negative side of anxiety, a non-specific response to a stress factor (Uvarova, Kedyarova, 2014). A colossal number of studies are concentrated in the field of studying the level of anxiety in the context of various comorbid conditions and psychopathological phenomena. However, the comprehension of the very nature of anxiety, aspects of its non-biological genesis, its value for the subject beyond the socially useful function is still located mainly in the philosophical plane and somewhat reduced in psychological

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science. There is also a certain bias towards the study of the quantitative expression of anxiety, while the strength of anxiety carries real diagnostic value only taking into account the context reflecting the nature and commensurability of the experience with reality (May, 2001).

Anxiety disorders are often underdiagnosed despite their high prevalence in the population, as a result of which patients are not always able to receive timely and adequate psychotherapeutic and pharmacological support (Banushi et al., 2023). The described trend may be associated with the multifactorial and ambiguous nature of anxiety, the high proportion of simultaneous course of anxiety disorders with other psychopathological processes, as well as the potency to somatoform expression, which in some cases disorients patients themselves and significantly complicates the process of diagnosis at the stage of primary health care.

The phenomenon of anxiety is not only socially significant, but also "politically charged", having a pronounced transformative potential both at the constitutional-subject level and on the scale of sociopolitical reality (Zevnik, 2021). At the same time, in modern society there is a high demand for the formation and development of a personality capable of effective adaptation, having formed skills of social competence (Tserkovsky, 2011), in this regard, the study of the driving forces of personality, among which constructive anxiety plays an important role, acquires high relevance and practical significance.

The purpose of this study is to systematize an analytical framework that includes descriptions of the essence of a number of concepts that, to a greater or lesser extent, reflect the constructive potential of anxiety in the most used contexts, as well as its processual dynamics.

In the course of achieving the goal, the following tasks were solved, each of which determines the logic of the narrative:

- Outlining the current problems in the field, among which are the over-medicalization of anxiety, the predominant neglect of its positive aspects and the questioning of the relevance of existing norms;
- Synthesizing and structuring knowledge defining the place of normal, helpful, constructive anxiety in theoretical representations of different approaches;
- Description of constructive aspects of existential, separation anxiety, outlining the role of constructive anxiety in the framework of stress coping, psychological safety, activity, creativity and adaptive potential of the subject;
- Introduction of a definition of "constructive potential of anxiety" based on the comprehension and systematization of the above material.

Theoretical justification

Anxiety, worry and fear

In most relative studies, anxiety is described as a systemic process responsible for mental regulation, and anxiety is usually labelled as a personality trait that performs an adaptation-orientation function (Sidorov, 2013). According to A. M. Prikhozhan (2000) anxiety is considered as an emotional state, and anxiety is considered as a personal formation of a stable character, including emotional, cognitive and operational components. Anxiety can also be interpreted as forecasting, anticipation of a threatening future, accompanied by insufficient awareness and high level of uncertainty, unawareness of potential threat (Khabiev, 2020). Both frequent experience of situational anxiety and psychological, psychophysiological determinants are called predictors of persistent anxiety. Individual experience of the subject, accumulating the intensity and frequency of experienced anxiety episodes, determines the formation of anxiety as a constant property of personality (Sidorov, 2013). Being located in the structure of integral individuality, anxiety is a parameter of individual differences (Solovieva, 2012). The question concerning the identification of anxiety caused by different reasons remains debatable (Prikhozhan, 2000).

From the point of view of clinical psychology, the core element in the structure of anxiety can be considered to be the cognitive component, which is revealed in the tense expectation of undifferentiated threat. At the same time, anxiety is a continuous concept affecting both the conditionally healthy part of the population and the contingent of patients belonging to the subclinical and clinical sample (Pogosova, Koltunov, Yufereva, 2010; Bobrov, Usatenko, 2021).

Located in the unconscious core of the personality, anxiety regulates orientation in the world of object relations, the way and nature of contact with the unconscious, participates in the formation of the subject's authenticity (Kabanova and Neznanova, 2003) and prompts the search for and identification of the threatening object (Solovyova, 2012). From the point of view of V. M. Astapov, correct assessment of the current situation and subjective evaluation of the possibility to cope with it quite effectively is an important function of anxiety. The process of assessing a potential threat has a multicomponent structure, including perceptual functions, retrieval of memories, and the use of abstract thinking (Astapov, 2001; Nehoroshkova, Gribanov, Jos, 2014).

Fear is distinguished from anxiety to a large extent by the presence of a specific potentially dangerous object (Krichevets, Solodushkina, 2014). Thus any anxiety, according to P. Tillich (1995), tends to transform into fear, but existential anxiety is indestructible. Since anxiety, unlike fear, does not have a specific object of application, the associated increase in intrapsychic tension can find an outlet in irrational migrating phobias, the isolated psychotherapy of which does not have a systemic effect. However,

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the discussion of whether anxiety really has no object, or whether it is beyond awareness, has not been finalised to date.

According to G. Ammon, the study of anxiety as an isolated stable trait or a reactive new formation allows some eclecticism and impersonality in the understanding of this phenomenon (Kabanova, Neznanova, 2003), therefore the material of this article is presented in the logic of synergy of the designated concepts (anxiety and anxiety) and has a contextual colouring corresponding to each of the considered approaches, at the junction of which the definition of the constructive potential of anxiety is introduced.

Constructive aspects of existential anxiety

According to C. G. Jung (1938), people fear contact with the fear of the irrational content of the unconscious, having weighty, self-preserving motives. A significant part of mass culture fulfils the function of distraction from living existential anxiety (Leontiev, 2003). G. Crystal believed that the accumulation of hope and "effective denial" of one's own mortality are necessary for normal life, which, in turn, confirms the importance of faith for every person (Starovoitov, 2015). However, a respectful, accepting attitude towards fear and anxiety contributes to the search for answers to existential questions, while avoidance of these experiences, on the contrary, distances us from a deeper comprehension of being (Mackler, 2003). In P. Tillich's understanding, existential anxiety is associated with the fragility of human life, with the unattainability of spiritual perfection and the lack of ultimate meanings of existence (Krichevets, Solodushkina, 2014). Accompanied by a specific sense of fear from the realisation of the finitude of the life path, as well as the horror of the probable meaninglessness of life and deep loneliness, existential anxiety serves as a stable background reminder of existential givenness (Akimova, 2015). At the same time, the fear of death and the anxiety associated with it naturally prompts a person to be more careful with time, opportunities, and relationships (May, 2001). Gradual comprehension of existential anxiety is probably a significant stage in the formation of subjectivity (Makushina, Borisova, 2021).

In recent years, there has been particular interest in the study of fear of death and its role in the broader context of psychopathology. It has been suggested that fear of death plays a role as a transdiagnostic factor underlying various mental illnesses (Rachel & Ross, 2023). However, the extinction of existential anxiety becomes a suicidal state; a blunted or absent sense of fear generally sets a superficial dynamic, reducing the possibility for emotional intimacy (Kabanova & Neznanova, 2003). Distress, including existential distress, is a frequent symptom in severe somatic illnesses. The current support methods for palliative patients and patients with a negative prognosis for the underlying diagnosis have limited effectiveness, which is a critical shortcoming in end-of-life care (Ross et al., 2022). The load of the system of life meanings with cognitive categories determines the desire for rational cognition of oneself, the world, and understanding the causality of what is happening, which naturally increases thanatotic anxiety. Reduction and reduction

of the specific weight of cognitive categories in the structure of life meanings, in turn, reduces anxiety associated with mortality and finitude of one's own life (Kulik, Dontsov, 2020).

There is no reason to believe that we need special strategies for coping with existential anxiety, but we need a certain resilience to withstand this anxiety and live with it. From the point of view of S. Muddy, the acceptance of existential anxiety consists in choosing the future, that is, in accepting the anxiety of change (Krichevets, Solodushkina, 2014). "Courage to be" is P. Tillich's view, which implies the ability to recognize existential anxiety, accepting its inevitability and maintaining it at an optimal, non-destructive level (Tillich, 1995). According to Kierkegaard, risk is accompanied by anxiety, and deliberate risk-taking is accompanied by loss of self. Thus, true courage lies in the ability to live and develop by feeling, recognizing and enduring one's own anxiety, moving as it were through it (May, 2001). In talking about the formation of subjectivity, it is important to address the experience of separation anxiety as an integral component of different stages of development.

Constructive aspects of separation anxiety

The experience of isolation experienced by the population during the Covid-19 pandemic, and the intensification of the telecommuting of organizations and life support systems were catalysts for experiencing not only existential but also separation anxiety. In his concept of dynamic psychiatry, G. Ammon suggests that constructive anxiety is formed in early relationships with mothers and other significant figures (normal symbiosis), underpinning the vital skill of seeking help from others in situations of threat, as well as accepting help and support (Kabanova, Neznanova, 2003). Early experiences characterised by developmentally inappropriate weakening of control by parental figures potentially contribute to a higher likelihood of the child incorrectly interpreting various stimuli as out-of-control events, which may induce increased vulnerability to anxiety and subsequent difficulties in undergoing normal separation (Chorpita et al., 1998). The intense experience of separation anxiety in adulthood is accompanied by disturbances in object relations homeostasis, personality, mood and anxiety disorders (Milrod et al., 2014). Adults who are used to their anxiety often do not perceive separation anxiety as a problem, but those who develop pathological anxiety and mood disorders respond worse to pharmacological and psychotherapeutic interventions. This poorer response may reflect patients' difficulties in forming and maintaining attachments, including therapeutic relationships (Milrod et al., 2014).

According to one point of view, separation anxiety and the distress it causes are normative developmental experiences before the age of five (Bovin, Kokurin, Trubetskoy, 2010). However, according to O. Rank, separation anxiety is adequate not only at an early age, but throughout life. Successfully passing through each round of this experience contributes to the development of autonomy and the ability to intimacy (May, 2001).

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Constructive anxiety serves as an important factor in critical understanding of losses of different levels and adaptation to them, healthy attitude to existential givenness and normal sensitivity to boundaries (Kabanova, Neznanova, 2003). Also, according to E. Fromm, every person faces the anxiety of loneliness, but the shades of its experience differ in accordance with characterological features (Levchenko, Kravtsov, 2011). Speaking about freedom in the context of achieving a certain personal maturity, E. Fromm describes the accompanying anxiety and loneliness, which must be managed in order to "act and live" (Fromm, 2006).

Stress and coping strategies in the context of constructive anxiety

From the point of view of physiology, the activation potential of anxiety as a reactive response to a stimulus is to trigger psychophysiological processes that promote, in a broad sense, survival, in a narrower sense - attack or escape (Aleksandrova, 2014; Kashapov, Kudryavtseva, 2021). Anxiety, which is a response to stress, is associated with a wide range of ways of compensation, the originality of which depends on the individual characteristics of the subject (Khodos, Chukhrova, Pronin, 2021).

Effective management of everyday stress is the most important criterion of psychological health and well-being (Burkova, Marina, 2019), with each person needing a certain level of stress for subjective comfort (Sellier, 1979). In the concept of G. Sellier stage of anxiety is the first phase of the adaptation syndrome, which has a configurational identity with the Yorks-Dodson curve (Tserkovsky, 2011), arising at the moment of the appearance of the stressor. The normal course of a number of vegetative and somatic processes is temporarily disrupted, being replaced by resource mobilisation and activation of self-regulation mechanisms, the efficiency of which choice determines the speed of the subject's return to a normal state (Vodopyanova, 2009). Eustress and distress according to G. Sellier - impacts on the organism, differing in their duration and "usefulness" (Sellier, 1979; Kitaev-Smyk, 1983), are probably concordant with the experiences of constructive and destructive anxiety, respectively. Just as eustress can be transformed into distress, constructive anxiety can be transformed into destructive anxiety. Being by nature an adaptive and mobilising reaction, in conditions of constant or excessive stress, normal anxiety can be modified, developing features of a maladaptive process (Zaitseva, Plaksina, 2018). The cycle of reactive anxiety is gradually integrated into the structure of "protective-coping behaviour", so, anxiety begins to take part in the subject's self-regulation. The resulting tension can bring discomfort and form the need for justified use of psychological defences. Probably, in adolescence, anxiety is gradually built into the system of defence mechanisms of the personality, ending with sufficient assimilation in the period of late adolescence (Antonovsky, 2010; Gabdreeva, 2012). Personality anxiety plays a significant role during the choice of coping strategy and correlates with avoidance, as well as with persistent and systematic problem solving (Lvova, Mitina, Shalyagina, 2015). At the same time, constructive anxiety acts as a regulator

of coping behaviour and participates in the process of experience integration (Kabanova, Neznanova, 2003).

An optimal level of anxiety is a necessary adaptive resource of a personality in a stressful situation (Uvarova, Kedyarova, 2014). People with high levels of personality anxiety are significantly better at processing emotions associated with threat, but such selectivity of perception in the long run may deplete the ability to process other stimuli and lead to certain social maladaptation (Heffer, Gradidge, Karl, Ashwin & Petrini, 2022). In situations where anxiety fulfils a natural signalling function, increased vigilance to threatening stimuli is warranted. Attention deficits, which are consequences of abnormal anxiety, are widespread (Notebaert, Tilbrook, Clarke & MacLeod, 2017). High levels of anxiety may potentiate greater vigilance to perceived threats, but it remains an open question whether this is a consequence of increased focus on subjectively suspicious objects and general alertness, or whether this type of response favors overreaction to irrelevant stimuli (Savitskaya & Merzlyakov, 2022). As a rule, such difficulties in differentiating stimuli in terms of realistic danger have a complex disorganizing effect on personality and are characteristic of subjects experiencing post-traumatic stress (Lopatkova et al., 2018; Soldatkin, 2015).

Along with the symptom complex of psychopathological disorders, posttraumatic stress is accompanied by increased anxiety, vulnerability to new stressors; there are changes in the subject's implicit perceptions of himself and the world (Kharlamenkova, 2016). In different subjects at certain stages, identical experiences accompanying posttraumatic states can acquire both destructive and constructive forms. The latter is a phenomenon of posttraumatic growth, which implies retrospective rethinking and revision of values in connection with the traumatic experience (Magomed-Eminov, 2009) and changes the subject's ideas about psychological safety.

Constructive aspect of anxiety in the context of psychological safety

Psychological security is experienced as a comfortable, balanced state. The antipode can be a feeling of anxiety that distorts the perception of the surrounding reality (Kharlamenkova, 2015). The basis of anxiety is not the situation of uncertainty itself, but its subjective assessment and some additional factors (Kharlamenkova, Bykhovets, Dan, Nikitina, 2020), so it is important to consider the difference between evaluative and interpretive perception, in the sense that the interpretive process is an impartial reflection of reality, unlike the evaluative one (Vasilyuk, 1984). Being in conditions of uncertainty, the personality spends a significant amount of resources on controlling the emotional state and coping with natural anxiety (Suvorova, 1974), decreased tolerance to this process (coping) can lead to the development of destructive forms of anxiety, up to generalised anxiety disorder (Dugas et al., 2005). High-intensity anxiety, provoking disorganisation and panic states, carries an independent danger (Pogosova, Koltunov, Yufereva, 2010).

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Normal anxiety is rooted in an adequate, realistic perception of danger, whereas the prerequisite for the development of neurotic anxiety may be a disregard for one's own capabilities, the sense of potential for which is associated with the natural experience of anxiety. In such a case, anxiety may be experienced as "flooding", an experience from which it is impossible to dissociate, as it engulfs the central structures of the personality, jeopardising the intrapsychic security system itself, and causing a sense of powerlessness in the face of an uncertain threat (May, 2001). The main goal of neurotic drives masking compulsive anxiety, C. Horney calls the achievement of a sense of security (Horney, 1945).

The inability to differentiate the source of anxiety determines the painfulness of experiencing this state, while the search and realisation of individual meaning of anxiety helps to adapt to it more successfully (Norina, Pavlova, 2011). Increased attention to constructive ways of coping with anxiety and weak interest in the nature of constructive anxiety as such may be a reflection of attempts to resolve the tension of existential anxiety at the behavioural level bypassing the deeper value and meaning structures of personality.

Semantic connotations of row definitions of constructive potential of anxiety

Anxiety is an important criterion signalling the presence of intrapersonal conflict, intrapsychic tension, and this is its significant role for both introspection and external diagnosis (May, 2001). In our culture, the very term "anxiety" has a rather negative connotation, characterising the subjective experience of tension and anxiety, accompanied by non-specific physiological reactions (Nehoroshkova, Griбанov, Jos, 2014).

To describe the constructive potential of anxiety, a certain range of concepts is found in the literature. Let us dwell on the most frequent of them.

Normal anxiety is adequate to the actual threat, is not accompanied by activation of mental defence mechanisms, is of moderate intensity and does not interfere with effective activity and awareness (May, 2001). Normal anxiety can be used as an impulse to explore oneself and the world, as well as a means of maintaining an optimal level of alertness and tone (May, 2001). Adaptive anxiety, with sufficient adaptive potential, should be at an optimal, normal level (Kenwood, Kalin, Barbas, 2022; Soshkin, Belov, Zabrodsky, 2020; Prikhozhan, 2000). K. Horney emphasises the inseparability of normal anxiety from life itself, which involves unpredictable threats and, ultimately, death. The dissociation of normal anxiety can have a disorganising effect and manifest as neurotic anxiety, reflecting the individual's desire for integration and development (May, 2001).

Useful anxiety is a natural state and, in addition to the signalling function, contributes to the mobilisation of personality resources (Nehoroshkova, Griбанov, Jos, 2014). Useful anxiety appeals to a level that promotes personal development without being a way to ignore intrapsychic conflict (Miklyaeva, Rummyantseva, 2004; Afonina, 2021). An intense increase in the level of anxiety reflects some aspect of subjective disadvantage, while

an individual level of useful anxiety is an obligatory attribute of an active personality (Polshkova, 2013). Such anxiety can act as a predictor of some aspects of emotional well-being (Sidorov, 2013). An important useful function of anxiety also consists in coded informing the subject about the need for careful preparation for the upcoming activity (Abakarova, 2010).

According to G. Ammon, anxiety is the central function of the Ego, in its constructive hypostasis being responsible for mobilising the creative potential of human functions (Bovin, Kokurin, Trubetskoy, 2010; Kabanova, Neznanova, 2003). Constructive anxiety can be characterised as concentrated tension, a state of wakefulness and excitement, during which curiosity is able to overpower fear; signalling, evaluative, orienting and protective functions are included in the concept of constructive anxiety (Kabanova, Neznanova, 2003). Constructive anxiety is a normative egosyntonic state, the manifestations of which, as a rule, do not cause subjective discomfort (Uvarova, Kedyarova, 2014). The constructive aspect of anxiety was also studied by S. Muddy (1983), who described making vital decisions as a dilemma of two choices: in favour of the past, accompanied by guilt, and in favour of the future, bringing with it inevitable anxiety. S. Maddi considered the choice of the past as a refusal to realise, while the choice of the future as an opportunity for a new stage of personal development, accompanied, respectively, by constructive anxiety (Maddi, 1983).

A. M. Prikhozhan says that in adolescence the personality develops cultivated anxiety, a personal quality of subjective value in terms of regulation of activity and achievement of goals, the manifestations of which can be deliberately intensified in order to increase motivation (Prikhozhan, 2000). According to L. I. Bozhovich, adequate anxiety serves to stimulate creative activity and successful self-realisation, while inadequate anxiety, on the contrary, interferes with the process of personality development and disrupts adaptation mechanisms (Bozhovich, 1995). Suggested and imaginary, unrealistic fears can be attributed to inadequate anxiety (Orlov, Orlova, Orlova, 2011).

Despite the fact that adequate anxiety is a natural experience, its intensity can change due to changes in the level of stress (Uvarova and Kedyarova, 2014). Objective, realistic anxiety, described in the psychodynamic approach, is a response to an external threat and is opposed to neurotic anxiety. Its deviation from normal levels reduces the ability to coping with threatening exposure (Festinger, 2018). An important finding is the realisation that an optimal level of anxiety becomes achievable with a non-evaluative, interpretive attitude towards it. Thus, the desire for awareness, learning effective self-regulation and search for individual meanings of anxiety activates personal resources (Kashapov, Kudryavtseva, 2021), contributing to finding a balance of cognitive, emotional-volitional and behavioural spheres, which can be considered in more detail in terms of the issues of activity, creativity, intelligence and personality adaptation.

The useful aspect of anxiety in the context of activity

Anxiety becomes truly pathological when it transforms into a barrier to activity and the search for ways to overcome obstacles or expediently circumvent them (Malkova, 2014). K. Levin's research substantiated the significance of situation anticipation in terms of how significantly it can determine human activity (Yaroshevsky, 1996). In the context of activity regulation, anxiety fulfils a signalling, anticipatory function, originating at the stage of planning and research of possible options for achieving the desired result, which is especially clearly manifested in dangerous spheres of activity or on the way to especially significant achievements (Pogorelov & Pogorelova, 2005).

Successful realization in any activity depends, among other things, on the subject's anxiety level. From the point of view of the American researcher D. Atkinson, avoidance can be determined by the fear of failure, forming anxiety, which becomes a determining factor for the avoidance motive (Atkinson, 2000), while studies show that anticipatory anxiety can be most effectively counteracted by paradoxical intention (Frankl, 2020).

According to the Soviet psychophysicologist I. M. Feigenberg, when performing any type of activity in stressful conditions, a person with high anxiety experiences intense mental tension determined by excessive demands on himself, which provokes a shift of motive from activity to self-assessment of the quality of the performed task (Feigenberg, 1986; Griбанov et al., 2019). It can be assumed that the optimal level of anxiety is maintained in the zone of the nearest development of personality, decreasing to demobilizing indicators in the course of performing tasks of insufficient complexity, and increasing to destructive values when it is necessary to carry out excessively complex activities or, on the contrary, falling below the optimum depending on the individual characteristics of the subject and his characteristic style of activity. Thus, for example, in the study of athletes it is noted that the highest rates of anxiety can be observed directly during competitions, when constructive anxiety begins to dominate. Mental tension is induced by conditionally negative states, including anxiety, which plays the role of an activating, mobilizing factor. At the end of the competitive process, the level of anxiety naturally decreases, which entails a natural decrease in resilience (Samoilov, Aleshicheva, 2022).

Creativity, intelligence and constructive potential of anxiety

The combination of developed intellectual abilities and above-average creativity increases the chances of successful adaptation, socialization and autonomy, while the combination of high creativity and below-average intelligence is often characteristic of anxious and maladaptive individuals (Druzhinin, 1994). When experiencing anxiety, we deal not only with a sense of danger and disturbance of homeostasis caused by real dangers or difficulties, but also with frustration on the way to the desired (Levitov, 1969). Frustration is a state closely related to anxiety, and anxiety, in turn, reflects the subjective

complexity of the situation, requires increased concentration, mobilization of resources and determines the need for creative search and creative adaptation (Kuznetsova, Kharlamenkova, 2008; Cheng, 2023). At the same time, the "gap" arising between the real and the expected conditions a person's creative endeavor and is invariably accompanied by anxiety commensurate with creative potential (May, 2001).

There is a certain contradiction in terms of the role of anxiety in intellectual productivity: on the one hand, a number of studies show a negative relationship between anxiety and intelligence, indicating the negative impact of anxiety states on the course of intellectual activity, on the other hand, a high level of anxiety contributes to a more successful performance of test tasks assessing the level of intelligence. It can be stated that high personality anxiety has a direct relationship with high intelligence, while, in accordance with the logic of the York-Dodson law, the optimal level of anxiety is potentially favorable in relation to the success of intellectual activity (Gribanov et al., 2019).

The ability to metacognitive thinking, the formation of which occurs on the basis of high intelligence, can both contribute to the reduction of anxiety levels as a result of an expanded vision of the situation and awareness of cause-and-effect relationships, and hinder it due to the need to make multiple choices in the course of solving routine tasks (Gribanov et al., 2019).

Adaptation potential of anxiety in personality development

The harmonious development of identity and its subsequent affirmation is inevitably accompanied by a certain level of anxiety due to the potential to cope with it (Kabanova, Neznanova, 2003). According to O. Kernberg, the ability to cope with anxiety is an important indicator of mental health and personal maturity, a significant indicator of differentiation of neurotic and borderline structure (Kernberg, 2001), which causes special attention to the process of experiencing anxiety in different periods of adulthood for diagnostic and pedagogical purposes. Each stage of child development, including normative age crises, is accompanied by natural changes in the nervous system, specific manifestations and transfers of anxiety to different objects in accordance with individual characteristics (Eric, Lenze & Julie, 2011; Malkova, 2014). Thus, anxiety is a marker of the child's adaptive tension at different stages of ontogenesis, while acting as one of the leading conditions of mental and personal development (Malkova, 2014).

In the process of search and formation of subjectivity and self-identity, the general level of anxiety naturally increases (Tikhanova, 2008). Adaptation anxiety, potentiating self-actualisation, is of interest for acmeology: in this context, the optimal level of anxiety implies the formation of anti-cypticism and activation of personal resources (Kashapov, Kudryavtseva, 2021).

Individual experience plays a significant role in overcoming obstacles: for example, the combination of high personal anxiety and low situational anxiety may be due to the

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lack of skills to successfully pass relevant situations (Kuznetsova, Kharlamenkova, 2008). In general, the repertoire of events that cause anxiety is very variable, complementary to the subject's lived experience and resource potential (Uvarova, Kedyarova, 2014), but the very assumption of responsibility for personal potential can be accompanied by anxiety (Binder, 2022). In this case, the degree of awareness of the level, nature and origin of anxiety will vary from subject to subject, as well as within the framework of individual development in different periods of adulthood and maturity (Makushina, Borisova, 2021). From the point of view of R. May, destructive anxiety contributes to the triumph of threats, and constructive anxiety contributes to the triumph of values (Lvova, Mitina, Shalyagina, 2015). In a situation when the value of development subjectively exceeds the desire for avoidance, a person can overcome the inevitable anxiety (May, 2001).

Determining the constructive potential of anxiety

The systematisation of the analytical framework presented in the article allows us to introduce a generalised definition of the ***constructive potential of anxiety***: an individual personality characteristic reflecting an extremely accessible level and unique pattern of anxiety experience that contributes to effective development, self-actualisation and subjective well-being.

Discussion

This review, firstly, describes the problems of overmedicalisation of anxiety in the population in general and devaluation of the constructive potential of anxiety in particular, the day-to-day solution of which is usually implemented in the field by practitioners. Secondly, an attempt has been made to systematise semantically similar definitions reflecting the constructive potential of anxiety, which can serve as an additional point of reference in the diagnostic process. Thirdly, attention is focused on "normal", "useful", "constructive" manifestations of anxiety, which contributes to additional validation of social groups with different levels of anxiety and rejection of self-stigmatization.

One of the most acute challenges of the time faced by anxiety researchers is the problem of assessing the feasibility and humanity of revising the generally accepted standards concerning the boundary between conventional norm and pathology, as well as closer attention to the continuum of the "border zone", which includes a wide range of conditions of different genesis. The issues of anxiety as a way of adaptation to psychophysiological data, to the consequences of everyday, traumatic, post-traumatic stress, as well as the study of anxiety as a consequence of above-normal intellectual, creative and prognostic abilities represent a classic dilemma of causal uncertainty and continue to be discussed in different approaches. Further theoretical understanding

of the constructive potential of anxiety can be extended by a review of research on anxiety sensitivity, which will enrich the understanding of the subjective evaluation of the phenomenon under study.

The exploration of human nature on a meta-level beyond the paradigm of concretism is associated with the experience of anxiety, like any creative process, the constructive passage through which is possible only in a sufficiently mature social environment (vonBulow, 1996). It can be said that in recent years there has been traced an excessive medicalisation of a wide range of human suffering (Svetlichnaya, Smirnova, 2017) and a somewhat reductionist attitude to the phenomenon of anxiety, the popularization of an idealistic view of which is often reduced to the dangerous idea of "life without anxiety" (Cagan, 1966). Excessive concretism and illusions of escape from the "symptom" question the very processuality and multidimensionality of human life, denying the dynamic principle of personality development (vonBulow, 1996), and the desire to abandon anxiety can be interpreted as "abandonment of the future" (Kashapov, Kudryavtseva, 2021).

According to S. Kierkegaard, the inability to escape anxiety makes this experience a more valuable "teacher" for the individual than reality (Grinker, Spiegel, 1945). This position explains the importance of normalizing the experience of different aspects of anxiety, and informing about the causes and functions of anxiety should be included in the system of psychoeducation (Carlson & Siroky, 2017).

Spinoza considered hope to be the antithesis of fear, calling it an "indefinite pleasure" associated with the expectation of fulfilment of what is desired, and fear an "indefinite torment" accompanied by an intense anticipation of difficulty or distress. Spinoza concluded that the existence of these phenomena separately was impossible (Spinoza, 1999). Anxiety and hope are two experiences that have different semantic connotations, but a single vector directed towards the future. And sometimes it is unexplained, irrational anxiety that accompanies the process of self-awareness and development (Orlov, 1991).

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Personality Traits, Emotions and Metacognitive Skills as Predictors of Subjective Well-being of University Students, Teachers and Staff

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Abstract

Introduction. The article analyzes the phenomenon of psychological well-being by examining its internal, subjective factors. It emphasizes the significance of well-being research in contemporary contexts and conducts an analysis of recent studies exploring the correlation between well-being and personality traits, emotional regulation, and metacognitive skills among students, teachers, and other educational professionals. The primary aim of this study was to identify predictors of subjective well-being within the cohorts of students, teachers, and other university staff. A total of 453 individuals participated in the research: 313 students, 106 teachers, and 45 other university employees. **Methods** and questionnaires employed included the short portrait questionnaire of the Big Five (B5-10, 2016), the 'Differential Emotions Scale' technique (SDE, adapted in 2003), the 'Personality Differential' test (2015 version), the methodology for diagnosing an individual's subjective well-being (Shamionov R. M., Beskova T. V., 2018), a questionnaire assessing metacognitive involvement in activity (adapted by A. V. Karpov, 1994), the 'Self-assessment Scale of Metacognitive Behavior' (adapted by A. V. Karpov, 1998), the 'Differential Type of Reflection' test (D.A. Leontyev, E.M. Lapteva, E.N. Osin, A.Zh. Salikhova, 2009), and the 'Cognitive Regulation of Emotions' questionnaire (adapted by O. L. Pisareva, 2007). The research design encompassed multiple stages of data analysis, involving comparative and regression analyses. **Results** indicated a direct correlation: heightened levels of metacognitive involvement and increased awareness of metacognitive skill utilization were associated with elevated levels of subjective well-being among

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educational practitioners. Additionally, a positive impact was observed from heightened scores on conscientiousness, extraversion, agreeableness, openness to experience, and the adoption of positive refocusing and positive revision strategies. Conversely, lower scores on introspection, neuroticism, and the acute negative emotion index also positively influenced subjective well-being. **Discussion.** The described findings offer valuable insights for addressing challenges such as preventing burnout and enhancing the well-being of students, teachers, as well as support and administrative staff within educational institutions.

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Keywords

psychological well-being, subjective well-being, education, metacognitive skills, metacognitive engagement, personality, cognitive regulation of emotions

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Introduction

Over the past decade, the landscape of education across various levels has undergone rapid transformation. The integration of distance learning, evolving educational standards and programs, and the introduction of innovative interaction formats, in particular through emerging digital technologies, has rendered the modern teaching environment distinct. This constant state of evolution, set against a backdrop of general instability and heightened stress in the environment, coupled with the absence of a clearly defined time horizon, may potentially detrimentally impact the well-being, motivational and value components, as well as the effectiveness of students, teachers, educational support staff, and administrative professionals (Isaeva, Akimova, Volkova, 2022; Devvrat, Gujral & Bhatt, 2022; Pilishvili, Savushkina, Danilova, Soruko Torres, 2021; Puchkova, 2021; Pilishvili,

Dyukareva, 2019). Consequently, there is an escalating need to explore subjective well-being factors that could enhance personal resilience in contemporary circumstances.

The significance of addressing the psychological well-being of teachers and students is underscored by a body of work from both domestic and foreign academic communities (Gilemkhanova, Khusainova, Lushpaeva, Khairutdinova, 2022; Koreshnikova, Frumin, 2020; Osamika, Lawal, Osamika, Hounhanou & Laleye, 2021). A teacher's psychological well-being is often regarded as a fundamental factor and a marker of professional efficacy (Manina, Petrakova, Kulikova, Orel, Kanonir, 2023; Zhang, Chen & Li, 2023; Gilemkhanova, Khusainova, Lushpaeva, Khairutdinova, 2022; Petrakova, Kanonir, Kulikova, Orel, 2021). Teaching is perceived as an intellectual pursuit, demanding a high level of emotional involvement, a creative approach, continual development, and the broadening of knowledge (Rodionova, Konyukhova, 2022; Glushkova, Kora, 2019). For students, their well-being is often linked to academic performance, attention levels, creative self-expression, and motivation (Samokhvalova, Tikhomirova, Vishnevskaya, Shipova, 2021; Volkova, Miklyaeva, Khoroshikh, 2022; Alkhatib, 2020; Gokalp, 2020). Moreover, authors emphasize that the educational process encompasses more than just students mastering the curriculum, but it is also about multi-level interpersonal interactions, the acquisition of social norms, enhancing social skills, as well as the professionalization of teachers and diverse professional interactions in organizing the learning environment (Khakimzyanov, Ryazanov, 2022; Viac & Fraser, 2020). Evidence has demonstrated a correlation between teachers' well-being and the emergence of risk factors for antisocial behavior among students (Khusainova, Gilemkhanova, 2019). Additionally, connections have been established between well-being and student motivation and performance (McLean & Connor, 2015; Li-Grining, Raver, Champion, Sardin, Metzger & Jones, 2010; Klusmann, Kunter, Trautwein, Lüdtke & Baumert, 2008). In essence, educational activity extends beyond mere teaching and learning; it constitutes a holistic system involving a minimum of three primary subjects, where the state and functionality of each entity are interdependent upon the others within the system.

Exploration into personal traits as predictive factors for well-being represents a contemporary phase in understanding the subjective elements of well-being. Numerous studies have established associations between agreeableness, extraversion, openness to experience, neuroticism, and various forms of well-being (Osamika et al., 2021; Banshchikova, Lukyanov, Kurdanova, 2022; Zhang & Chen, 2023; Laktionova, Matyushina, 2018). In the early 2000s, K. Peterson and M. Seligman, while advocating the '24 personality strengths' or Values In Action (VIA) model, suggested investigating positive personality traits contributing to higher levels of well-being (Park, Peterson & Seligman, 2004). This model finds echoes in more recent works, where traits like curiosity, energy, gratitude, and optimism, along with socio-demographic indicators, hold predictive value in assessing an individual's positive functioning, well-being, and self-efficacy (Rean, Stavtsev, Kuzmin, 2022; Azañedo, Artola, Sastre & Alvarado, 2021). Contemporary research underscores the connection between well-being and emotional characteristics, particularly the prevalence

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of positive affect, emotional intelligence levels, development of self-regulation skills, and stress coping strategies (Rodionova, Konyukhova, 2022; Gilemphanova, Khusainova, Lushpayeva, Khairutdinova, 2022; Grigorova, 2019). The regulatory aspect's significance is also evident in studies of metacognition, a form of reflexive regulation within educational and professional spheres (Prokhorov, Yusupov, 2011). Metacognitive skills, notably linked to self-organization, metapanning, and reflection, have proven crucial in academic performance, well-being, and effective communication within the educational setting (Perikova, Byzova, 2020; Perikova, Lovyagina, Byzova, 2019; Berezhnova, Fedoseeva, Tarasov, 2019; Danilenko, 2018; Tikhomirova, Malykh, Lysenkova, Malykh, 2021), with the emotional sphere of students (Guseva, Sylka and Denisova, 2022). Also of interest is the connection between metacognitive awareness and the degree of alienation from the educational process (Belikova, Pronenko, 2023a; Pronenko, Belikova, Skripkina, 2023) and meaning in life (Belikova, Pronenko, 2023b).

As we can see contemporary research on subjective well-being primarily focus on establishing correlations or attributing standard socio-psychological characteristics, such as stable personality traits, to factors influencing well-being. However, for a more comprehensive understanding of the predictors shaping the well-being of educational practitioners in current conditions, it becomes imperative to consider not only personal characteristics but also the nuances of emotional regulation and the level of metacognitive skill development.

Hence, the study **aim** was to conduct a holistic examination of emotional, personal, and metacognitive predictors influencing the psychological well-being of students, teachers, and other educational professionals. The investigation anticipates the existence of universal components within emotional-personal and metacognitive predictors that impact the well-being of all educational stakeholders, alongside factors specific to each subgroup under scrutiny.

Methods

Sample

The study encompassed individuals from higher educational institutions within the southern federal district of the Russian Federation, totaling 453 participants (77% female, 23% male) aged between 18 and 75 years. The distribution comprised:

- 106 teachers (75% female, average age 45.8 years).
- 45 administrative, management, and support staff (77% female, average age 37.8 years).
- 313 students (79% female, average age 21.8 years) across various educational levels - bachelor's, specialist's, master's, and postgraduate programs.

The survey and psychological testing were conducted in person and through

electronic testing formats. Prior to participation, all respondents provided explicit consent for their involvement in the study, were briefed on its objectives, and received notification regarding the subsequent use and publication of the study's findings.

Techniques

To elucidate the socio-psychological characteristics of the participants and assess metacognitive skills, a survey method was employed. All participants provided demographic details such as gender and age. Students were additionally asked to specify their educational level, field of study, study format, and rate the intensity of academic stress along with their coping mechanisms. Teachers and other educational professionals were prompted to specify their position, years of professional experience, evaluate their level of professional stress, and self-assess their ability to manage their workload effectively.

The self-assessment questionnaire utilized for measuring metacognitive behavior was the "Metacognitive Skills in the Structure of Educational and Professional Activities" (Denisova, 2022; Denisova, Ermakov, Abakumova,, Sylka, 2022).

Psychological testing encompassed the following methods to explore personal characteristics, emotional aspects, and metacognitive behavior:

1. Short Portrait Questionnaire of the Big Five (B5-10, M. S. Egorova and O. V. Parshikova, 2016);
2. Differential Emotions Scale (SDE, adapted by A. V. Leonova and M. S. Kapitsa, 2003);
3. Personality Differential Test (version adapted at the V. M. Bekhterev Research Institute, 2015);
4. Methodology for Diagnosing Individual Subjective Well-being (R. M. Shamionov, T. V. Beskova, 2018);
5. Questionnaire of Metacognitive Involvement in Activity (G. Schrow, R. Dennison, adapted by A. V. Karpov, 1994);
6. Self-assessment Scale of Metacognitive Behavior (D. Lacoste, adapted by A. V. Karpov, 1998);
7. Differential Type of Reflection Test (D. A. Leontyev, E. M. Lapteva, E. N. Osin, A. Zh. Salikhova, 2009);
8. Questionnaire on Cognitive Regulation of Emotions by N. Garnefsky and V. Craig (adapted by O. L. Pisareva, 2007).

These techniques were employed to comprehensively investigate personal attributes, emotional aspects, and metacognitive behavior within the context of educational and professional activities.

Statistical Methods for Data Analysis

The statistical processing of the obtained results employed various methods, including Kruskal-Wallis Test and Dunn's Post-hoc Test (to compare multiple groups for statistical differences); Multiple Regression Analysis by Least Squares Method (to explore the relationship between multiple independent variables and a dependent variable); Akaike Information Criterion (AIC, for model selection and comparison to identify the best-fitting model among alternatives); Durbin-Watson Autocorrelation Check (to examine autocorrelation in model residuals); Bonferroni Test for Outliers (to detect and address outliers in the data); Breusch-Pagan Test for Residual Variance Unevenness (to assess heteroscedasticity in residuals); Cross-Validation of the Model (to assess the performance and generalizability of the statistical model).

The statistical analysis was conducted using the open-source software package R version 4.2.2, facilitated by the R Commander shell version 2.8-0, and supplemented by the DAAG package version 1.25.4 for specific analyses and procedures.

Results

In the initial phase of data processing, an analysis of average values within the sample and across comparison groups was conducted, accompanied by a normality assessment utilizing the Shapiro-Wilk test. The test results indicated deviations from normal distribution for most studied indicators. However, the overall sample's average values fell within or near normative ranges for the tests, with no extreme values recorded.

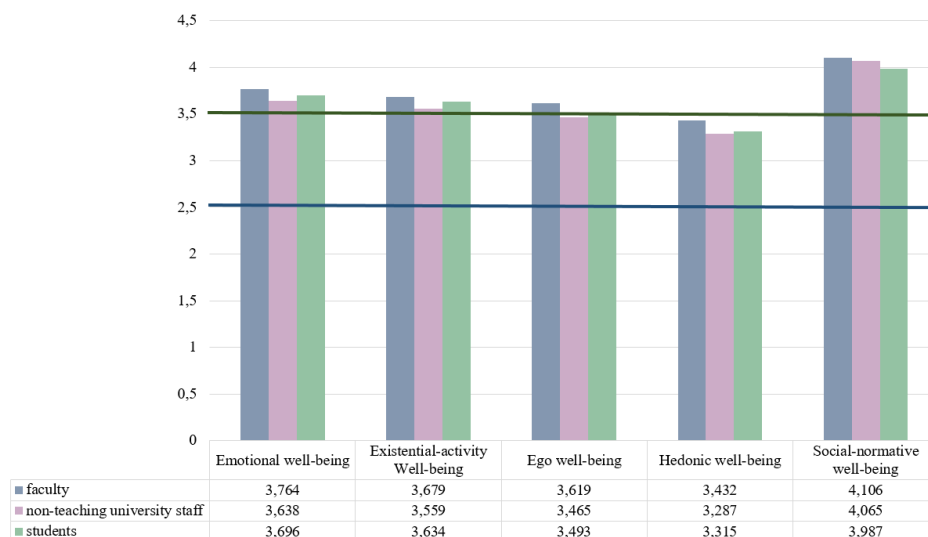
A comparative analysis of the studied subgroups was undertaken utilizing the Kruskal-Wallis test, followed by Dunn's method for pairwise comparisons as a post-hoc analysis.

Subjective well-being indicators showcased average values nearing the upper limits of normative ranges, with no significant disparities detected among student, teacher, educational support staff, and administrative worker subgroups (Figure 1). Notably, all three groups exhibited highest scores on the social-normative well-being scale.

The evaluation of metacognitive skills and reflection indicators showcased average values either meeting average normative benchmarks or reaching their upper limits (Figure 2). Statistical examination via the Kruskal-Wallis criterion revealed significant differences between groups on both the scale of metacognitive involvement and various types of reflection ($p < 0.01$). However, upon post-hoc analysis, distinctive differences were identified solely within a subgroup of students. This subgroup notably demonstrated significantly lower levels of metacognitive involvement and higher values across multiple reflection types, particularly systemic reflection.

Figure 1

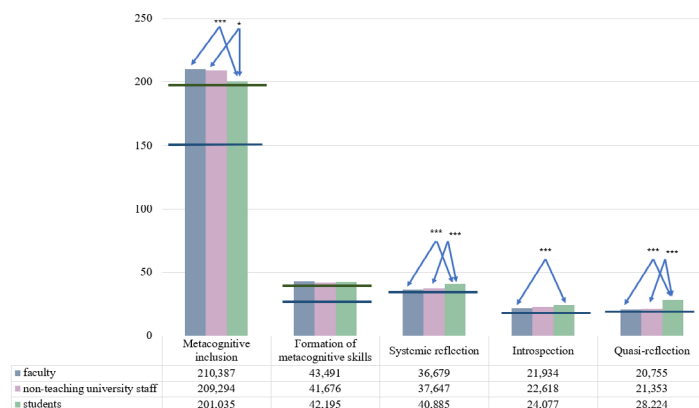
Comparative analysis of average values based on the methodology for diagnosing individual subjective well-being across the studied subgroups



Note: The blue and green horizontal lines denote lower and upper limits, respectively, of the average value ranges for the studied indicators.

Figure 2

Comparative analysis of average values for metacognitive skills and reflection among the studied subgroups



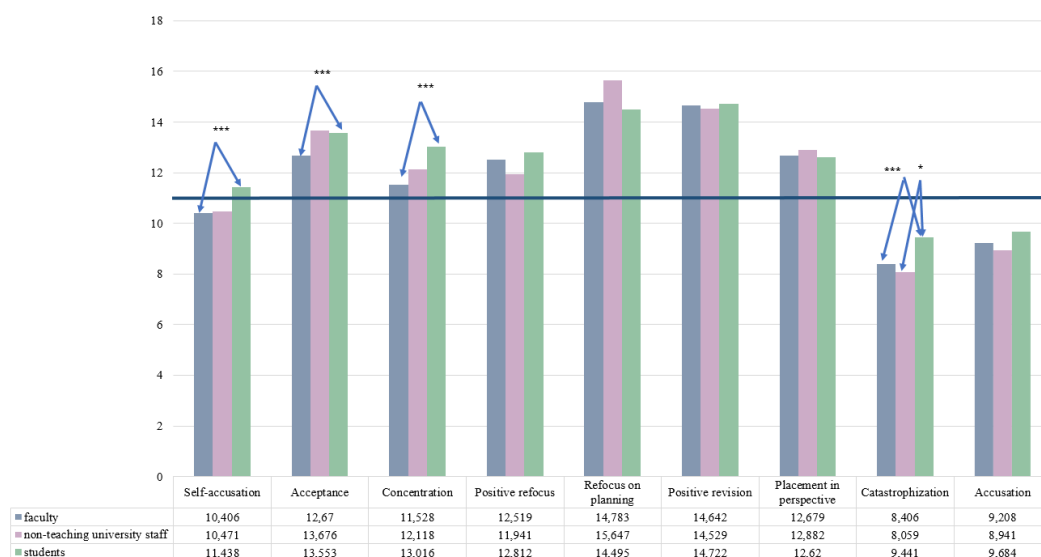
Note: The significance levels of pairwise comparisons using Dunn's method are indicated as follows: * - $p_{holm} < 0,05$; ** - $p_{holm} < 0,01$; *** - $p_{holm} < 0,001$; blue and green lines represent the lower and upper limits, respectively, of the average value ranges for the indicators.

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In examining the preference for various cognitive regulation strategies of emotions, it is evident that the least favored strategies are catastrophizing and blaming, while the highest scores are consistently observed on the positive refocusing and positive revision scales (Figure 3). Noteworthy distinctions primarily emerged within the student subgroup, where, in almost all cases, significantly higher frequencies were noted in the utilization of strategies such as acceptance, self-blame, concentration, and catastrophizing.

Figure 3

Comparative analysis of average values on the questionnaire test "Cognitive regulation of emotions" among the studied subgroups



Note: The significance levels of pairwise comparisons using Dunn's method are indicated as follows: * – $p_{holm} < 0,05$; ** – $p_{holm} < 0,01$; *** – $p_{holm} < 0,001$; blue horizontal line indicates the lower limit of the average value range for the studied indicators.

To investigate the role of emotional, personal characteristics, and metacognitive parameters as predictors of the subjective well-being of educational professionals, a multi-stage regression analysis was conducted.

Initial Stage: At the outset, a regression model was constructed, incorporating the subjects' group affiliation (students, faculty members, academic staff, and administrators) as a predictor. The interaction of this factor with other independent variables was calculated, revealing no significant interactions, except for "Consciousness" and the "Index of Acute Negative Emotions." Due to the multitude of predictors without significant

interactions and the absence of notable differences in the previous comparative analysis, these variables were excluded from further calculations.

Second Stage: A full regression model encompassing various predictors, including metacognitive inclusion, self-assessment of metacognitive behavior, B5-10 questionnaire scales, "Differential Emotions Scale," "Personality Differential" test, "Differential Type of Reflection" test, and "Cognitive Regulation of Emotions" questionnaire, was constructed (Table 1).

Table 1

Full Regression Model for the Studied Indicators

	Coefficient estimate	Standard error	t value	Significance level
(Free coefficient)	1,4874	0,253	5,885	8,04*10 ⁻⁹
Metacognitive involvement	0,0024	0,001	1,896	0,0586
Systemic reflection	0,0052	0,003	1,527	0,12746
Introspection	-0,0094	0,004	-2,31	0,02137
Quasi-reflection	-0,0031	0,003	-1,194	0,23331
Metacognitive skills level	0,0001	0,004	0,023	0,98133
Degree of awareness of using metacognitive skills	0,0142	0,007	2,133	0,03345
Self-accusation	-0,0086	0,007	-1,276	0,20258
Acceptance	0,0039	0,007	0,569	0,56945
Concentration	0,0003	0,007	0,047	0,96249
Positive refocus	0,0127	0,006	2,244	0,02536
Refocus on planning	0,0009	0,007	0,125	0,90089

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	Coefficient estimate	Standard error	t value	Significance level
Positive revision	0,0155	0,007	2,093	0,03697
Placement in perspective	0,0045	0,006	0,719	0,47238
Catastrophization	-0,0056	0,007	-0,806	0,42065
Accusation	-0,0025	0,007	-0,348	0,72795
Extraversion	0,0336	0,010	3,265	0,00118
Benevolence	0,0189	0,012	1,542	0,12387
Consciousness	0,0205	0,010	1,997	0,04644
Neuroticism	-0,0273	0,011	-2,558	0,01086
Openness to experience	0,0159	0,013	1,267	0,20593
Index of Positive Emotions	0,0275	0,003	8,073	6,99*10 ⁻¹⁵
Index of acute negative emotions	-0,0052	0,003	-1,811	0,07092
Index of Anxious-Depressive Emotions	0,0002	0,003	0,047	0,96245

Standard error of residuals: 0.3754 at 429 degrees of freedom

Coefficient of multiple determination R-square: 0.6021, Adjusted R-square: 0.5808

F-value: 28.23 at 23 and 429 degrees of freedom, p-value: < 2.2*10⁻¹⁶

Despite the overall significance of the model, a large proportion of coefficients proved insignificant. To optimize the model, a stepwise model selection was performed using the Akaike information criterion, resulting in a second model with a reduced number of predictors (Table 2).

Table 2
Reduced Regression Model for the Studied Indicators

	Coefficient estimate	Standard error	t value	Significance level
(Free coefficient)	1,4987	0,2379	6,299	7,26*10 ⁻¹⁰
Metacognitive involvement	0,0028	0,0010	2,782	0,0056
Introspection	-0,0117	0,0036	-3,282	0,0011
Degree of awareness of using metacognitive skills	0,0157	0,0063	2,492	0,0131
Positive refocus	0,0121	0,0052	2,33	0,0203
Positive revision	0,0211	0,0058	3,656	0,0003
Extraversion	0,0331	0,0099	3,346	0,0009
Benevolence	0,0220	0,0118	1,861	0,0634

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	Coefficient estimate	Standard error	t value	Significance level
Consciousness	0,0200	0,0100	1,994	0,0467
Neuroticism	-0,0270	0,0104	-2,606	0,0095
Index of Positive Emotions	0,0268	0,0032	8,263	1,69*10 ⁻¹⁵
Index of acute negative emotions	-0,0064	0,0023	-2,776	0,0057
Openness to experience	0,0171	0,0120	1,427	0,1544

Standard error of residuals: 0.3734 at 440 degrees of freedom

Coefficient of multiple determination R-square: 0.5962, Adjusted R-square: 0.5852

F-value: 54.13 on 12 and 440 DF, p-value: < 2.2*10⁻¹⁶

Notably, despite a significant reduction in predictors, key diagnostic metrics such as the standard error of residuals and the coefficient of multiple determination (Multiple R-squared) remained nearly unchanged, with a slight increase in the corrected Multiple R-squared. Most coefficients in the reduced model retained statistical significance.

Numerical diagnostics of the model indicated no statistically significant autocorrelation (Durbin-Watson test: DW = 2.0304, p-value = 0.7534), absence of residual outliers (Largest |rstudent|: Bonferroni p = 0.431), and even dispersion of residuals according to the studentized Bruschi-Pagan test (BP = 2.0588, df = 1, p-value = 0.1513). These results underscore the robustness and reliability of the model.

A model cross-validation procedure was executed by randomly partitioning subjects into three sections, predicting the dependent variable values in each section using model coefficients from the remaining two (Figure 4; Table 3).

Table 3

Results of Cross-sectional Analysis of Reduced Regression Model

	Number of Subjects (n)	Sum of Squares	Average Square
Part 1	151	24,68	0,16
Part 2	151	23,35	0,15
Part 3	151	20,41	0,14

Mean Square Error 0,1510747

The outcomes indicate high predictive accuracy of the model when the sample is randomly divided into three sections. Results from one section are effectively reproduced in the others, showcasing substantial consistency across all three models (Figure 4).

The graphical representation in Figure 5 illustrates the observed effects. Subjects displaying higher subjective well-being tend to exhibit elevated levels of positive emotions, increased metacognitive involvement, awareness of metacognitive skill utilization, extraversion, conscientiousness, agreeableness, and openness to experience. Additionally, positive emotional coping strategies such as positive refocusing and positive revision significantly contribute to higher well-being levels. Conversely, adverse effects were noted concerning introspection, neuroticism, and the index of acute negative emotions.

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Figure 4
Results of Cross-sectional Analysis of Reduced Regression Model

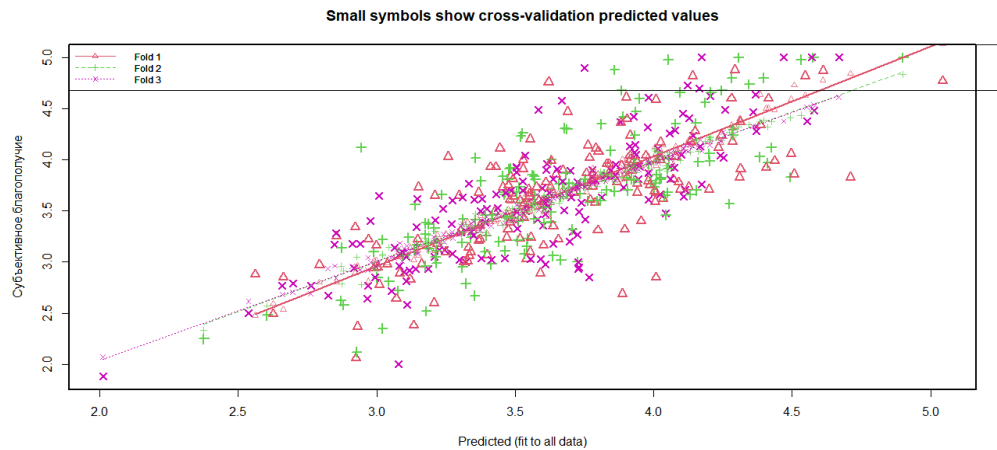
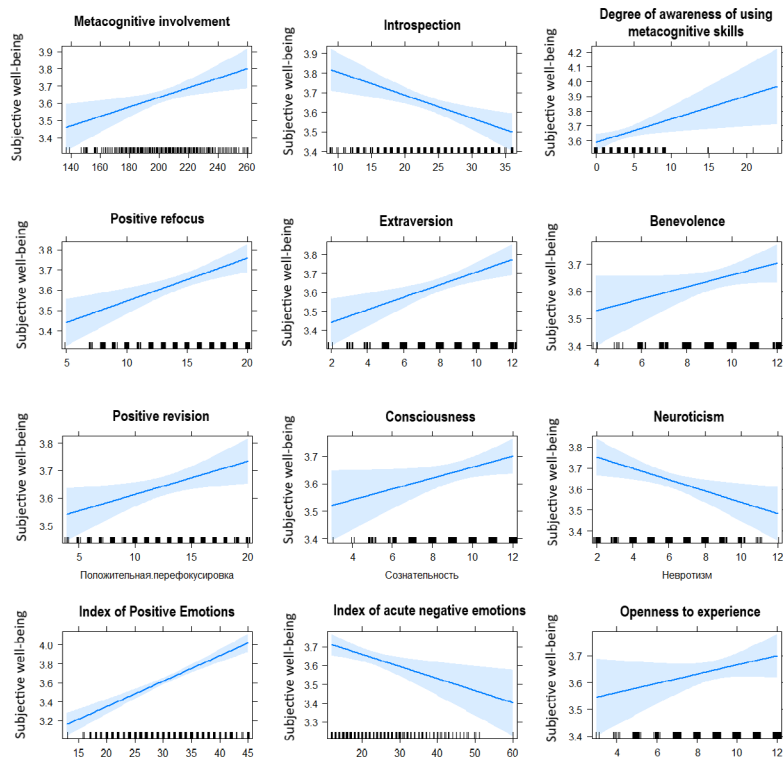


Figure 5
Analysis of Influence Nature of Personal Characteristics, Emotional Sphere, and Metacognitive Skills Awareness on Subjective Well-being



Discussion

The findings from this study underscore the substantial impact of personal characteristics, emotional state, and metacognitive skills on the subjective well-being of key figures in educational activities.

A comparative analysis of well-being, metacognition, and emotional regulation across the studied subgroups revealed limited differences. The lack of differences in the components and level of well-being between different subjects of educational activity contrasts somewhat with a study by V. N. Sofina and colleagues (2022). Their work suggested that, in comparison to working individuals, students exhibit the highest levels of emotional well-being but lower values in other components. Sofina and colleagues attributed this to students' potentially insufficiently formed notions about their personalities and societal roles (Sofina, Rastorgueva, Balasanyan, Gabova, 2022). In our study, significant differences were primarily observed between the student and teacher groups. The observed distinctions might be attributed not solely to the nature of the activity but potentially to age differences among respondents. Given that students are generally younger, their heightened interest in their inner world and a lower level of control over cognitive processes may contribute to these differences. Furthermore, young individuals often exhibit reduced coping differentiation and an exaggerated focus on the significance of negative experiences in the present (Regush et al., 2021).

Initially, we assumed that the structure of emotional-personal and metacognitive predictors could contain both universal components that determine the well-being of students, faculty and non-teaching university staff. However, as a result of analyzing the influence of the grouping variable in the regression model and analyzing its interactions with other predictors, significant effects were noted only for the indicators "Conscientiousness" and "Index of Acute Negative Emotions". Notably, previous analyses using covariance analysis separately on student and teacher samples revealed a similar significant impact of conscientiousness on well-being (Denisova, Ermakov, Abakumova, Sylka, 2022). Given the minimal disparities between groups, these findings potentially indicate the specificity of how personal conscientiousness and negative emotions interact within educational activities. The interaction of the grouping variable with the index of negative emotions might stem from distinct sources of negative experiences and varied emotional intensity across different age groups. The multifaceted nature of conscientiousness, encompassing reliability, responsibility, discipline, self-control, and organization, likely engages differently with the well-being of students, teachers, and other educational workers. These components might exhibit nuanced interactions within the unique dynamics of their respective roles and responsibilities.

Limitations of the Study

While striving for a comprehensive analysis of subjective predictors of well-being among educational professionals, this broad approach may have slightly compromised the

granularity of the results. The study's limitation lies in the reduced level of detail, which could impact the depth of the findings.

Research Prospects

Future investigations could benefit from considering additional factors such as gender, educators' tenure, educational level, and training format within the student sample. These factors could provide a more nuanced understanding of how subjective well-being operates within specific demographics or professional contexts.

Conclusions

The study aimed at comprehensively examining emotional, personal, and metacognitive predictors influencing the psychological well-being of students, teachers, and educational staff. The analysis reveals that higher subjective well-being aligns with elevated positive emotions, extraversion, conscientiousness, agreeableness, and openness to experiences. Lower levels of acute negative emotions, proficient control over cognitive processes, and awareness of metacognitive skill utilization strongly support well-being.

Moreover, constructive strategies that seek positive meaning in adverse events and focus on more positive aspects of life significantly contribute to well-being. Conversely, negative influences arise from tendencies toward introspection, getting caught in one's thoughts (introspection), and heightened neuroticism.

These findings align with existing well-being concepts and empirical data across various samples. The novelty lies in understanding which facets of metacognition and cognitive emotion regulation, alongside personal characteristics, exert the most significant positive influence on educational professionals' well-being.

This study's outcomes offer valuable insights for mitigating burnout and enhancing the well-being of students, teachers, and educational staff. Strengthening metacognitive involvement, fostering awareness of metacognitive skills, and cultivating constructive emotion regulation strategies can sustain higher psychological well-being and efficacy amid evolving socio-political and economic landscapes.

Main conclusions

- In the current climate of increased stress and instability, there is a need to shift the focus from objective, external factors to internal, subjective factors of well-being for students, educators and non-teaching university staff, which can be used as tools for increasing the level of stability, personal effectiveness and maintaining an adequate level of well-being;
- In modern circumstances personal characteristics, metacognitive parameters, and emotional regulation should be considered as predictors of well-being for students, educators and non-teaching university staff.

- Conscientiousness, extraversion, agreeableness, openness to experience, positive refocusing and positive reappraisal strategies, high levels of positive emotions, high levels of metacognitive engagement, and awareness of using metacognitive skills have a reliable positive effect on the level of subjective well-being of students, teachers, and other university workers.

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Authors' contribution

Ekaterina Gennadievna Denisova – general supervision of the work, development of the research concept, selection of methods, theoretical analysis of the literature, processing of experimental data and analysis of the results.

Igor Vladimirovich Kupriyanov – participation in data processing, mathematical and statistical data analysis, participation in the preparation of the final text of the article.

Anastasia Olegovna Gosteva – theoretical analysis of literature, participation in data collection and analysis of results.

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Conflict of Interest Information

There is no conflict of interest to declare.

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Oculomotor Activity During the Perception of Faces of People, Animals and Objects: the Role of the Emotional Coloring of Stimuli

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Abstract

Introduction. Faces are an important aspect of social interaction, containing a wealth of information that facilitates communication. Eye movement studies are relevant for uncovering cognitive mechanisms in various mental disorders. **Purpose of the study** – analysis of the parameters of oculomotor activity when perceiving social stimuli containing images of people’s faces, and comparing them with the parameters of oculomotor activity when perceiving stimuli containing images of animals or inanimate objects. **Methods.** The study was carried out using the eye tracking method using the Neurobureau software and hardware complex. Total number of respondents – 60 people (age – 15–45 years). **Results.** Social scenes containing images of people’s faces require more cognitive resources to perceive than images of animals or inanimate objects. This is typical for neutral and positive stimuli, as well as threatening stimuli. However, dysphoric stimuli containing human faces are more often avoided by subjects in a choice situation than dysphoric images of animals or objects. Attention in social scenes is distributed unevenly and focuses on faces. **Discussion.** Respondents in the 18–30 age group tend to have more experience in analyzing emotions, which may explain more fixations on social stimuli. Avoidance of dysphoric stimuli may be associated with protective mechanisms of the psyche. The results can be interpreted in two ways: 1) social stimuli are evolutionarily more significant for people, so they are analyzed more carefully and for a long time, and 2) the emotional coloring of social situations is not so clear and requires analysis of the characters’ facial expressions.

Keywords

eye tracking, eye movements, fixations, saccades, visual perception, social scenes, dysphoric stimuli, threatening stimuli, positive stimuli

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Introduction

Scanning the visual environment that surrounds us every day, we are faced with an excessive array of its constituent elements. But a detailed analysis of each component element is impossible, since the capabilities of the human visual system are limited. To cope with limitations, the human brain is forced to evaluate the priority of incoming visual signals and allocate the greatest amount of cognitive resources to processing significant elements and events. But which elements and events are considered significant?

It is assumed that the main way of prioritization is by assessing the emotional significance of a stimulus or event (Compton, 2003). Stimuli that are assessed as emotionally significant are subject to enhanced processing. Although the emotional significance of stimuli may vary from person to person, there are some stimuli that are emotionally meaningful to most of us – human faces, for example. The significance stems from the fact that humans are an inherently social species whose brains have specialized areas that are sensitive to a variety of visual social cues, particularly faces (Landsiedel, Daughters, Downing, & Koldewyn, 2022).

The orbitofrontal cortex and ventral striatum respond to socially reinforcing stimuli such as beautiful or smiling faces, while lesions of the orbitofrontal cortex impair interpersonal behavior in neuroimaging studies (Hornak et al., 2003). Research also shows that both the ventral and dorsal striatum respond to more complex social information, such as cooperation or the opportunity to punish a traitor (Sanfey, 2007). In addition, the amygdala plays an important role in calculating and updating the value of social information. It has also been shown that perceiving faces expressing emotions causes increased activity in the amygdala because emotions are biologically significant

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stimuli that enable us to anticipate critical events in our environment (Davis, Johnstone, Mazzulla, Oler, & Whalen, 2010). Thus, the study of the distribution of visual attention depending on emotional and social significance contributes to the understanding of the mechanisms by which the psyche analyzes objects in the environment and prioritizes stimuli.

Neuroimaging has found that images of faces preferentially activate visual cortical areas corresponding to the central visual field, whereas other images, such as buildings, produce stronger activation in areas responsible for peripheral vision (Wang et al., 2013). It is important to note that face recognition and discrimination are impaired when peripheral vision is used (Mäkelä, Nasanen, Rovamo, & Melmoth, 2001). This is because face perception is a challenging cognitive task because its constituent structures are small in size as well as have a low signal-to-noise ratio (Behrmann & Avidan, 2022).

Faces are very effective at attracting attention if they express a particular emotion. For example, researchers have found that fearful and angry expressions are recognized faster than neutral and happy expressions (Lanfranco, Rabagliati, & Carmel, 2023). In the emotional Stroop test, speed of naming facial color is slower when the facial expression is angry rather than neutral, suggesting that processing angry faces requires more cognitive resources (van Honk, Tuiten, De Haan, van den Hout, & Stam, 2001).

Features of facial perception change in some mental and neurological disorders. For example, people with depressive disorder pay more attention to sad faces (Holas, Krejtz, Wisiecka, Rusanowska, & Nezelek, 2020; Holas, Krejtz, Rusanowska, Rohnka, & Nezelek, 2019; Ding et al., 2019). Anxiety increases attention to fearful and angry faces (Weeks, Howell, Srivastav, & Goldin, 2019; Wermes, Lincoln, & Helbig-Lang, 2018) and decreases attention to happy faces (Kraines, White, Grant, & Wells, 2019). Autism spectrum disorders in general affect visual processing of faces, causing avoidance of eye contact (Billeci et al., 2019; Wan et al., 2019). Studying the perception of people's faces, including those expressing a particular emotion, can shed light on the cognitive mechanisms of perception of social information in various psychopathological conditions (Lanfranco et al., 2023).

Social interaction plays a central role in human life. People observe and participate in numerous social scenes every day. Visual processing of human faces underlies the detection, recognition and identification of conspecifics, and is also an important aspect of social interaction. Faces contain a wealth of information (e.g., emotional and physical states, intentions) that facilitate communication. The ability to process such information represents a highly developed skill in visual perception (Haxby, Hoffman, & Gobbini, 2000; Geringswald, Afyouni, Noblet, & Grosbras, 2020).

The purpose of this study is to compare the parameters of oculomotor activity during the perception of social stimuli containing human faces and stimuli containing images of animals or inanimate objects in a choice situation.

Further research in this area can be scaled up with larger samples of participants in different age groups and a variety of stimuli. This approach may lead to more reliable results.

Careful study of different groups of people will provide a better understanding of how age, experience, and personality influence oculomotor activity during the perception of social scenes. In addition, research may shed light on the relationship between oculomotor activity in social scenes and various mental disorders such as autism, anxiety disorders or schizophrenia spectrum disorders. This approach could contribute to the development of new methods for diagnosing these disorders, which will help improve the quality of life of patients, as well as tailor therapeutic approaches to their individual characteristics.

In practical terms, the results of the study have significance in the fields of psychology, psychiatry and social work. They can help us better understand which aspects of social stimuli attract our attention and how they relate to emotional responses and cognitive processes. This knowledge can be valuable for developing training programs and techniques, training social skills and providing support to people suffering from mental disorders.

Methods

The study was carried out using an eye tracking method using **Neurobureau hardware and software complex** (Skuratova, Shelepin, Shelepin, 2022).

Stimulus material consisted of 25 stimuli, of which 20 were experimental and 5 control. The experimental stimuli contained 4 images of different emotional colors (positive, dysphoric, threatening, neutral), and the control stimuli contained 4 neutral images. One part of the stimuli contained social scenes with images of people's faces, the other part contained scenes with animals or inanimate objects. All images used were CC0 licensed, and their selection and emotional categorization was carried out using expert assessment.

Between stimuli, a fixation cross was presented for 3000 ms to fix the gaze position at the center of the screen. Stimuli were presented in random order.

The subjects' task I had to carefully look through the images and choose the most attractive ones. The time for stimulus presentation was not limited.

Participated in the study **60 people** from 15 to 45 years. The subjects were divided into three age groups: 15–17, 18–30 and 30–45 years. The sample was normed by gender. All subjects had normal and corrected-to-normal vision, and were free of mental and neurological diseases.

For statistical processing of quantitative data, Student's t-test for dependent samples was used.

There were also two stages of interpretation of the results. At the first stage, the influence of the social content of the stimulus on the choice of the subjects was analyzed. At the second stage, a preliminary assessment of age-related characteristics in preference for stimuli was carried out.

Results

Analysis of the influence of the social content of a stimulus on human oculomotor behavior depending on the emotional coloring of the stimulus

The subjects paid attention faster to neutral images if they contained human faces than to images of animals or objects, looked at them longer, making more fixations and saccades, and also returned to them more often. Saccades of shorter amplitude are typical for the perception of images of people's faces, since their content requires more detailed analysis. Also, shorter amplitude saccades may be associated with difficulties in the holistic perception of social scenes, since the peripheral processing of faces is more complex than the peripheral processing of other images (Table 1).

Table 1
Parameters of oculomotor activity when viewing neutral images

Parameter of oculomotor activity	Average value		t test	p
	images of people's faces	images of animals or objects		
Number of fixations before first fixation	4,046	4,968	3,17	0,002
Time to first fixation (seconds)	1,278	1,594	3,35	0,001
Total viewing time (seconds)	1,798	1,362	-3,30	0,001
Total number of returns	1,695	1,371	-3,00	0,003
Average duration of fixations (seconds)	0,317	0,305	-1,10	0,272
Total number of fixations	6,150	5,100	-2,77	0,006

Parameter of oculomotor activity	Average value		t test	p
	images of people's faces	images of animals or objects		
Average amplitude of saccades (angular degrees)	2,945	3,445	4,34	0,000
Total number of saccades	3,572	2,922	-2,13	0,034
Total scan path length (angular degrees)	10,441	9,707	-0,80	0,426

Positively colored images of animals or objects attract attention faster than positive images of people. At the same time, positive social situations are analyzed over a longer period of time and in more detail (Table 2).

Table 2
Parameters of oculomotor activity when viewing positive images

Parameter of oculomotor activity	Average value		t test	p
	images of people's faces	images of animals or objects		
Number of fixations before first fixation	4,496	3,535	-3,91	0,000
Time to first fixation (seconds)	1,420	1,061	-4,70	0,000
Total viewing time (seconds)	1,692	1,428	-2,21	0,027
Total number of returns	1,696	1,743	0,37	0,709

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Parameter of oculomotor activity	Average value		t test	p
	images of people's faces	images of animals or objects		
Average duration of fixations (seconds)	0,317	0,331	1,19	0,235
Total number of fixations	5,861	4,883	-2,75	0,006
Average amplitude of saccades (angular degrees)	2,839	2,989	1,36	0,173
Total number of saccades	3,301	2,294	-3,82	0,000
Total scan path length (angular degrees)	9,111	6,210	-4,01	0,000

Dysphoric social scenes, on the contrary, are more often avoided by subjects than dysphoric images of animals or objects (Table 3).

Table 3
Parameters of oculomotor activity when viewing dysphoric images

Parameter of oculomotor activity	Average value		t test	p
	images of people's faces	images of animals or objects		
Number of fixations before first fixation	4,809	4,651	-0,54	0,588
Time to first fixation (seconds)	1,504	1,396	-1,18	0,239
Total viewing time (seconds)	1,179	1,403	2,04	0,042

Parameter of oculomotor activity	Average value		t test	p
	images of people's faces	images of animals or objects		
Total number of returns	1,073	1,197	1,23	0,221
Average duration of fixations (seconds)	0,325	0,332	0,69	0,491
Total number of fixations	4,084	4,833	2,08	0,038
Average amplitude of saccades (angular degrees)	2,896	2,586	-2,43	0,015
Total number of saccades	2,177	2,791	2,11	0,035
Total scan path length (angular degrees)	6,168	7,265	1,32	0,187

When viewing threatening images containing human faces, subjects made longer fixations than when viewing images containing objects or animals (Table 4). We can hypothesize that analyzing a threatening social situation containing an image of a person is more complex and requires more cognitive resources.

An attentional bias toward threatening faces may evolutionarily provide a critical survival advantage (Öhman, 2002).

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Table 4
Parameters of oculomotor activity when viewing threatening images

Parameter of oculomotor activity	Average value		t test	p
	images of people's faces	images of animals or objects		
Number of fixations before first fixation	4,101	3,735	1,38	0,167
Time to first fixation (seconds)	1,276	1,210	0,72	0,471
Total viewing time (seconds)	1,293	1,269	0,21	0,837
Total number of returns	1,099	1,102	-0,03	0,980
Average duration of fixations (seconds)	0,322	0,292	2,56	0,011
Total number of fixations	4,601	4,773	-0,46	0,645
Average amplitude of saccades (angular degrees)	2,869	2,926	-0,52	0,605
Total number of saccades	2,644	2,815	-0,58	0,563
Total scan path length (angular degrees)	7,313	8,321	-1,22	0,224

Preliminary analysis of age-related characteristics of perception of stimuli depending on their social content and emotional coloring

On stimuli containing social scenes, adolescents aged 15–17 years are quickest to notice threatening images, and on stimuli containing only objects or animals - positive images. Neutral images are the last thing to attract teenagers' attention.

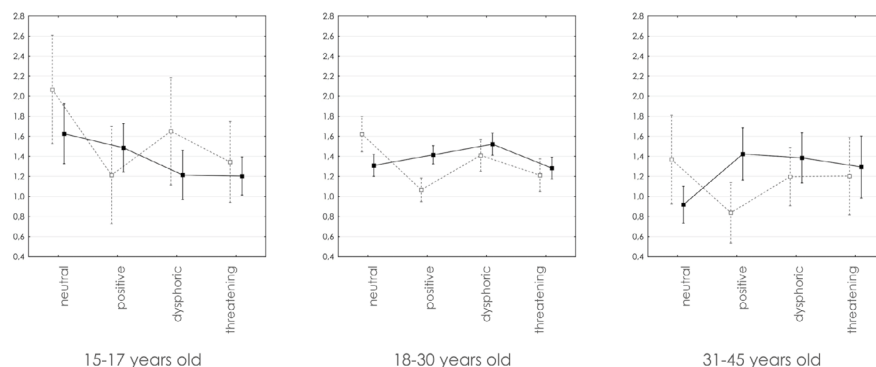
Subjects aged 18 to 30 are quickest to pay attention to positive images of objects or animals.

Subjects over 30 are quickest to notice neutral social scenes and positive images of animals and objects.

The results are presented in more detail in the graphs in Figure 1.

Figure 1

The time until the first fixation on a stimulus depending on its social content and emotional coloring by subjects of different age groups



Note. *The gray color on the graph indicates stimuli containing objects or animals, the black color indicates social scenes.*

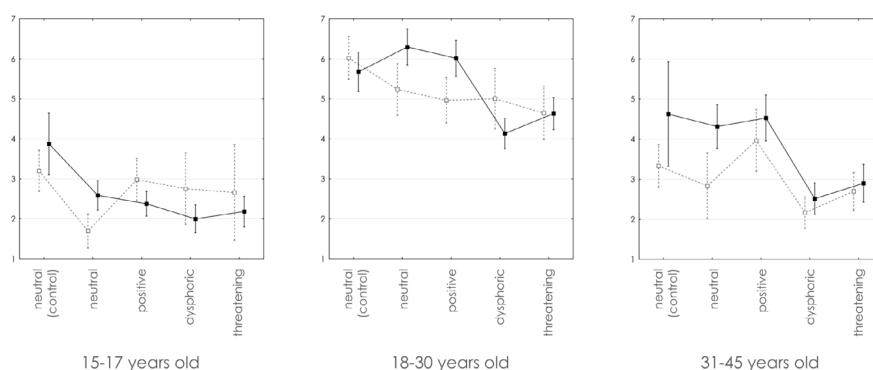
Among all age groups, teenagers 15–17 years old make the fewest fixations, which makes their choice more impulsive. At the same time, they make the most fixations on control stimuli, since the same neutral emotional coloring makes it difficult to choose the image they like. Among emotionally charged images, more fixations are made on images with animals and objects than on social scenes.

People from 18 to 30 years old require the most fixations to select the image they like, which may be due to the higher level of anxiety in this age group, identified on the basis of clinical scales (Spielberger-Hanin Anxiety Scale). The graph shows that respondents try to avoid dysphoric and threatening social scenes, giving greater visual preference to neutral and positive images of people. It can be assumed that protective mechanisms of the psyche, in particular avoidance, play a role here. The results are presented in more detail in the graphs in Figure 2.

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Figure 2

The number of fixations on a stimulus depending on its social content and emotional coloring by subjects of different age groups

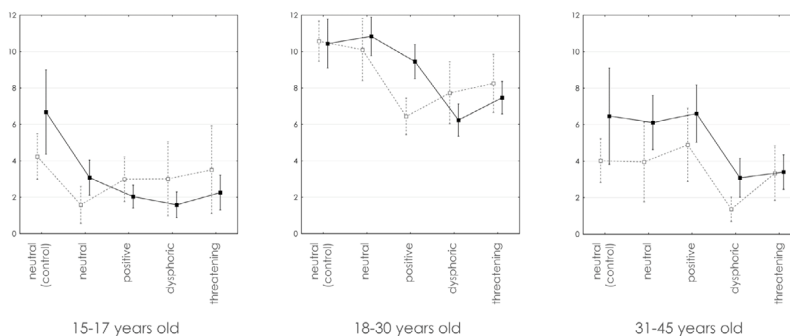


The longest scanning path length is typical for subjects aged 18 to 30 years. This suggests that they analyze the proposed images in the most holistic way.

Despite the fact that the sample of subjects from 18 to 30 years old is the largest, the data turned out to be more consistent with the smallest variations. Perhaps further analysis of the psycho-emotional state of the subjects in this group will help to understand why their perception patterns are so similar. Additionally, study participants completed the following clinical questionnaires: Spielberger-Hanin Anxiety Scale; Beck Depression Inventory; Beck Hopelessness Scale. A preliminary analysis of the results of clinical scales showed that subjects in this group had high rates of anxiety, hopelessness, and more pronounced depressive symptoms. Among subjects over 30 years of age, there are more people with indicators within the normal range. The results for the scanning path length are presented in more detail in the graphs in Figure 3.

Figure 3

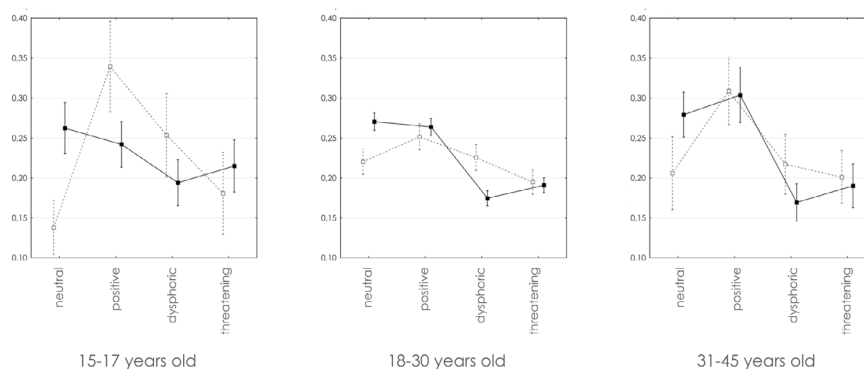
The length of the scanning path on a stimulus depending on its social content and emotional coloring by subjects of different age groups



Attention index is calculated as the ratio of the time spent viewing an emotionally charged image to the total time spent viewing the stimulus. The results of calculating the attention index are presented in the graphs in Figure 4.

Figure 4

Index of attention to a stimulus depending on its social content and emotional coloring by subjects of different age groups



Among social scenes, adolescents aged 15–17 years prefer neutral images and avoid dysphoric ones. Among images of animals and objects, positive ones are preferred and neutral ones are avoided.

Among social scenes, people from 18 to 30 years old prefer neutral and positive images, and avoid dysphoric and threatening ones. Among images of animals and objects, positive ones are preferred, and threatening ones are avoided.

Among social scenes, people over 30 prefer positive images and avoid dysphoric and threatening ones. Among images of animals and objects, they prefer positive ones, and pay much less attention to all others.

Discussion

As expected, social scenes containing images of human faces require more cognitive resources during perception than images of animals or inanimate objects. But this is typical only for neutral and positively colored, and also, partially, for threatening stimuli. Dysphoric stimuli containing human faces, on the contrary, are more often avoided by subjects in a choice situation than dysphoric images of animals or objects.

Qualitative analysis of heat maps confirmed our hypothesis that attention in social scenes is unevenly distributed and focused on faces.

The results obtained can be interpreted in two ways.

First, social stimuli are evolutionarily more significant for people, so they are analyzed more carefully and for a long time. This raises the question of why social dysphoric

situations, on the contrary, are more often avoided.

Secondly, the emotional coloring of social situations (except for dysphoric ones) is not so unambiguous and requires analysis, including the facial expressions of the characters, so they have to be considered longer and returned to more often.

Teenagers (15–17 years old) make the fewest fixations when analyzing emotionally charged images, while young people aged 18 to 30 make the most fixations. Adolescents are also less likely to return to re-analysis of images and make more fixations on images with animals and objects. People over 30 make more fixations on social stimuli. This may be due to differences in cognitive processes, empathy development, and different experiences among different age groups. The active formation of one's personality in adolescents can affect the ability to analyze emotionally charged images (Feldstein, 2008). Adolescents may also have difficulty recognizing and understanding complex emotions (Dubrovina, 1999; Lyusin, 2006), which may make it difficult to analyze such images. Adults in the 18 to 30 age group typically have more experience analyzing both their own emotions and the emotions of those around them, which may explain more fixations on social stimuli. Fixation on images of animals and objects may indicate lower levels of empathy in adolescents compared to adults, who may be more successful in identifying and recognizing emotions in people (Savazzi et al., 2022; Luna, Velanova, & Geier, 2008).

The most holistic analysis of the proposed images is typical for people from 18 to 30 years old. They avoid dysphoric and threatening social scenes and tend to return to positive images. It is assumed that this may be associated with protective mechanisms of the psyche, in particular, avoidance - refusal of activity that causes discomfort (Kirshbaum, Eremeeva, 2000; Romanova, Grebennikov, 1996).

Conclusion

This study breaks new ground in understanding how different objects in emotionally charged scenes affect people's oculomotor activity and reactions. The significance of this work is evident in its ability to expand our knowledge of the mechanisms of perception and processing of emotional stimuli. The results of the study have important implications for psychological research and can make significant contributions to the development of theories that explain emotional processes in people.

The stimulus material developed in this study is planned to be used to analyze oculomotor patterns during the perception of emotionally charged scenes by people with various mental disorders (for example, depressive disorder, anxiety disorder). This will not only allow us to examine in more detail the cognitive mechanisms characteristic of various mental disorders, but also to develop objective methods for their diagnosis.

At the moment, we have already discovered a relationship between hopelessness and oculomotor patterns when perceiving emotionally charged social scenes (Skuratova, Naumova, 2022).

Limitations of the Study

However, some limitations of this work must be taken into account. First, the sample size is limited to only 60 participants. Larger and more diverse samples would help obtain more valid results regarding differences in oculomotor activity between groups. Second, the stimuli used may not fully reflect real-life scenarios, which may limit the generalizability of the results to real-life situations. In addition, the limited variability of emotions presented in scenes may affect the completeness of perceptual representation and oculomotor activity.

Despite these limitations, this work has immediate implications for the field of psychology. It could serve as a starting point for further research that will deepen our knowledge of emotion perception and the connection to eye movements.

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Conflict of Interest Information

The authors have no conflicts of interest to declare.

Ontogeny of the Proactive Interference Effect in Visual Short-term Memory

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Abstract

Introduction. The processes of information selection and memorisation undergo changes during ontogeny of the controlling functional systems of the brain, including the formation of inhibitory control associated with the organisation of proactive interference. The *aim of the* present study was to investigate the regularities of changes in the volume of memorisation of visually presented information at different stages of ontogeny (in the age range from 5 to 78 years) due to both the action of proactive interference and the activity of learning in the process of reproduction during testing. **Methods.** A total of 563 participants, including preschool and school-aged children, students, and retired people, took part in the study. To investigate inhibitory functions in memory processes, a computerised technique was used to study the memorisation of the same set of visual stimuli presented in different order in three series. A new series was started after the subject made an error in the previous series. **Results.** Nonlinear changes of proactive interference (RIF) during the reproduction of visual information in ontogeny were found: proactive interference is less pronounced at preschool age, reaches its maximum expression in students at the age of 20 years and remains at a high level in the elderly when the volume of reproduced material decreases. Comparison of proactive interference in people with different memory productivity revealed that the expression of proactive interference is higher at high productivity levels regardless of age and interference is insignificant in people with low memory productivity. Relationship of interference with gender was found only in preschool and junior high school age: proactive interference is higher in

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girls. possibly due to the speed of brain maturation in this age range in boys and girls. **Discussion.** It is shown that the critical period for the formation of proactive interference is the age range of 6-8 years, when the severity of interference depends on gender, which is probably due to the conditions of brain maturation in boys and girls. Proactive interference reaches its highest expression in students at the age of 20 and then gradually decreases in old age.

Keywords

Short-term memory, ontogeny, proactive interference, memory learning, inhibitory functions

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Introduction

Inhibitory functions as components of executive control of information memorisation behaviour can manifest in proactive interference (Bari & Robbins, 2013; Luna, Marek, Larsen, Tervo-Clemmens & Chahal, 2015). Proactive interference has previously been shown to dominate the temporal dynamics of remembering visually presented information in groups of both twenty- and sixty-year-old study participants. However, the organisation of cognitive functions (attention and intelligence) differs depending on age and the preferred memorisation strategy: the effect of forgetting induced by reproduction or learning to remember during testing (Razumnikova, 2019).

The Retrieval-Induced Forgetting (RIF) effect (Anderson, 2003; Murayama, Miyatsu, Buchli, & Storm, 2014) is an impairment in reproduction due to proactive interference of remembered information, or impaired executive control of retrieval of a memory trace (Anderson, Reinholz, Kuhl, & Mayr, 2011; Aslan & Bauml, 2011; Rowland, 2014). Greater RIF reflects effective inhibitory functions (Noreen & MacLeod, 2015).

The early stages of ontogeny are characterised by the development of inhibitory functions as a consequence of myelination of nerve fibres and the formation of functional connections of the prefrontal cortex when organising purposeful behaviour (Razumnikova, Nikolaeva, 2021). In preschool children, the temporal dynamics of this process varies significantly depending on their genetic features and educational conditions (Nikolaeva, 2010). The efficiency of formation of inhibitory functions and executive control at early stages of Ontogeny is considered as the basis for successful

schooling of children (Ribner, Willoughby & Blair, 2017; Sánchez-Pérez et al., 2017) and as a predictor of high intelligence and social status in the future (Moffitt et al., 2011).

Late stages of ontogeny are characterised by a weakening of inhibitory functions, which is associated with memory impairment in ageing (Collette, Schmidt, Scherrer, Adam & Salmon, 2009; Healey, Hasher & Campbell, 2013). Moreover, more pronounced RIF in older adults is accompanied by better executive control of attention (Razumnikova, 2019; Razumnikova, Nikolaeva, 2019), which may reflect the relative preservation of inhibitory functions as a cognitive resource of "successful" aging.

The observed diversity in the dynamics of cognitive performance decline in older adults has been attributed to a complex set of changes in inhibitory control, working memory and speed of mental operations, each characterised by an individual age-related trajectory (Grégoire, Rivalan, Le Moine & Dellu-Hagedorn, 2012; Rozas, Juncos-Rabadán & González, 2008; Sylvain-Roy, Lungu & Belleville, 2015).

The purpose of the present study was to investigate the patterns of ontogeny of remembering visually presented information across a wide age range from 5 to 78 years using a model of memory formation that incorporates the effects of forgetting induced by playback or learning to remember during testing.

Methods

Test subjects

There were 563 participants in the study, of which:

- 89 preschool-aged children (GrPG);
- 56 junior school students (GrJSc);
- 64 Middle-aged school children (GrMASc);
- 37 adolescent high school students (GrAHSc);
- 193 twenty-year-old students (GrS);
- 124 people of retirement age (GrPRA).

Adult participants of the study or parents of children were familiarised with the conditions of testing and gave informed consent for testing. The study was approved by the Ethical Committees of the NSTU CSF and Herzen State University of Russia.

For comparative analysis of changes in memory indices, 6 age groups were identified, the numerical composition of which is shown in Table 1.

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Table 1
Age characteristics of the six groups studied

Group	Quantity		Age (years)
	Men	Women	
Preschoolers (GrPG)	38	51	5,7 ± 0,4
Junior school students (GrJSc)	27	29	7,6 ± 0,4
Middle-aged school children (GrMASc)	31	33	10,9 ± 0,4
High school students (GrAHSc)	16	21	14,2 ± 0,6
Students (GrS)	49	144	20,0 ± 0,3
People of retirement age (GrPRA)	34	90	62,6 ± 0,3

Research methodology

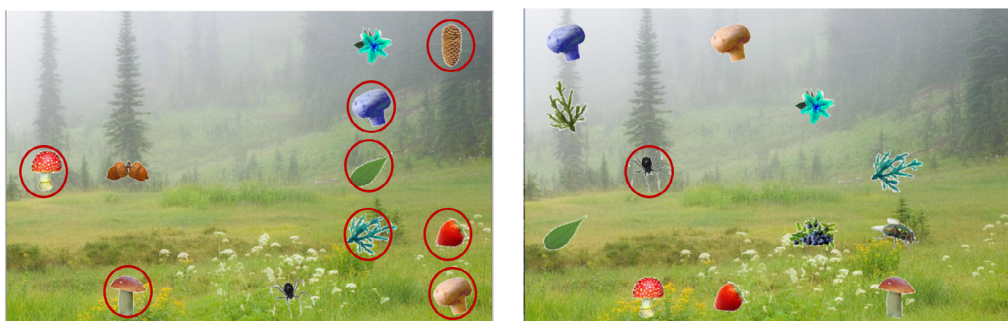
To investigate inhibitory functions (proactive interference) in memory processes, we used a **computerised technique of memorising visual stimuli**: objects of wildlife of different categories, different colours and different spatial arrangements.

At the first presentation, three stimuli randomly selected from a set of 30 objects appeared on the screen. The instruction was to select any one of them by marking it with the mouse cursor. Subsequently, at each new presentation, one new stimulus was added, while the instruction for the subject remained the same: to mark the stimulus that had not been previously selected (Razumnikova and Savinykh, 2016).

Figure 1 shows an example with the presentation of 11 stimuli with eight stimuli previously marked for memorisation, with the next presentation marking one of the new stimuli. When the same, already selected object was pressed again, the first series of testing ended and the next one began with the presentation of the same objects, but in a different random sequence. A total of three test series were used.

Figure 1

An example of stimuli presented during a visual memory test (on the left, circles indicate those that have been selected; on the right, a new stimulus)



Statistica 13.3.1 Ru AXA8051391121ARCN5-S software package was used for statistical analysis of recall rates.

Results

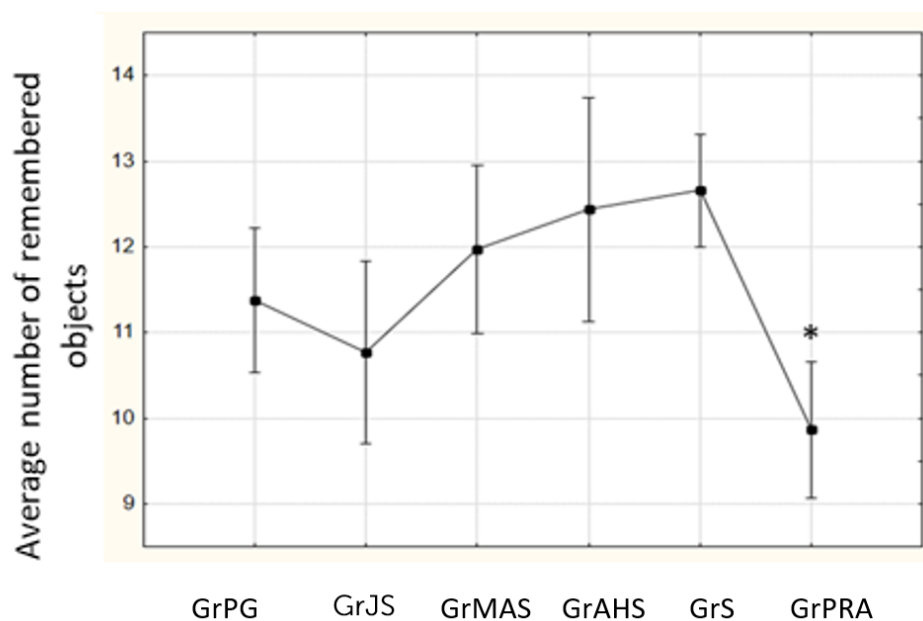
Age-related features of short-term visual memory as a reflection of the effect of proactive interference

To find out possible individual changes in the dynamics of memory performance during repeated stimulus presentation, we used analysis of variance (two-factor ANOVA with repeated measures) with the factors AGE (6), GENDER (2), and the dependent variable SERIES (3). A significant effect was found for the factor AGE ($F_{5,547} = 6.69$; $p < 0.000005$; $\eta^2 = 0.06$) due to lower reproduction values in the people of retirement age (in GrPRA) compared to the other groups, with significant differences with students and schoolchildren over 11 years of age (GrS, GrAHSc and GrMASc) (Figure 2). At the same time, the best average memory scores were observed in older schoolchildren (GrAHSc) and students (GrS).

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Figure 2

Age-related changes in mean values of visual short-term memory reproduction in six groups



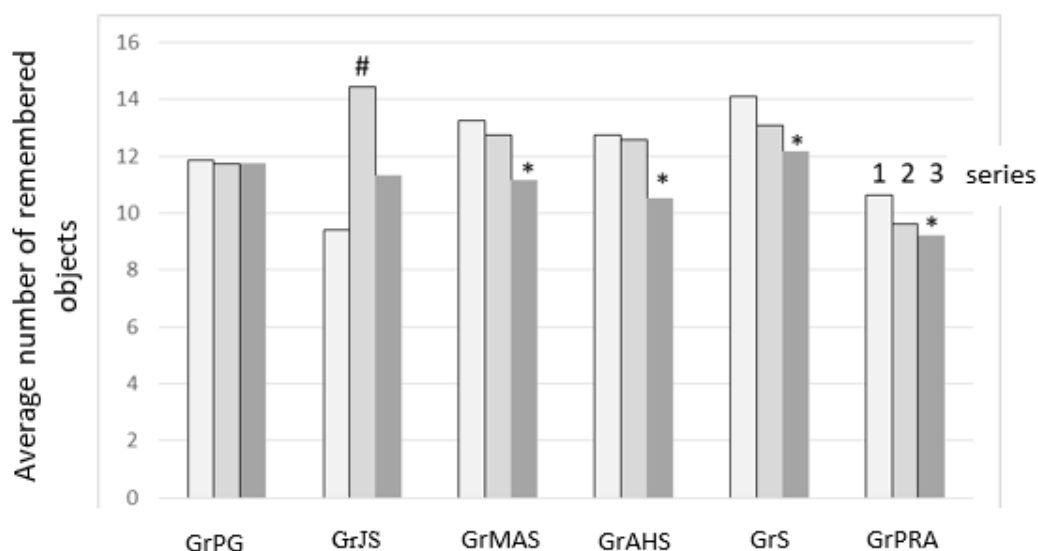
Note: *GrPG*- preschoolers, *GrJS* - junior school students, *GrMAS*- middle school students, *GrAHS* - high school students, *GrS* - students, *GrPRA* – people of retirement age; * - $p < 0.02$ with Bonferroni correction for *GrPRA* compared to *GrMAS*, *GrAHS*, *GrS*.

No significant effect was found for the **GENDER** factor.

The effect of **age** on the dynamics of the reproduction of memorised objects according to the detected interaction effect AGE x SERIES ($F_{10, 1094} = 1.81$; $p < 0.05$; $\eta^2 = 0.02$) is shown in Figure 3. This effect is due to differences in the reproduction of objects presented in Series 1, with significantly greater performance compared to Series 3 for the four groups: *GrMAS*, *GrAHS*, *GrS* and *GrPRA*, but no such differences for preschoolers (*GrPG*) and a maximum reproduction value for younger pupils (*GrJS*) in series 2 compared to series 1 and 3.

Figure 3

Influence of age on the dynamics of memory trace reproduction in three series of visually presented stimuli



Note. Group designations as in Figure 2 and Table 1; * - $p < 0.05$ in series 3 compared with series 1, # - $p < 0.01$ in series 2 compared with series 1 and 3.

Age-specific proactive interference effects in short-term visual memory related to retrieval performance

In the next stage of the analysis, three groups were identified that differed in mean reproduction values according to the distribution of total memory scores: respectively, with low scores of 5.2 ± 0.5 (45 individuals) (GR0); medium 10.0 ± 0.2 (345 individuals) (GR1) and high 16.0 ± 0.2 (167 individuals) (GR2).

Table 2 presents the numerical composition of the three formed groups (GR0-GR2) and the corresponding mean values of memory indices for the six age groups. Significant differences in quantitative composition were found only when comparing students (GRS) and elderly (GRP) in GR0 with a greater representation of the number of elderly people with low memory indices ($p < 0.02$ according to χ^2).

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Table 2

Numerical composition and number of memorised objects (memory capacity) in groups differing in the efficiency of memory trace reproduction (GR0-GR2) as a function of age (GRPG-GrPRA)

Group	Indicator	GrPG	GrJS	GrMAS	GrASH	GrS	GrPRA
GR0	N (%)	6 (7)	8 (14)	4 (6)	1 (3)	10 (5)*	16 (13)*
	volume	17,0 ± 2,8	15,3 ± 2,4	13,0 ± 3,5	15,0 ± 6,9	17,4 ± 2,2	16,5 ± 1,7
GR1	N (%)	60 (67)	30 (54)	37 (58)	18 (49)	114 (60)	86 (71)
	volume	31,2 ± 0,9	28,5 ± 1,3	31,4 ± 1,1	29,6 ± 1,6	30,8 ± 0,7	28,4 ± 0,7
GR2	N (%)	23 (26)	18 (32)	23 (36)	18 (48)	67 (35)	19 (16)
	volume	47,4 ± 1,4	46,7 ± 1,6	47,3 ± 1,4	46,3 ± 1,6	51,9 ± 0,8	48,0 ± 1,6

Note. * - $p < 0.02$ according to Chi criterion².

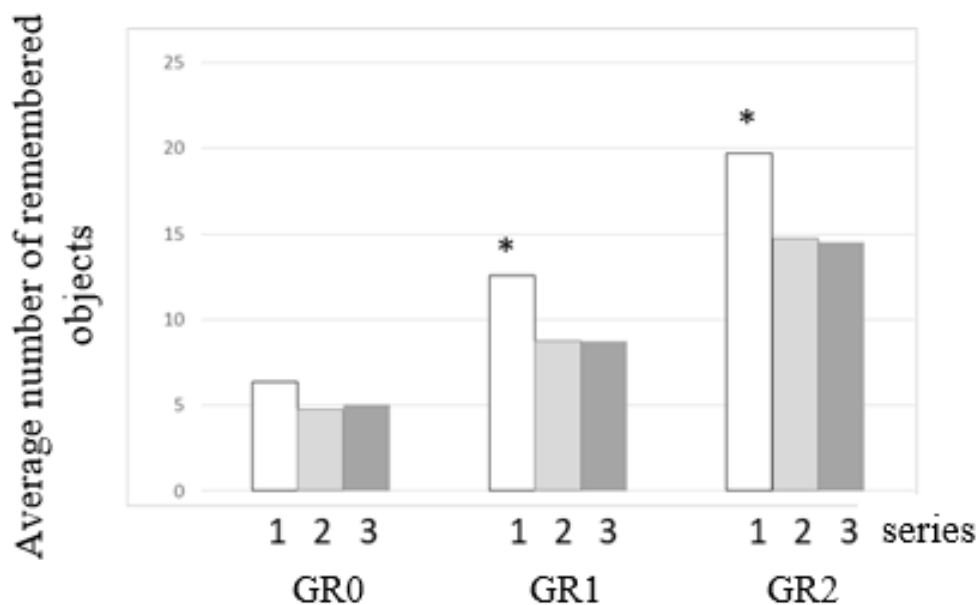
ANOVA with the factors GROUP (3), GENDER (2) and SERIA (3) revealed a trend for a GROUP x SERIA interaction effect ($F_{4, 1078} = 1.85$; $p < 0.12$) due to no significant change in GR0 and a similar RIF effect in GR1 and GR2 (Figure 4).

The planned analysis of the dynamics of stimulus reproduction in three series of stimulus presentations revealed the general age-independent effects of the absence of significant changes in the group with low reproduction volume (GR0) and a pronounced manifestation of RIF in subjects with better memory capacity (GR1 and GR2) ($p < 0.0001$). Moreover, this effect was noted for the 2nd series of presentation and persisted in the 3rd series (Fig. 4).

A significant GENDER x SERIA interaction effect ($F_{2, 172} = 3.30$, $p = 0.039$) was found in GR1 for preschoolers (GRPG) and junior school children (GRJS): RIF was characteristic of girls but absent in boys (Table 3).

Figure 4

Peculiarities of temporal dynamics of the reproduction index in three series of stimulus presentation for three formed groups differing in memorisation efficiency: GR0 - low, GR1 - medium, GR2 - high



Note. * - $p < 0.0001$ when comparing the rates in series 1 with the other two series.

Table 3

Peculiarities of temporal dynamics of remembering visually presented stimuli by boys and girls from groups of preschoolers and junior schoolchildren

Series	Playback	
	Boys (n=42)	Girls (n=48)
1	10,1 ± 0,8	13,4* ± 0,8
2	9,9 ± 0,8	8,8 ± 0,8
3	8,9 ± 0,8	8,5 ± 0,8

Note. * - $p < 0,01$.

Discussion

We obtained data according to which the most pronounced decrease in reproduction in visual memory occurs in old age, and the peak of memorisation occurs at the age of twenty.

These results are consistent with the previously noted age-related dynamics of visual memory due to the development of mechanisms of executive control of information selection and binding of elements of visual images and their impairment in aging due to inhibition deficit in the visual system (Brockmole & Logie, 2013; Gazzaley et al., 2008). Despite lower scores compared to children and young adults, the RIF effect is present in the HGP, with greater expression of this effect in older adults accompanied by better executive control of attention (Razumnikova, 2019), and successful memory recall is ensured by reorganisation of neural networks involving temporal and dorsolateral prefrontal cortex (Bennett, Sekuler, McIntosh & Della-Maggiore, 2001). Consequently, it is the resource capacity of the executive system of behavioural control that underlies the retention of short-term visual memory in old age.

According to the results of the performed analysis of the dynamics of short-term visual memory performance, RIF is absent only in GR0 with the lowest memory performance (see Figure 4), in GR1 it is detected in younger girls (but not boys) and is maximally expressed in GR2 (with the best memory performance). Executive control functions are known to form earlier in girls than boys during childhood (Chaku & Hoyt, 2019; Vrantsidis, Wakschlag, Espy & Wiebe, 2022), although recent research suggests that the effect of individual variability is greater than gender in age development (Thanadkit, Sudjainark, Boonpleng & Kulsaravuth, 2021; Wierenga, Bos, van Rossenberg & Crone 2019).

Our findings support the link between RIF and established inhibitory functions in information selection (Friedman & Miyake, 2017), and that sustained RIF is characteristic of individuals with better memory (Aslan & Bauml, 2011). This interference effect is attributed to the inhibition of irrelevant information as a function of prefrontal cortex. Since the neuroanatomical model of inhibitory modulation of memory trace reproduction, includes 1) switching attention to other stimuli, 2) inhibition of individual memory representation and 3) generalised hippocampal inhibition and reactivation processes of reproduction (Depue, 2012), then in ontogeny each of these processes may acquire leading importance. In childhood it is attention switching, in young adulthood it is inhibition in formed engram neural networks, and in old age it is predominantly hippocampal. These age effects along with their individual variability of involvement in the mechanisms of reproduction determine the diversity of the dynamics of memory indices.

A stable process of proactive interference is formed only by age 10, as evidenced by the presence of the RIF effect generalised for all four older age groups (GrJS-GrPRA) (Figure 3), with no significant serial changes in reproduction in the GrPG and its pronounced dynamics in groups of schoolchildren (of different ages) with an increase in the number of memorised objects in the second series followed by a decrease in this indicator in the third series. In preschool age, apparently, memorisation strategies are very

diverse, and the final result in the GrPG is represented by the summation of at least three effects: RIF strategy formed in one part of the children, whereas Retrieval-Based Learning (RBL) may predominate in another part (Pastötter, Schicker, Niedernhuber & Bäuml, 2011; Roediger & Karpicke, 2006), and uncontrolled spontaneous memorisation in a third part.

A distinctive feature of GrJS is the dominance of the RBL effect during memory recall in series 2, which in the next stage of object memorisation already leads to the development of RIF. The RBL effect is useful for effective learning and intellectual development (Karpicke & Blunt, 2011; Pastötter & Bäuml, 2014). In this regard, its dominance in younger pupils seems to indicate a successful educational programme and the children's ability and motivation to acquire new knowledge.

Working memory, including visual memory, is a component of executive functions, the main task of which is to control the transition process from habitual behaviour to new behaviour (Nikolaeva, Vergunov, 2017). Consequently, therefore, we see an externally conditioned activation of executive functions related to achievement motivation at the initial stage of school education, which, apparently, is not so relevant in other age groups.

The features of working memory at preschool age reveal a biologically unfolding process due to the gradual formation of inhibitory control in immature prefrontal cortex (Nikolaeva, 2019). At the same time, preschool children have active learning, which is found in the absence of a sharp drop in reproduction from series to series. However, both the process of proactive interference and learning are far from a mature state. This is why children of this age easily learn new information and forget it with equal ease. Undoubtedly, this is an evolutionarily conditioned process, as the child is not yet able to sustainably identify relevant information (Nikolaeva, 2011).

Memory deterioration in old age is not only due to the biological aging process, but also due to a decrease in motivation to try different strategies, invent them and incorporate them into daily life (Razumnikova, 2015; Razumnikova, Nikolaeva, 2019). Studies of engaging the elderly for cognitive training and activation of cognitive resources indicate that only a small part of them is capable of mastering new activities (Razumnikova, Asanova, 2018). However, people in creative professions, such as conductors, actors, or those engaged in scientific work, are able to retain quite large amounts of information in memory because they are motivated to change strategies for effective professional activity. Consequently, an important recommendation for maintaining effective memory functioning in aging is learning strategies to assimilate new information, which is a natural process at a young age.

Conclusion

The effect of proactive interference (RIF) in remembering visually presented figurative information is poorly represented in preschoolers, develops with age, reaches maximum expression in twenty-year-old students and persists in retirement age, despite the noted weakening of memory in the elderly.

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The RIF effect, regardless of age, accompanies the best reproduction performance and is absent in the group with weak memory. At average memory performance RIF is related not only to age but also to the gender of preschoolers and younger schoolchildren: at the age of 6-8 years RIF is characteristic of girls but not of boys. The best memory performance and maximum proactive interference are noted in twenty-year-old students.

Thus, the effect of proactive interference develops with age and favours better recall of a series of visually presented objects, with the peak of memory recall reaching at age 20 and its subsequent weakening at age sixty. The critical period for the development of this effect is age 6–8 years. The absence of age differences in the temporal dynamics of visual memory recall at both its low and high values can be attributed to a complex of factors not taken into account in the present study, for example, the combination of different memorisation strategies and the flexibility of their use depending on individual motivation to perform the task.

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Author Contributions

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Conflict of Interest Information

The authors have no conflicts of interest to declare.

Visual-spatial Search in Tasks with Verbal and Non-verbal Stimuli in Patients with Negelect Syndrome

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Abstract

Introduction. The article deals with the possibilities of using new methodological tools for diagnosing left-sided spatial neglect (nonglect) occurring in the clinic of local brain lesions. The novelty of the study lies in testing the hypothesis that the success of diagnostic tests performed by patients with left-sided spatial neglect depends not so much on the nature of the stimuli used (speech or non-speech) as on the place occupied by the process of visual search in the structure of activity according to A. N. Leontiev, namely, whether visual search is an independent action or an operation as part of another action. **Methods.** To test this hypothesis, we developed an author's method aimed at diagnosing nonglect, which was used along with classical methods of neuropsychological diagnostics developed by A. R. Luria and his followers. **Results.** It is indicated that the author's method

is a valid method for diagnosing left-sided spatial neglect. The nature of the stimuli used in it does not play a significant role in the productivity of its performance by patients with non-glect. At the same time, the place of visual search in the structure of activity when performing the author's diagnostic method significantly affects the success of its performance. **Discussion of the results.** The place of visual search in the structure of activity appears to be a significant factor in the performance of diagnostic tests aimed at detecting this type of disorders of higher mental functions arising in connection with brain damage in patients with left-sided spatial neglect.

Keywords

left-sided spatial neglect, neglect, neuropsychological diagnosis, activity structure, visual search, brain damage, diagnosis of neglect

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Introduction

Unilateral spatial neglect (neglect), or inattention to one half of space, more commonly the left (Andrews, 2016) is one of the most disabling syndromes occurring in patients with brain injury. The mechanisms of neglect remain controversial. A number of researchers associate this phenomenon with perceptual impairment (Dobrokhotova, 1966; Korchazhinskaya and Popova, 1976), as neglect is not compensated for when the patient's attention is drawn to it. Most often, such a rough degree of expression of the syndrome depends on the involvement of deep structures of the brain in the pathological process. Most experts believe that neglect is an attention deficit disorder (Heinke & Humphreys, 2003; Schmahmann & Pandya, 2006; Corbetta & Shulman, 2011; Vallar & Ronchi, 2021), as perceived objects are recognisable after a cue. In the presence of this syndrome, damage is noted more often to the convexitals of the cortex. However, after right-sided unilateral seizures, whether left-sided neglect occurs or not, preferences for the right side of the field are observed. This fact does not fit into the traditional understanding of neglect as a deficit of attention to the left side of space (Nikolaenko, 1993).

The contribution of disorders of consciousness (awareness) (Daini, 2019; Dalla Barba et al., 2018) and interhemispheric interaction processes (McFie, Piercy & Zangwill, 1950; Hecaen, 1962; Nikolaenko, 1993; Bahrainwala et al., 2014; Baldassarre et al., 2014; 2016) to this disorder has also been suggested.

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There are a number of models explaining the phenomenon of non-glect. One of the earliest is the hemispheric competition model of M. Kinsbourne (1970, 1977, 1987), according to which arbitrary shifts of attention are provided by the appropriate work of one hemisphere and stopped on the target due to negative feedback from the other hemisphere.

Consistent with this model is a study by Posner, Walker, Friedrich & Rafal (1984), who showed that neglect may be related to difficulties in diverting attention away from target stimuli in a non-ignorable part of space.

Another model of non-glect, the anisometric hypothesis, suggests that in non-glect the image of space "shrinks" towards the affected hemisphere of the brain (Bisiach, Neppi-Modona & Ricci, 2002; Nikolaenko, 1993). This model is consistent with the hemispheric competition model.

Karnath (2015) suggests that neglect syndrome is associated with dissociation between bottom-up and top-down attention networks. Patients with neglect are more likely to have impaired attention associated with low-level, involuntary, non-conscious information processing. Consequently, the bottom-up network is more affected. At the same time, goal-oriented attention (top-down network) is more preserved. Therefore, high-level, conscious and arbitrary mental processes can act as a compensatory reserve in rehabilitation work.

In Russian psychology, the determining role of high-level, conscious and arbitrary processes has been emphasised repeatedly. Thus, in the theory of N. A. Bernstein (1966), the motor composition of a movement is subordinated to its semantic side. In the work of P. Y. Galperin and T. O. Ginevskaya (1947), a change in the motor task in the structure of activity changes the efficiency of movements; in the studies of Yu. B. Hippenreiter (1983) the effectiveness of attention increases with greater meaningfulness and relevance of the task.

According to the theory of A. N. Leontiev (2005). N. Leontiev (2005), visual search as a component of visual attention can be represented either as an action corresponding to a certain goal or as an operation that is performed as part of another action. A change in the structure of activity of patients with unilateral spatial neglect of the place occupied by visual search can improve the results demonstrated by them, which was shown in the work of A. S. Mironchuk (2019). In the first series of the experiment, the patient had to turn over all the cards on the table. Here, visual search acted as an action corresponding to such a goal as direct detection of objects; apart from this, nothing else was required from the subject. In the second series, the patient's goal was to put together a jigsaw puzzle of the cards on the table. In this case, the search acted as an operation as part of the action of putting the puzzle together. In the third series, the patient with neglect syndrome had to compose a sentence, which was previously voiced by the specialist, from the letters written on the cards on the table. In these conditions, visual-spatial search also acted as an operation as part of an action, but now, from the author's point of view, the action

corresponded to an even more meaningful task, compared to the second series, i.e. obtaining a sentence.

The results showed that patients' task performance increased when visual-spatial search was presented as an operation (Mironchuk, 2019). At the same time, the efficiency of visual search when performing a verbal task was higher than when performing a non-verbal task. From our point of view, the difference between the verbal and non-verbal task used in this experiment, in addition to the material of the stimuli themselves, was due to two characteristics. First, the difference was the degree of visibility of the task goal. In the case of the nonverbal task, the content of the goal was limited to the simpler, more visual properties of the stimuli, namely the shape of the puzzle pieces. In the case of the verbal task, the content of the goal was already related to the more complex, speculative sphere of verbal meanings. This difference in target content depth is consistent with the well-known theory of information processing levels (Craik & Lockhart, 1972; Craik & Tulving, 1975; Rogers, Kuiper, & Kirker, 1977; Bransford, Franks, Morris, & Stein, 1979). Second, the tasks differed in the degree of goal certainty. While in the nonverbal task of the second series of the experiment the subject was not told what his final result should be (low degree of goal certainty), in contrast, in the verbal task the required phrase was initially formulated (high degree of goal certainty).

An alternative explanation for these features could also be the difference in the stimuli used, verbal or non-verbal. The **present work is** devoted to testing which of these parameters influenced the results obtained in the described study.

Methods

The work included approbation of the author's method of assessing visual-spatial search in patients with non-glossal speech and testing the hypothesis about differences in the efficiency of visual-spatial search for verbal and non-verbal stimuli at a high degree of certainty of the result image.

Sampling

The study was conducted at the Department of Medical Rehabilitation of Patients with Central Nervous System Dysfunction of the N.I. Pirogov National Medical and Surgical Centre of the Russian Ministry of Health. Sixty-six right-handed patients with localisation of the lesion focus in the region of the right cerebral hemisphere participated. The experimental group consisted of patients with left-sided neglect (33 patients), the control group - without neglect (33 patients).

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Methods

Patients from both groups underwent neuropsychological examination according to A. R. Luria (2020) to assess the state of higher mental functions; Trail making test (TMT), part A, and The Bells Test.

The time of performance, performance/failure to perform the test (1/0) were evaluated, in some tests errors were evaluated separately. The scale 0-2 was used, where 0 - no violation, 1 - not severe degree of error severity, 2 - severe degree of severity.

Also, all participants were presented with the author's method of assessing visual-spatial search (verbal/nonverbal variants): 18 cardboard cards (6 x 6 cm) with letters printed on one side. On 9 of them on the back side were glued parts of the object image, which could be used to make a puzzle.

Study series

In the first series, 18 cards were laid out in front of the subject with the letter up (3 piles of 6 cards each: centre, left and right).

In the second series, the cards were arranged in the same way: 9 cards (3 piles of 3 cards each) and a sample image of the object was presented. The experimenter recorded the time of execution, the number of ignored cards and their location, and overall search activity (number of head/torso turns to find a card).

Statistical analysis

The Mann-Whitney test for comparison of two unrelated groups and the Wilcoxon test for comparison of visual-spatial search performance within a group (IBM SPSS Statistics 26 programme) were used for statistical analysis of the obtained data.

Results

Visual-spatial analysis and synthesis, visual gnosis

Copying Taylor's figure

When copying the Taylor figure, significant differences between the experimental and control groups were observed in the number of copied elements ($p < 0.001$), the expression of structural-topological errors ($p < 0.001$), coordinate errors ($p = 0.01$), the expression of neglect ($p < 0.001$), and the use of fragmentary ($p < 0.001$) or chaotic ($p < 0.01$) copying strategies (Table 1).

Table 1

Comparison of the control and experimental groups in terms of scores and severity of errors in copying the Taylor figure. The values with statistically significant differences are highlighted in bold font

	Num- ber_ elem	Strukt_ top	Met- ric	Na- egle	Fragm	Chao- tic	Co- ord	Verbal	Microgr	Mac- rogr
U Mann- Whitney	96,0	316,0	486,5	99,0	248,5	415,5	410,5	525,0	461,0	528,5
Wil- coxon's W	657,0	877,0	1047,5	660,0	809,5	976,5	971,5	1086,0	1022,0	1089,5
Z	-5,824	-3,19	-,817	-6,507	-6,507	-2,655	-2,565	-,327	-1,799	-,384
Asympt. value (bila- teral)	,000	,001	,414	,000	,000	,008	,010	,744	,072	,701

Reproduction of the Taylor figure

When reproducing the Taylor figure, significant differences between the experimental and control groups were noted in the number of copied elements ($p < 0.001$), the severity of coordinate errors ($p < 0.05$), the severity of non-glect ($p < 0.001$) and the use of fragmentary ($p < 0.001$) or chaotic ($p < 0.05$) copying strategies (Table 2).

Table 2

Intergroup comparison in terms of scores and severity of errors in reproducing the Taylor figure. Statistically significant differences are highlighted in bold font

	Num- ber_ elem	Strukt_ top	Met- ric	Naegle	Fragm	Chao- tic	Co- ord	Ver- bal	Micro- gr	Macro- gr
U Mann- Whitney	159,5	389,5	464,5	76,5	358,	379,5	373,5	493,0	490,5	465,0
Wil- coxon's W	720,5	885,5	960,5	572,5	854,5	875,5	869,5	989,0	1051,5	961,0
Z	-4,744	-1,782	-,69	-6,282	-2,296	-2,395	-2,011	-,329	-,431	-,953
Asympt. value (bila- teral)	,000	,075	,49	,000	,022	,017	,044	,742	,667	,340

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Independent drawing of a cube, a table, a house

In the test for independent drawing of a table, a cube and a house, significant differences between the groups are noted both in the number of correctly drawn objects ($p < 0.001$) - more in the control group; and in the severity of inertia ($p < 0.001$), projection errors ($p < 0.001$), which may be associated with a greater degree of severity of impairment in patients with non-glect (Table 3).

Table 3

Intergroup comparison of scores and severity of errors in the independent table, cube and house drawing test. Statistically significant differences are highlighted in bold font

	Number_ paint	Inert	Projectz	Microgr	Macrogr
U Mann-Whitney	211,000	254,500	259,000	479,000	526,500
Wilcoxon's W	772,000	782,500	787,000	1007,000	1087,500
Z	-4,317	-4,510	-3,756	-1,196	-,039
Asympt. value (bilateral)	,000	,000	,000	,232	,969

Recognising realistic and superimposed images

In recognising realistic and superimposed images, there were significant differences in the number of named items ($p < 0.01$) (which was associated with ignoring some of the items by respondents with non-glossal language), and in naming ($p = 0.001$), which is probably due to fragmentation-type errors ($p < 0.05$), as well as in the number of impulsive responses on an isolated feature ($p < 0.05$), which was evident in the experimental group in the Poppelreiter test, and in the severity of left-sided visual neglect ($p < 0.001$) (Table. 4).

Table 4

Intergroup comparison in terms of scores and severity of errors in the subject gnosis tests. Statistically significant differences are highlighted in bold font

	Score_ realist	Score_ over- head1	Score_ over- head2	Recog- nition	Nomi- nation	Fragm	Im- pulse	Na- egle	Pseudo- agn
U Mann- Whitney	350,500	369,50	220,0	478,5	396,0	421,0	462,0	363,0	544,5
Wil- coxon's W	911,500	930,5	781,0	1039,5	957,0	982,0	1023,0	924,0	105,5
Z	-3,121	-2,790	-4,575	-1,14	-3,204	-2,168	-2,308	-3,594	,000
Asympt. value (bilateral)	,002	,005	,000	,254	,001	,030	,021	,000	1,00

Praxis

Kinetic praxis

The kinetic (dynamic) praxis test revealed a significant difference between the groups in the number of reproduced elements of the motor programme ($p < 0.001$), expression of difficulties in forming ($p < 0.01$) and retaining ($p < 0.001$) the programme, increase in the number of programme elements ($p < 0.001$), expression of element-by-element programme execution ($p < 0.05$), and weakness of speech regulation ($p < 0.05$) (Table 5).

Table 5

Intergroup comparison by scores and degree of severity of errors in the kinetic (dynamic) praxis test. Statistically significant differences are highlighted in bold font

	Score	Form_ progr	Hold_ program	Uvel_ numbers_el	Desautom.	Persevere	Slab_Rech_ Reg
U Mann- Whitney	225,5	312,000	207,000	320,500	299,500	412,000	429,000
Wil- coxon's W	786,5	840,000	735,000	848,500	827,500	940,000	957,000
Z	-4,150	-3,075	-4,535	-3,731	-3,415	-2,074	-2,072
Asympt. value (bilateral)	,000	,002	,000	,000	,001	,038	,038

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Letter

The writing test revealed significant differences between groups in writing items on the right side of the sheet ($p < 0.001$) and in the expression of micro- or macrographia ($p < 0.05$) (Table 6).

Table 6

Intergroup comparison of scores and severity of errors in the writing test. Statistically significant differences are highlighted in bold font

	Score	Naegle	Verbalise	Microgr	Macrogr	Grammat_ str.
U Mann-Whitney	511,50	306,000	511,500	445,500	462,000	511,500
Wilcoxon's W	1072,5	867,000	1072,500	1006,500	1023,000	1072,500
Z	-,681	-3,795	-1,425	-2,548	-2,308	-,681
Asympt. value (bilateral)	,496	,000	,154	,011	,021	,496

Memory

Memorising 6 words

When memorising 6 words, there was a higher number of errors in the experimental group by type of inertia ($p < 0.01$), lower memorisation efficiency ($p < 0.01$), and less delayed reproduction ($p < 0.05$) (Table 7).

Table 7

Intergroup comparison of scores and severity of errors in the six-word recall test. Statistically significant differences are highlighted in bold font

	Directly	Postpo- nement	Total_point	Low_ef_ study	Dean_ Zauch	Izbir	Inert
U Mann-Whitney	459,500	354,500	378,000	369,000	504,000	512,500	383,00
Wilcoxon's W	1020,500	915,500	939,000	897,000	1032,000	1040,500	911,000
Z	-,946	-2,347	-2,015	-2,612	-,440	-,249	-2,919
Asympt. value (bilateral)	,344	,019	,044	,009	,660	,804	,004

Thinking

The story "The Hook."

In the story comprehension and memorisation test, no significant differences were found between the two groups (Table 8).

Table 8

Intergroup comparison of scores and severity of errors in the story retelling test

	Score_ meaning_ part	Loss_of_ parts	Loss_of_ meaning	Side_ assoc	Izbir
U Mann- Whitney	423,500	447,000	460,000	502,000	525,000
Wilcoxon's W	951,500	1008,000	988,000	1063,000	1086,000
Z	1,422	-1,270	-1,423	-,436	-,059
Asympt. value (bilateral)	,155	,204	,155	,663	,953

Arithmetic problem and serial counting 100-7

In the arithmetic problem solving test, differences in difficulties in programme formation ($p < 0.01$), reduced control ($p = 0.001$), and difficulties in switching when changing the solution algorithm ($p = 0.001$) were observed. In the serial counting test, there is a greater number of errors in the experimental group by the type of programme loss ($p < 0.05$), errors in passing through the tens ($p < 0.01$) (Table 9).

Table 9

Intergroup comparison in terms of scores and severity of errors in arithmetic tasks and serial counting. Statistically significant differences are highlighted in bold font

	Arith- _z_ball	Ponim_ _usl	Form- _progr	Cont- _roLz	Regu- _lus	Pe- reckL _alg	Score_ _point	Poter_ _prog.	Coun- _ter_ _acc	Pereh_ _des	Inner_ _des
U Mann- Whitney	247,5	482,0	339,5	322,5	425,5	379,5	334,0	391,5	468,5	334,5	486,0
Wil- coxon's W	808,5	1043,0	900,5	883,5	986,5	940,50	895,0	952,50	1029,5	895,5	1047,0
Z	-4,449	-,934	-2,820	-3,413	-1,679	-3,407	-2,805	-2,226	-1,089	-2,905	-1,025
Asympt. value (bilateral)	,000	,350	,005	,001	,093	,001	,005	,026	,276	,004	,305

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Analysing serial images

In the serial image analysis sample, there was a significant difference in the severity of errors such as formal description of story elements ($p < 0.01$) and failure to describe the story independently ($p < 0.01$) (Table 10).

Table 10

Intergroup comparison of scores and severity of errors in serial picture analysis tests. Statistically significant differences are highlighted in bold font

	Score_ser_ card	Fragm_an.	Decrease_ur_ general	Side_ assoc	Formal_ Opis	Reso- nance	Impos- sible_ Opis
U Mann- Whitney	521,000	444,000	539,500	491,000	350,500	465,500	390,000
Wil- coxon's W	1082,000	1005,000	1100,500	1052,000	911,500	1026,500	951,000
Z	-,333	-1,410	-,080	-,897	-2,854	-1,702	-2,712
Asympt. value (bilateral)	,739	,158	,936	,370	,004	,089	,007

Tracking Test (TMT), Part A and The Bells Test.

Significant differences were found between groups in the time to complete the tracking test (TMT) part A ($p < 0.001$), the time to complete the bell test before cueing ($p < 0.05$), the number of bells detected before cueing ($p < 0.001$) and the total time to complete the test ($p < 0.001$), and the difference between right and left bell misses ($p < 0.001$), all better in the control group (Table 11).

Thus, between the two groups, in addition to manifestations of left-sided neglect, there were differences in the neurodynamic parameters of mental activity, in the regulatory and visual-spatial spheres. The revealed disorders may be related to the fact that patients with non-glect disorder often have a greater cognitive deficit.

Table 11

Intergroup comparison of scores and error severity in TMT and The Bells Test. Statistically significant differences are highlighted in bold font

	TMT	BELLS1t	BELLS1	BELLS2t	BELLS 2	BELLST	BELLS_R-L
U Mann- Whitney	80,000	301,500	99,000	354,500	415,000	192,000	120,000
Wilcoxon's W	576,000	766,500	477,000	819,500	911,000	657,000	498,000
Z	-5,777	-2,196	-4,991	-1,509	-,060	-3,814	-4,712
Asympt. value (bilateral)	,000	,028	,000	,131	,952	,000	,000

In the phrase and puzzle methods, significant differences were found between the groups in the number of left card omissions in both the verbal and non-verbal tasks ($p < 0.001$). There were also significant differences in the time of completing these tasks ($p < 0.001$) - patients with non-glossal speech took longer to complete them (Table 12).

Table 12

Intergroup comparison in terms of execution time and number of omissions on the left in the experimental methods. Statistically significant differences are marked in bold

	Phrazat	Phrase_prop	Picture t	Picture_prop
U Mann-Whitney	139,500	117,000	34,500	104,000
Wilcoxon's W	667,500	468,000	385,500	455,000
Z	-5,002	-5,108	-5,774	-5,297
Asympt. value (bilateral)	,000	,000	,000	,000

In addition, an analysis of the relationships of the author's experimental methodology with standardised techniques for assessing non-glect, as well as errors associated with the presence of neglect (by Spearman's criterion) was carried out.

Significant positive correlations ($p < 0.001$) were found between, on the one hand, the performance time and the number of omissions to the left in the verbal task and, on the other hand, ignoring the Taylor figure when copying and reproducing it, and the TMT performance time; between the number of omissions to the left in the verbal task and the number of omissions in the visual gnosis task ($p < 0.001$); between the verbal task performance time and the number of omissions in the visual gnosis task ($p < 0.05$); between the verbal task completion time and the bell test completion time ($p < 0.05$); negative correlations ($p < 0.001$) between, on the one hand, the completion time and the number of omissions in the verbal and non-verbal tasks and, on the other hand, the number of bells found during the first series and the difference between the right and left bell omissions (patients with non-glossal speech are characterised by lower values).

The present results may indicate the presence of construct validity of the experimental techniques used.

The non-parametric Wilcoxon test was used to test whether there were differences in the success rate of the verbal and non-verbal task in the experimental group (sample - 33 individuals with Neglect Syndrome).

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The results of the analyses showed that there were significant differences between conditions (verbal and non-verbal task) in task completion time ($p < 0.001$), finding letters and putting the phrase together was faster than finding parts of the picture and assembling it. There were no significant differences between conditions in the number of omissions and intrinsic activity (Table 13).

Table 13

Intragroup comparison of data in the nonverbal and verbal tasks. Statistically significant differences are highlighted in bold font

	Kartinkat-Frasat	Picture_prop-Phrase_prop.	Picture_act-Phrase_act.
Z	-3,579 ^a	-,750 ^a	,000 ^b
Asympt. value (bilateral)	,000	,453	1,000

Note. a - based on negative ranks, b - sum of negative ranks equals sum of positive ranks.

Discussion

As a result of the study, intragroup differences in the success rate of diagnostic techniques were noted. Patients without neglect were on average more preserved, namely, they had less pronounced disorders of visual-spatial analysis and synthesis, regulatory difficulties, deficit of neurodynamic parameters of mental activity, etc., which is consistent with the data that the presence of left-sided spatial neglect often correlates with other disorders of functioning (Van Kessel, Geurts, Brouwer & Fasotti, 2013).

In the author's methodology, the differences between groups concerned the number of omissions and the time of task completion (Propustina et al., 2022). Probably, the significant parameter is the number of omissions, while the completion time is related to the general pace of activity.

According to M. V. Falikman (2016), visual-spatial search in both puzzle assembly tasks and classical bell test tasks will meet the tasks of detection and identification. Nevertheless, based on the study, it can be assumed that the place that visual search occupies in the activity structure of these tasks will not be the same. This search will also differ in such an important parameter as the presence or absence of distractors in the visual field (the latter is characteristic of the bell test, for example). Consequently, the process of performance and the results may be different, despite the fact that both techniques are aimed at investigating search and diagnosing non-glect.

Under the conditions of equalisation of the content depth and certainty of the tasks' goals, there are no significant differences in the number of omissions. It can be considered that both tasks are equivalent.

There are also no significant differences in search activity during verbal and non-verbal tasks. Consequently, the feature of stimuli is insignificant, unlike the place of search in the structure of activity (Mironchuk, 2019).

The difference in the timing of task completion may be due to the strategy of the activity rather than the specifics of the stimuli. The goal can be achieved in different ways: first collecting all the elements and then the puzzle/suggestion; or sequentially selecting the necessary element and immediately attaching it to the puzzle/suggestion.

Thus, in neuropsychological evaluation, A. N. Leontiev's (2005) provisions on the structure of activity allow us to reveal the actual psychological content of diagnostic tasks, which is often not taken into account in their formal description.

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Using a Cognitive Simulator: Possibilities for Minimizing Self-regulatory Deficits in Cognitive Activity in Primary Schoolchildren

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Abstract

Introduction. Studying the modality of sensorimotor activity of elementary school children is influenced by the demand for new research data about the developmental capabilities of cognitive simulators that are focused on strengthening self-regulatory potential of primary school students. The novelty of the study lies in the testing of the use of a cognitive simulator as a diagnostic tool that allows studying the modality of sensorimotor activity of primary schoolchildren as a psychological marker of self-regulation of cognitive activity. **Methods.** We used cognitive simulator which allows making a visual distortion in the process of solving the cognitive problem "Tower of Hanoi", which complicates the solution process. To obtain psychological and educational information for each subject (n = 6) we used the method of expert assessments. **Results.** The paper presents the results of a qualitative analysis of the video images obtained for each subject in the process of solving the "Tower of Hanoi" problem in three experimental conditions (without distortion of the visual field, with inversion of the visual field and time delay of the image). During the experimental study, we identified and described the individual indicators of invariant and variable features of sensorimotor activity of children of primary school age who have different experiences of educational achievements and self-regulation of cognitive activity. **Discussion.** We identified main characteristics of using self-regulatory resources of cognitive activity by younger schoolchildren in the process of solving a cognitive task in specially designed experimental conditions, taking into account the real educational achievements of the participants. We outline

further research directions for creation of a developmental program to use this cognitive simulator to minimize existing self-regulatory deficits in cognitive activity of elementary schoolchildren as one of the significant tasks of psychological and educational support for the cognitive development of modern children and adolescents.

Keywords

sensomotor activity, elementary school children, cognitive simulator, self-regulation, cognitive activity, cognitive task

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Introduction

The growing dynamism and unpredictability of the modern world makes it extremely important to develop such skills and abilities that help person successfully navigate in new for him conditions (Kolin, 2005; 2014; Leontiev, 2020). The ongoing transformations of the life world of a modern person form new educational trends: the use of digital technologies, automation of educational processes, building new communication models between students and teachers, an increase in the number of non-standard tasks. In this regard, models of education are changing, the emphasis is shifting to new forms of presentation of material, a change in the role of the teacher, thereby starting the process of introducing new educational technologies (Galazhinskiy & Sukhanova, 2022; Drugova, Veledinskaya & Zhuravleva, 2021; Zotkin, 2012; Trubitsyna, Baranova, Bannikova & Glazkova, 2011). Students of primary general education require special attention, since younger students are very sensitive to changes, they are characterized by increased impressionability and suggestibility (Lesev & Valeeva, 2021; Barabash, 2023). This age stage is a sensitive period for the formation of learning skills and the development of cognitive processes. The processes that take place in a fundamentally new environment, implemented by a new type of activity, influence the process of personality formation. First of all, this is reflected in the cognitive processes of the student: the child's thinking, his sensation, perception and memory change (Martsinkovskaya, 2015; Zhiginas, Sukhacheva, 2015).

Recent studies show that a significant part of today's younger schoolchildren have a pronounced deficiency in the development of voluntariness and activity of attention, stable concentration (Makhnovskaya & Aristov, 2021). It is noted that the dominance of visual perception of information leads to a lag in verbal intellectual development; increasing manifestations of instability in the emotional sphere were also recorded (Gagay & Efremova, 2019). Scientists emphasize that such problems among students can lead to maladaptive behavior patterns, which will be the cause of problems in the educational process and in the social environment at the same time (Konopkin, 2011; Barabash, 2023; Preobrazhenskaya, 2019).

Many researchers who have studied the development of children have noted that primary school age is the period of a child's transition to a new level of self-awareness and knowledge of the world around him, the formation of arbitrariness in activity and the ability to control his actions (Elkonin, 2007; Mukhina, 2006; Obukhova, 1996; Brofman, Masterov & Tekoeva, 2022). This creates favorable conditions for the development of self-regulation of younger students, which is an important condition for adaptation to the educational process and serves as an indicator of the development of cognitive activity (Zinchenko, 2020; Popova, 2022).

Self-regulation of cognitive activity is a significant component of the ability and readiness for self-regulation of younger students. Children should be able to plan their actions, control their attention, be able to switch from task to task, pay attention to their emotions and manage them (Gavrilina, 2019; Kukubaeva & Sadvakasova, 2021). The work on the formation of self-regulation of younger students' cognitive activity implies not only the existence of certain rules that the child must comply with, but also the creation of special developmental conditions in the form of involving the child in cognitive activity aimed not only at developing certain cognitive skills, but also at developing operational self-control and regulation of behavior. To solve this kind of psychological and educational problems, we should pay special attention to the sensomotor activity of children of this age, which is a complex system of perception, processing and regulation of information received from the senses, which includes active interaction between body movements, perception and muscle responses (Mamina, 2020; Balanov, Tyutyunnikov & Kokh, 2022).

Sensomotor activity can be considered as an indicator of the characteristics of self-regulation, since it is directly related to the child's ability to control his body and movements (McClelland & Cameron, 2019). Research shows that self-regulation is important for child development (Puranik, Boss & Wanless, 2019), it is continuously associated with writing skills (Chandler et al., 2021), children's involvement and performance in school (Bohlmann & Downer, 2016), emotions (Gagne, Liew & Nwadinobi, 2021). Self-regulation is also studied in terms of executive functions (Vink et al., 2020), such as planning one's actions in accordance with the set goal, solving problems, paying attention to necessary stimuli, processing information received and cognitive flexibility (Rosario Rueda, Posner & Rothbart, 2005; Veraksa, Gavrilova & Lepola, 2022).

The purpose of this article is to discuss the results of a study of the modality of sensomotor activity as an indicator of the features of self-regulation of cognitive activity of younger schoolchildren using the cognitive simulator developed and previously tested on other age groups (Balanev, Smeshko & Kokh, 2022).

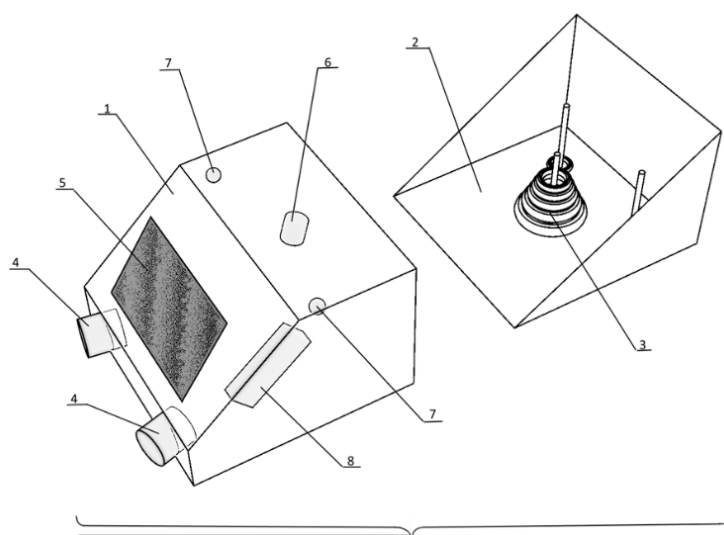
Methods

As a simple cognitive task, we used methodological tool that initially acted as a mathematical task, but then were introduced into the field of psychological assessment, which can be used to measure cognitive abilities – the "Tower of Hanoi" (Okulov & Lyalin, 2008). The solution of a cognitive task includes the processes of changing, supplementing, generalizing and systematizing the initial representations of knowledge using the range of their cognitive abilities (Fansher, Shah & Hélie, 2022; Šunić, 2012).

The "Tower of Hanoi" task was placed in a cognitive simulator (Balanev, Shamakov, Smeshko, Shmer & Ivanova, 2023) (Fig. 1). The test subject interacts with the simulator by placing his hands inside the body and solves the problem, performing simple mechanical actions. In the process of completing the task, the subject looks at the screen broadcasting the space in which the "Tower of Hanoi" and the hands of the subject are located. The use of the simulator allows you to make a visual distortion of the process of solving the problem, which complicates the course of the solution.

Figure 1

System for diagnostics and development of human cognitive abilities



Note. 1 – user interface body; 2 – stage body; 3 – a set of fasteners; 4 – two hand cuffs; 5 – device video screen; 6 – internal video camera; 7 – light source; 8 – microprocessor control device).

All participants solved the "Tower of Hanoi" problem under three experimental conditions:

1. The condition without visual space distortion upon presentation of a normal image;
2. The condition with inversion of the visual field, i.e. the subject observed through the monitor at the subject visual scene, inverted by 180 degrees;
3. The condition with a time delay of the image.

Each experimental condition had a different degree of cognitive load on the respondent when solving the problem. The inversion of the visual field and the delay of the image, being methodological techniques in time, made it possible to "unroll" the process of perception in time. In addition to complicating the experimental conditions, the task itself became more complicated: an additional new disk was added at each stage.

The research procedure included several stages.

1. At the **first** stage, the participant was informed of the purpose of the study, then received the instruction:

"This study is aimed at studying cognitive abilities, the ability to solve cognitive problems in complex conditions and the ability to find the right strategy for solving a problem. We will be evaluating the accuracy and the speed of solving a problem in conditions of visual field reconstruction. You have the task "Tower of Hanoi". When solving a problem, you must follow certain rules:

- Do not place a larger disc on top of a smaller one.
- Do not hold the discs in your hand or place them on a table, i.e. the discs must always be placed on the stem.
- You cannot swap multiple discs at once".

Your task is to solve the "Tower of Hanoi" by making the least number of mistakes and moves.

2. On the first day of study the **second stage** for all the participants was the same. The subjects were told that in front of them was a special cognitive simulator that changed the field of vision. The simulator is equipped with a specialized video screen, which displays the image obtained with the help of a video camera. The specially designed conditions presented to the participants make it possible to increase the efficiency of cognitive processes in the framework of solving problems in experimental conditions. Then the test person sat down in front of the design of the simulator, located at the optimal distance from him, which allowed him to position himself with maximum comfort and freely move inside the body of the simulator, there was no need to change the position of the body during the experiment. The experimental part of the study took approximately 30–60 minutes, depending on the level of complexity of the task.

The experimental and theoretical part of the study was carried out on the basis of the General Education School «Integration» Tomsk, Tomsk region, Russian Federation. The

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participants of the study were students of 4th grade majoring in engineering. The sample included 6 children (4 boys and 2 girls aged 10 to 11 years). The participants took part in the study on a voluntary basis. We received signed informed consent forms from the parents. All participants did not have any contraindications for refusal to participate in the study.

At the first stage of the study, using the method of expert assessments (teachers, psychologists), psychological information was obtained for each person, including characteristics of relations with classmates, parents and teachers, behavioral characteristics, information about educational achievements and educational interests.

At the second stage of the study, a qualitative analysis of the video images obtained for each subject in the process of solving the "Tower of Hanoi" problem was carried out. During the analysis, an additional diagnostic protocol was created, including the analysis criteria for solving the Tower of Hanoi problem.

Results

During the analysis of the obtained results (Table 1), we can draw generalized conclusions on the selected criteria in three experimental conditions.

Table 1

Selected criteria for all subjects in three experimental conditions.

Mode	Criteria	Participants					
		P103	P213	P365	P491	P523	P648
No distortion of the visual field	Total time to solve the problem	15:13	19:59	16:53	13:53	8:30	8:57
	Total number of mistakes made	4	6	4	23	0	14
	Commented on their actions	+		+	+		+
	Executes instructions independently	+		+		+	
	Follows instructions with the help of an adult		+		+		+
	Avoids executing instructions				+		+
	Cannot master the rules of instruction on their own				+		+
	Returned to the initial stage of solving the problem			+			
	Completed the issue	+	+	+		+	
	Couldn't solve the problem					+	+

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	Criteria	Participants					
		P103	P213	P365	P491	P523	P648
Visual field inversion	Total time to solve the problem	10:00	10:52	14:10	17:30	13:27	16:38
	Total number of mistakes made	5	7	6	20	4	15
	Slow motor actions	+		+	+	+	+
	Changes the position of a task		+		+		+
	Changes the position of the hands (right / left)			+			+
	Commented on their actions	+		+	+		+
	Executes instructions independently	+		+		+	
	Follows instructions with the help of an adult		+				
	Avoids executing instructions				+		+
	Cannot master the rules of instruction on their own				+		+
	Returned to the initial stage of solving the problem						
	Completed the issue	+	+	+		+	
	Couldn't solve the problem				+		+
	Criteria	Participants					
		P103	P213	P365	P491	P523	P648
Image time delay	Total time to solve the problem	5:36	6:22	6:50	8:19	10:14	12:28
	Total number of mistakes made	2	6	1	16	0	14
	Slow motor actions	+			+		+
	Changes the position of a task		+				+
	Commented on their actions				+		+
	Executes instructions independently	+	+	+		+	
	Follows instructions with the help of an adult				+		+
	Avoids executing instructions						+
	Cannot master the rules of instruction on their own						+
	Returned to the initial stage of solving the problem						+
	Completed the issue	+	+	+	+	+	
	Couldn't solve the problem						+

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The total time for solving the problem and the number of students' mistakes made for all three experimental conditions are shown in Figures 2 and 3.

Figure 2

The total time for solving the problem for each subject in three experimental conditions

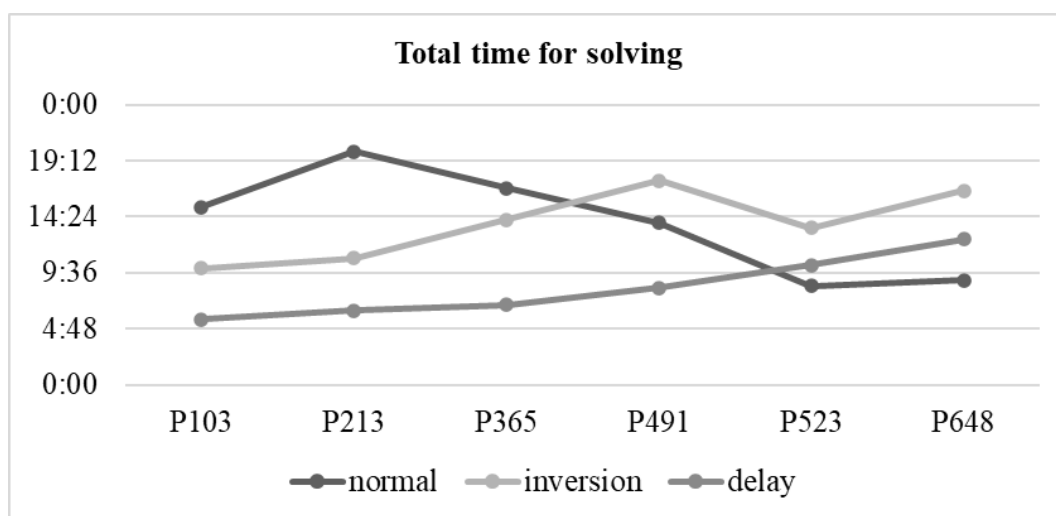
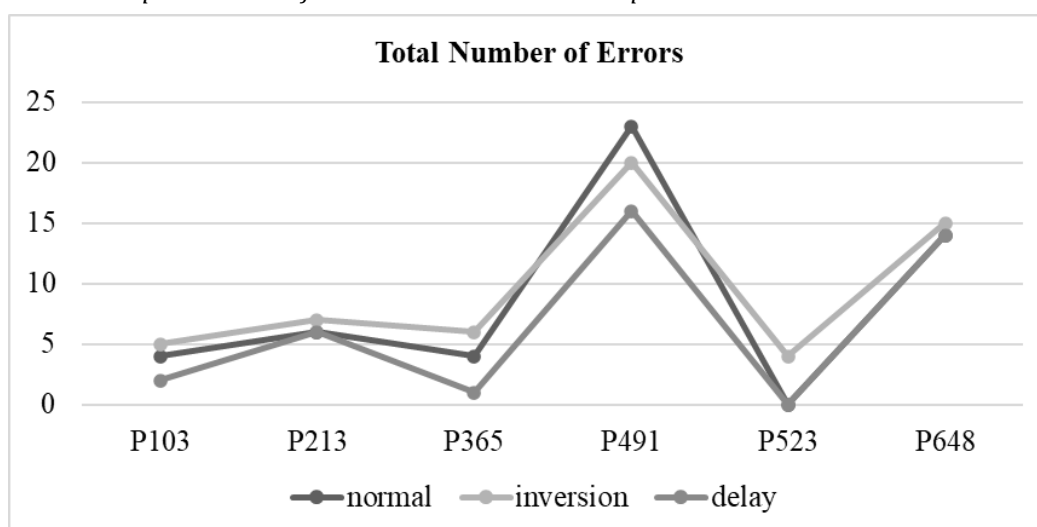


Figure 3

Schematic representation of committed errors in three experimental conditions



The results obtained during the qualitative analysis showed significant differences in individual indicators. For example, there is an extremely large spread in the time for solving the problem by the participants, differences in the number of mistakes made, the absence or, conversely, the ability to independently follow instructions and solve the problem, the speed of solving the problem, as well as different dynamics of motor activity. This study made it possible to check to what extent the conditions with the use of a cognitive simulator allow creating a situation of examination and emotional involvement of the subject. For us, it was necessary that the subject was emotionally involved in the process of solving the problem.

It should be noted that the subjects took the task proposed to them quite seriously and positively, emotionally reacted to the experimental conditions, the phrase was often noted: *"This is interesting, but I cannot solve it"*, *"It is difficult to perceive the task"*, *"The task is not solvable"*, *"I really enjoyed solving the problem"*, etc. In addition, the subjects were interested in who else was participating in the study, what their results were, how quickly other subjects solved the problem, whether there were those who could not solve the problem. Also, several subjects, coming to the second and third stages of the study, began solving the problem with the phrase: *"I figured out how I can solve the problem faster"*, *"I learned my moves"*, but at each stage of the study an additional new disk was added, which significantly complicated the task itself and the course of action.

However, there were test subjects who had never solved the problem, who at each stage of the study faced various difficulties. For example, without the experimenter's hints, they did not know how to solve the problem; they also had certain features, such as loss of orientation due to visual field distortion, and difficulty in determining the strategy for solving the problem. Some of the subjects explained the failure by the fact that they could not concentrate on solving the "Tower of Hanoi" problem due to the experimental conditions.

Below, as an illustration, descriptions of self-regulatory manifestations of subjects differing in the modality of sensomotor activity in the course of solving a cognitive task in three experimental conditions (without visual field distortion, with visual field inversion and time delay of the image) are presented.

Participant P103 at the first stage of solving the problem immediately understood the rules for solving the task, did not experience any difficulties in solving the problem, very often commented on his actions, constantly repeated the phrase "small disk to large", thus helping himself in solving the problem. The total time for solving the problem was 15 minutes 13 seconds. This participant had calm dynamics of motor activity and

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average speed of solving the problem. At the second stage of solving the task, he took the experimental condition rather hard, which was accompanied by a slow pace of solving the problem, as well as making mistakes. The test subject said that it was difficult for him to get used to the conditions, the inversion of the visual field greatly confused him in the space of the stage. In addition, the subject commented on his actions, thereby helping to solve the problem. The dynamics of motor activity in this subject was calm and the speed of decision making was average.

At the **third stage** of the study, he did not experience any difficulties, the delay of the images did not distract him from the decision in any way, since he relied on his tactile sensations. He solved the problem quite quickly – in 5 minutes 36 seconds. The subject had an active dynamics of motor activity and a high speed of solving the problem.

Test subject **P213** at the **first stage** of the study solved the problem for the longest time – 19 minutes 59 seconds, made 6 mistakes. The participant did not immediately understand the rules of solution and, with the help of the experimenter, tried to figure them out, however, in the process of solving the problem, he refused prompts. The subject had chaotic dynamics and a low speed of solving the problem. At the **second stage** of the study, the subject solved the problem faster than at the first stage, despite the fact that the solution conditions and the task itself became more complicated. There were more mistakes than at the first stage. It was difficult for the test person to navigate in space due to the experimental conditions. It is worth noting that before starting to solve the problem, the participant said that he figured out how to solve the problem, but did not expect that an additional disk was added. There was an active dynamics and a high speed of solving the problem. At the **third stage** of the study, the subject solved the problem in 6 minutes 22 seconds. It is worth noting that the subject at first waited for the image delay to stop, then made his moves, but somewhere in the middle of solving the problem he began to rely on his tactile sensations, because he experienced complexity and intolerance to the image delay. There was a chaotic dynamics and average speed of solving the problem.

Test **subject P491** at the **first stage** of the study stubbornly did not follow the rules that the experimenter indicated to him, inventing his own, commenting on his actions, as if he wanted to hear approval from the experimenter. This subject made many mistakes, more than other participants. After the help of the experimenter, he continued to ignore the rules, saying the following phrases: *"The problem is not solvable"*, *"It cannot be solved"*, *"You are deceiving me"*, *"I want to solve it in my own way"*. For the entire time of solving the problem – 13 minutes 53 seconds – I could not solve the problem. Additionally, it is worth emphasizing that by the end of the decision, there was a loss of motivation. The subject

had chaotic dynamics and a low speed of solving the problem. At the **second stage** of the study, he experienced excitement, but at this stage, the subject was motivated to solve the problem. The inversion of the visual field greatly influenced the course of solving the problem, the test subject tried to adapt to the conditions by constantly changing the position of the tower. He commented on his actions, often saying one phrase: *"Here you have to think"*. The subject could not find the correct strategy for solving the problem, even with the help of the experimenter, and also made many mistakes. Without hints and leading questions, he could not solve the problem. For the total time of 17 minutes 30 seconds, he could not solve the problem. The dynamics of motor activity of this subject was chaotic and the speed of solving the problem was low. At the **third stage** of the study, the subject solved the problem, focusing on his hands. The time for solving the problem was 8 minutes 19 seconds, the number of errors was less than in the previous two stages. The subject was quite positively involved in the process of solving the task, he also relied on the help of the experimenter. At this stage, the subject managed to find the right strategy, and he was able to solve the problem. The subject had an average dynamics of motor activity and an average speed of solving the problem.

Participant **P648** at the **first stage** of the study could not understand the rules for solving the problem, commented on his actions, for the entire time of solving the problem – 8 minutes 57 seconds, he could not solve the problem, while making a large number of errors. The subject had a chaotic dynamics of motor activity and an average speed of solving the problem. The subject at the **second stage** of the study with the inversion of the visual field showed a lack of motivation, he indulged, could not sit still, did not want to solve the problem in the cognitive simulator, and almost cried because he didn't manage to solve the problem. He often changed the position of his hands, trying to help himself, holding the disks in his hand for a long time, thereby trying to deceive the experimenter and put the disks in the correct position. By the middle of solving the problem, he pulled the tower out of the cognitive simulator and refused to solve it further. In 16 minutes 38 seconds, he did not solve the problem, leaving it halfway through the solution. The subject had a chaotic dynamics of motor activity and a low speed of solving the problem. At the **third stage** of the study, everything was the same as at the second stage, i.e. there was a lack of motivation, the subject indulged, could not sit still, did not want to solve the problem in the cognitive simulator. When solving a problem with a time delay, he played with the regime, the motor activity was slow, the subject deliberately did everything slowly, thereby showing that he did not want to solve the problem in a cognitive simulator. After the experimenter asked to solve the problem without using the cognitive simulator, the subject also failed to solve

the problem. This participant had a chaotic dynamics of motor activity and a low speed of solving the problem.

Discussion

The solution of the proposed cognitive task by younger students in specially designed conditions, such as visual field inversion and image delay in time, required the subjects to optimally use their sensory potential to determine the position and size of the discs, as well as balance muscle efforts to move the discs from one stem to another. In addition, the subjects had to use the self-regulatory resources of cognitive activity so that they could focus on the task, not be distracted by the surrounding objects, and not lose patience with unsuccessful attempts. In addition, solving the problem required analytical and strategic thinking from the subject, planning their actions. The test subjects had to understand how to move the disks in order to reach the goal. The proposed experimental plan for increasing the efficiency of recording the manifestation of features of sensorimotor activity when solving a cognitive task in specially organized conditions on a cognitive simulator made it possible to record the correspondence of invariant and variable features of sensorimotor activity of children of elementary school age, who have different experiences of educational achievements, and the features of self-regulation of cognitive activity. The obtained results provide grounds for creation of a developmental program for using this cognitive simulator to minimize existing self-regulatory deficits in cognitive activity of primary schoolchildren as one of the significant tasks of psychological and educational support for the cognitive development of modern children and adolescents (Popova, 2022; Barabash, 2023; Gagai & Efremova, 2019; Kukubaeva & Sadvakasova, 2021; Preobrazhenskaya, 2019).

The analysis of the results of the study allowed us to make several **generalizing statements**.

The **invariant** (independent of the individual psychological characteristics of educational activity, educational activity and behavioral characteristics of the subjects) features of the sensomotor activity of children of primary school age when solving a cognitive task include the following:

- When working on a cognitive simulator, the subjects were faced with the fact that they had to control their emotions and behavior when a difficult situation appeared while solving a problem, as well as show patience, perseverance and confidence in their abilities;
- Experimental conditions, such as distortion of the visual field and image delay in

time in the process of solving the problem, led to a violation of sensomotor activity, thereby complicating the process of solving the problem for the subject;

- Visual field inversion caused some perceptual changes, such as misorientation of objects in space, a feeling of unusualness and disorientation, and also led to a situation of perceptual uncertainty, since it disrupted the idea of how the task should look like.

The following are identified as variable features of sensomotor activity when working on a cognitive simulator:

Some subjects had problems with self-regulation, which were accompanied by a problem with sensomotor activity. For example, they showed hyperactivity, lack of confidence in movements, difficulty with attention and concentration on a task. They also experienced difficulty with emotion control and stress tolerance, which was associated with impaired sensomotor information processing;

- When solving a cognitive task, subjects with good motivation for learning and additional education, as well as good educational achievements, demonstrated a fairly high rate of sensomotor activity, found an effective solution strategy, applying it at all stages of the experiment;
- Junior schoolchildren participating in the study, who have problems with learning and demonstrate underdevelopment of the ability to control their emotions and behavior, were hardly able to build an effective strategy for solving the problem, having a large spread in time compared to others. None of them showed a high level of sensomotor activity.

Thus, the study allows us to make a conclusion about the possibility of using a cognitive simulator as a diagnostic tool for identifying the modality of sensorimotor activity of elementary schoolchildren as one of the significant psychological markers of self-regulation of cognitive activity.

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Mariya Anatol'yevna Podoinitsina – working with sources, writing an overview of the article, conducting research.

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The Impact of the Framing Effect on Potential Investor Decision-Making: Results of an Oculographic Experiment

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Abstract

Introduction. In recent years, private investors have significantly increased their influence on the Russian securities market. Understanding the cognitive biases of private investors will help to fill the gap in research into cognitive decision biases in decision-making in investment behavior. Private investors participate in the placement of federal loan bonds and also support private enterprises through participation in corporate bonds. This study aims to test experimentally the impact of the framing effect (the effect of the 'frame' or information presentation format) on the decision-making of potential investors in securities trading. **Methods.** The sample comprised 20 adults aged 20–35 years (7 men and 13 women). Stimulus materials were presented on the Neurobureau platform for neurocognitive research and involved recording subjects' videooculography using the GazePoint GP3 eye tracker (with the Neurobureau software). A total of 240 measurements were carried out. The experimental series consisted of 12 stimuli. Pairs of financial proposals were created, with differences provided only by different formulations and emotional and semantic features. **Results.** Using quantitative data analysis, significant differences were established between responses to stimuli of the same content but different wording. A step-by-step regression analysis confirmed the impact of the framing effect on economic decision-making. In qualitative data analysis, the proportion of attention to stimuli was determined using heat maps, which also confirmed the role of lexical forms and emotional connotations of the wording of company news (without changing objective information) in purchasing and selling shares or in not taking action.

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Discussion. The results of the experiment proved the impact of the framing effect on the decision-making of potential investors. Based on the obtained data, a conclusion is drawn on the importance of psychological factors in selecting and assessing information resources in the process of obtaining company news information.

Keywords

decision-making, stock exchange, framing effect, eye tracking, oculography, potential investors

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Introduction

The framing effect is a cognitive bias when the form of information representation affects the subject's perception (Kahneman & Tversky, 1984). This concept is generally considered in the context of dual-process theories of thinking. According to these theories, human thinking includes cognitive processes and strategies that are intuitive (System 1) and analytical (System 2). Most human behavior is believed to be controlled by System 1. It makes it possible to react quickly to situations with minimal attention and time resources (Kahneman, 2003).

Due to a lack of time, the quality of decisions may deteriorate (Maule & Edland, 2002), and the decision-making strategies may change (Ariely & Zakay, 2001). This is explained by the characteristics of System 1. Its speed compensates for inaccuracies and vulnerability to various types of cognitive biases (Evans & Stanovich, 2013). Such biases include the break-even effect (Thaler & Johnson 1990), representative heuristics (Nazlan, Tanford & Montgomery, 2018), and the framing effect.

Most research on the influence of the framing effect focuses on areas where decisions must be made quickly and often without full information, such as medicine (McNeil, Pauker, Sox & Tversky, 1982) and consumer psychology (Sanford, Fay, Stewart & Moxey, 2002; Sun, Hu & Yu, 2022). In these situations, behavior is controlled by System 1, which leads to biases, including framing effects. Private investors often need to make quick decisions to buy or sell securities. The abundance of cognitive biases generated by the speed of decision-making prevents investors from properly understanding the situation and assessing risks (Pompian, 2006). Studies in this area confirm that time constraints can change investors' perception of risks (Huber & Kunz, 2007), including

in terms of the framing effect (Young, Goodie, Hall & Wu, 2012). Other studies show the influence of information presentation. Thus, respondents made different decisions when selecting funds to invest, depending on how the returns were presented (absolute figures or percentages) (Diacon & Hasseldine, 2007). The decision-making of private investors is strongly influenced by the media covering the company's activities (Barber & Odean, 2013; Fedorova, Demin, Afanas'ev, & Rogov, 2020). Analysis of annual reports from more than 300 companies from different countries revealed the selective use of charts and their distortions depending on company-related performance indicators in the past year (Beattie & Jones, 2000). Accordingly, given the tendency of individual market players to manipulate, private investors must be able to accurately assess information (In'kova, Adasova, 2021; Kong, Shi & Zhang, 2021).

With the increase in the number of private investors in recent years, it is necessary to study their behavior. In 2020, more than five million individuals entered the market, and in previous years – about 3.8 million individuals (according to the analysis summary on the Moscow Exchange website, URL: <https://www.moex.com/n32140/?nt=106>). Such an active increase in the number of investors was largely due to the influence of the Central Bank of the Russian Federation and the state (increasing interest rates and tax benefits through a special brokerage account – IIS), and the active pressure exerted by the Russian largest banks to use brokerage services (Abramov, Radygin, & Chernova, 2020).

In 2022, the number of private investors reached almost 23 million. In addition, the number of daily transactions carried out by individuals increased from 392 thousand in December 2019 to an average of more than 2.2 million transactions by 2022 (MB, <https://www.moex.com/n53950/?nt=106>). In 2022, non-residents were denied access to the Russian stock market, and private investors also increased the influence on the stock market significantly – shares increased by 45.3 %, bonds increased by 87 %, forward markets increased by 40.7 %, spot currencies increased by 65 % (MB's analysis summary <https://www.moex.com/n54937/?nt=106>).

According to Saibel' and Koval'chuk (2018), the Russian market has always been considered to be very volatile due to changes in the exchange rates of Russian national currencies and changes in world prices of main raw materials – oil, gas, and metals. However, changes in the ratio of private investors and non-residents affect market volatility due to the sensitivity of the first to cognitive biases and investment characteristics (low investment horizon, excessive emotionality in response to stock market changes) (Schroders International Investor Research, https://prod.schroders.com/en/sysglobalassets/_global-shared-blocks/gis-2019/theme-1/new-full-report/global_investor_study_2019_t1_v7_v4_eng.pdf).

Due to the increased influence of physical investors on the market, research on the cognitive biases of investors is important. The development of information and communication technologies also changes the approach of private investors to trading (Barber & Odean, 2002). However, this issue remains largely undeveloped in Russia, despite

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the active growth of private investors and the influence they have on the development of the country's economy through the issue of federal loan bonds and when the issuers are individual regions of the country. It is also important for private investors to participate in the placement of corporate bonds to support the development and existence of national companies in difficult economic times.

This study **aims** to experimentally examine the impact of the framing effect (the effect of the 'frame' or the form of information presentation) on potential investors' economic decision-making.

To study the impact of the framing effect on the cognitive behavior of potential investors, the eye-tracking methods are recommended, as they are used in social and human sciences to identify visual attention and decision-making processes (Skuratova, Shelepin, & Shelepin, 2022).

Research hypotheses are as follows: (1) In the process of visual perception of paired visual stimuli with different information presentations, the oculomotor activity of the study participants will vary in the number and duration of fixations. (2) The framing effect will influence economic decision-making.

Methods

The data were collected with a GazePoint GP3 computer oculograph (60 Hz sampling rate) and Neurobureau software created by Neuroiconics to record oculomotor activity in the economic decision-making process. The eye tracking data were compared with the responses of the participants.

The criteria for selecting subjects included the absence of specialized economic education in stock market trading, the absence of experience in stock market trading, the absence of a history of neurological or psychiatric diseases and the absence of medication intake that could affect the results of the experiment.

The study involved 7 men and 13 women aged 20 to 35 years ($n = 20$, mean age 23.5 ± 4.01 years). As the study procedures included recording participants' eye movements using eye tracking, all subjects had normal or corrected-to-normal vision. Participation in the experiment was voluntary; participants could refuse to participate at any time without explanation. The duration of the experiment was 7 to 11 minutes, depending on the speed of the participants' responses.

Stimulus materials

To achieve the main goal of the study, visual stimuli must be created with different lexical forms and emotional meanings of the news formulation without distorting the information component. It was also necessary to create a feeling of belonging to the company to properly assess the risks to which real investors are exposed. The stimulus materials consisted of 12 news from different companies and were combined into six pairs.

1. The capitalization of Company A (total value of the company) decreased by up to 25 % during the pandemic.
2. The capitalization of Company A (total value of the company) decreased by only 25 % during the pandemic.

Stimulus materials can be found in Appendix 1.

Research procedure

The participant was placed in front of the computer at a fixed distance of 50 cm. Before the data collection began, the subject was calibrated to fix the eye tracker in the pupils. The instructions were presented on a white screen in a black font and contained detailed information on tasks and answers. If the subject had questions, the experimenter gave verbal explanations. In order to maintain the internal validity of the experiment, participants were not informed of the purpose, objectives, and hypotheses of the experiment. After reading the instructions, the subjects underwent a training session that included a slide similar to the experimental session but not taken into account in the responses and analyses. For each subject, visual stimuli were presented in a randomized order. At the top of the slide there was information that created a sense of belonging to the company, "Imagine that you invested 30 % of your monthly income in this company". The news was presented in the center of the slide. At the bottom of the slide, information about answer options was provided. The participants' answers were recorded by pressing the appropriate keys on the computer keyboard.

Processing the results

The results of the study were qualitatively and quantitatively analyzed. The qualitative analysis process used heat maps to determine the percentage of attention to stimulus elements. To determine the impact of the framing effect on the choice of three alternatives, the statistical significance of the differences in the first and second stimuli for each pair of investment proposals was examined. Furthermore, step-by-step regression analysis was used to identify the impact of a particular phrase that constitutes the framing effect on decision-making.

Results

The assessment of the significance of differences in the perception of different wording used for investment proposals (stimulus pairs) showed that the Chi-square value exceeds the critical value ($14.29 > 9.21$; at $p = 0.01$), the number of degrees of freedom ($df = 2$). Thus, the differences in decision-making were statistically significant ($p < 0.01$).

However, these results do not enable us to conclude that the word or phrase has a direct impact on the subjects' decisions. To demonstrate the importance of different

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wording used for investment proposals, a step-by-step regression analysis of the subjects' responses to purchase/sell and eye tracking variables were used within the following areas of interest:

- The number of returns to the area of interest (hereinafter 'returns'), i.e., the number of times the respondent returned to the area of interest.
- The total number of saccades to the area of interest (hereinafter 'saccades'), i.e., the number of saccades the respondent made to the area of interest while viewing the stimulus. Only the saccades which beginning and end were located within the area of interest were considered.
- The average period of fixation on the area of interest (hereinafter 'fixations'), i.e., the average time period of fixation on the area of interest (duration of all fixations on the area of interest/number of fixations) (Shelepin, Shelepin, Skuratova, Zueva, 2020).

On the slides with stimulus materials, three areas of interest were identified – the entire slide, the news itself, and the changed wording in a pair of stimulus words. The step-by-step regression analysis consists of several steps.

In the first stage, the influence of the variables (predictors) mentioned above on the subjects' responses to the first stimulus of the corresponding pair was assessed. The relationship (R) between the subjects' responses and the variables in the first stimulus was 0.208. At the same time, 4.3 % of the variance in the results of the subjects were explained by the effects of predictors (R-square = 0.043). Since no significant correlations were found, variables did not affect the results of the subjects: 'returns' (p = 0.592), 'fixations' (p = 0.132), and 'saccades' (p = 0.165) (Table 1).

Table 1

The impact of variables on decision-making when presenting the first stimulus of the corresponding pair

The first stimulus of the pair				
	B	Standard error	β	Significance
Returns	0.094	0.174	0.052	0.592
Fixations	1.465	1.013	0.132	0.151
Saccades	0.447	0.32	0.135	0.165

Note: B – regression coefficient; β – standardized regression coefficient; The standard error is an indicator of the stability of the coefficient B.

In the second stage, the influence of the variables (predictors) mentioned above on the subjects' responses to the second stimulus of the corresponding pair was also assessed. The relationship (R) between the subjects' responses and the variables in the second stimulus was 0.375. At the same time, 13.9 % of the variance in the results of the

subjects were explained by the effects of predictors (R -square = 0.139). In this case, some of the variables had a statistically significant effect on the subjects' responses: 'returns' ($p = 0.01$), 'fixations' ($p = 0.047$), and 'saccades' ($p = 0.309$) (Table 2).

Table 2

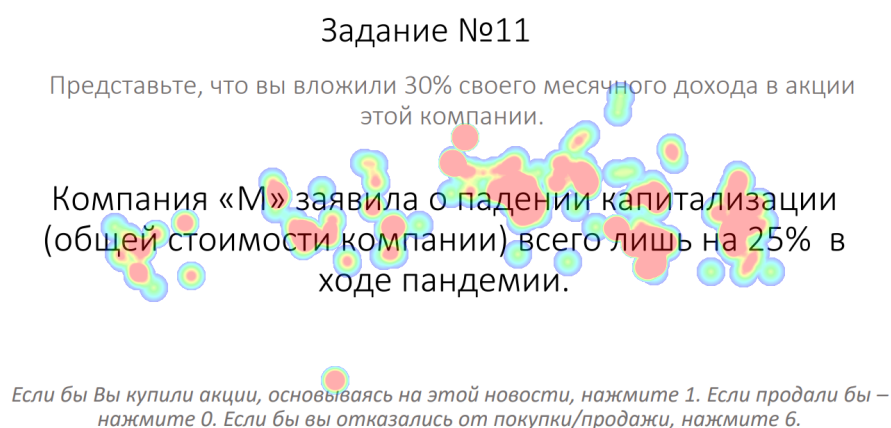
The impact of variables on decision-making when presenting the second stimulus of the corresponding pair

The second stimulus of the pair	B	Standard error	β	Significance
Returns	0.586	0.417	0.294	0.001
Fixations	2.678	0.174	0.176	0.047
Saccades	0.36	0.352	0.09	0.309

Figure 1 shows a heat map generated from the analysis of data from all subjects.

Figure 1

Heat map form the data from all subjects



The heat map shows the distribution of visual attention represented using a color gradient, with red representing the most important areas. This image shows that the area of interest (changed wording) – 'only' – is one of the main areas of attention fixation.

Discussion

Therefore, the results obtained using Chi-squares showed statistically significant differences between the responses to each pair to stimuli (14.29, $df = 2$; $p = 0.01$). This enabled us to make the conclusion that the respondents made different decisions. It was not yet clear whether this change was influenced by wording or by other unaccounted for variables. To determine the influence of the form of information presentation on changes in responses, a step-by-step regression analysis was performed.

Regression analysis found that the variable of 'saccades' did not have statistically significant relationships to assess its influence on the responses ($p = 0.309$). The variable of 'fixations' has a statistically significant effect on decision-making, but the level of significance is at the threshold level ($p = 0.047$) and should be examined again in a larger sample. The variable of 'returns' had a statistically significant effect on investment decisions ($p = 0.01$).

Thus, the return to a changed wording was the best predictor of the subject's decision among the variables selected for analysis. As a result, when the same information is presented in different forms, the subject's decision is significantly changed, and this effect depends directly on wording changes (see Figure 1). Thus, the data obtained confirm the previously stated hypothesis that (1) in the process of visual perception of paired visual stimuli with different information presentations, the oculomotor activity of study participants will vary in the number and duration of fixations and (2) the framing effect will influence economic decision-making.

The results obtained are consistent with the results of other researchers, such as the introduction of a recommendation in the process of independent economic decision-making has a significant impact on the willingness to put resources at risk (Folomeeva, Vinokurov, Fedotova, & Sadovskaya, 2022), and with other studies using eye tracking in areas of economic choice. Thus, researchers have found that the individual characteristics of subjects, such as the level of emotional enthusiasm and detachment, can influence decision-making (Toma, Cepoi, Kubinschi, & Miyakoshi, 2023). Furthermore, it has been shown that the characteristics of information presentation influence its perception and the decision-making process. Thus, the impact of the latest information received (Duclos, 2015), the impact of information modality (Fulmer, 2014), and the impact of visual emphasis on information (Sirois, Bédard, & Bera, 2018) have been identified. Our experiment demonstrates the impact of information presentation formats, which is consistent with the study of Hess et al., that revealed the impact of graphic presentation of information on risk perception (Hess et al., 2010).

Another similar eye-tracking study compared positive and negative framing and found differences in respondents' processing effort depending on the type of framing (Kuo, Hsu, & Day, 2009). A study conducted on lay investors found similar results – the format of information presentation (strategic or shareholder-oriented) influences investors' attitudes and stock buying/selling decisions (Cheng, Ko, & Green, 2023).

The data obtained are important for understanding the cognitive biases of private investors in trading on the stock exchange, as they are an important part of the Russian economy. The results are also important for investors themselves because they show the need to acquire information on the website of the company, not information intermediaries, because financial and non-financial reporting is strictly regulated by Russian legislation.

Conclusion

In our study, the responses of the subjects changed depending on different wording used for the news information. Evidence has been obtained that the lexical forms and the emotional connotation of news phrases (without changing objective information) influence the decision to purchase or sell shares in a company. This was reflected in the parameters of the oculomotor activity of the study participants in the process of visual perception of paired visual stimuli with different information presentations (parameters of the number and duration of fixations). Therefore, the results obtained enabled us to conclude that the framing effect has an impact on investment decision-making.

Research limitations

The disadvantage of this study is a relatively small sample size ($n = 20$). This limitation is expected to be overcome in the next study.

Another important limitation of this study is the lack of a clear operationalization of the concept of the framing effect in the experiment. Meanwhile, researchers (Levin, Schneider, & Gaeth, 1988) distinguish three types of framing:

1. Risky choice framing (two options are framed either positively or negatively, but with different degrees of risk).
2. Goal framing (two options lead to the same goal, but in one case through negative consequences if not achieved, and in another through positive consequences if achieved).
3. Attribute framing (two options to describe the same attribute – a positive and a negative description).

Thus, future research needs to more precisely operationalize the phenomenon under study on the basis of existing theoretical concepts.

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Appendix 1

Stimulus materials

Task 1.

Insiders predict that there is an 80 % chance that Company C will prepare a good report to ensure long-term growth of shareholder value.

Task 2.

This year, Company Q reported a record decline in capitalization rates (the company's total value). Most experts agree that the reason is external factors.

Task 3.

An anonymous source from Company F predicts a 80 % probability of a drop in the company's revenues.

Task 4.

This year, Company W reported an expected decline in capitalization rates (the company's total value). Most experts agree that the reason is external factors.

Task 5.

Company K reported high profits last year. It amounted to 500 billion rubles.

Task 6.

Company M reported a decline in capitalization rates (the company's total value) by only 25 % during the pandemic.

Task 7.

According to the results of the financial performance of company J, the Board of Directors voted to change the General Director.

Task 8.

At the extraordinary general meeting of shareholders of Company I, the Board of Directors voted to change the General Director.

Task 9.

An anonymous source from Company E predicts a 80 % probability of a decline in the company's revenues.

Task 10.

Insiders predict that there is a 20 % probability that Company D will produce a bad report, which will result in a long-term decline in shares.

Task 11.

Company B reported a decline in capitalization rates (the company's total value) by as much as 25 % during the pandemic.

Task 12.

Company L reported its standard profit last year. It amounted to 500 billion rubles.

Stimulus pairs: 1–10, 2–4, 3–9, 5–12, 6–11, 7–8.

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Arsenii Vladimirovich Leont'ev contributed to the experimental design and the choice of statistical methods, processed the data, interpreted statistical data, wrote the Introduction and the Discussion sections.

Pavel Igorevich Letyagin contributed to the choice of research methods, collected the data, wrote the Methods and the Results sections.

Ol'ga Sergeevna Deyneka supervised the research, prepared the instructions for the stimulus materials, edited the text of the manuscript (logic, style).

Lyubov' Olegovna Tkacheva contributed to a critical revision of a part of the content of the manuscript and to scientific and literary editing.

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Conflicts of Interest Information

The authors have no conflicts of interest to declare.

Interaction of Semantic Contexts in Problem Solving: Congruence and Dissociation Effects

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Abstract

Introduction. Many cognitive phenomena can be justifiably interpreted as manifestations of contextual mediation: word superiority effects, priming effects, attitudinal effects, contextual memory effects, and so on. A separate area of research is the study of contextual interactions. In the present work, the aim was to identify congruence and dissociation effects in the interaction of short-term and ultra-short-term semantic contexts. **Methods.** The sample (121 subjects) was divided into four experimental and one control group. The procedure included five blocks of tasks. Participants were required to solve 15 anagrams (three tasks in each block). The short-term context was given by a sequence of words, which were the solutions to the anagrams. After the third anagram in each block, a prime - a word that either semantically matched the short-term context (congruence condition) or did not match it (dissociation condition) - was presented for 40 msec. After the mask, a target task was demonstrated - "complementing the base of the word to the whole". Conditions differed between groups according to congruence/dissociation of contexts and relevance/irrelevance to the solution. **Results.** Relevance and congruence conditions significantly reduced target task completion time. The effect was also evident in the reduced time of contextually related responses compared to the solution alternatives. In context dissociation conditions, there was a reduction in the strength of the effect of contextual interaction. **Discussion.** Contextual interactions have two main types: co-operation, and rivalry. Based on temporal stability, we can differentiate ultra-short-term, short-term, and long-term contexts. Their co-operation or competition defines the longitudinal type of interaction. The transversal type should include the interaction of simultaneously given contexts. The study took into account the types of interaction of the longitudinal type,

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as well as semantic "relevance/irrelevance" to the task solution. The main result of the experiment can be considered the establishment of the effect of contextual additivity. The prospect of research may be the study of contextual interaction of different kinds and types.

Keywords

cognitive activity, context, types of context, contextual interactions, congruence and dissociation effects

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Introduction

The concept of "context" is actively used not only in linguistics, but also in scientific and psychological literature. In cognitive psychology, the context effect (CE) is understood as the result of the influence of psychological and situational factors that condition cognitive activity on problem solving (perceptual, attentional, mnemonic, thinking, etc.). In other words, contextual mediation is referred to when some organised information, which precedes the process of problem solving, determines the productivity of its performance (Baars, 1989).

According to A. A. Verbitsky (2005), context is "a system of internal and external factors and conditions of human behaviour and activity that influence the features of perception, understanding and transformation of a particular situation" (pp. 137-138). In turn, P. Lindsay and D. Norman (1974) believe that context is a certain set of rules according to which a person constructs the perceptual world. Contexts define our expectations and ensure the meaningfulness of perception.

The idea that stimulus influences of the environment are not isolated is suggested by R. Solso (2006). On the one hand, any object is an element or part of the entire perceptual field, or, in other words, it is embedded in the situational context. On the other hand, the internal, psychological context proper, previously formed in perceptual experience, creates expectations that guide the top-down processes involved in the act of perception. It is known that the role of readiness for perception was particularly emphasised in his

concept by J. Bruner (1977). The opinion that subjective experience can act as a context of perception is shared by E. E. Bechtel and A. E. Bechtel (2005). "Context," these authors note, "is a mental construct that is used to recognise perceived objects, informationally enrich them and optimise perception" (p. 191).

The concept of "context" is one of the key concepts in B. Baars' (1989) theory of global workspace. Currently, it is one of the most popular cognitive theories of consciousness. To the main types B. Baars refers: contexts of perception and mental images, contexts of conceptual thinking, goal contexts and communication contexts (Baars, 1989, pp. 177). Baars (1989) pays special attention to the implicit nature of contextual influences: although a context can be formed as a result of previously realised influences, its influence is beyond conscious control at the moment of a cognitive act. V. M. Allakhverdov (2021) takes a similar position regarding the implicit nature of contextual influences. In his concept he distinguishes between positive and negative choice effects. The positive choice effect, in the broad sense of the word, is the information that is realised by the subject at a given moment of time. At the same time, the actual perceived but unconscious information is chosen negatively. Thus, the author specifies: "...negative choice determines what is usually called context, but without special efforts this context is usually not realised" (Allakhverdov, 2015, p. 1).

In the psychology of cognition, a large number of experimental effects have been described that can be considered private varieties of EC: priming effects (Marcel, 1981; Marcel, 1983; Falikman & Koifman, 2005; Agafonov, 2010; Gulan & Valerjev, 2010); attitudinal effects (Uznadze, 2004; Arbekova, 2016; Koifman, 2017); multivalence understanding effects (Rayner & Frazier, 1989; Kudelkina, 2008; Mamina, 2012; Filippova, Moroshkina, 2015; Haro, Demestre, Boada & Ferré, 2017; Filippova, Allakhverdov, 2020); context-dependent memory effects (Godden & Baddeley, 1975; Bower, Monteiro & Gilligan, 1978; Parker & Gellarty, 1997; Grant et. al, 1998; Isarida & Isarida, 2006; Isarida & Isarida, 2014); the effect of contextual cues (Chun & Jiang, 1998; Chun, 2000; Jiang & Chun, 2001); the effect of functional fixity in thinking (Dunker, 1965); and so forth. It is no coincidence that B. Baars (1989) believes that "context" is a collective concept for various phenomena of a wide cognitive spectrum; "it is a modern close relative of "attitude," "level of adaptation" in perception, and a variety of proposed knowledge structures and "frames" in cognitive science" (pp. 161).

A promising direction in the study of EC in cognitive activity is the study of contextual interactions. The search in this direction is stimulated by the idea that the subject of cognition can be simultaneously included in different contexts, so it is important to take into account the mediating influence on cognitive activity of intercontextual connections, not only local, isolated contexts. B. Baars (1989) distinguishes two main types of such interaction: competition (rivalry) and co-operation (pp. 392). In the case of competition, contexts are incompatible, i.e. conflicting with each other. In the case of co-operation, we can talk about their unification ("coalition", in B. Baars' terms). An example of co-operation is such interaction when some contexts are embedded in others.

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In addition to the types described by B. Baars, we should also distinguish types of contextual interactions. Longitudinal and transversal types can be roughly distinguished. The longitudinal type includes interactions of contexts that have different temporal stability. By analogy with the accepted classification of memory types, contexts can be differentiated on this basis into ultra-short-term, short-term and long-term. Their interaction defines the longitudinal type of interaction. The transverse type includes the interaction of simultaneously given contexts. The same context can be involved in different types of interaction. In other words, intercontextual links can form a network of contextual interactions.

In our study, we took into account the types of contextual interaction of the longitudinal type, as well as such a characteristic of the context as "relevance/irrelevance" to the task solution (in our case - semantic correspondence of a separate context to the solution of the target task). Thus, the experimental plan assumed the variation of the states of two independent variables.

The aim of the study was to establish the influence of contextual interaction on the productivity of cognitive problem solving. The following hypotheses were tested:

- *Hypothesis 1:* The positive effect of the influence of contextual interaction will be most pronounced when the ultra-short-term and short-term contexts relevant to the target task are congruent;
- *Hypothesis 2:* The dissociation of ultra-short-term and short-term contexts will lead to a reduction in the strength of the influence of contextual interaction on problem solving;
- *Hypothesis 3:* The negative effect of contextual interaction will occur when there is congruence between short-term and ultra-short-term contexts irrelevant to the task.

Methods

Sampling

The procedure involved 121 participants (80 females and 41 males) aged 17 to 34 years ($M = 22$) with normal or corrected-to-normal vision. Four experimental groups (EG1-EG4) of 25 participants each and one control group (CG) of 21 subjects were formed. The experiment was conducted with each subject individually in laboratory conditions.

Study procedure

The experimental design was realized using the PsychoPy software package. A personal computer with a monitor diagonal of 18 inches was used.

The procedure consisted of five blocks of tasks. The subjects were instructed to solve 15 anagrams (three problems in each block). In each separate block, the sequence of

words that were anagram solutions established a short-term context (STC). The CCs for the different task blocks were formed by anagram solutions belonging to the following categories: "winter", "food", "sports", "furniture", "animals". For example, in the first block of tasks, subjects were presented with anagrams in which the following words were encoded: "holod", "sneg", "led". It took no more than 30 seconds to solve the anagram.

After solving the third anagram in each block, the ultra-short-term context (USC) was set. For this purpose, an experimental priming technique was used. A masked prime, a word that either semantically matched the CC (congruence condition) or did not match it (dissociation condition), was exposed to the subject in the centre of the screen for 40 ms. After prime stimulation, a grating mask was exposed for 100 ms. Immediately after the visual masking, a target task was demonstrated - "addition of the word base to the whole" (Falikman & Koifman, 2005). For example, the subject had to find as quickly as possible a word that matched the base "_oro_" (potential solutions could be the words: "moroz", "gorod", "korob", "threshold"). The following target tasks were presented: "_oro_", "_u_la", "_urn_r", "_i_an", "_o_ka". The tasks could have a single solution ("_urn_r" / "turnir"; "_u_la" / "bulka") or several possible solutions (e.g., "_i_an" / "divan", "tyran"). When finding an answer, the subject had to react as quickly as possible by pressing the "space" key, followed by naming the word aloud. The programme recorded the reaction time (RT) and the experimenter noted the subject's response in the experimental protocol. All stimuli were printed in bold, size 48. Before the main procedure, participants underwent a training phase.

The conditions in the groups differed according to context congruence/dissociation and relevance/irrelevance to the solution of the target problem:

- EG1: CC and USC are congruent and relevant to the solution of the target problem;
- EG2: contexts are congruent and irrelevant to the solution;
- EG3: contexts dissociated; CC was relevant to the decision USC was irrelevant;
- EG4: contexts dissociated; CC was irrelevant to the decision USC was relevant;
- CG: contexts are dissociated and irrelevant.

Results

Only those answers in the task blocks in which all three anagrams were solved were selected for processing. After removing outliers (values that were greater / less than two standard deviations from the mean), the data distributions became normal.

The experimental design is a patchwork design and is not a full factorial design; therefore, a one-factor analysis of variance was used to test the hypotheses. First, the time to solve the target task was analyzed for the factor "relevance / irrelevance of congruent contexts to the solution of the target task" for EG1 and EG2. (The dispersions in the compared groups did not differ significantly by Fisher's criterion, which confirms

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the validity of using the analysis of variance: $F = 1.781$, $p = 0.056$). The results showed that subjects in EG1 were significantly faster in completing the target task than those in EG2: $F(1; 48) = 6.462$; $p = 0.014$.

Next, a one-factor analysis of variance was performed on the factor "context congruence/dissociation" with the results obtained in EG1, EG3 and EG4. Thus, the type of CC and USC interaction served as the independent variable. (The variances were not significantly different: $F = 1.939$, $p = 0.069$). Task performance was found to vary significantly across conditions: $F(2; 69) = 7.017$; $p = 0.001$. At the same time, CC mismatch with the target task solution (EG4) had a significantly stronger effect on task completion time than USC mismatch (EG3): by Tukey's criterion, $p = 0.032$. The results on RT for all groups of subjects are given in Table 1.

Table 1
Results of target tasks, in sec.

groups	Average solution time	Standard deviation	95 % confidence intervals	
			From.	Before
EG1	4,689	2,945	3,474	5,905
EG2	8,757	7,416	5,625	11,888
EG3	6,525	3,763	4,936	8,114
EG4	7,689	3,104	6,347	9,032
CG	11,269	7,103	8,019	14,486

Comparison of the experimental groups' indicators with the results of the CG was carried out using Tukey's criterion. It was found that RT in EG1 and EG3 was significantly lower than in CG: EG1 ($p < 0.001$), EG2 ($p = 0.25$), EG3 ($p = 0.008$), EG4 ($p = 0.1$).

Next, we analyzed the indicators of time spent by subjects on solving only those target tasks that potentially had several answer options. The RT in situations where the answers were words corresponding to the contexts (e.g., "holod", "turnir", "koshka") and the time of alternative answers (e.g., "gorod", "korob", "divan", "tyran", "goroka", "lodka") were compared (Table 2). Processing was performed using Student's t-criterion with Bonferroni correction.

Table 2

Results of solving target tasks with several answer options, in sec.

groups	Average time of contextually related responses, in sec	Average time of alternative answers, in sec
EG1	3,724	8,117
EG2	3,924	8,499
EG3	3,929	6,291
KG	6,07	5,677

It was found that subjects in EG1, EG2 and EG3 were significantly faster in giving the answer corresponding to both contexts (EG1) compared to the alternative choice: EG1 ($t(21) = 2.9$; $p = 0.046$). No significant differences were found in EG2, EG3 and CG: EG2 ($t(29) = 0.8$; $p > 0.05$), EG3 ($t(38) = 0.7$; $p > 0.05$), CG ($t(24) = 0.15$; $p > 0.05$). In EG4, the subjects did not give any contextually related answers; therefore, no analyses on this indicator were conducted in this group.

The number of contextually related and alternative responses was compared using the χ^2 -Pearson criterion (Table 3).

Table 3

Number of contextually related and alternative responses

groups	Contextually related responses	Alternative answers
EG1	20	5
EG2	11	21
EG3	20	23
EG4	0	35
CG	6	20

The results showed that in EG1 there were significantly more "contextual" responses than alternative ones. In contrast, the opposite ratio was found in CG: EG1 ($\chi^2 = 7.84$; $p < 0.01$), EG2 ($\chi^2 = 2.532$; $p > 0.05$), EG3 ($\chi^2 = 0.094$; $p > 0.05$), CG ($\chi^2 = 6.5$; $p < 0.05$).

Discussion

The results of the study showed that the strength of the influence of contextual interaction on the solution of the insight-type task, which was the task "addition of the word base to the whole", depends both on the nature of the contexts' interaction and on their relevance to the solution.

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When contexts are congruent and, at the same time, semantically relevant to the solution of the target task, the time spent on the task is significantly reduced. Thus, we can say that the cooperation of congruent contexts significantly increases the total power of contextual influence. We propose to understand "power" as a parametric characteristic of a context that reflects the measure of integration of individual, local contexts (e.g., semantic, perceptual, or spatial orientation contexts) into a single context. Such integration can take place in conditions of both longitudinal type of co-operation, as in our case, and transversal.

The cumulative positive effect of context co-operation was also manifested in a greater number of choices of contextually related solutions compared to alternatives. "Contextual" answers were given by the subjects four times more often than alternative answers. In turn, a significant difference was also found between the time of contextually relevant solutions and the time of alternative solutions: contextually related answers were given more than twice as fast.

This study result is consistent with the experimental data obtained by A. Marcel (1981), who used sequential prime stimulation, and with the data of D. Balota & S. Paul (1996). In the latter's experiment, the nature of the interaction between two successive prime stimuli preceding a target task varied. When the primes were semantically close, the severity of the priming effect increased. In our case, under the conditions of co-occurrence of relevant contexts, the expression of the EC increased.

At the same time, a noticeable decrease in the strength of the influence of contextual interaction occurs in conditions of context dissociation, when only one of them is relevant to the task solution. If the relevant USC slightly accelerates the solution (the effect was manifested at the level of tendency), the relevance of the CC has a much more noticeable facilitating effect on the solution. This is quite consistent with the results of an earlier study that assessed the difference in the degree of influence of previously realised and unrealised information on the effects of perception of ambiguous images (Agafonov, 2007).

The data obtained in the experiment also allow us to speak about the detected negative effect of the influence of contextual interaction. It manifested itself in the increase of task performance time in conditions when both contexts were congruent, but at the same time irrelevant to the solution.

Conclusion

The results of the study demonstrated that in conditions of co-operation of relevant semantic contexts, the total power of the context or, in other words, the strength of contextual influence on the solution of the task increases, which was manifested in the

- A meaningful reduction in task completion time;
- b) a greater number of contextually related answers compared to the number of answers semantically irrelevant to contexts;

- c) a meaningful reduction in the time of contextually related decisions compared to alternative choices.

Thus, an experimental fact has been established in the co-occurrence of relevant contexts, which can be tentatively called the *contextual additivity effect*.

In conditions of context dissociation, when only one of them is semantically relevant to the task solution, a decrease in the strength of the influence of contextual interaction was found. In this case, the semantic inconsistency of the short-term context with the solution slows down task performance more compared to the condition when the ultra-short-term context is irrelevant. In turn, a negative context effect was found in conditions where both contexts had no semantic correspondence with the potential solution.

Thus, the experimental results demonstrated both facilitative and inhibitory effects of contextual interaction on cognitive productivity.

The prospect of further research in this area may be the study of the effects of interaction between heterogeneous contexts of different types and kinds, as well as the construction of a model of contextual interactions that would take into account both the parametric characteristics of individual contexts (e.g., "homogeneity", "stability") and the features of the interactions themselves.

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Conflict of Interest Information

The authors have no conflicts of interest to declare.

Social Factors of Psychological Well-being of Cancer Patients During the COVID-19 Pandemic

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Abstract

Introduction. The combination of oncopathology and coronavirus infection significantly increases the risk of developing mental maladaptation. Currently, insufficient research has been conducted on the relationship of social factors with the psychological characteristics of cancer patients during the coronavirus pandemic. On this basis, this study examined the relationship between marital status and educational level with the characteristics of the personal, value-semantic sphere, quality of life, intensity of stress coping strategies, as well as the severity of psychopathological symptoms in cancer patients during the COVID-19 pandemic. **Methods.** The study was conducted on the basis of the Federal State Budgetary Institution "NMIC of Oncology" of the Ministry of Health of the Russian Federation (Rostov-on-Don), 112 cancer patients aged 18 to 62 years took part in it (the average age was 42 years, 36% of them were men), 49% had a diagnosis in the field of oncogynecology, 17% – in the field of oncomammology, 20% – in the field of oncurology, 14% had lymphomas. The following psychodiagnostics tools were used: the SCL-90-R questionnaire, the R. Lazarus coping test, 5PFQ, the "Test of meaning-life orientations" by D.A. Leontiev, the M. Rokich "Value Orientations", the WHO-100 scale. For statistical processing of the obtained results, one-factor ANOVA analysis of variance was used, as well as a posteriori Tukey's analysis for nonequilibrium sample sizes. **Results.**

Widowhood reduces the resource potential of the individual; it is associated with a low level of meaningfulness of life and a greater severity of psychopathological symptoms in cancer patients; the level of education is associated with the intensity of pain experience, as well as with the intensity of stress coping strategies. **Discussion.** The results obtained complement existing data on the impact of marital status and educational level on the psychological characteristics of patients with life-threatening diseases. The results of the study can be used to develop programs for psychological support of patients, taking into account their psychosocial characteristics.

Keywords

psycho-oncology, COVID-19, value orientations, quality of life, psychological well-being, coping strategies, oncology patients

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Introduction

An illness is a crisis period during which not only a person's life and health are threatened, but also his psychological well-being, values are being revised, new strategies for coping with stress are being developed.

Psychological well-being can be considered as "an integral systemic state of a person or group, which is a complex interrelation of physical, psychological, cultural, social and spiritual factors" (May, 2015).

Cancer patients during the COVID-19 pandemic experienced serious distress due to two life-threatening diseases, as well as social restrictions (including the inability to receive planned treatment). The study of the psychological characteristics of cancer patients, strategies for coping with stress, value orientations, as well as associated social factors is of interest not only from a scientific point of view, but also from the standpoint of developing measures of adequate psychological support, which allows to increase the level of psychological well-being of people who find themselves in similar circumstances.

The study of the relationship between psychosocial (quality of life and characteristics of socio-psychological adaptation) and psychobiological factors with the peculiarities

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of the course of cancer and comorbid disorders is carried out by interdisciplinary fields of knowledge located at the junction of psychology, sociology and medicine – psychoncology (Khozhaev et al., 2020; Archer et al., 2020; Millar et al., 2020), oncopsychiatry and psychoimmunology (Bower, Radin & Kuhlman, 2022; Brietzke, Magee, Freire, Gomes & Milev, 2020; Debnath, Berk & Maes, 2020). In this context, data from studies examining the self-concept and self-attitude of patients in connection with different physical health status are also important (Bespalova, 2022).

The relevance of the study of social factors of psychological well-being of cancer patients during the COVID-19 pandemic is explained by the fact that to date there has been insufficient research to understand the holistic picture devoted to studying the specifics of the influence of comorbid disorders – oncopathology and coronavirus infection – on the characteristics of mental activity, personality, as well as indicators of socio-psychological adaptation of patients.

It is known that mental disorders are comorbid to oncological diseases and coronavirus infection (Tarasevich, Baryash, Obe'dkov, 2020). Patients with oncopathology are at risk of developing mental illness: according to a number of studies, depression occurs in almost 30% of oncopathologists, anxiety occurs in 50% (Caliandro et al., 2023; Stiegelis, Ranchor, Sanderman, 2004), severe stress occurs in 20.8% (Juanjuan et al., 2020). A number of authors points to a significant increase in indicators of anxiety and depression, as well as the risk of suicide in women who have survived breast cancer, compared with conditionally healthy ones (Bates, Mostel & Hesdorffer, 2017; Carreira et al., 2018). Anxiety and depressive disorders also top the list of complications of coronavirus infection (Akimenko, 2022; Seledtsov, Kirina, Akimenko, 2020; Ho, Chee & Ho, 2020; Klaassen & Wallis, 2021; Liu et al., 2020; Ng et al., 2020; Romito et al., 2020; Venderbos et al., 2015; Watts et al., 2015; Wang et al., 2020).

Toquero P. et al. (2021) showed that the combination of oncopathology and coronavirus infection increases the level of emotional distress in patients by 10.3%, compared with patients with monopathology. The most life-threatening, according to research results, is a combination of coronavirus infection and malignant neoplasms (ZNO) of the lungs and organs of the gastrointestinal tract (Karakozov, Zotov, 2020).

The results of the meta-analytical study showed that COVID-19 had a pronounced effect on the psychological well-being and health of cancer patients. Fear of COVID-19, fear of progression of the underlying disease, interruptions in the work of cancer services, the stage of cancer and weakened immunity are factors that significantly influence the decision of cancer patients regarding further treatment of the underlying disease in a pandemic. Against this background, many patients refused to receive medical care for cancer (Momenimovahed et al., 2021).

Thus, the combination of oncopathology and coronavirus infection significantly increases the risk of developing mental disorders: according to data obtained by E. S. Gural (2022), 90% of patients from among those who suffer from oncopathology and

have suffered a coronavirus infection have mental disorders. Among these patients, 60% have neurotic disorders, 20% have affective disorders, and 10% have organic disorders.

There is a wide prevalence of postcovid syndrome (PTSD, anxiety disorders, depression). Bo et al. (2021) showed that the severity of post-traumatic stress disorder in the group of patients with COVID-19 was 96.2%. According to the results of Rogers et al. (2020), the average duration of postcovid syndrome is at least three months, it significantly reduces the quality of life of patients and often requires psychological support, which in a pandemic could only be implemented in an online format. At the same time, according to the results of a study conducted in China on the peculiarities of the population's attitude to crisis mental health services engaged in psychoeducation and counseling activities, only 50% of respondents trusted online psychological assistance services. Psychosocial obstacles in seeking psychological help online were caused by the elderly age of patients and concomitant conditions: decreased vision, inability to use electronic devices through which you can connect to the Internet, etc. (Wang et al., 2020).

Magomed-Eminov M.S. (2021) shows that in an extreme situation, the COVID-19 pandemic, there was a resocialization, a value transformation of personality, identity, and subjectivity of a person. At the same time, patients with lung, stomach, and intestinal cancers who participated in the Gural E. S. study (2022) and highly appreciated the social significance of family and children showed relative stability in the quality of life.

The purpose and hypothesis of the study

Thus, the study of social factors of psychological well-being of cancer patients during the COVID-19 pandemic is of particular importance due to their likely impact on the formation of the internal picture of the disease of patients, on the level of compliance, as well as on the success of psychological support. This determined **the purpose** of this study.

The hypothesis of the study was the assumption that psychological characteristics (including value-semantic orientations, strategies for coping with stress, personal characteristics, quality of life, severity of psychopathological symptoms) in the conditions of the COVID-19 pandemic may differ in patients with different marital status and educational level.

Methods

Sample Characteristics

The study involved 112 cancer patients aged from 18 to 62 years (average age – 42 years, of which 36% were men, 64% were women). 49% of patients were diagnosed in the field of oncogynecology (cervical cancer, uterine body cancer, ovarian cancer), 17% – in the field of oncomammology (breast cancer), 20% – in the field of oncurology (testicular cancer, kidney cancer, prostate cancer, bladder cancer), 14% of patients had lymphomas

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(Hodgkin's lymphoma, follicular lymphoma, non-Hodgkin's lymphoma). The study was conducted on the basis of the Federal State Budgetary Institution "NMIC of Oncology" of the Ministry of Health of the Russian Federation (Moscow Rostov-on-Don) from spring 2021 to autumn 2023.

Psychosocial characteristics of the sample participants

Let's present some psychosocial characteristics of the sample participants:

- The study involved cancer patients with secondary complete (12%), secondary specialized (34%) and complete higher education (54%).
- 48% of cancer patients surveyed had COVID-19. 15% are single, 39% are in a registered marriage, 14% are in an unregistered marriage, 20% are divorced, 12% are widows/widowers.
- 9% of respondents indicated that they considered their own childhood unhappy.
- 15% of the respondents had no children, 30% had one child, 30% had two children, 25% had three or more children.
- 61% of respondents live in the city, 39% in rural areas.

Psychodiagnosics tools

The following psychodiagnosics tools were used in the study:

- Symptom Checklist-90-Revised;
- Questionnaire "Methods of Coping Behavior" (CSP), S. Folkman, R. Lazarus;
- Five-factor personality questionnaire, 5PFQ;
- "Test of meaning-life orientations" by D. A. Leontiev;
- "Value orientations" methodology by M. Rokich;
- The WHO-100 scale.

For statistical processing of the obtained results, one-factor ANOVA analysis of variance was used (categorizing factors: COVID-19 in the anamnesis no earlier than 6 months in relation to the time of psychodiagnosics; marital status, level of education), as well as a posteriori Tukey's analysis for nonequilibrium sample sizes.

Results

The relationship of marital status with the psychological characteristics of cancer patients during the COVID-19 pandemic

According to the results of a one-factor analysis of variance, a significant influence of the variable "marital status" on the psychological characteristics of cancer patients was revealed ($F = 3.3$, the effect of art.sv. = 24, the error of art.sv. = 241.9, $p = 0.000$). Also,

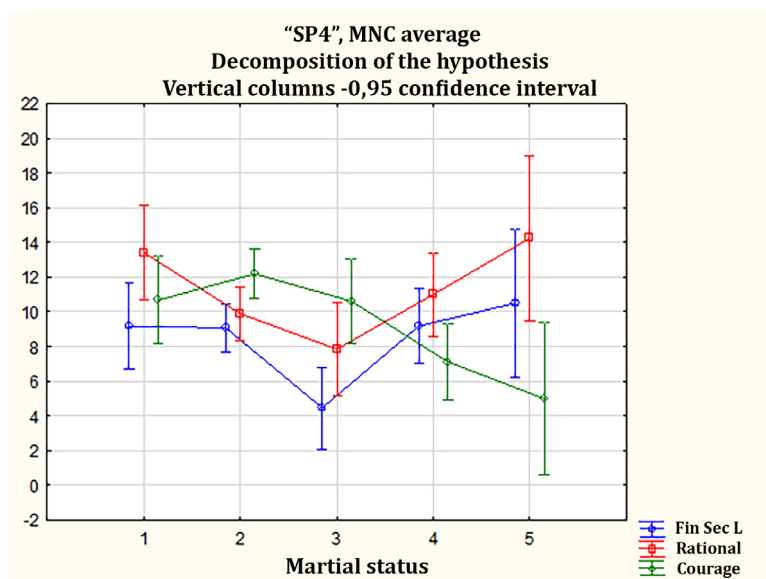
during the a posteriori Tukey's analysis, a number of significant differences in the severity of the signs we studied were revealed.

Statistical analysis showed that in the hierarchy of value orientations of oncology patients who are in an unregistered marriage (M3), such a terminal value as "financially secure life" occupies a significantly higher position (absence of material difficulties; $M_1 = 9.2$, $M_2 = 9.1$, $M_3 = 4.5$, $M_4 = 9.2$, $M_5 = 10.5$; $p = 0.01$); rationalism occupies a higher position in the hierarchy of their instrumental values (the ability to think sensibly and logically, make deliberate, rational decisions; $M_1 = 13.4$, $M_2 = 9.9$, $M_3 = 7.8$, $M_4 = 11.0$, $M_5 = 14.3$; $p = 0.037$).

Among divorced (M4) and widowed (M5) cancer patients, a higher position in the hierarchy of values is occupied by courage in defending one's opinion and views ($M_1 = 10.7$, $M_2 = 12.2$, $M_3 = 10.6$, $M_4 = 7.1$, $M_5 = 5.0$; $p = 0.002$) (Figure 1).

Figure 1

Results of variance and post hoc analyzes of value orientations of cancer patients with different marital status (Tukey's Test for Post-Hoc Analysis after One-way ANOVA).



Note. Designations: (*Fin Sec L*) – terminal value "Financially secure life" (absence of material difficulties); *Rational* – instrumental value "Rationalism" (ability to think sensibly and logically, make deliberate, rational decisions); *Courage* – instrumental value "Courage in defending one's opinion, views". Marital status (hereafter): 1 – single; 2 – officially married; 3 – unregistered marriage; 4 – divorced; 5 – widow/widower.

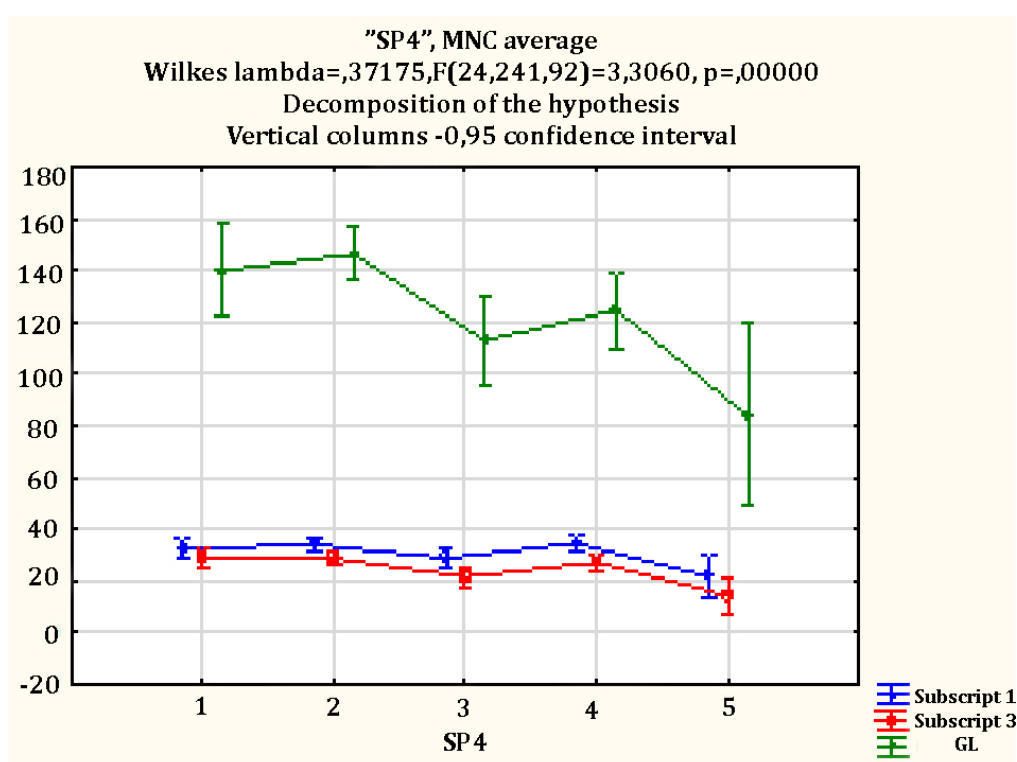
The study of life meaning orientations showed a significantly lower level of life meaning in the group of widowed cancer patients (M5); significantly higher - in the

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group of cancer patients who were married (M2), (M1 = 140.2, M2 = 146.5, M3 = 112.9, M4 = 124.8, M5 = 84.0; $p = 0,01$). The differences were expressed to a greater extent in lower commitment (M1 = 32.3, M2 = 33.9, M3 = 28.6, M4 = 34.4, M5 = 21.7; $p = 0.04$), as well as – life performance and satisfaction with self-realization (M1 = 29.1, M2 = 28.5, M3 = 21.3, M4 = 27.1, M5 = 14.0; $p = 0.004$) (Figure 2).

Figure 2

Results of variance and post hoc analyzes of life-meaning orientations of cancer patients with different marital status (Tukey's Test for Post-Hoc Analysis after One-way ANOVA).



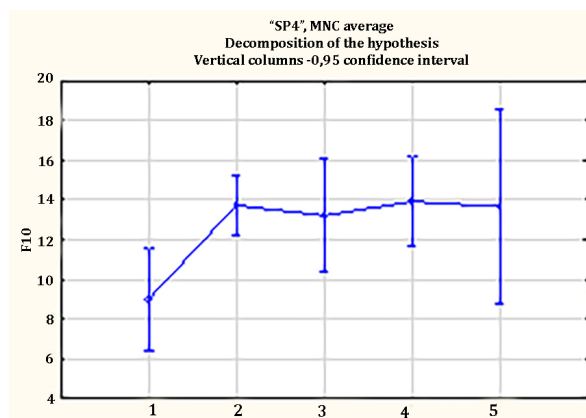
Note. Designations: *Subscript.1* – Subscale 1 "Goals in life". *Subscript.3* – Subscale 3 "The effectiveness of life or satisfaction with self-realization." *GL* is a general indicator of the meaningfulness of life.

There were no significant differences in the severity of stress management strategies depending on the marital status of cancer patients.

The study of the relationship between marital status and the quality of life of cancer patients demonstrated that single cancer patients cope worse than others with taking care of themselves and their property (M1 = 9.0, M2 = 13.7, M3 = 13.2, M4 = 13.9, M5 = 13.7; $p = 0.02$) (Figure 3).

Figure 3

Results of variance and post hoc analyzes of characteristics of the quality of life of cancer patients with different marital status (Tukey's Test for Post-Hoc Analysis after One-way ANOVA)

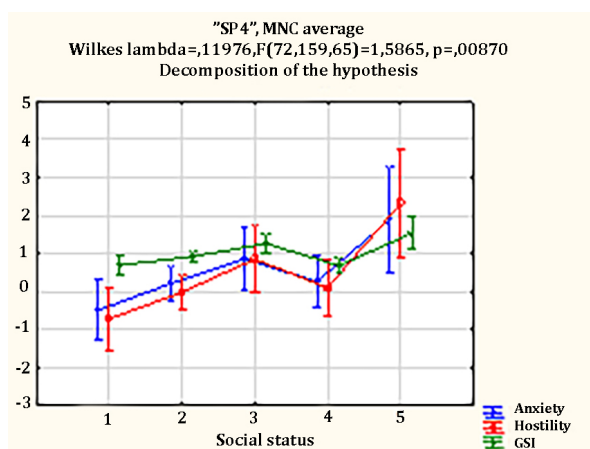


Note. Designations: F10 is an indicator of "Ability to perform everyday tasks".

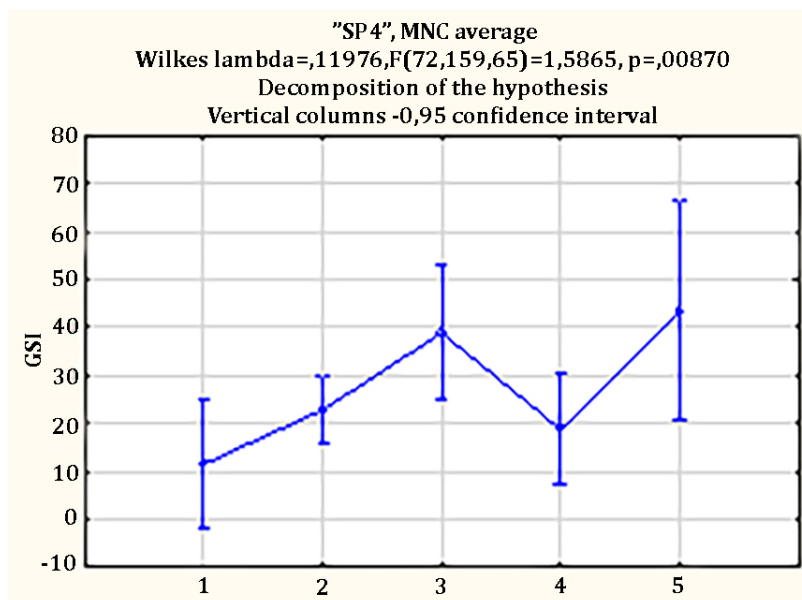
The study of the severity of psychopathological symptoms (Symptom check list-90-revised – SCL-90-R) demonstrated significantly high indicators of anxiety ($M = 1.9$, $p = 0.03$) and hostility ($M = 2.3$, $p = 0.004$), as well as the overall severity of symptoms ($MGSI = 1.5$, $p = 0.009$; $MPSI = 43.3$, $p = 0.046$) in widowed cancer patients (M5). Patients living in an unregistered marriage (M3) have a higher number of symptoms compared to single (M1), ($M1 = 38.9$, $M3 = 11.44$, $p = 0.046$) (Figure 4).

Figure 4

Results of variance and post hoc analyzes of the severity of psychopathological symptoms in cancer patients with different marital status (Tukey's Test for Post-Hoc Analysis after One-way ANOVA)



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Note. Notation: GSI is the general index of severity of symptoms.

The connection between the level of education and the psychological characteristics of cancer patients during the COVID-19 pandemic

According to the results of a one-factor analysis of variance, there was no significant effect of the variable "level of education" on the psychological characteristics of cancer patients ($F = 1.7$, effect of art.sv. = 72, error of art.sv. = 60, $p = 0.3$). However, Tukey's post hoc analysis revealed a number of significant differences in the severity of the signs we studied.

According to the results of Tukey's post-hoc analysis, the terminal value "active lifestyle (fullness and emotional richness of life) occupies significantly higher positions in the hierarchy of values of cancer patients with complete secondary education and is preferred and significant for them, while for groups of cancer patients with secondary education with special and complete higher education, this value is indifferent ($M_2 = 2.4$; $M_3 = 7.7$; $M_5 = 6.9$, $p = 0.02$) (Figure 5).

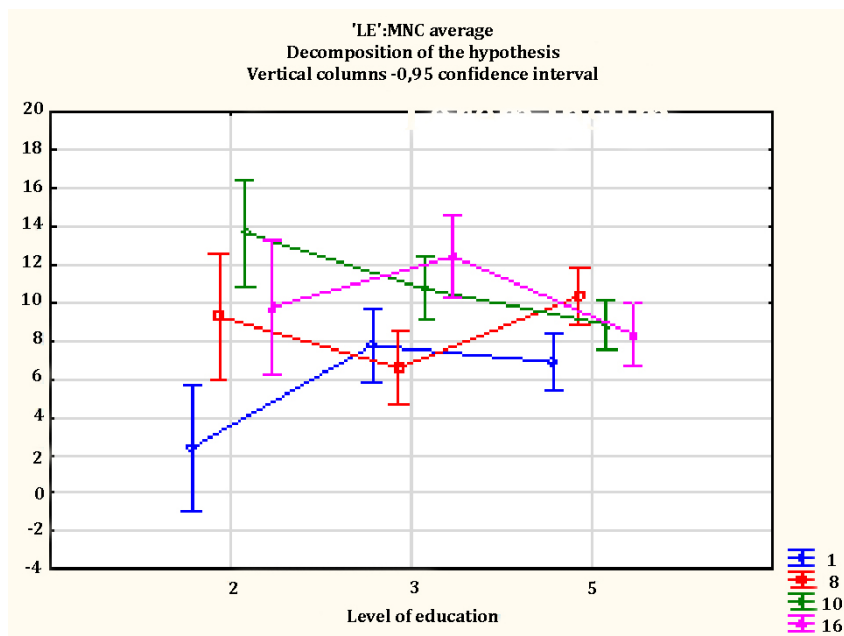
More significant for cancer patients with secondary specialized education is the value of "having good and loyal friends" ($M_2 = 9.3$; $M_3 = 6.6$; $M_5 = 10.3$, $p = 0.009$) (Figure 5).

Significantly less significant for cancer patients with complete secondary education is the value of "cognition" ($M_2 = 13.6$; $M_3 = 10.7$; $M_5 = 8.8$, $p = 0.009$) (Figure 5).

Significantly more significant for cancer patients with complete higher education is the instrumental value of "honesty" ($M_2 = 9.8$; $M_3 = 12.4$; $M_5 = 8.3$, $p = 0.009$) (Figure 5).

Figure 5

Results of variance and post hoc analyzes of the severity of terminal and instrumental values in cancer patients with different levels of education (Tukey's Test for Post-Hoc Analysis after One-way ANOVA)



Note. Designations: 1 – the value of "active lifestyle" (fullness and emotional saturation of life); 8 – the value of "having good and faithful friends"; 10 – the value of "cognition" (the opportunity to expand one's education, horizons, general culture, intellectual development); 16 – the value of "honesty" (truthfulness, sincerity). The level of education (here and further): 2 – complete secondary education; 3 – specialized secondary education; 5 – complete higher education.

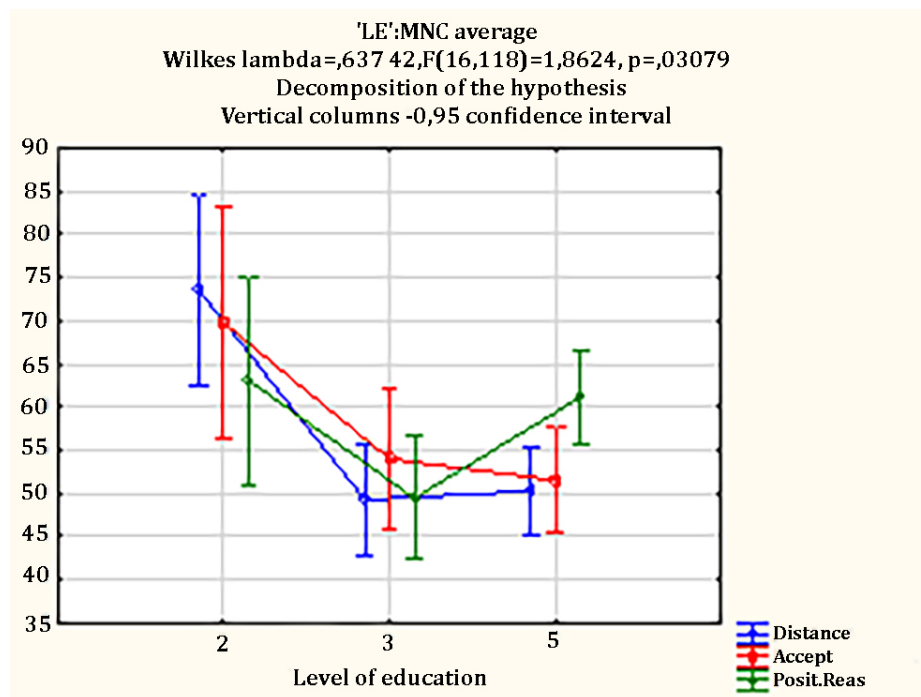
According to the results of a one-factor analysis of variance, a significant influence of the variable "level of education" on the coping strategies of oncopatients was revealed ($F = 1.9$, the effect of art.sv. = 16, the error of art.sv. = 118, $p = 0.03$).

During Tukey's post-hoc analysis, it was revealed that in cancer patients with secondary complete education, the intensity of coping strategies is "Distancing" ($M_2 = 73.6$; $M_3 = 49.3$; $M_5 = 50.3$, $p = 0.001$), "Taking responsibility" ($M_2 = 69.8$; $M_3 = 54.0$; $M_5 = 51.5$, $p = 0.045$) The "positive reevaluation" ($M_2 = 63.1$; $M_3 = 49.5$; $M_5 = 61.2$, $p = 0.003$) has significantly higher values compared to other groups, which may indicate the maladaptive severity of these strategies (Figure 6).

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Figure 6

Results of variance and post hoc analyzes of the severity of stress coping strategies in cancer patients with different levels of education (Tukey's Test for Post-Hoc Analysis after One-way ANOVA)



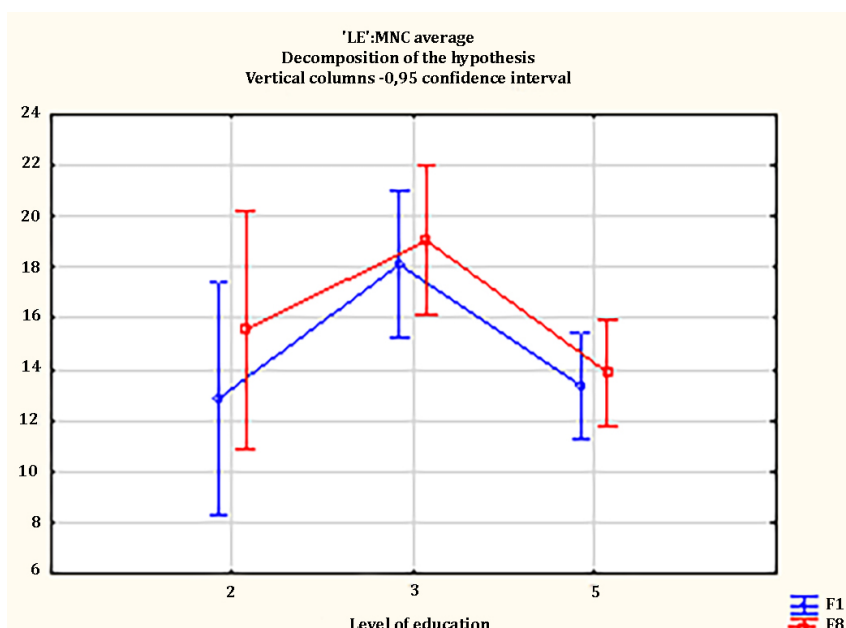
Note. Designations: *Distan.* - distancing; *Accept* - acceptance of responsibility; *Posit.Reas* - positive reassessment.

According to the results of post hoc Tukey analysis, significantly more pronounced indicators of physical pain, discomfort ($M_2 = 12.9$; $M_3 = 18.1$; $M_5 = 13.4$, $p = 0.03$) and negative emotions ($M_2 = 15.6$; $M_3 = 19.1$; $M_5 = 13.9$, $p = 0.014$), compared with other groups, cancer patients with secondary vocational education have (Figure 7).

There were no significant differences in the severity of life-meaning orientations ($F = 1.2$, the effect of $St. = 12$, the error of $St. = 118$, $p = 0.3$) depending on the level of education of cancer patients.

Figure 7

Results of variance and post hoc analyzes of characteristics of the quality of life of cancer patients with different levels of education (Tukey's Test for Post-Hoc Analysis after One-way ANOVA)



Note. Designations: F1 – Physical pain and discomfort, F8 – Negative emotions.

Discussion

Our study revealed that the overall severity index of symptoms has a significantly higher intensity in the group of widowed cancer patients. It is known that the death of a spouse has the highest stress index according to the method of determining stress tolerance and social adaptation by Holmes and Rago (Raigorodsky, 2015). Getting into the conditions of an oncostationary hospital indicates at least a change in eating habits; changing the number of family members living together, the nature and frequency of meetings with other family members, changing social activity, changing place of residence, abandoning any individual habits, changing stereotypes, changing living conditions. Injury or illness also have high scores on this scale, and in conditions of a combination of two life-threatening diseases (cancer and covid) these points, as well as the danger to life, are doubled. Thus, even without taking into account the individual history of cancer patients in the conditions of the COVID-19 pandemic, their stress index is at least 223 points, which corresponds to the threshold resistance, and in the case of loss of a spouse, the degree of stress resistance decreases significantly, reaching more than 300 points. and threatening patients with nervous exhaustion.

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The study by P. Toquero et al. (2021) showed that significantly higher rates of distress were found in patients undergoing psychopharmacotherapy (which, in turn, is an indicator of a decrease in mental health), in those who considered themselves particularly susceptible to infection and took extra measures to prevent coronavirus infection (which may be due to with a high level of anxiety), as well as those whose economic situation worsened during the pandemic (which may be due to the presence of an additional stressor). According to the results of this study, higher rates of emotional distress were found in people under 65 years of age, with a low level of education (which can be explained by a lack of understanding of possible threats), loneliness and belonging to the female sex.

Conclusion

The study examined the relationship between marital status and educational level with the psychological characteristics of cancer patients during the COVID-19 pandemic.

The peculiarities of the relationship between marital status and psychological characteristics of cancer patients during the COVID-19 pandemic were revealed:

- The psychological characteristics of cancer patients who **are in an unregistered marriage** include the dominance of the terminal value of "Financially secure life" and the instrumental value of "Rationalism", which consists in the ability to think sensibly and logically, make deliberate, rational decisions. This group of patients has a greater number of psychopathological symptoms compared to single cancer patients;
- **divorced** cancer patients have a higher position in the hierarchy of values takes courage in defending their opinions and views;
- **widowed** cancer patients have significantly higher indicators of the overall severity of psychopathological symptoms, including high anxiety and hostility, as well as a lower level of meaningfulness of life (including low purposefulness, life effectiveness and satisfaction with self-realization); boldness in defending their opinions and views occupies a higher position in the hierarchy of their values;
- **registered married** oncopatients have a higher level of meaningfulness of life (higher purposefulness, efficiency of life and satisfaction with self-realization);
- **single** cancer patients have a lower severity of psychopathological symptoms compared to patients living in an unregistered marriage, but they cope worse than others with taking care of themselves and their property;
- There were no significant differences in the severity of stress management strategies in patients with different marital status.

The features of the relationship **between the level of education** and the psychological characteristics of cancer patients during the COVID-19 pandemic are revealed:

- Oncopatients with **full secondary education** have a high (maladaptive) intensity of such stress coping strategies as "Distancing" (may manifest itself in devaluing their own experiences and underestimating the possibilities of coping with a stressful

situation), "Taking responsibility" (may manifest itself in taking excessive responsibility and unjustified self-criticism), "Positive reassessment" (it may manifest itself in the underestimation by the personality of the possibilities of an effective solution to a problematic situation). The terminal value of "Active lifestyle" (fullness and emotional saturation of life) occupies significantly higher positions in the hierarchy of their values, and the value of "Cognition" is indifferent;

- Cancer patients **with secondary special education** have a high degree of physical pain, discomfort and negative emotions; their leading value is "Having good and loyal friends";
- The value-semantic sphere of oncopatients with **complete higher education** is characterized by the predominance of the instrumental value of "Honesty";
- There were no significant differences in the severity of life-meaning orientations, depending on the level of education of cancer patients.

The results obtained indicate that illness, as an event with a high stress index, requires high resources from the individual to overcome it. Psychosocial factors influencing disease resistance include marital status and level of education. Widowhood and divorce, as the results of our study show, reduce the resource potential of an individual; level of education is associated with the intensity of pain experience, as well as the intensity of stress coping strategies.

Thus, when developing and implementing a program of psychological support for patients, it is important to take into account a complex of psychosocial factors. Since the marital status of cancer patients has a significantly significant impact on their quality of life, improving the effectiveness of interpersonal relationships may become another task during the psychological support of cancer patients. The study of the leading values in different groups of patients will help in the development of a strategy for resource and existential psychotherapy, prevention of suicidal behavior; taking into account the value orientations of patients in the doctor–patient relationship can increase the effectiveness of treatment, which together will contribute to a more successful reintegration of patients into society, as well as increase their psychological well-being.

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Authors' contribution

Pavel Nikolaevich Ermakov – conceptualization, research planning, critical revision of the content of the article.

Ekaterina Mikhailovna Kovsh – statistical processing and analysis of the results obtained, writing the text of the article.

Alexey Yuryevich Maximov – conceptualization, planning, organization of the study.

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Conflict of Interest Information

The authors have no conflicts of interest to declare.

A Model of Self-Presentation in Interpersonal Relationships

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Abstract

Introduction. Today's changing society requires individuals who respond quickly to external challenges and develop their professional and personal skills successfully. Effective development requires personal potential and the ability to make impressions to achieve expected results. This is possible through the correct use of self-presentation strategies. This study developed for the first time a model of self-presentation. **Methods.** The study included 385 participants, 303 of whom were adults aged 18–22 years and 82 of whom were adults aged 25–36 years. A questionnaire was developed to identify the biographical characteristics of the participants and their views on self-presentation, which revealed implicit ideas about this phenomenon. The study used the following assessment tools: the Level of Reflexivity Assessment Inventory (A. V. Karpov), the Self-Regulation Style of Behavior Questionnaire, SSB-98 (V. I. Morosanova), the Affiliation Motives Assessment Inventory (A. Mekhrabian), the Individual Orientation in Communication Assessment Inventory (S. L. Bratchenko), the Self-Confidence Test (V. G. Romek), the Volitional Qualities Questionnaire (M. V. Chumakov), and the Strategies of Self-Presentation Questionnaire (I. P. Shkuratova). Theoretical analysis was performed and the results were summarized on the basis of exploratory and confirmatory factor analysis. **Results.** The relationship between behavioral strategies and individual psychological characteristics was established. A model of self-presentation was developed. The goal of the model is to identify the algorithm for actions of the subject in different stages of self-presentation in order to create a certain impression about himself/herself. The empirical model reflects the self-presentation process, which consists of preparatory-organizational, procedural-operational, procedural-effective, and evaluative-effective (reflective) stages. Each stage presents a combination of components, factors, individual characteristics, self-regulation

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styles, communication orientations, and behavioral strategies. **Discussion.** Based on the empirical model that identifies the characteristics required for the self-presentation process and effective methods for self-presentation to create the self-image necessary for recipients, a new approach to the scientific problem of self-presentation is proposed.

Keywords

self-presentation, self-presentation strategies, model, interpersonal relationships, reflection, self-regulation, dialogue, self-confidence, fear of rejection

For citation

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Introduction

The issue of self-presentation does not lose its relevance because modern world reality requires an increase in self-presentation behavior and self-presentation competence. In this regard, it is necessary to develop new approaches to study the process of self-presentation as an important condition for self-expression and achieving interpersonal communication objectives.

Self-presentation is the basis of social life, which effectiveness depends on the impression individuals leave on others (Sezer, Gino, & Norton, 2018; Akhmadeeva, 2023). This means that social success/failure in interpersonal relationships is determined by the ability of a person to choose the necessary behavior tactics, present himself/herself to a target audience, and calculate the algorithm of action and its possible consequences. According to I. V. Abakumova, the subjects of interpersonal interaction, consciously or unconsciously attempt to make an impression and attract the attention of others in order to maintain a priority position in communication and to be able to manage the interaction process (Abakumova, Brizhak, Kukulyar & Kolenova, 2020).

The issues related to effective self-presentation in a variety of interaction situations have been widely discussed in previous studies. In present research, 'self-presentation' is analyzed from the perspective of self-presentation (Abakumova et al., 2020; Koryagina, 2023; Pikuleva, 2023; Fedorov, 2020; Jones & Pittman, 1982; Leary, 2019; Mead, 2015; Schlenker, 2012; Snyder, 2000), self-representation (Vasil'eva & Tsvetova, 2021; Gotseva, 2008; Shkuratova, 2009; Goffman, 2021; Cooley, 2019; Nichols, 2020; Pandey, Chopra & Karve, 2020; Sezer et al., 2018), self-regulation, self-disclosure, self-expression, expressive behavior, manipulation, motivation, natural charm, intuition, impression

management, trust, and image characteristics (Belobragin, 2018; Borozdina, 2019; Labunskaya & Drozdova, 2017; Petrova, 2019), which indicates the breadth and diversity of this phenomenon. The above concepts are united by the idea of self-presentation as a process that helps demonstrate social courage, self-confidence, competence, dialogue, and reveal the volitional qualities required by the situation through the ability to develop self-reflection.

Researchers note that self-presentation is a form of individual activity that is carried out in interpersonal relationships and aims to achieve specific objectives (Pikuleva, 2023; Fedorova, 2007; Shkuratova, 2009; Jones & Pittman, 1982; Schlenker, 2012). According to the procedural approach, the phenomenon of self-presentation is interpreted as a holistic process of self-presentation, which has its own structure, and as a process consisting of certain stages of its implementation in interpersonal relationships. The motivational approach enables us to understand to what extent the communicator recognizes and accepts his/her own motivation, goals, and possible degree of self-disclosure in interaction situations. Based on this approach, we believe that motivation components of situational and individual characteristics affect the effectiveness of self-presentation forms and that it is necessary to implement specific strategies and tactics to influence partners (recipients) in interaction. Although there has been some in-depth study of this issue (Belobragin, 2018; Borozdina, 2019; Vasil'eva & Tsvetova, 2021; Goffman, 2021; Koryagina, 2023; Cooley, 2019; Labunskaya & Drozdova, 2017; Petrova, 2019; Pikuleva, 2023; Fedorov, 2020; Shkuratova, 2009; Abakumova et al., 2020; Jones & Pittman, 1982; Leary, 2019; Mead, 2015; Nichols, 2020; Pandey et al., 2020; Sezer et al., 2018; Schlenker, 2012; Snyder, 2000), it is important to pay special attention to aspects related to self-presentation in the context of interpersonal psychology, especially from the point of view of the individual psychological characteristics required in the process of self-presentation and the use of behavioral strategies.

Self-presentation is a complex psychological construct that is completely unavailable to empirical research. In this respect, we considered it necessary to study it at the phenomenal level, focusing on individual psychological characteristics that contribute to the effective self-presentation in important situations. We have identified individual personal characteristics mediated by situations of self-presentation, including:

- Reflexivity, the main mechanism for constructing a "road map" of self-presentation and representing mental representations of "how one perceives, understands and explains what is happening" (Kholodnaya, 2023, p. 296);
- Conscious self-regulation, which is "a tool for initiating and maintaining individual volitional activity" (Morosanova, 2021, p. 8);
- The need for affiliation (the desire for communication, emotional contacts, having friends, providing and receiving support), which contributes to the establishment of friendly relationships in self-presentation that have a significant impact on achieving objectives (Tarasova & Razuvaeva, 2022);

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- Orientation in communication, revealing the characteristics of the individual's value-meaning sphere, including objectives and means of communication, and methods of behavior in interpersonal relationships;
- Self-confidence, social courage, initiative in social contacts. These qualities enable individuals to express their needs openly, achieve goals, protect their interests, express their own positions and value preferences without resorting to aggression;
- Volitional personality traits (restraint, decisiveness, independence) aimed at overcoming difficult situations, rapid decision making, behavior regulation, variation of different strategies and tactics relevant for self-presentation;
- Activity which refers to the way in which the initiator interacts with the target audience, to the desire to occupy a central position and to initiate contacts in order to achieve the goals of self-presentation.

The presence of the above properties can enable the subject of self-presentation to create a self-image that corresponds to the situation. This, in turn, will enable subsequent interactions to choose strategies and tactics to achieve goals (e.g., establish contacts, develop relationships, speak publicly, and solve professional problems). We hypothesized that the relationship between individual psychological characteristics and behavioral strategies creates a certain dependency structure.

This **study aimed** to develop a model of self-presentation in interpersonal relationships.

In the proposed model, self-presentation is a structured process composed of preparatory-organizational, procedural-operational, and procedural-effective stages. Each stage presents a composition of components, a combination of factors, individual personality characteristics, self-regulatory styles, communication orientation and behavioral strategies. The criteria for the effectiveness of the self-presentation model we have developed are as follows: satisfaction with the need for affiliation, self-regulation, flexibility, modeling, dialogue, authority, and self-promotion. The existence of these criteria can enable the subject of self-presentation to create an appropriate image for the situation and choose the strategies necessary to achieve the objectives. The model reflects the process of personal promotion taken into account from the perspective of its integrity. The adjustment of certain characteristics of the subject is not excluded. Consequently, it is possible to identify the dynamics of individual development and predict its prospects from a perspective of increasing the efficiency of self-presentation.

Methods

The study was conducted at the Ufa University of Science and Technology and included 385 participants (men and women aged 18 to 36).

To verify the universality of the developed model, we argued that two age-based groups were needed. This was because the age range of the group of respondents

composed of students was very limited. Therefore, another sample was represented by older participants in the survey. The results were assumed to be identical and will not affect the stability of the structural components of the model and the model itself.

- The first group comprised of university students aged 18 to 22. At this age self-presentation has its own characteristics, related to the desire for self-identification and social isolation, university education, career development, and interpersonal relations (friends, romantic relationships, professional relationships). In all these areas, students may encounter psychological barriers and communication difficulties.
- The second group comprised of 25 to 36-year-olds (middle-aged adults). During this period of life, the majority of people have a harmonious combination of external conditions and subjective factors that contribute to their peak development (acme), including their highest potential, activity, and productivity in various areas of their lives, including self-presentation, which was reflected in the responses to the questionnaire, which recorded socio-biographical facts showing professional self-assessment and personal well-being.

Assessment tools

To prove the hypothesis, the study used the following assessment tools:

- The Individual Orientation in Communication Assessment Inventory by S. L. Bratchenko by S. L. Bratchenko to determine the dominant type of orientation of individuals in communication and interpersonal relationships.
- The Level of Reflexivity Assessment Inventory by A. V. Karpov to examine the level of reflexivity.
- The Self-Regulation Style of Behavior Questionnaire, SSB-98, by V. I. Morosanova to determine the individual profile in individual self-regulation.
- The Affiliation Motives Assessment Inventory by A. Mehrabian to identify motives in affiliation.
- The Volitional Qualities Questionnaire by M. V. Chumakov to determine the severity of individual volitional qualities in self-presentation.
- The Self-Confidence Test by V. G. Romek to assess general self-confidence, social courage, initiative in social contacts and self-presentation situations.
- The Strategies of Self-Presentation Questionnaire by I. P. Shkuratova to determine the preferred self-presentation strategies.

Analysis of results

The analysis of the empirical data results was performed on the basis of exploratory or confirmatory factor analysis using the principal component methods with the principal function from the psych package (Revelle, 2021). The quality of the compiled model

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was determined according to the following fit indices: CFI, comparative fit index, ($0 < CFI \leq 1$); TLI, Tucker-Lewis index, ($0 < CFI \leq 1$ TLI); RMSEA, Root mean-square error of approximation, ($0 < RMSEA \leq 1$); SRMR, Standardized Root mean square residual. This indicator ranges from 0 to 1. $SRMR < 0.08$ (Brown, 2015); $RMSEA < 0.06$ to 0.08 with 90 % CI and $SRMR \leq 0.08$; TLI and NFI ≥ 0.95 ; $CFI \geq 0.95$ (Hu & Bentler, 1999; Gatignon, 2010) are considered acceptable.

Results

An exploratory factor analysis was conducted using Spearman's rank correlation coefficients based on rank sequence matching. To determine the number of factors, the principal component methods were used. The oblique factor rotations were used, as it was assumed that there was a correlation between them. Subsequently, a confirmatory analysis was carried out to verify the consistency of the resulting factor solution with the hypotheses. This analysis was carried out for each age group.

Let us consider the results of confirmatory analysis in a sample of students (18–22-year-olds). A confirmatory analysis revealed a four-factor structure of the self-presentation process (anticipating self-presentation planning, flexible self-organization, confident self-promotion, evaluating self-presentation results), as shown in Table 1.

Table 1
Confirmatory factor analysis results in the group of respondents aged 18–22 years

Factor	Indicator	Assessment standard	SE	Z	P
	Self-regulation	1.000*			0.000
Anticipating self-presentation planning	Planning	0.146	0.0134	10.88	0.000
	Programming	0.161	0.0138	11.62	0.000
	Fear of rejection	0.576	0.1640	3.51	0.000
	Flexibility	1.000*			0.000
Flexible self-organization	Modeling	1.064	0.0738	14.41	0.000
	Variability of behavior	0.401	0.1193	3.36	0.000
	Endurance	1.669	0.1957	8.53	0.000

Factor	Indicator	Assessment standard	SE	Z	P
	Self-confidence	1.000*			0.000
Confident self-promotion	Initiative	1.062	0.1875	5.67	0.000
	Self-promotion	5.105	0.9507	5.37	0.000
	Dialogicity	2.532	0.4206	6.02	0.000
Evaluating self-presentation results	Reflection	1.000*			0.000
	Desire to please	5.313	1.8689	2.84	0.000

Note: * fixed parameter; CFI 0.965; TLI 0.955; SRMR 0.0489; RMSEA 90 %; $p < 0.001$

Since CFI = 0.965 and TLI = 0.955 are higher than the threshold value of 0.90, the quality of the factor model can be assessed as high.

Next, let us analyze the results of the confirmatory analysis of the 'adult' sample (25–36-year-olds), as shown in Table 2.

Table 2

Confirmatory factor analysis results in the group of respondents aged 25–36 years

Factor	Indicator	Assessment standard	SE	Z	P
	Self-regulation	1.000*			
Anticipating self-presentation planning	Planning	0.123	0.0218	5.63	<.001
	Programming	0.123	0.0201	6.11	<.001
	Independence	0.141	0.0295	4.79	<.001

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Factor	Indicator	Assessment standard	SE	Z	P
Flexible self-organization	Flexibility	1.000*			
	Modeling	1.050	0.1011	10.38	<.001
	Endurance	1.559	0.3241	4.86	<.001
Confident self-promotion	Self-confidence	1.000*			
	Self-promotion	0.583	0.1691	3.45	<.001
	Dialogicity	0.530	0.1552	3.42	<.001
Evaluating self-presentation results	Social courage	1.016	0.1661	6.11	<.001
	Reflection	1.000*			
	Initiative	3.188	0.9506	3.35	<.001

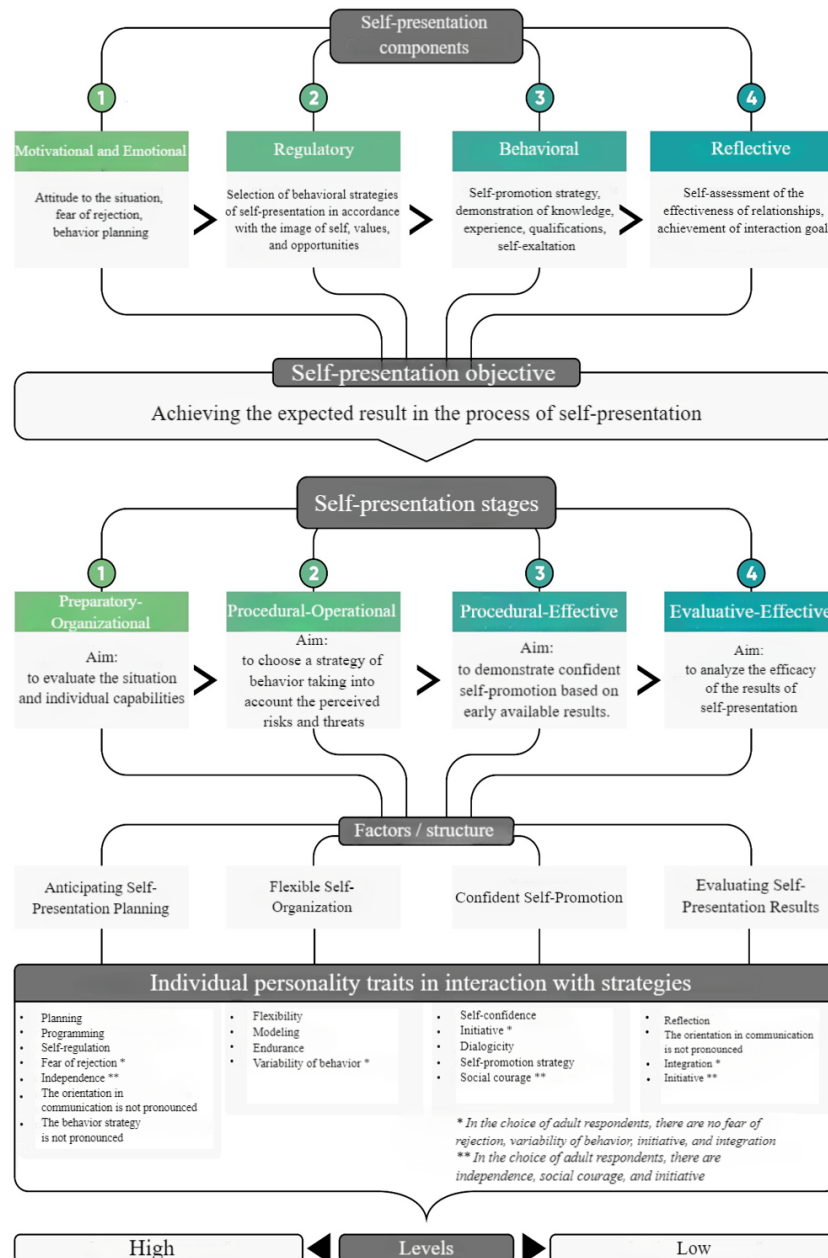
Note: * fixed parameter; CFI 0.954; TLI 0.940; SRMR 0.0803; RMSEA 90 %; $p < 0.001$.

Table 2 shows that the four-factor model of the given structure shows relatively high values of global fit indexes. CFI = 0.954 and TLI = 0.940 exceed their threshold value of 0.90. Consequently, the quality of the factor model can be assessed as high. The resulting structure of positive relationships between factors indicates that these factors are interdependent and form a single psychological construct.

As a result, we also identified four factors in the adult sample: anticipating self-presentation planning, flexible self-organization, confident self-promotion, evaluation of self-presentation results

The analysis of empirical data enabled us to develop the model of self-presentation (Fig. 1).

Figure 1
Self-presentation model



Discussion

Based on the confirmatory factor analysis, the factors enabled us to determine the stages of self-presentation, each logical continuation of the previous stage enabling the

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communicator to implement and improve the skills acquired at the previous stage. If the subject fails to perform the tasks assigned in the initial stages, he/she will not be able to demonstrate confident self-promotion and achieve the desired interaction objective.

Anticipating self-presentation planning

In the sample of students, the first factor, Anticipating Self-presentation Planning, reveals to the subject the possibilities of adaptive interaction with the environment, where the ability to anticipate (predict) the results of his/her activities is required. In the process of communication, individuals strive to be accepted to the maximum by others (Labunskaya & Drozdova, 2017). The sensitivity of interaction partners to rejection forces them to plan, program and anticipate the possible consequences of their actions in advance. Subjects with the ability to self-regulate and anticipate do not use specific self-presentation strategies. Perhaps they have a wide range of strategies and each one depends on the circumstances.

Flexible self-organization

The second factor, Flexible Self-organization, assumes that students have the ability to model and be flexible, so that they can adequately assess situations and external circumstances and regulate their own behavior according to changes in the circumstances. In psychological sources (B. A. Vyatkin, E. A. Klimov, A. V. Libin, V. S. Merlin, V. A. Tolocheck), such behavior is usually referred to as an "individual style of activity". Moreover, the concept of 'activity' includes a wide range of activities (communication, management, etc.). According to N. V. Grishina, an individual style of activity is trans-situational, as it can at the same time have stability and dynamism in accordance with a particular situation of interaction, which brings this phenomenon closer to the ability to self-regulate and be flexible (Grishina & Kostromina, 2021). Self-control helps in difficult situations to maintain calmness, not to 'be emotional' and not to show a negative attitude to what is happening. The presence of flexibility manifested in the 'variability of behavior' strategy indicates the tendency of respondents to analyze future situations in advance to understand how best to present themselves and what tactics should guide partner perception on the desired path.

Confident self-promotion

The third factor, Confident Self-promotion, provides students with an initiative, self-confidence and a dialogue orientation in communication, which manifests itself in a stance towards equality, empathy, non-judgment and cooperation.

Meanwhile, in self-presentation, especially in its early stages, it is difficult to talk about the 'equality' of psychological positions. According to L. G. Dmitrieva, dialogue is a complex phenomenon in which interpersonal relationships cannot be 'equilibrium' in real life situations. In real relationships, including self-presentation, we can most

likely observe an 'asymmetry' of dialogue that affects dialogue and self-presentation in interpersonal relationships. The process of balancing psychological positions is closely related to self-presentation, because here we observe the desire for balance between the subjects involved, the assessment of the situation and the opportunity to realize the communicator's individual resources (Dmitrieva & Akhmadeeva, 2023).

Evaluating self-presentation results

The fourth factor, Evaluating Self-presentation Results, involves a comparison of the objectives set and the results obtained. This can be achieved through reflection – individuals' ability to make introspection, the awareness of their own actions and the nature of relationships with others. By analyzing the responses of the communication partners, the subject of the self-presentation can conclude on the impression and sympathy of others. Here, the personal motivation is the desire to please. If the result of self-presentation is not justified and the communication partners do not like the subject presenting himself/herself, then he/she should adjust his/her behavior for further constructive interaction. A better behavior model will lead him/her to "search for new solutions and the desire to identify with a group that meets the values and interests" of the recipients (Vasil'eva, 2021, p. 690).

The results of the factor analysis seem to show some differences between the samples and are considered to be quite natural, which is consistent with the normative characteristics of the subject's age category. We associate the identified differences with age aspects and individual psychological characteristics that manifest themselves differently in motivations, attitudes, volitional qualities and self-presentation strategies. Nevertheless, we see no contradiction here that could lead to some uncertainty in the interpretation of the empirical model of self-presentation in the interpersonal relationships we have developed.

Next, let us interpret the factor structure obtained in the adult sample (25–36-year-olds).

Anticipating self-presentation planning

Unlike the group of boys and girls, in the group of men and women, the first factor included the 'independence' variable; the motive of 'fear of rejection' did not actualize. Independence (self-sufficiency and self-confidence) allows the older category of subjects to organize and control activities without external assistance, as this process includes subjective experiences and conscious self-regulation of behavior (in a broad sense – understanding and prediction of future actions). These subjects are capable of taking personal responsibility for their actions; they are ready to manage their motives, distribute their sequences and program their own behavior on this basis. Independence excludes situations where adult subjects may fear rejection (fear of not being accepted by the target audience).

Flexible self-organization

In the adult sample, the strategy variable of 'behavioral variability' was not included in the second factor. This can be explained as follows. Due to their age, these subjects have passed the 'testing' phase, i.e. they have already decided on their life plans and established value systems and stable behavioral patterns (Kulagina & Kolyutskii 2005; Sapogova, 2021). In this age group, the subjects of self-presentation may not feel the need for a 'behavioral variability' strategy. Flexibility, modeling, and resilience are more relevant for this age. Flexibility encourages the optimal choice of behavior strategies in various situations (interpersonal and professional relations) and allows subjects to model (predict) other ways to achieve their goals. Resilience and the ability to properly evaluate emerging issues contribute to the implementation of set goals and objectives.

Confident self-promotion

In the third factor, social courage appears instead of initiative in social contact, which requires non-compliance in social situations, tendency to take risks, an orientation towards individual actions and self, the ability to say "no", the ability to seek help if necessary, and the ability to express current emotions, initiate communication and interpersonal contact. All of this is a clear (positive) result of the implementation of the subjects' life plans, who can be characterized as successful in social matters and flexible in their contacts. Social courage acquired through the process of life experience eliminates the need to initiate contacts, especially those needed to solve problems important for the subject.

Evaluating self-presentation results

In the fourth factor, the position of the 'desire to please' strategy is taken by the volitional quality of 'initiative'. This means that adult subjects are fairly objective about their own resources and do not need to confirm their merits through flattery, compliments, demonstrating usefulness or providing services. In situations of self-expression that are important to them, the manifestation of volitional qualities and initiative (the desire to undertake a task independently, looking for new ways of solving problems more successfully, and the awareness of responsibility) is quite sufficient. Adults have therefore passed through a certain stage of personal and professional development in their lives, which allows them to be confident, to rely on their own strengths and to trust their own decisions and actions.

According to the obtained results, the adult sample of subjects is characterized by established values, personality traits, reflection, predictability, personal maturity, i.e. readiness to self-organize, including the desired behavior, effective solution of life problems, which they can correct independently according to the situation.

Research into theoretical works and empirical analysis have enabled us to develop a model of the process of self-presentation. In scientific sources, the model is considered

by certain characteristics, including a mental image, simplified reality, form, reflections of the original with real or presumed properties (reflection, self-regulation, self-confidence, and communication direction) influenced by various factors, conditioned by the subject's self-movement to achieve important results for him (El'kina, 2019). S. N. Kostromina believes that one of the main requirements for building a model is the existence of the structural elements and characteristics of the original (Kostromina, 2020). By interpreting the model in this way, we have the opportunity to identify its dynamics and to predict the future of the subject in terms of improving self-presentation efficiency. We should note that the subject of self-presentation may experience some limitations, lack of self-resources, and may remain in one of the stages. This is quite natural, as not all subjects can have the range of individual characteristics needed to achieve their goals.

We believe that self-presentation can be classified as a practical activity that enables people to better understand their identity and functions as a tool for self-knowledge, self-understanding, and self-acceptance. By evaluating the results of their actions and those of communication partners in interpersonal relationships, individuals develop ideas about their own qualities, skills, and abilities.

Self-presentation as a phenomenon of interpersonal interaction can be characterized by the following general parameters:

1. Awareness of goals, motives and conditions, assessment of the level of individual achievement abilities, attitude towards the situation of self-presentation;
2. Ways of implementing self-presentation, choosing strategies and tactics;
3. Personal characteristics: modeling, flexibility, endurance, decisiveness, initiative, self-confidence, social courage associated with the choice of self-presentation strategies;
4. Analysis of the achievement of desired goals of interaction through reflection.

The idea inherent in this model is that the subject constructs self-presentation as the process and the result of interaction to create a positive self-image for recipients. This structure includes two levels – mental (ideal ideas) and activity-based (real actions), because the result can be achieved through specific actions and remains at the mental level.

Modeling and predicting the desired outcomes depend on the effectiveness of the strategies and their compliance with the individual psychological characteristics of communicators. The subject can predict the potential consequences of various actions and adjust his/her behavior when he/she is aware of individual psychological characteristics, which in one way or another can affect the process of self-presentation. We agree with T. V. Eksakusto and I. A. Kibalchenko (2021), who believed that mental representations are formed in stages, from anticipating situations to reconstructing images of future behavior.

In the process of our empirical research we (a) identified individual psychological characteristics that could hinder or promote individual self-presentation at each stage of

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self-presentation; (b) distinguished the stages of self-presentation, including anticipating self-presentation planning as a factor of the preparatory-organizational stage; flexible self-organization as a factor of the procedural-operational stage; confident self-promotion as a factor of the procedural-effective stage; evaluation of self-presentation results as a factor of the evaluative-effective stage. Each stage corresponds to certain factors that affect the success of self-presentation. If the next stage is successfully completed, the communicator moves on to the next stage, which promotes the positive result of the final stage of self-presentation.

The model clearly shows that the relationships among factor structures indicate its integrity. This model is universal. It reveals self-presentation patterns in situations of interpersonal relationships and enables us to present this process as an ordered system, which stages are highlighted using the statistical analysis methods proving its universality, as changes in the content of the factor structure in the two age groups of respondents were minimal. The results of mathematical statistics and the modeling procedures suggest that the model is objective and suitable for other similar situations of interpersonal relationships.

According to cultural-historical theory, the ideas of the world and reality are associated with the reflection of means of consciousness (Vygotskii, 2023; Leont'ev, Averina, 2011). Therefore, this model may be extrapolated to other areas of life. Based on empirical results, the logic of the model makes it possible to create a holistic framework for the process of self-presentation needed in various situations of interpersonal relationships (business, profession, education, and personal contacts), especially its stages, to connect its component composition (motivational and emotional, regulatory, behavioral, and reflective) with individual psychological characteristics. Our main conclusion is that individual self-presentation (from beginning to end) is determined by the individual psychological characteristics of the communicator.

Conclusion

Self-presentation in interpersonal relationships is a complex psychological construct composed of certain individual psychological characteristics that mediate behavioral strategies implemented at stages, the sequence of which is focused on achieving the planned result.

The dominant self-presentation strategies of subjects were determined depending on their age characteristics.

Four factors that correspond to the stages of self-presentation in interpersonal relationships were identified, each with certain individual psychological characteristics, communication orientation, and behavioral strategies.

The self-presentation model in interpersonal relationships was developed based on empirical data, which enabled us to identify the consecutive stages of individuals' self-presentation.

The self-presentation model is a holistic construct required in various interpersonal relationships (business, profession, education, and personal contacts).

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Linking Leader's Avoidant Behavior to Counter productive work behavior: A Mediated Moderated Model

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Abstract

Introduction. Extant research has focused on the antecedents of culture, suggesting that a group's culture results from internal and external changes experienced by the group members or successfully transferred by the group leader. The current study aims to understand leaders' role in shaping organisational culture based on their behaviour in temporary work settings. Research to date has mostly focused on leadership styles, not behaviours such as Avoidant behaviour, and yet to examine How leaders' behaviours influence Individual and Organizational Outcomes in project-based firms. **Methods.** Two hundred ninety-seven leaders and followers (project manager and team members) from Lahore and Islamabad's NGOs participated in the study. **Results.** A leader's avoidant behaviour positively impacts conflict culture, which affects the individual's performance and organisational well-being. Results identified that CC is a product of behaviour that positively influences counterproductive work behaviour. The present research cannot prove moderation with suggested relations, but direct results unfold the interesting facet. **Discussion.** The research has found consistent results concerning previous studies. The research has also contributed theoretically and contextually. The research has implications for companies, leaders, and employees. Future researchers might broaden the study's scope by incorporating other constructs, such as employee promotive voice.

Keywords

leader's behaviour, conflict culture, group culture, negative and positive deviance, project managers, non-government organisations (NGO)

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Introduction

Surrounded by organisational sciences, the topic of conflict has been a constant obsession with organisation theories (Jaffee, 2007). Right from evolution till now, every school of thought has recognised the inherent intricacies of human firms and their relevant conflicts. Conflict culture is considered to be a social phenomenon as it is unavoidable in any organisational setting. It is a mixture of formal and informal practices. It may also emerge from the compositional process, which holds some cultures such as collaborative conflict culture (which holds constructive dialogues and negotiation), dominating conflict culture (where organisational members try to outwit each other and seek competition), and avoidant conflict culture, in which members collectively suppress the feeling of negotiation and withdraw from conflict.

Despite that, cultures continuously provide implicit guidelines for people to contemplate, sense, and act in groups. Previous literature defines conflict management approaches but cannot connect the leader's positive and negative behaviours to address organisational conflict (Gelfand, Leslie, Keller & de Dreu, 2012). This is because the leader has the authority and power to impress and suppress the followers, which may lead towards various organisational conflicts Kim & Toh (2019). A leader's behaviours can be perceived differently by the leader and his/her followers. Therefore, our exploration offers an essential insight into previous leadership studies' findings concerning CC.

The current study focuses on a leader's avoidant behaviour. It highlights its importance in Conflict Culture by illustrating leadership failures that missing subtle cues and subsequent role expectations within a team may cause. In doing so, we accept but also look beyond the significance of a leader's self-awareness and self-knowledge (Gardner, Avolio, Luthans, May, & Walumbwa, 2005; Peus, Wesche, Streicher, Braun, & Frey, 2012). The core assumption of this behaviour is to avoid disputes and to maintain harmony among the group, as it "strives to maintain the status quo through delay, indifference and absence" (Sims, Carter & Peralta, 2021).

As avoidant behaviour might boost harmony-seeking, such as unity among group members (Leung, Brew, Zhang, & Zhang, 2011) and at the same time may undermine feelings of self-worth and well-being, such as promotion, etc. (De Dreu, Van Dierendonck, & Dijkstra, 2004), which lead towards negative organisational consequences.

In light of the proceeding argument and to narrow these gaps in existing literature, current research's central research question is whether and how conflict culture relates

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with Leader avoidant behaviour and Counterproductive work Behavior. In line with this, firstly researcher believes that leadership traits are not fixed. Instead of as human beings, individuals are blessed by God to learn required leadership behaviours (Gelfand et al., 2012) as per the requirements of organisational culture. And researcher argues that a leader disproportionately influences the group culture based on their particular attitude and behaviour. Secondly, researchers believe subordinates have limited power to challenge the organisational culture. At the same time, dynamic leaders customise their behaviours and act accordingly to transform the corporate culture to achieve organisational goals.

Drawing on these assumptions, the researcher uses the philosophy of organisational theories (Jaffee, 2007) and contingency theory (Vroom & Yetton) as our underpinning theories. Following these theories, conflict has always been a salient part of organisational culture, and from Weber's bureaucracy and scientific management to open systems theory, researchers discussed various conflict practices to manage it effectively. Likewise, contingency theory (Vroom & Yetton, 1973) discusses the decision-making and behaviours or leadership style, which defines no best way to organise or lead the firm. One behaviour or leadership style may prove efficient in one situation and fail in another one. Therefore, the researcher hypothesised that avoidant behaviour will be negatively associated with conflict culture, but cc is positively linked with CPB. The researcher will test the conflict culture hypotheses using the concept of a leader's diverse/conflicting behaviours, such as avoidant, which refers to the suppressed environment regarding a leader who shapes and transforms the culture with norms variance (Gelfand et al., 2012; Mustafa, Saleem & Dost, 2021).

This study will also be helpful for an organisation for an in-depth understanding of leaders' avoidant behaviour concerning conflict culture and its effects on organisational and individual levels. Here researcher will gather the data from the project-based organisations as these organisations are in line with the concept that a leader with avoidant behaviour avoids every situation to get rid of disputes which ultimately generates the conflict culture and its adverse effects such as CPWB because avoidant behaviour affects safety behaviour (Liu, Mei, Jiang, Wu, Liu, & Wang, 2021). In project-based organisations, behaviours and consequences can be assessed and measured more regularly than in permanent organisations. In temporary project-based organisations, projects start and finish within time, and teams start working on new projects. There is a regular flow of projects. Therefore leader's and followers' behaviours can be evaluated quickly.

The rest of the study is structured as follows. In section two, the researcher will establish the study's theoretical framework by explaining how a leader's past cultural experience and different behaviours will help them generate a new culture and elucidate the consequences of conflict culture. In the third section, the researcher will explain the data and methods in detail.

Hypothesis Development

According to Gelfand et al. (2006), ownership greatly influences an organisational culture. A recent study by Kim & Toh (2019) explored and asserted that a leader's traits successfully influence the new group culture. The traits may change per circumstance and open up new dimensions for other scholars to explore collaborative, dominating and avoidant behaviours. Likewise, (Gelfand et al., 2012) asserted that leaders theorised their normative ways to generate and handle the new culture and individually exhibited the salient role of leader's behaviours. Likewise, as our focus is on the leader's avoidant behaviour, the researcher also takes support from the prior work of Lewin, Lippitt, & White (1939). The leader's behaviour is the primary force which will help generate a new culture, which can be conflict culture. Although there are diverse sets of practices which an individual can have, our study focuses on one of the salient behaviours.

Avoidant behaviour inclines to shy away from conflicts, suppress the feelings of fights and try to maintain harmony among groups (Gelfand et al., 2012), and is acknowledged as a form of laissez-faire leadership (Liu et al., 2021). This behaviour's normative parameter includes suppressing and avoiding open discussions by changing the subject. This behaviour is geared up by the top management, such as leaders, as revealed by Perlow (2003). She discussed an online education enterprise called Versity, where conflict avoidance behaviours and norms started from the top management. She defined that the senior management and founders of Versity willingly indulged in acts which avoided the conflict by spreading a custom to quietness, which was deliberately set by the CEO to gain support. This deliberate silence provided ultimate success to business because when employees do not indulge in useless talks, it leads to work effectiveness.

A leader's avoidant behaviour is a kind of self-protection; this behaviour exercises order and control, avoids disputes and tries to maintain harmony in groups (Gelfand, Leslie & Keller, 2008), and hindrance to conflict culture. So, drawing on these assumptions, the researcher hypothesised that:

H1: Leader's avoidant behaviour will be negatively associated with CC.

Conflict culture is inherent and unavoidable in any organisational setting, even a salient part of national culture (Da'as & Zibenberg, 2021). In conflict culture, members continuously work opposite to each other by sabotaging and pushing back to win the situation. Conflict Culture occurred not only in traditional firms and modern organisations but also in different settings, i.e. in political establishments such as the democratic presidential elections of the US in 2008, which showed that Obama people were known to be collaborative and non-defensive (Tumulty, 2008). On the other hand, the Hillary Clinton team is known to be dominant behaviour (Karabuschenko, Pilishvili, & Shtyrev, 2021). According to Klein & Kozlowski (2000), Conflict culture is guided by organisational members' behaviours and attitudes, such as top management, because conflict cultures

might develop by composition procedures. Conflict culture may emerge from the composition of leadership behaviour, such as avoidant behaviour.

In addition, conflict culture is a product of a leader's different behaviours (Gelfand et al., 2012). Put differently, a leader's actions are the critical drivers of conflict culture. Among numerous behavioural consequences of CC, one of the specific relevant outcomes is norm deviation (Gelfand et al., 2006), such as counterproductive work behaviour.

The current research expands the conflict culture literature by demonstrating that conflict culture decreases both negative and positive forms of deviance about the organisational context at an individual level. To do so, the researcher emphasises counterproductive work behaviour, a kind of negative deviance of individuals in the group. From an organisational perspective, negative workplace deviance refers to "voluntary behaviour that violates significant organisational norms and in so doing threatens the well-being of an organisation, its members, or both" (Robinson & Bennett, 1995, p. 556). CWB comprises intentional harmful and violent acts done by employees which lead towards loss of well-being of an organisation, such as theft alone, causing to loss of billions of dollars annually (Pletzer, Bentvelzen, Oostrom & De Vries, 2019). Biased organisational treatment leads toward enhanced counterproductive work behaviour (De Clercq, Kundi, Sardar, & Shahid, 2021; Uchaev & Alexandrov, Yu., 2022).

Many behaviours and emotions are connected with CWB, such as fury and rage, that point towards cognition and instigation. According to Barling, Dupré & Kelloway (2009) and Bowling, Burns, Stewart & Gruys (2011), such behaviour has serious adverse effects on the achievement and well-being of the organisation. Thus researcher can hypothesise that:

H2: Conflict Culture will be positively associated with CWPB.

The current research expands the conflict culture literature by demonstrating that conflict culture increases negative forms of deviance to the organisational context at an individual level. To do so, the researcher emphasises counterproductive work behaviour, a kind of negative deviance of individuals in the group. From an organisational perspective, this behaviour refers to "voluntary behaviour that violates significant organisational norms and threatens the well-being of an organisation" (Robinson & Bennett, 1995, p. 556). In addition, the theory of job burnout provides ways to incite deviant workplace behaviour (Lubbadeh, 2021).

CPWB comprises intentional harmful and violent acts done by employees which lead to the loss of an organisation's well-being (Pletzer et al., 2019). Many other behaviours and emotions are connected with CWB, such as fury rage, which points towards cognition and instigation.

In conflict culture, members continuously work opposite to each other by sabotaging and pushing back to win the situation. Conflict culture may emerge from the composition of leadership behaviours such as avoidant behaviour. A leader's avoidant behaviour is a kind of self-protection; this behaviour exercises order and control, avoids disputes

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and tries to maintain harmony in groups (Gelfand et al., 2008). Likewise, a Leader who emphasises absolute unity (Amanatullah et al., 2008; Gelfand et al., 2012) exercises this behaviour and doesn't deal with disputes openly, which shows that CC paves the way to negative deviance. So, based on this perspective, the researcher assumes that CC provides the cushion to explain the association between Avoidant behaviour and CWP. By avoiding the conflict leader practices avoidant behavior, which gives room to negative deviance called CWB. Thus researcher can hypothesise that:

H3: CC mediates the relationship between the Leader's Avoidant behaviour and CWB.

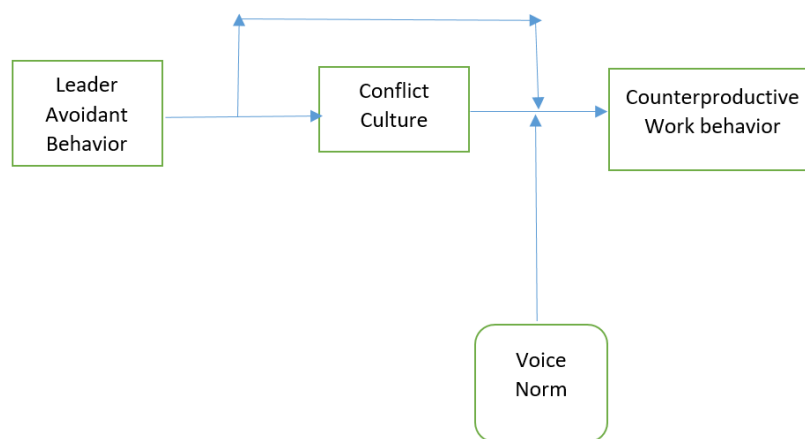
Norms identify the values and ethics of the group members. Norms are the directions concerning the right, decent and normative way to behave in the interpersonal context (Zhang, Akhtar, Zhang & Rofcanin, 2019). Interpersonal ethical norms exercise the particular feelings of ethical obligations to engage in inappropriate behaviour; or other words, they give a moral voice to an individual (Ajzen, 1991). Voice is also unique and inherently challenging (Vandewalle, Van Dyne & Kostova, 1995) because it gives the ultimate direction, which might result in enhanced visibility (Stamper & Van Dyne, 2001). The researcher will use the voice norm as a moderator to ease the relationship between the CC and CWPB.

Organisational conflict history is a history of change and tension, later generated through people's capacity to fight with structural restraints. And former is created through logical reasoning. Conflict culture is dangerous and needs to be bottled up for the prosocial goal of maintaining harmonious relationships (Gelfand et al., 2012). Likewise, negative work deviance, such as counterproductive work behaviour, threatens organisational well-being, but in the current study, the researcher postulates that voice norm might not strengthen their relationship.

Voice scholars have concentrated on situations where input from workforces can be supportive of the organisation, whereas giving less importance to situations where employees are voicing forth their own legitimate interests, which might be at odds with the interests of the firm (Jul, Xu, Qin, & Spector, 2019). It is also fair to say that voice researchers have largely overlooked this aspect in relation to the role of formal voice mechanisms or institutional structures in enabling voice. So researchers postulate that normative behaviour to handle conflict and negative behaviour includes accommodating or soothing approaches such as providing a cushion in the form of voice. Among the budding literature, many studies have recognised abusive supervision as an antecedent to CWB (Jul et al., 2019). But, current research expands the Voice Norm literature by demonstrating that VN may be negatively connected to conflict culture and counterproductive work behaviour, giving room to a beneficial and healthy working environment free from conflict and dangerous behaviour. Taken together, the researcher can hypothesise that:

H4: Voice Norm moderates the relationship between CC and CPWB.

Figure 1
Theoretical model



Methods

Research Methodology

Research methodology enables the reader to critically assess the study's overall reliability and validity (Hair, Black, Babin & Anderson, 2010). It includes surveys, interviews, questionnaires, and statistical procedures. Therefore, this segment contains research design, sample design, population, instruments, data collection procedures, and data analysis techniques. In the current research, the researcher intends to elucidate the distinction between groups as the hypothesis is tested. Consequently, the researcher explained the casual association among variables, measured the effect of independent variables on dependent variables, and ran SEM (Structure Equation Modelling).

The researcher used the survey approach to get the data from the population. One of the main advantages of using this approach as it is widely accepted and facilitates the researcher to a large extent (Bell, Fairbrother & Jones, 2019). In the current study, the researcher considered the NGOs of Pakistan, geographically based in Punjab province (Lahore and Islamabad) and tried to understand their impact on our society. Data was acquired from international and indigenous NGOs concerning areas of healthcare, education, child care, human and youth development, and women empowerment.

Moreover, the researcher was expecting 3 to 5 project teams in each NGO (Shah, Bari & Ejaz, 2005), so based on the formula given on the website, the researcher had computed 297 an appropriate sample size, i.e. 297 dyads (Confidence level 5%, confidence interval 95% and population 1300) to deal with various research biases as reported (Shah, Bari &

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Ejaz, 2005). This methodology was in line with our leader's avoidant behaviour as the project/team leader/manager joins the NGOs for a short period, rather than in regular firms where leaders/managers work for a more extended time and show no signs of conflict culture (Raziq et al., 2018). The data collection process took place in December after conducting the pilot test; the data was collected over a personally administrated questionnaire to get the required number of responses. This certified the non-response bias fixes the results accordingly. The questionnaire was dyadic; therefore, it consists of two parts, one for leaders and the other for followers, with clear instructions.

Unit of Analysis

As the current research concentrates on the dyadic relationship between project managers, dyadic association is the unit of analysis. The study needed to approach the specific sector, such as NGOs, in which project managers and employees have close and extensive daily interaction to complete their tasks (see Gelfand et al., 2012). Therefore, the data was collected from two salient stakeholders (the project managers and employees). This method is in line with the previous literature (Chang, Van Witteloostuijn, & Eden, 2020) suggested that successful data might be gathered from several sources such as leaders/managers, followers, customers, etc. The researcher used the cross-sectional approach to collect the data.

Instruments

As a self-administrated questionnaire is designed, questionnaires are based on the Likert Scale, and items were valued at 1-5, 1-6 and 1-7, 1 signify strongly disagree. The wording of the instruments is slightly changed, such as branch manager to project manager. The First part contains eleven items, which measure the leader's conflicting/diverse behaviours by Gelfand et al. (2012), and the 2nd segment holds thirteen items, which measure Conflict Culture by Gelfand et al. (2012). The 3rd part contains twelve items, which measure Counterproductive Work Behavior by (Robinson & Bennett, 1995), and the last but not least part contains six items, which measure Employee Norm Voice by (Van Dyne & LePine, 1998).

Control variables

A control variable is detained constant to clarify the association between independent and dependent variables because while testing, there could be some variables which might cause the variation in the dependent variable (Bernerth, Cole, Taylor & Walker, 2018). Consequently, the researcher controls these variables during an experiment to save the differences of dependent variables, which may occur because of independent variables. So, based on prior literature, the researcher considered controlling the three demographic variables of group leaders such as the leader's age, education, NGO type, number of projects, budget, employee's age, education and gender.

Reliability and validity Test of the Instruments

Reliability of instruments evaluates and elucidates the stability and internal consistency of measures that to what extent the scale will produce identical outcomes at different times (Anderson, Black, Bavin and Hair, 2010; Kimber & Winterstein, 2008). Construct validity assures the items the study has operationalised to measure and provides the evidence that results achieved from the adapted items can fit the theories around which the test was calculated. This study utilised both ways to determine construct validity, such as convergent validity and discriminant validity (Hair Jr., Hult, Ringle, & Sarstedt, 2013; Vanderstoep & Johnston, 2009).

Data Analysis

Data analysis is the procedure of cleansing, inspecting and transforming the data to discover useful information. The researcher used the Partial Least Square Structure Equation Modeling (PLS-SEM) statistical approach to analyse the quantitative data in the current study. PLS-SEM is the 2nd generation approach to SEM, which the researcher has used based on various reasons, such as it permits estimating multifaceted cause-effect association among latent variables. Specifically, PLS-SEM can be applied in strategic management, marketing, and other social sciences research. Furthermore, PLS-SEM has no boundaries in terms of the interaction method used in moderation tests compared to other covariance techniques; therefore, it is perceived as a feasible efficient alternate way for testing the moderation effect (Esposito Vinzi, Chin, Henseler, & Wang, 2010). The current study used Smart PLS v3.0 (Ringle et al., 2014) to determine the outer model, which includes the reliability, convergent validity and discriminant validity, and the inner model, such as the significance of the path coefficients, coefficient determination, the effect size and predictive relevance (Hair et al., 2013;).

Pilot/Preliminary Test

Initially, a pilot test was conducted to check the validity and reliability of the survey instruments. Secondly, this test aids the researcher in anticipating the potential problems and adjusting when embarking on the actual research.

Validity Test

To make sure how efficiently and effectively an instrument measures the construct/concept, validity was conducted. Consultations were made with the PhD supervisor and other PhD experts who had already worked on these measures. Additionally, some items were re-worded/re-phrased appropriately to measure the construct and be understood by potential respondents. An improved version of the instrument was distributed for the pilot test. Mostly in pilot tests, the sample size is generally small (Fink, 2003), though it could be increased up to 100 responses. So, 50 copies were randomly self-administrated,

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46 were collected, and 6 were not duly filled; therefore, 40 were responses preferred for analysis. The high response rate of about 76.7% was achieved due to the personal distribution and collection of questionnaires. This process ended within two weeks in September and October 2021.

Reliability Test

Various tests are used to check reliability, but one of the most popular methods researchers use is Cronbach's alpha (Sekaran & Bougie, 2010). It specifies the extent to which replies of the respondents to all the items are consistent. After running a reliability test using SPSS, all the measures revealed a higher level of reliability, ranging from 0.72 to 0.95. This is in line with the threshold point that a Cronbach's alpha coefficient of 0.60 is considered average reliability, while a coefficient of 0.70 or above points out that the instrument has a higher level of reliability criterion (Hair Jr. et al., 2010; Sekaran & Bougie, 2010).

Table 1
Reliability Test

Constructs	Number of Items	Cronbach's Alpha
Counterproductive work Behavior	12	.911
Leader Conflict Behavior	11	.785
Conflict Culture	13	.805
Voice Norm	6	.860

Results

The means, standard deviations, and correlations among study variables are reported in Table 2.

Table 2
Descriptive Statistics

	Mean	S.D	CC	LBA	CWB	VN
CC	3.23	.692	1			
LBA	3.16	.956	.207**	-.092		
CWB	2.98	1.282	.140*	.070	.341**	
VN	4.81	1.125	.160**	.108	-.045	1

Note: CC = Conflict Culture, LBA = Leadership Behavior Avoidant, CPWB = Counterproductive Work Behavior, VN = Voice Norm.

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An initial examination of the descriptive statistics table proposes that multicollinearity is not an issue because correlations among variables are in accordance with the threshold parameter. As per Hair Jr et al. (2010) and Pallant (2010), multicollinearity occurs when the correlation among variables is 0.9 and higher, and results in the correlation matrix showed that none of the variables is highly correlated with any other exogenous variable. The researcher also performed a multicollinearity test to observe each independent variable's variance inflation factor (VIF). It is obvious from the results that Tolerance scores fall under the range and the VIF. Consequently, no multicollinearity does exist in this study.

The values of the outer model are reported in Table 3.

Table 3
Loadings, Reliability and Convergent Validity Values

Vari-ables	Items	Loadings	Cron-bach's Alpha	CR	AVE	Discriminant Validity?
CC	CC10	0.599	0.808	0.852	0.445	Yes
	CC11	0.578				
	CC12	0.691				
	CC13	0.629				
	CC5	0.534				
	CC6	0.552				
	CC7	0.608				
	CC8	0.665				
	CC9	0.756				
CPWB	CWB10	0.764	0.913	0.926	0.535	Yes
	CWB11	0.724				
	CWB12	0.598				
	CWB2	0.63				
	CWB3	0.665				
	CWB4	0.772				
	CWB5	0.81				
	CWB6	0.79				
	CWB7	0.783				
LAB	CWB8	0.667	0.721	0.82	0.535	Yes
	CWB9	0.806				
	LAB10	0.799				
	LAB11	0.795				
	LAB8	0.603				
	LAB9	0.711				

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Vari-ables	Items	Loadings	Cron-bach's Alpha	CR	AVE	Discriminant Validity?
VN	VN1	0.567	0.86	0.863	0.519	Yes
	VN2	0.639				
	VN3	0.688				
	VN4	0.631				
	VN5	0.859				
	VN6	0.88				

Note: CC = Conflict Culture, LBA= Leadership Behavior Avoidant, CPWB = Counterproductive Work Behavior, VN = Voice Norm CR=Composite Reliability, AVE = Average Variance Extracted.

The next step was to evaluate the inner (structural model) and outer model (measurement model) with the aid of PLS-SEM (Hair Jr. et al., 2013) by running the Factor analysis. Put another way, PLS-SEM is used to analyse direct relations among variables along with mediation and moderation association. Valuation of the measurement model deals with the measurement of the element, which defines how well the items are loaded theoretically and ensures that indicators are valid and reliable. In PLS-SEM analysis, validity and reliability are the two main criteria used to evaluate the outer model (Hair Jr. et al., 2013; Ramayah, Lee & In, 2011). Results showed that values of Cronbach's Alpha and (CR) composite reliability are up to the recommended threshold point (Hair Jr. et al., 2013), such as 0.759 to 0.925, indicating the measurement model's reliability. Next comes the Convergent validity (CV), and AVE value defines an adequate CV. AVE values range from 0.501 to 0.589, meaning the CV is established.

The values of the discriminant validity are presented in Table 4.

Table 4
Discriminant Validity

Variables	CC	CPWB	EVN	LBA
	CC	CWPB	LAVB	VN
CC	0.627			
CWPB	0.207	0.732		
LAVB	0.278	0.076	0.731	
EVN	0.042	-0.097	0.078	0.72

Note: CC = Conflict Culture, LBA = Leadership Behavior Avoidant, CPWB = Counterproductive Work Behavior, VN = Voice Norm.

Discriminant validity reveals to what extent measures are different from each other as explained theoretically (Hair Jr. et al., 2013), and the best conventional approach to measure DV is the Fornell-Larcker criterion (Hair Jr. et al., 2013). The current study presents the Fornell-Larcker Criterion assessment (discriminant values), the square root of AVE's each construct. AVE's square root in bold is larger than its highest construct's correlation compared to other constructs. After attaining a satisfactory outcome of the measurement model, the next step demands evaluation of the inner model (structural model).

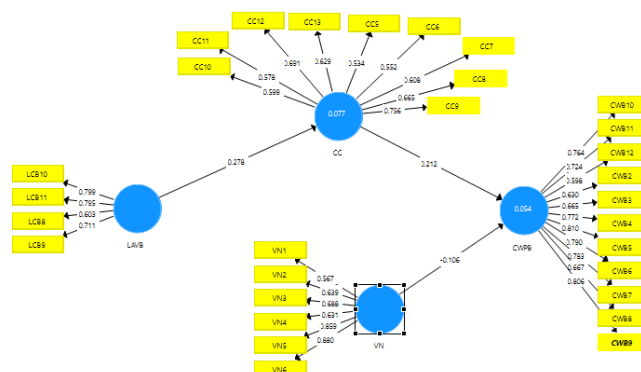
The Structural Model

After the establishment of the measurement model, the next turn is to assess the structural model's results. It involved evaluate the model's predictive capabilities and the associations among constructs. To assess the structural model, path coefficients need to be significant, predictive value, t-statistics and SE value (Hair et al., 2013).

Direct Relationships

The current study provides a detailed picture of the outcomes by analysing the structural model in relation to the hypothesis test comprehensively from 1 to 4. The assessment of the inner model starts by examining the direct association between independent and dependent variables. The coefficient's path size was examined with the aid of the PLS-SEM Algorithm, and bootstrapping was run to investigate the significance of the relationships. The first model emphasises the direct connections between IV and DV, such as (H1 and H2). In 2nd model, the mediation analysis was run to analyse the mediation relations such as (H3). Then, in 3rd model, analysis for moderation was run to analyse the relationship among VN, CC and CPWB (H4).

Figure 2
 Measurement Model



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Figure 3 reveals the bootstrap results that the relationship between an independent variable and Conflict Culture is significant with $p < 0.01$. Similarly, another direct relationship between CC and CPWB is also substantial with 0.001. As β compares and defines the strength of the effect of each independent variable to the dependent variable. The higher the value of the β represents, the stronger the effect, such as (β . 0.297; $t = 4.863^{**}$; $p < 0.0$), which shows that H1 is supported. The researcher also proposed with the help of literature, that there is a positive association between two variables, and the results support the literature. Likewise, results revealed that H2 is supported (β . 0.231; $t = 3.451^{**}$; $p < 0.001$), β value accounted for 23% of the variability, showing that conflict culture significantly impacts counterproductive work behavior, which means that CC gives cousin to employees to contributes to CPWB.

Figure 3
 Structural Model 1

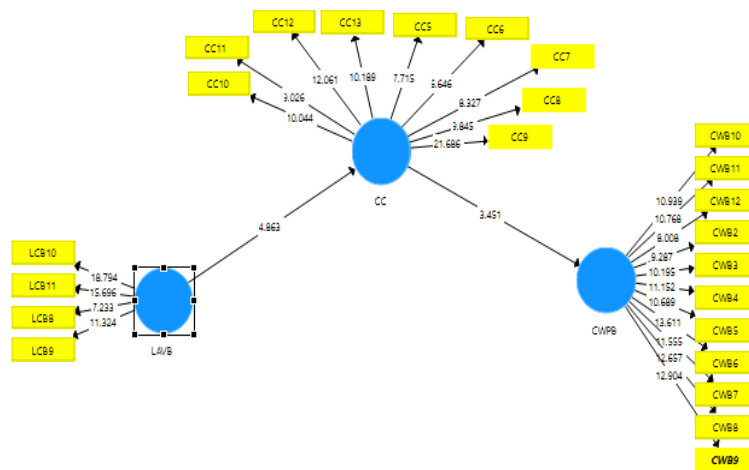


Table 5
 Results of Hypotheses Testing (Direct Relationships)

Hypotheses	Paths	β	S.E	T Statistics	P Values	Decision
H2	CC -> CWPB	0.231	0.061	3.451**	0.001	Supported
H1	LAVB -> CC	0.297	0.057	4.863**	0.0	Supported

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Mediation Test

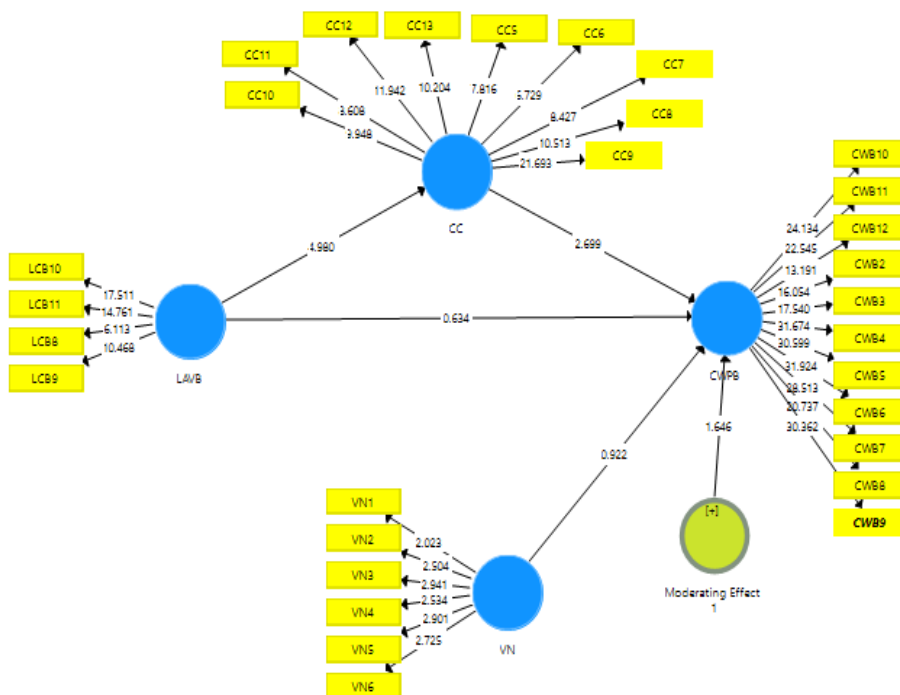
In the 2nd model (Table 6), the mediation was introduced and assessed with relation to IV and DV, and the results reveal that mediation is supported (β . 0.067; $t = 2.451^{**}$; $p < 0.015$), β value showed that CC accounted for 7% of the variability between leader's avoidant behaviour and CPWB, again this shows that CC is one of the causes to push the employees towards the destruction of an organisation.

Table 6
 Results of the Mediation Test

Hypotheses	Paths	β	S.E	T Statistics	P Values	Decision
H3	LAVB -> CC -> CWPB	0.067	0.023	2.451	0.015	Supported

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Figure 4
 Structural Model 2



Moderation Test

The purpose of moderation is to check how far the moderating variable is affecting the association between IV and DV, whether it is strengthening their relationship or not. According to Hair et al. (2013), once the interaction terms show the significance level means that there is a moderating effect (Hair Jr. et al., 2013). So, in the 3rd model, the moderation was conducted to see the impact of Voice Norm on CC and CPWB. The results of the H4 revealed that VN was unable to moderate the association between CC and CPWB (β -0.109; $t = 1.646$; $p > 0.01$), which means the positive relationship was not significant—aligning expectations, it is creating a negative impact between constructs, not strengthening their association. As H4 is not supported, it shows no significance level and generalizability (see Table 7).

Table 7
Results of the Moderation Test

	Direct Effect	β	S.E	T-value	Sig	Decision
Independent Variable	CC -> CWPB	0.188	0.067	2.699	0.007	
Moderator Variable	VN -> CWPB	-0.091	0.119	0.922	0.357	Not Supported
Interaction Effect	CC * VN-> CWPB	-0.109	0.058	1.646	0.1	

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Discussion

In any organisational setting, conflict culture is inherent means deeply engraved into a corporate system as it is unavoidable, and researchers in the past have shown conflict management techniques (Gelfand et al., 2012) to combat CC. But current study focused on one of the fundamental reasons contributing towards CC, such as behaviour.

The current section provides the recapitulation of the study in relation to research objectives (See Table 8). One of the aims of the study is to understand the leaders' role in determining organisational culture based on their Avoidant behaviour. Studying and analysing these associations will deliver beneficial avenues to temporary work settings. The current study's theoretical framework is supported by the Theory of Habitual Routines is in line with the concept of the study. More specifically, to assess the effect

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of a leader's behaviour on an organisation in relation to conflict culture, two hypotheses were generated.

Direct hypotheses were accepted. The result of the H1 revealed a surprisingly positive influence on CC with a significance score, which means that the project manager's avoidant behaviour generates a positive impact on CC with 30%, which is considered a good amount of effect. Although, the researcher proposed a negative association between them. Similarly, the H2 results also showed the approval, as proposed by the researcher, that there is a positive association between CC and CPWB with significance level. An organisation conflict culture is (23%) positively associated with CPWB, revealing CC is one of the pivotal features to generate the CPWB in an organisation, which is a threat to the employee's well-being of an organisation.

Likewise, mediation is also accepted with a significance level. The results showed that where there is conflict, it increases the risk of organisational damage, which can be seen through results. And as behaviour is the reflection of preferences which a new project manager has brought to the organisation and created a new culture with the aid of his behaviour (Gelfand et al., 2102). Results revealed that CC 8% successfully explain the relationship between both variables.

Moderating variable strengthens the association between IV and DV, and employee voice norm moderates the association between CC and CPWB. The β value revealed the negative effect between both constructs with no significance level. Consequently, moderation is rejected because a negative impact was recorded.

Table 8
Recapitulation of the Study Finding

Hypotheses	Statement of Hypothesis	Decision
H1	Leader's avoidant behavior will be negatively associated with CC.	Supported
H2	CC will be positively associated with CWPB.	Supported
H3	CC mediates the relationship between Leader's Avoidant behaviour and CWB.	Supported
H4	Leader's avoidant behavior will be negatively associated with CC.	Not Supported

Precisely results showed that a leader successfully and disproportionately generates the CC based on their behaviour, which contributes towards counterproductive behaviour. The indirect relationship also showed stimulating results that CC identifies

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a good amount of association between avoidant behaviour and CPWB because LBA always avoids disputes. However, results showed that CC explain their relationship with significance score. Thus, moderation is not accepted, allowing new thinking patterns to explore.

Theoretical Implications

The current study provides empirical evidence for the theoretical associations hypothesised. Specifically, it highlights the direct relationships between a leader's avoidant behaviour and conflict culture. Furthermore, the consequences of CC at the individual and organisational level contribute at the maximum level towards counterproductive work behaviour. The current study offers significant contributions to organisational literature by providing a new and different answer to the question of whether and how leader-avoidant behaviour relates to, is one of the major reason generating conflicting culture. The culture literature identified conflicting management techniques that help resolve the conflict among groups (Gelfand et al., 2012). Current research introduced another salient antecedent, one of the leader's diverse behaviours called avoidant, and proposed how a newly appointed leader generates a new culture based their behaviour along with its consequences. A leader may disproportionately influence culture as they hold enough social power and control over critical organisational resources (Caldwell & Doerr, 2014). The current research clarifies the role of leaders concerning avoidant behaviour and how extent their behaviour either triggers or avoids CC and identifies it as a salient dimension for group culture.

The current study further provides proof with results of how a leader's behaviour contributes towards new conflict culture in relation to their characteristics. LAB provides the pillar to the conflict in groups. However, researchers purposed that there is a negative relationship between them. This evidence persuasively proves that a group leader's behaviour applies a maximum influence while generating group culture compared to group members.

The current research also explains the association among CC, CPWB, and VN. Although cultural tightness transfer (Kim & Toh, 2019) is a relevant cultural concept that might inspire organisational consequences and performance (Gelfand et al. 2006), research on conflicting culture with relation to organisational performance is lacking (Gelfand et al. 2012; Gelfand, Nishii & Raver, 2006). The findings showed that CC has a positive impact on CPWB, which is a threat to an organisational setting; because CPWB leads towards the loss of well-being of an organisation where theft alone is a source of billions of dollars annually (Pletzer et al., 2019). The new group culture generated by the leader has a positive association with counterproductive behaviour, which is also a novel offering to the organisation literature.

The mediation also contributes theoretically and empirically as CC successfully mediated the relationship between LBA and CPWB, and as mentioned above the association between CPWB and CC is positive, and now LBA is also part of the loop.

Practical Implications

Aside from theoretical contributions, the present study perspective also has budding implications for practice. The present study offers to understand the leader's behaviour regarding CC. It will inaugurate to display the value of a leader's behaviour in relation to CC and counterproductive behaviour for top management and HR policymakers. It also gives aid to the policymakers and recruiters that, when appointing group leaders, need to be aware of behaviour which will affect the organisation's existing culture either positively or negatively because behaviour may mislead the manager and team. Also conflict culture paradigm invites fresh and novel diagnostic tools and mechanisms for implementing systematic changes in NGOs and firms. For instance, the positive association between conflict culture and avoidant behaviour opens up a new thinking dimension for top management and project managers.

Furthermore, results also showed that a leader's behaviour is the salient factor contributing to a new culture. Therefore, it is possible for NGOs and organisations to strategically appoint leaders to create a diverse culture, which may lead the organisations to achieve their goals at the maximum level and may avoid the counterproductive behaviour of the employees.

Contextual Contributions

The current study fills the gap with a unique combination of variables such as CC along with leader's avoidant behaviour and counterproductive behaviour, as researchers did not explore this dimension of organisational literature in the Pakistani context. A recent study of Pakistani firms is limited to exploring evidence regarding happy employee support of peers (Clercq, Haq and Azeem, 2019), and this demand to address contextual gap regarding leaders' behaviours to transform organisational cultural (Ong, Magsi & Burgess, 2019). Similarly, project-based organisations such as NGOs are frequently more prone to cultural transformations because of their unique team structure and temporary project leads (Hassan et al., 2017; Saleem, Hoque, Tashfeen, & Weller, 2023; Tysen, 2013). So, this study provides a generous amount of assistance on how a leader transforms the group culture based on their behaviour.

Limitations and Future Research Direction

Like all other research, the current study has several limitations that nurture salient queries to authorise future research. The first limitation is methodological, as the present study has used PLS-SEM for analysis. Regardless of any doubt, PLS-SEM is a sophisticated statistical tool, but it is subject to some constraints, such as the assessment of model fit (Hair et al., 2014). So, to combat this issue, future researchers can apply AMOS to have a model fit. Secondly, the current study has used a cross-sectional survey in which the responses were collected at one specific time. So because of the cross-sectional survey,

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it is limited in verifying causal associations between the variables (Saleem & Ashfaq, 2023; Sekaran & Bougie, 2010).

Moreover, as data collection held at one time, which might not elucidate the data in accordance with to present long-term behaviours of NGOs, future research can be done by using other data collection strategies such as a longitudinal survey. In addition, future researchers can also consider other sectors for data collection, such as manufacturing teams and software. Furthermore, a recent study only considered Lahore and Islamabad's NGOs. Future studies might consider the nationwide. Moreover, future research can also see the impact of healthy leadership against tangible behavioural issues concerning the well-being of team members, the organisation and society as a whole (Altaf, Saleem, Mustafa, & Anwar, 2022; Rudolph, Murphy and Zacher, 2020).

The present research cannot prove moderation with suggested relations, but direct results unfold the interesting facet. So, future researchers might further broaden the study's scope by incorporating other constructs such as employee promotive voice (Liang, Farh & Farh, 2012, p. 71).

Conclusion

The primary purpose of the present research work is to scrutinise the role of a leader in shaping organisational culture based on their behaviour in temporary work settings and to examine the indirect and direct effects of corporate culture in relation to organisational and individual outcomes in temporary work settings. The study has found a significant association among variables following its purpose.

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Irfan Saleem is supervision, he later completed the thesis into paper format, proofread it and is the corresponding author of this research study.

Shumaila Zamir originally conducted the research in university of central Punjab, she written original thesis, collected data and analysed it.

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Conflict of Interest Information

The authors have no conflicts of interest to declare.

Types of Socio-psychological Competence of Adolescents with Disabilities: from Adaptability to Maladaptability

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Abstract

Introduction. In the conditions of modern digital society, the research of socio-psychological competence of adolescents with disabilities (AWD) is relevant. Socio-psychological competence determines the variable ability of a personality to adapt in interpersonal interaction. The novelty of the work lies in the development of a typology of socio-psychological competence of adolescents with disabilities taking into account the properties and degree of their adaptability. **Methods.** Adolescents with mild mental retardation (n = 84), adolescents with visual impairment (visually impaired) (n = 70) and adolescents with hearing impairment (hearing impaired) (n = 60) were recruited as respondents (n = 294). The control group included adolescents with normal development (n = 80). The studied parameters of socio-psychological competence - directions and types of reactions in a frustrating situation, self-esteem and level of pretensions, types of behaviour, social interest and others - were assessed by the method of expert evaluations and the projective method. The methods of factor and cluster analysis were used for statistical data processing. **Results.** On the basis of mathematical and statistical processing of the results of the empirical study, a typology of socio-psychological competence of adolescents was created taking into account the characteristics of adaptability-maladaptability of personality. The proposed

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typology includes four different types of competence: (1) adaptive type, (2) partially adaptive, (3) partially maladaptive, and (4) maladaptive type. **Discussion.** As a result of the study, it was proved that groups of adolescents with disabilities are heterogeneous in terms of the degree of adaptability-maladaptability, the presence and expression of personal resources, and the characteristics of social and psychological competence of adolescents in these groups are largely determined by the potential safety of the intellectual sphere in case of sensory disorders and intellectual weakness in case of mental retardation.

Keywords

socio-psychological competence, adaptability-maladaptability, adolescents with disabilities

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Introduction

Modernisation processes, covering the social reality of modern society and occurring in all its spheres, actualise the requirements to the process and the result of interaction of the individual with the social environment. Significant changes arising in the interaction of a person with the external world inevitably lead to a state of instability, triggering the processes of adaptation and changes in system parameters.

For modern children and adolescents, the process of adaptation to the social world is burdened by the conditions of digital society, which actualises the need to study the communicative features of the younger generation at the present stage. Intensification of communication with its shift towards virtual communication, limitation of real communication due to displacement by other activities (including the Internet) leads to the lack of social experience and the emergence of its specificity, weakening the ability of the individual to social interaction - social and psychological competence (SPC).

Interest in the study of personality SPC is due to the significance of this construct for interaction with the social world, for the process of personal integration into the social system. Social-psychological competence, including its emotional component, contributes to a positive attitude towards oneself, reducing anxiety, increasing adaptation

to school and to society in general, as noted in foreign studies (Corcoran, Cheung, Kim & Xie, 2017; Mella et al., 2021).

There has been a steady interest in the study of the phenomenon of SPC for more than sixty years, but there is no identity in the authors' views on the essence and structure of this phenomenon. Despite the lack of identity, there is a similarity in the general focus of SPC - on the effectiveness of social or interpersonal interaction (Kvitchastny, 2012; Koblyanskaya, 1995; Minkina, 2005). This allows us to consider SPC as an ability that provides an individual with the ability to adapt, flexibly change his/her behaviour, and realise himself/herself in society, i.e. it characterises adaptability.

In foreign psychology, the concept of "social competence" is more often used as a concept that includes the ability of an individual to interact with other people. F. Hellmann (1963) considered this phenomenon through the prism of ideas of relativistic approach, emphasising the constant changeability of reality and denial of relative stability of things and phenomena.

The definition of social competence by J. Bowlby, who interprets this phenomenon as "a positive sense of self-efficacy in achieving socially significant goals" (1973, p. 82), allowed followers to structure their studies taking into account the variability of these goals and subject areas: the feeling of sufficient comfort in social situations, development and maintenance of good relations with other people were also taken into account (Semrud-Clikeman, 2007; Zimmer, Ullrich & Ullrich de Mueynk, 1978).

Social psychological or social competence includes a complex set of social skills involving the ability to assess perspectives, understand the social environment, and initiate positive social interactions (Milligan, PhillSPC & Morgan, 2016).

In domestic psychology, the problem of SPC is widely presented within the framework of the systemic approach, in which, as a rule, a triadic model of cognitive, emotional (or expressive) and behavioural (or interactive) characteristics is considered (Koblyanskaya, 1995; Koroleva, 2008).

In the present study, the triadic variant of the phenomenon structure presented in the author's works (Koroleva, 2008), framed by personal-resource organisation and related to the adaptability of the individual, was taken as the structure of SPC.

The concept of adaptability is interpreted by researchers in a variety of ways: as the ability to internal self-organisation, as a result of activity, as variability of behaviour in accordance with role expectations, but more often as an innate or acquired ability to adapt to the whole variety of life in any conditions (Mikhailova, 2012; Nalchajian, 1988). Social and psychological adaptability is interpreted as the ability of an individual to adapt in interpersonal interaction, fulfil social roles, while maladaptability implies a decrease in the ability to adapt, characterised by possible difficulties in adapting a person to the social environment.

At the socio-psychological level, the dyad "adaptability-maladaptability" determines the variable ability to adapt in interpersonal interaction. Using specific models of socio-psychological competence based on the dyad characteristics of "adaptability-

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maladaptability", it is possible to determine and predict the success of personality adaptation in different conditions and at different stages of development.

The most important factors that reduce the quality of personality adaptability in society are the conditions of abnormal development of personality, which largely determine the deficit or fullness of a person's social skills.

According to modern research, the assessment of SPC in persons with disabilities can be carried out at the stage of preschool childhood. Thus, Kurienkova A. (2020), distinguishing socio-motivational, socio-cognitive, socio-activity, socio-personal components in the structure of SPC, notes that already a preschooler with intellectual disability should have knowledge about himself and socially significant phenomena, ideas about peers and relatives. However, the achievement of SPC is associated with a certain level of maturity of the personality, the development of its self-consciousness, which draws our attention to the adolescent stage, which is rightly considered sensory for the development of personal constructs.

Domestic educational standards and adapted educational programmes for children with disabilities provide not only for the formation of a system of knowledge and skills, but also social competence in general (Borisova, 2018), necessary for successful social interaction.

The analysis of specific secondary and tertiary symptoms in the structure of the defect in different developmental disorders allows us to discover common characteristics that disrupt social and interpersonal interaction of the individual (Boykov, 2005; Vygotsky, 1983; Korobeinikov, 2002; Mallaev, Omarova, Bazhukova, 2009).

The **aim of the study** is to theoretically justify and develop a typology of socio-psychological competence of adolescents with disabilities, which allows determining and predicting the success of their social adaptation.

Methods

To test these assumptions, we conducted a study involving four groups of 12–15 year old adolescents (n = 294):

- All subjects in experimental group 1 have **mild mental retardation** and are taught according to version 1 of the adapted educational programme (n = 84);
- Experimental group 2 consisted of **visually impaired adolescents** (n = 70);
- Experimental group 3 consisted of **hearing-impaired adolescents** (n = 60);
- The control group consisted of adolescents **with normative development** (n = 80).

All subjects in the experimental groups study in special remedial schools, often boarding schools, but live in families. The groups are homogeneous by gender and similar in social characteristics. Taking into account the psychological characteristics of

the respondents of the experimental groups (infantile, insufficient reflexivity, reduced criticality, etc.), most of the methods used belong to the method of expert evaluations. The exceptions were the "Frustration Tolerance Test by S. Rosenzweig" and "Frustration Tolerance Test by S. Rosenzweig". "Rosenzweig" and "Symbolic tasks to identify the "Social Self", which are based on the projective method. The methods used are presented in Table 1.

The development of the SPC typology required a number of standard mathematical and statistical procedures with empirical data using factor and cluster analyses.

Results

In order to generalise and reduce the large amount of empirical data, we performed the procedure of their factorisation using the principal component method with Varimax rotation, which allowed us to reduce the techniques whose parameters were not included in the factors in any of the groups. Thus, we obtained 24 parameters (instead of 45), which were distributed across the principal components of the SPC and are presented in Table 1.

Table 1

Components and parameters of adolescents' SPC

Name of the components of the SPC	Parameters to be studied	Methods
Cognitive-emotional	Cognitive-emotional competence	Social and psychological competence of an adolescent (Koroleva, 2018; Koroleva 2022)
	Emotional-regulatory competence	Social and psychological competence of an adolescent
Emotional-regulatory	Arbitrariness	A.M. Prikhozhan Social Competence Scale (Prikhozhan and Tolstykh, 2005)
	Directions of reactions in a frustrating situation: extrapunitive, Intrapunitive, impunitive	S. Rosenzweig's frustration tolerance test. Rosenzweig (Dermanova, 2002)
	Types of reactions in a frustrating situation: obstacle-dominant ant reactions, self-protective, necessary-supportive	

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Name of the components of the SPC	Parameters to be studied	Methods
Instrumental and operational	Instrumental-operational competence	Social and psychological competence of an adolescent
	Conforming behaviour	
	Protest behaviour	
	Hyperactive behaviour	M.E. Weiner questionnaire (Weiner, 2004)
	Demonstrative behaviour	
	Social disorientation	
Aggressive behaviour		
	Development of communication	A.M. Prikhozhan Social Competence Scale
Personal-resource organisation	Self-esteem	Dembo-Rubinstein self-esteem diagnostic technique modified by A.M. Prikhozhan
	Claim level	
	The value of "I"	Symbolic tasks to identify the "Social Self" according to B. Long, R. Ziller, Henderson (Kikina and Ovsyannikova, 2007)
	Social interest	
	Self-confidence	A.M. Prikhozhan Social Competence Scale
	Self-activity	
	Personal-resource organisation of the SPC	Social and psychological competence of an adolescent

Due to the multidimensional values, standardisation of the data was required, after which their analysis was carried out using the k-means method, which made it possible

to divide the observations (from R space nR^m) into 4 clusters, i.e. **types of SPC**, by dividing them into 4 clusters. The Euclidean distance was used as a measure of proximity. Significant differences between the types were found for all parameters except for 6, 13, 14. The results of intergroup and intragroup dispersions of features during clustering are presented in Table 2.

Table 2

Results of analysis of intergroup and intragroup variance of traits during clustering

No. n/a	Parameters	Intergroup sum of squares ¹	Step free intergr.	Intragroup sum of squares	Steppe's free inside gr.	F	p	Methods
1	Extrapunitive reactions	<u>26,1157</u>	3	266,8843	290	9,4592	0,000006	Frustration Tolerance Test S. Rosenzweig
2	Intro-spunitive orientation of reactions	<u>11,0775</u>	3	281,9225	290	3,7983	0,010713	
3	Impunitive orientation of reactions	<u>55,0620</u>	3	237,9380	290	22,3700	0,000000	
4	Obstacle fixation	<u>29,2238</u>	3	263,7762	290	10,7097	0,000001	
5	A fixation on self-defence	<u>25,4612</u>	3	267,5388	290	9,1996	0,000008	
6	Fixation on fulfilment of a need	3,7361	3	289,2639	290	1,2486	0,292365	
7	Self-esteem	<u>91,2224</u>	3	201,7776	290	43,7024	0,000000	Methodology Dembo-Rubin self-esteem diagnostics
8	Claim level	<u>61,1452</u>	3	231,8548	290	25,4931	0,000000	

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No. n/a	Parameters	Intergroup sum of squares ¹	Step free intergr.	Intragroup sum of squares	Steppe's free inside gr.	F	p	Methods
9	Social interest	4,7175	3	288,2825	290	1,5819	0,193876	Symbolic tasks
10	The value of "I"	6,5158	3	286,4842	290	2,1986	0,088365	
11	Self-confidence	<u>153,7799</u>	3	139,2201	290	106,776	0,000000	A.M. Prikozhan Social Competence Scale
12	Autonomy	<u>155,1381</u>	3	137,8619	290	108,780	0,000000	
13	Arbitrariness	<u>133,4212</u>	3	159,5788	290	80,8215	0,000000	
14	Development of communication	<u>164,4750</u>	3	128,5250	290	123,705	0,000000	
15	Conforming behaviour	<u>50,8786</u>	3	242,1214	290	20,3132	0,000000	M.E. Weiner questionnaire
16	Protest behaviour	<u>206,7419</u>	3	86,2581	290	231,689	0,000000	
17	Hyperactive behaviour	<u>174,2626</u>	3	118,7374	290	141,870	0,000000	
18	Demonstrative behaviour	<u>130,5143</u>	3	162,4857	290	77,6461	0,000000	
19	Social disorientation	<u>154,9075</u>	3	138,0925	290	108,437	0,000000	
20	Aggressive behaviour	<u>144,7434</u>	3	148,2566	290	94,376	0,000000	

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No. n/a	Parameters	Intergroup sum of squares ¹	Step free intergr.	Intragroup sum of squares	Steppe's free inside gr.	F	p	Methods
21	Cognitive-emotional competence	<u>109,0596</u>	3	183,9404	290	57,3144	0,000000	Social and psychological competence of an adolescent
22	Emotional-regulatory competence	<u>124,9579</u>	3	168,0421	290	71,8823	0,000000	
23	Instrumental-operational competence	<u>113,9780</u>	3	179,0220	290	61,5448	0,000000	
24	Personal resource competence	<u>104,7154</u>	3	188,2846	290	53,7616	0,000000	

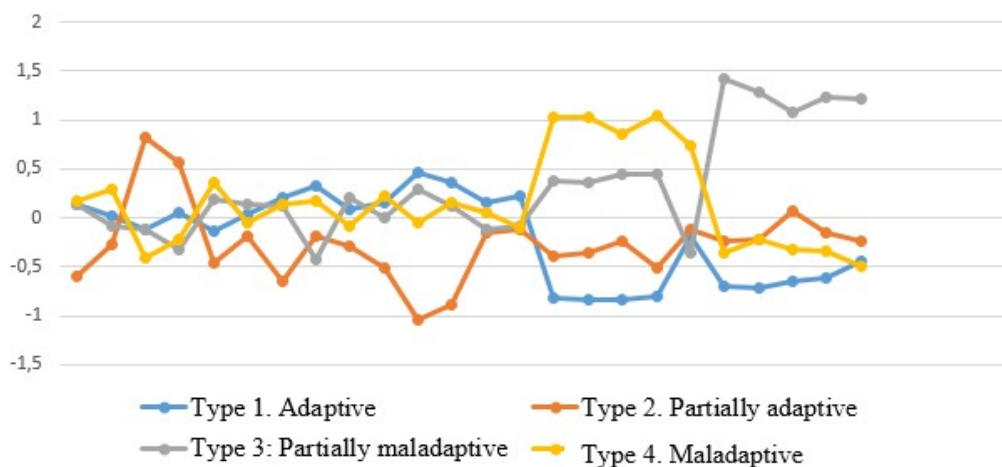
Note. ¹- Significant differences are highlighted in the table.

Discussion

Figure 1 presents the types of adolescents' SPC.

Figure 1

Types of socio-psychological competence of adolescents



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Adaptive type of SPC

The first type is characterised by a high level of arbitrariness and a harmonious (relatively even representation of reaction types and directions) response profile in a frustrating situation. Negative types of behaviour (hyperactive, demonstrative, aggressive, protest and social disorientation) are not characteristic of adolescents with this type of SPC.

Personal-resource organization of SPC is characterised by high indicators of self-esteem, pretensions and self-confidence. In the process of interaction, the adolescent is able to show independent activity, take responsibility for himself. Adolescents with this type of behaviour have the highest social interest and recognition of the value of "I". These are the most successful teenagers in interpersonal interaction, characterised by strong resources that guarantee their successful adaptation.

This type, which is characterised by the greatest maturity of the SPC and balance between components, was called **adaptive and** was found in 98 adolescents, including 35 with normal development, 31 with hearing impairment, 18 with visual impairment and 14 with mental retardation. The presence in this group of adolescents with mental retardation is most likely explained by the quality of relations with their social environment, characteristic features of the social resource environment, which may fulfil a compensatory function. Analysis of the social history of these adolescents shows that most of them are brought up in complete families with a relatively favorable psychological climate, i.e. close adults are the agents of adaptability.

Partially adaptive type of SPC

The second type is characterised by readiness to recognize a frustrating situation as unimportant and passing overtime. Adolescents are generally successful in communication, sufficiently independent and able to manage their behaviour in interpersonal interaction. However, they have a personality-resource deficit, which is expressed in low self-esteem and pretence levels. They are characterised by a certain impressionability and insecurity. Active negative types of behaviour (hyperactive, aggressive, protest) are not characteristic of them, but they may have tendencies to demonstrative actions.

This type, labelled as **partially adaptive**, was found in 64 adolescents, including 31 with normal development and 24 with visual impairment. This type was not characteristic of adolescents in the other two groups, although it was found in a small number of respondents with mental retardation (n = 5) and hearing impairment (n = 4).

A certain proportion of adolescents with mental retardation among the

representatives of the first and second types can also be explained not by the identity of the quality of SPC with the quality of competence of adolescents of other groups, but by the specificity of the assessment of most parameters by experts who were oriented in scoring not on age but on group norms. It is clear that the group of mentally retarded is very heterogeneous and among them one can find relatively adaptive and successful in interpersonal interaction, against the background of others characterised by signs of obvious maladaptation. Children with disabilities have reduced abilities to adaptation, but even with a lack of competence in this area, the group of these individuals, firstly, is characterised by heterogeneity (Korobeinikov, Babkina, 2021) with a significant scatter of data on the degree of adaptability-maladaptability, and secondly, they will certainly have preserved or relatively preserved properties (Korobeinikov, 2002; Koroleva, 2022), which constitute the resource of adaptability.

Partially maladaptive type of SPC

The third type of SPC is characterised by the highest indicators of ego-protective reactions, which characterize low frustration tolerance, personality weakness, and the need for protection. Adolescents of this type are characterised by the instrumental-operational immaturity of SPC, which is expressed in difficulties in mastering available non-verbal means of communication, underdeveloped ability to initiate communication, limited ability to solve conflict situations with peers, to foresee the consequences of their behaviour. The most pronounced tendency of this type is a high level of conformist behaviour, indicating, on the one hand, a desire for unquestioning adherence to instructions, which can have a very positive connotation, but, on the other hand, it also indicates insecurity, inherent passivity, avoidance of collective games and tasks. The personal-resource organisation of SPC is an area of deficit: the level of self-confidence and independent activity is rather low.

This type, labelled as **partially maladaptive**, is quite characteristic of adolescents and was found in 69 respondents, among whom adolescents with mental retardation (n = 34) and visual impairment (n = 26) predominate. This type was least characteristic of adolescents with hearing impairment (n = 5) and respondents with normal development (n = 4).

Maladaptive type of SPC

For adolescents of the fourth type of SPC, frustration becomes a condition of a special attitude to social reality, in which the subject is not given the opportunity to realize

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internal needs, i.e. an obstacle has a special significance regardless of whether it is viewed negatively or positively. All this is accompanied by the activation of negative types of behaviour (hyperactive, demonstrative, aggressive, protest and social disorientation) and a low level of conformism. At the same time, the level of self-esteem and self-confidence is quite high, and there may be a tendency to display independent activity, but often of a negative nature. Adolescents find it difficult to control speech and emotions in situations of interaction, to regulate their activities, to observe norms and rules in the process of communication, are characterised by immaturity of personal resources, expressed maladaptability.

This type, labelled **maladaptive, was** found in 63 respondents, predominantly among adolescents with mental retardation (n = 32), and less frequently among adolescents with hearing impairment (n = 19) and normal development (n = 10). This type is least characteristic of respondents with visual impairment (n = 3).

While there are common manifestations of maladaptive behaviour, its genesis differs between adolescents with mental retardation and adolescents of other groups. Most symptoms (difficulties in controlling speech, emotions and behaviour, etc.) in mental retardation are the result of a primary defect, while in sensory deficiency and normal development these deficits are more likely to be socially conditioned.

Social skills deficits characteristic of adolescents with a maladaptive type of SPC affect all levels of their social interaction and can "negatively impact several important domains, including academic performance, interpersonal relationship, behaviour, mental health and adult life outcomes", as noted in foreign studies (Silveira-Zaldivara, Ozerki & Ozersk, 2021, p.341).

Thus, adolescents with socio-psychological competence of maladaptive and partially maladaptive types of SPC need targeted psychological and pedagogical support aimed at developing their social skills in order to achieve an acceptable level of social adaptation.

Conclusions

The theoretical and empirical study allowed us to draw the following conclusions:

- Socio-psychological competence as an individual's ability to interpersonal interaction determines the variability of her adaptation in society;
- The development of social skills of modern adolescents with disabilities is weakened both by the specific conditions of their growing up in a digital society and the conditions of abnormal development of personality, which actualises the problem of managed development of their social and psychological competence;

- The development of a typology of socio-psychological competence based on the dyadic characteristics of "adaptability-maladaptability" allows, depending on the attribution to one of the four types, to determine and predict the success of social adaptation of adolescents with disabilities;
- Both adolescents with disabilities and adolescents with normal development can be categorised as highly adaptive and maladaptive, which confirms the significant heterogeneity of the characteristics of socio-psychological competence within each group and is determined by both social factors and the level of intellectual development of the individual;
- Adaptive types of SPC, characteristic mainly of adolescents with sensory deficiency and adolescents with normal development, allow flexible action in situations of communication, change their behaviour when it is ineffective, control themselves and deeply understand and adequately assess their capabilities;
- Non-adaptive types of SPC are most inherent in adolescents with mental retardation, characterised by uneven development of traits, a clear deficit of internal and external resources, and the presence of non-constructive types of interaction.

The results of this study can be used in the development and implementation of individual correctional programmes for the development of social and psychological competence of adolescents with disabilities, for building a system of their controlled support in the process of education and upbringing.

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Information on conflict of interest

The author declares no conflict of interest.

Strategic Directions to Improve the Habilitation Process for Individuals with Disabilities

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Abstract

Introduction. Issues of habilitation of individuals with severe and multiple developmental disabilities are relevant in the educational systems of different countries. There is a contradiction between the need for habilitation of individuals with disabilities and the lack of necessary conditions for its implementation. The importance of continuing education for individuals with severe and multiple developmental disabilities is to train life skills, to develop social skills, and to develop 'viable' personality. With regard to individuals with severe and multiple developmental disabilities, the concept of 'viable personality' refers to an individual who is able to carry out household and work activities at a corresponding level, interact with others, follow the rules of safe behavior and therefore feels comfortable and secure in society. **Theoretical justification.** The issue of disability habilitation has been studied using theoretical methods, including analysis of psychological and educational research in this area, educational regulations for individuals with severe and multiple disabilities, and the current practice of habilitation for individuals with severe and multiple developmental disabilities over the age of 18 years. **Discussion.** A list of strategic directions to improve the habilitation process with a brief description of each direction is proposed, including (a) adoption of the Concept of Continuing Education for individuals with severe and multiple developmental disabilities; (b) creation of a program of interdepartmental interaction aimed at maintaining organizational and substantive continuity in habilitation of individuals with severe and multiple developmental disabilities; (c) interdisciplinary scientific research on systematization and development of diagnostic tools to identify the

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potential capabilities of individuals with severe and multiple developmental disabilities; (d) development of multi-module variable educational plans and training programs as the basis for the implementation of multi-level educational content; (e) inclusion of deontological issues in the educational program for teacher retraining and advanced training; (f) vocational training and providing safe workplaces in the labor market.

Keywords

habilitation, multiple developmental disorders, continuing education, life and socialization skills, adaptive developmental environment, interdepartmental coordination, succession and continuity

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Introduction

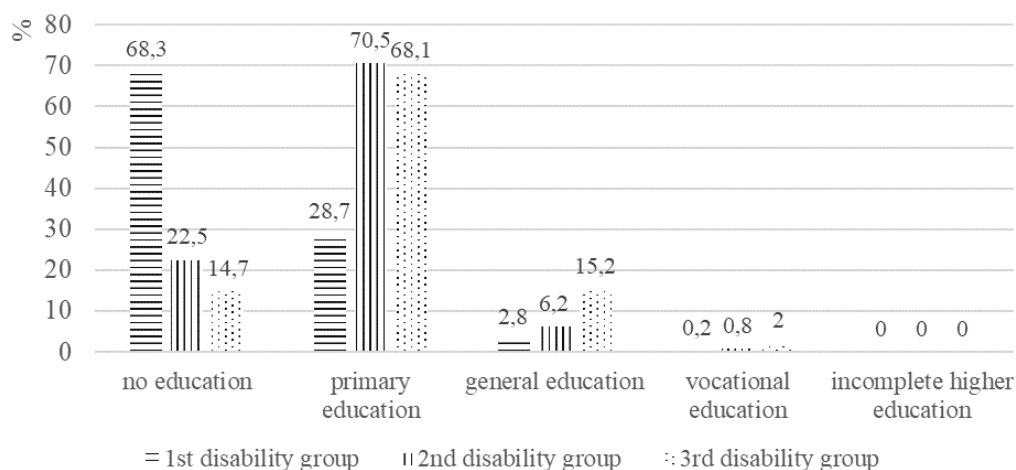
In modern society, unique human individuality, its characteristics and the most important needs are recognized as absolute values. The most important needs include training and education. It is training that enables individuals to reveal their inner potential, which is especially important for individuals with severe health and developmental disabilities to be as high as possible involved in social life (Shpek, 2003; Tsarev, 2015). First, when talking about individuals with serious health and developmental disorders, we refer to students with severe and multiple developmental disabilities (hereinafter referred to as SMDD), as identified in special education. SMDD patients are characterized by severe mental disorders combined with sensory, motor, and communication disorders.

Continuing education is important for individuals with SMDD. In the process of learning, they develop higher mental functions and form the most important skills to live and work in the social environment. As a result, the level of independence and social importance of individuals with SMDD increase, and their quality of life and family life also improves (Lisovskaya, 2015b; Lisovskaya, 2016c).

Figure 1 shows the educational level of individuals with disabilities.

Figure 1 shows that the majority (68.3 %) of individuals with disabilities of the first group living in psychoneurological boarding schools in the republic have no education; 28.7 % of individuals have only primary education; 2.8 % of individuals have general education (9 grades); 0.2 % of individuals have vocational education.

Figure 1
Educational level of individuals with disabilities



Another important outcome related to the education of individuals with SMDD is their professional training. Work activity is a critical part of SMDD individuals' lives (Robitaille, 2010). Work activities at the level corresponding to this category of individuals enable them to feel like important members of society, as people around them. Work activity is the most important condition for the socialization of individuals with SMDD. As a result, issues related to assisted employment and assisted housing for individuals with SMDD have recently been examined in special education (Lisovskaya, 2016; Lisovskaya, 2015b; Tsarev, 2015).

Therefore, it is impossible to talk about comprehensive habilitation and rehabilitation of individuals with SMDD without solving educational issues in the field of vocational training.

Another social effect of the continuing education of individuals with SMDD is to develop social and life skills, and to promote positive attitudes towards interaction with them and to change public opinion on the possibilities of including this category of citizens in social life (Malofeev, Nikol'skaya, Kukushkina, & Goncharova, 2010; Konopleva, 2011). The possibility of the development of SMDD individuals is considered on the basis of activity and social activity in the environment (Bondar' & Karanevskaya, 2020; Filatova, 2018; Filatova & Karakulova, 2017). Over the past decade, social demands (from both the state and parents) have changed in order to increase the subjective and social viability of individuals with disabilities who, as far as possible, can participate in society's life (Lisovskaya, 2015a).

The object of our research is the national system of continuing education of individuals with SMDD, which determines the possibility of their habilitation and aims to improve their

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ability to form a viable personality. We define the concept of 'viable personality' as an *individual who is able to carry out family and work activities at a corresponding level, who is able to interact with others, who knows how to follow the rules of safe behavior, and who therefore feels confident and comfortable in society*. Therefore, such a habilitation system should contribute to improving the quality of life of SMDD individuals and their families and ensuring the highest level of socialization in society.

Theoretical justification

During the study, we used theoretical analysis of sociological, psychological, and educational literature to study the education and socialization of individuals with SMDD, and the method of logical reasoning. We examined the legislative and regulatory framework of special education, explored and summarized the experience of organizing education, assisted employment and assisted housing for individuals with SMDD.

Objectives of improving the process of habilitation of individuals with SMDD

The main challenge (contradiction) is the contradiction between the need for continuing education of adults with SMDD aged 18 years and older, which is the basis of their habilitation, and the immaturity of such national continuing education systems for this category of citizens (Malofeev et al., 2010).

In our view, this contradiction can be overcome by solving certain tasks. Let us consider the possibility of addressing them, for example, through the education system of the Republic of Belarus.

The first task is to implement the main provisions of the United Nations Convention on the Rights of Persons with Disabilities, especially the requirement that States Parties ensure access to education and professional training for adults with disabilities throughout their lives, laid down in Article 24(5) (the United Nations Convention on the Rights of Persons with Disabilities, 2006).

The second task is to create conditions for the implementation of interdepartmental approaches to ensure continuous habilitation of individuals with SMDD and to coordinate the activities of the three most important ministries – education, health, labor and social protection, which can ensure its complexity, substantive integrity, and continuity (Lisovskaya, 2016, Lisovskaya, 2015c).

The solution of *the third task* is related to the focus on individuality- and personality-related approaches when constructing a continuing habilitation system for individuals with SMDD. Attention to the experiences, needs, aspirations, inner meanings of a person with a disability, interest in his/her inner world, determine the choice of methodology approaches in working with students with SMDD (Attwood, 2010). In this case, the task of maximizing the individual potential of each person, supporting and helping him/her

in his desire to value, respect and express himself, comes first. This approach is a feature of the existential approach in education, especially in the education of individuals with SMDD (Konopleva, 2011).

The fourth task is to focus the vector of attention on the creation of an adaptive learning environment. The essence of such an environment is the need to adapt it to the special educational needs of SMDD students, while contributing to adjusting individuals with disabilities to social conditions and promoting the development of their personalities (Ayres, 2018; Gopnik & Meltzoff, 1997). When organizing such an environment, the age and individual characteristics of students should be taken into account, and the environment must be open to the necessary changes. Therefore, it must not only develop students, but also develop itself (Gaidukevich, 2010; Boyarshinova & Paikova, 2018; Lisovskaya & Maller, 2022). To create an adaptive environment, it is possible to use projective and playful methods, for example, fairytale therapy (Gneusheva, Shcherbakova, 2022).

The solution of *the fifth task* is related to scientific and methodological support and the development of educational and methodological materials for continuing education of individuals with SMDD, which is necessary for their habilitation. It must be taken into account that the characteristics of development and the nature of the special educational needs of this category of students require a maximum reduction in the academic component of the education content and a corresponding expansion of the component related to the development of life skills of individuals with SMDD. In this case, the possibility of socialization and adaptation to society will be ensured (Malofeev et al., 2010).

The sixth task is to prepare a multidisciplinary team of experts who understand the characteristics of specific developmental stages of individuals with SMDD, educational tasks and the tasks that ensure their comprehensive habilitation, who are psychologically and methodologically prepared to work with this category of students, who are able to work in a team and to work with the families of individuals with SMDD (Muzdybaev, 2009; Lemekh, 2022).

The importance of solving *the seventh task* is determined by the importance of creating conditions for the vocational training of individuals with SMDD, their preparation for assisted employment and assisted housing (Lisovskaya, 2015b).

Finally, *the eighth task* relates to the need to create protected employment opportunities in the labor market for adults with SMDD, taking into account their professional training.

Discussion

Strategic directions for improving the habilitation process

The identification of the main challenge and tasks aimed at its resolving has enabled the identification of strategic directions to improve the process of habilitation of individuals

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with SMDD. Each strategic direction consistently reveals the solution to the above-mentioned tasks of improving the habilitation process for individuals with disabilities and presents a brief commentary. The main challenge is to integrate SMDD patients into the objective and social world, ensuring their participation in everyday activities such as work, economics, art and creativity – all of which contribute to dependency as a form of secondary disability.

Adoption of the Concept of Continuous Education of Individuals with SMDD

Commentary. The Concept provides the main provisions to support the main ideas of education for individuals with disabilities under modern circumstances in a rapidly changing world – continuing education. These provisions clearly define the implementation of this idea for individuals with SMDD and take into account the characteristics of the country's modern educational situation. This concept not only shows the essence of the provision of continuing education, but also reveals the aim of such education for this category of students, its main tasks, principles, functions and implementation conditions.

The concept is based on basic legal documents such as the Universal Declaration of Human Rights, the Convention on the Rights of the Child, and the World Declaration on Education for All. These documents represent the basic idea – the right of every person to receive a high-quality education that meets his/her educational needs (Maslow, 2013).

The special educational needs of individuals with SMDD include acquiring basic skills such as the ability to express thoughts with verbal means of communication, the ability to read, write and count at a corresponding level, and the readiness to solve complex and difficult tasks. In addition to skills, the special needs also include values, knowledge, and ideas that help people solve various life problems in order to improve the quality of their lives, to participate in activities useful to society, to perform tasks related to individuals' self-development, and to ensure their vitality.

The concept was based on several ideas that defined the value of continuing education presented in the 1968 UNESCO Document (Vinogradov & Shkatulla, 1994). These ideas are related to the most important areas of education that determine their results for the individual:

- Learning to study, learning new things, developing curiosity, cognitive interest, and interest in cultural values, particularly in the development of information culture.
- Learning to apply knowledge in practice, use it to solve practical and research problems, and prepare for the development of future professional activities.
- Learning to cooperate with others in various activities, communicate in friendly and open ways and treat partners in activities with attention.
- Learning to formulate and express individual opinions, develop imagination and creativity.

Creation of an Interdepartmental Cooperation Program that ensures continuity both in the content of continuing education for students with SMDD and its organization

Table 1 shows the organization of continuing education and comprehensive support for students with SMDD. It also presents organizations of various departments that ensure this continuity.

Table 1

The system of continuing education and comprehensive support for individuals with SMDD

Age	Educational organizations	Health care organizations	Social protection organizations	Type of assistance
Infancy and early childhood	CCRE&R	Early comprehensive care in polyclinics, children's homes	—	early correctional and pedagogical assistance, medical care
Preschool age	CCRE&R	—	orphanages for preschool children with disorders in psychophysical development	education, support, medical care
School age	CCRE&R	—	boarding schools for children with special needs of psychophysical development	education, support, medical care
Adults (aged ≥ 18)	RSSC	—	psychoneurological boarding schools for the disabled and elderly	support, medical care

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Currently, it is necessary not only to ensure the continuity of education and comprehensive support for individuals with SMDD, but also to ensure the continuity of education content for this category of citizens.

Commentary. This Program can be characterized in a number of areas of activity:

- Establishing a unified information environment with data on SMDD graduates, including the Centres for Correctional and Developmental Education and Rehabilitation (CCRE&R) and the Regional Social Services Centres (RSSC).
- Providing the most appropriate conditions for the development of SMDD graduates within the framework of the activities of the RSSC.
- Providing information to graduates and their families on future prospects after graduation from the CCRE&R.
- Preparing the necessary documentation to ensure continuity of support for the transition of graduates and their families by RSSC experts.
- Updating the RSSC database with data on CCRE&R graduates.
- Methodological support to RSSC experts on the content and methods of work with SMDD graduates.
- Coordinating work with the Committee on Labor, Employment and Social Protection of the Population on the issues of continuity of the transition of CCRE&R graduates to the RSSC and the database exchange.

Table 2
Goal content of each stage of the Plan

Stage	Goal
Preparatory	Providing complete information on CCRE&R graduates and their families to RSSC
Adaptation	Development of an individual rehabilitation program for CCRE&R graduates
Basic	Direct work on the social rehabilitation of individuals with SMDD admitted to RSSC
Control/evaluation	Assessment of the effectiveness of interdepartmental interaction in the process of transition of CCRE&R graduates to the TCSO and the dynamics of social development of individuals with SMDD

Table 2 presents the goals for each of the four phases of the inter-departmental communication plan. Let us consider the tasks of each stage, the expected results and indicators for achieving the expected results.

The transition algorithm involves the following four stages – *preparatory*, *adaptation*, *basic* and *control/evaluation*. In addition to goals, each stage performs specific tasks.

The tasks of *the preparatory stage* include:

- Obtaining information by RSSC experts about the characteristics of CCRE&R graduates and the special housing conditions that they may need.
- Conducting open lessons, correctional classes with the invitation of RSSC experts and parents of graduates.
- Organizing round tables where principles, content and methods of working with graduates are discussed and agreed.
- Meeting parents of graduates with RSSC experts, getting acquainted with the work schedule of the institution and day care department for young persons with disabilities, its arrangement, rules of conduct.
- Preparing supplementary documents for graduates by CCRE&R employees and providing these documents to RSSC.

The tasks of *the adaptation stage* include:

- Forming friendly attitudes, sensitivity and tolerance towards individuals with SMDD among RSSC staff.
- Organizing a barrier-free and adaptive spatial environment at RSSC for the full personal development of individuals with SMDD.
- Planning work in RSSC day care services, taking into account the needs of newly admitted CCRE&R graduates.
- Developing individual rehabilitation programs for CCRE&R graduates.

The tasks of *the basic stage* include:

- creating equal opportunities and access for individuals with SMDD to participate in various forms of public life, including active social interaction.
- promoting the achievement of the maximum independence for individuals with SMDD.

The tasks of *the control/evaluation stage* include:

- Assessing the effectiveness of inter-departmental interactions in the process of CCRE&R graduates' transition to RSSC.
- Assessing the results of the activities of RSSC and CCRE&R.
- Analyzing the existing achievements and identifying ways to improve the work on social rehabilitation of individuals with SMDD.

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Expected results:

- RSSC is ready for graduates. The graduate documentation is completed, the classrooms for classes and rehabilitation activities are equipped, specialist working with SMDD category of individuals are hired.
- Graduates and their parents meet other members of the team and specialists in the day care department for individuals with disabilities, familiarize themselves with the schedule of RSSC and the day care department for individuals with disabilities, its regulations, and rules of conduct, etc.
- The short-term plan for the integration of graduates is made and approved by the Head of the RSSC.
- The short-term plan is tested and successfully implemented.
- RSSC creates the most favorable conditions for the social and environmental adaptation of the RSSC graduates.
- Rehabilitation work with a graduate in the RSSC is carried out in accordance with an individual working plan annually discussed and approved by the RSSC together with parents.
- The graduates are compensated and supported in accordance with the obligations of law.
- The range of services and the content of work meet the needs of the family and a young person with disabilities.

Indicators for the achievement of the expected results:

- All CCER&R graduates are enrolled in RSSC at their place of residence.
- In the local community, a tolerant attitude towards individuals with disabilities is established; there are no facts for their rejection.
- Favorable conditions for the social adaptation and integration of individuals with SMDD in society are created.
- Social contacts of individuals with SMDD are expanded, their employment and participation in public life improve their quality of life.

The problem of continuity of CCER&R graduates' transition to the RSSC is resolved through cooperation processes between experts from the two departments – education and social protection. In this regard, thematic interdepartmental seminars are held. The RSSC actively participates in the transition process of graduates. Experts attend all CCER&R events to meet future graduates and see their working conditions, prepare facilities taking into account the characteristics of young people with disabilities and consider different types of work activities taking into account the abilities of SMDD children. In the RSSC, a trusting and friendly atmosphere is created to provide psychological comfort to children with SMDD. Through early preparatory work, graduates' parents reduce their concerns about the future of their children (Lemekh, Shinkarenko, Skivitskaya, & Zabelich, 2020).

Conducting interdisciplinary scientific research

In these studies, such concepts as 'social education', 'individualization of learning', 'pedagogy of experiences', 'pedagogy of motivation', 'situational learning paradigm' will be defined.

Commentary. Each definition requires an independent consideration. For example, the 'individualization of learning' can be regarded on the basis of an existential approach that recognizes the uniqueness of each person. This approach determines the importance of taking into account the individual characteristics of each student, his/her feelings, health, and social experience (Abul'khanova, 2009). The 'pedagogy of motivation' can be considered through the need for care, the need for development, the need for communication, and the need for relationships (Maslow, 2013). In the context of proposed research, it is necessary to empirically determine the potential abilities of children and adults with developmental disorders (Berben, Sereika & Engberg, 2012; Lemekh, 2021). Thus, various diagnostic materials can be developed, such as a Scale for Assessing Communication Level Development, a Scale for Assessing Independence Level Development, which will help to determine the potential capabilities of children and adults with psychophysical developmental disorders (Göthe, Messer, Gent, & Kliegl, 2012; Gathercole & Pickering, 2001).

Development of multi-module variable educational plans and training programs

It is also necessary to develop multi-module variable educational plans and training programs for RSSC day care services, which content is linked to CCRE&R curriculum and training programs which goals and objectives are characterized by continuity.

Commentary. Such an educational plan can differentiate training content and act as a mechanism for the implementation of multi-level training content for individuals with SMDD, which in turn will enable us to get as close as possible to the implementation of an individual educational path for each student and to choose educational subjects that will contribute to self-disclosure of each student, the development and improvement of his/her potential skills. The modular structure makes it possible to meet the changing educational needs of students with SMDD (Lisovskaya, 2019). The content of educational subjects is aimed to develop life skills to the maximum (Gopnik & Meltzoff, 1997).

The inclusion of educational subjects on deontological issues in the educational plans and training programs for training, retraining, and advanced training of personnel

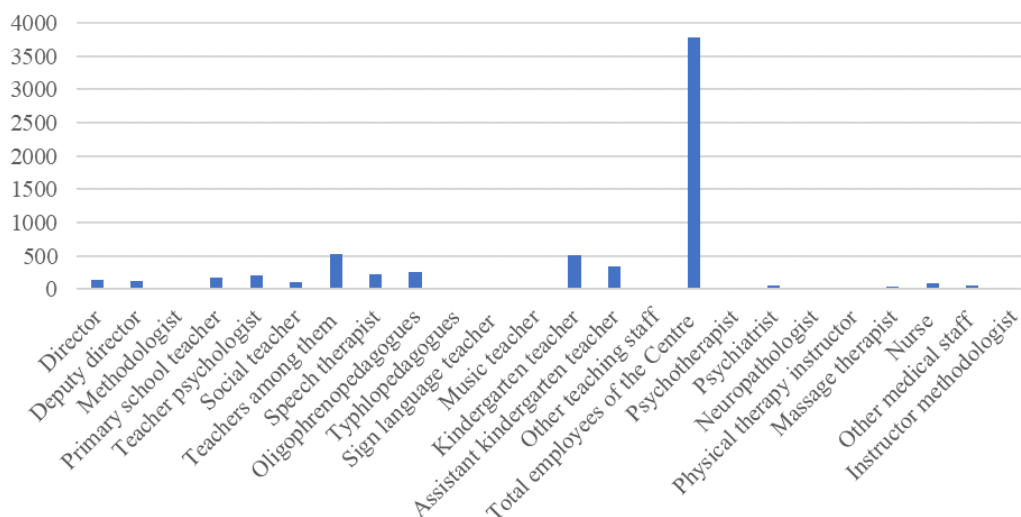
Deontology is a professional ethics that promotes the formation of a system of views and beliefs that recognizes the possibility of learning despite the severity of the existing developmental disorders, and does not focus on difficulties or problems, but on developmental abilities.

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Commentary. A humanistic approach to teaching individuals with SMDD presupposes that the direction of student social development is more important than the development of their cognitive abilities, suggests a structure of education where the priority is to preserve student health, taking into account the characteristics of their communication, understanding and behavior, which ultimately ensures the formation of a viable personality (Ayres, 2018; Robitaille, 2010).

Figure 2 shows the range of experts working with students with SMDD in an interdisciplinary team of experts. It includes teachers, methodologists, general education teachers, social educators, speech pathologists (speech therapists, oligophrenopedagogues, sign language teachers, typhlopedagogues), educational psychologists who provide personalized correctional support and participate in the correctional and developmental education of individuals with SMDD. Medical support for the education of this group of students is provided by medical experts (neurologist, psychiatrist, psychotherapist and therapist, nurses, physical therapy instructor, massage therapist and other medical specialists).

Figure 2
Interdisciplinary expert team



Such a number of experts in various fields is determined by the wide range of health and developmental disorders of children with SMDD. Therefore, the ability to work in a team and adhere to ethical rules of interaction are particularly important.

Preparing individuals with SMDD for future professional activities and independent assisted housing

Commentary. The formation of a viable personality requires a certain level of work ability. And work ability, in turn, is determined by a number of factors, including the state of health, the existing interests of the individual and the presence of external support (Rozov, 2016). This determines the importance and prospects of the organization of vocational training for individuals with SMDD on the basis of vocational training organizations, professional and social rehabilitation centres. Such vocational training gives individuals with SMDD the opportunity to master certain types of work or individual activities, to acquire work-related skills, to master these skills, and to support these categories of citizens through accompanied employment or employment in the open labor market, and thus to integrate into society.

The solution to the problem of creating safe workplaces for individuals with CMDD

Safe workplaces require workplace assistance, reduced working hours, additional breaks and timely psychological and medical assistance. This social support would enable this group to increase their self-sufficiency and independence, to provide for themselves financially at least partially and to live independently, not in a boarding school.

Commentary. Employment organization for individuals with SMDD offers them the opportunity to participate in socially useful work, to feel their importance and their independence, thanks to their compensation. In addition, work activities extend the social relationships, give individuals of this category the opportunity to communicate with others, and ensure the acquisition of social skills.

Conclusion

Each identified strategic direction may include several tactical steps or tasks that help to achieve positive decisions in a particular strategic direction, including (a) a meaningful disclosure of each structural component of the Concept of Continuing Education for individuals with SMDD and the expected steps for its adoption; (b) the presentation of a possible sample of the interdepartmental cooperation program for the implementation of the Concept of Continuing Education in the SMDD rehabilitation system; (c) the compilation of a list of scientific research topics aimed at solving the problem of Continuing education in the SMDD rehabilitation system; (d) and the development of a modular variable educational plan for the day care departments of Regional Social Services Centres for individuals with SMDD over the age of 18 years.

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Author Contribution

Lisovskaya Tat'yana Viktorovna contributed to the research concept and methodology, organized the study, and analyzed the literary sources.

Skuratovskaya Marina Leonidovna worked with sources, edited the text of the manuscript, approved the final version of the manuscript.

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Implementation of a new Continuing Training Framework in Physics Didactics: Perspectives and Recommendations

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Abstract

Introduction. This study aims to evaluate the effect of continuous training of physics teachers, which was realized within the context of the cooperation between the Moroccan Government and the Government of the United States of America, and which aims, among other objectives, to reinforce the competences and the professionalization of the teachers. **Methods.** The research study group was composed of 62 teachers of physics from high and middle schools. The training lasted 5 days and included face-to-face lessons on the central concepts of physics and chemistry didactics and one of the active methods, namely inquiry-based learning. The analysis of a survey delivered online after three months of the mentioned training, aims at showing the impact of this kind of continuous training on the beneficiaries' classroom practices and the obstacles encountered. **Results.** The results indicate that this continuous training could not considerably change their classroom practices, due to administrative, didactic and working conditions problems. **Discussion.** Despite the aim of the training course, which was to encourage participants to change their approach in the classroom to adopt learner-centred practices, the results had only a limited impact. Consequently, it becomes crucial to consider the obstacles uncovered by this study as essential factors for improving the conditions of future continuing training courses.

Keywords

continuing training, physics didactics, active learning, classroom practice, learner-centered practices, inquiry-based approach

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Introduction

In Morocco, as in many countries around the world, the issue of learner performance in science is a hot topic. Indeed, the international survey TIMSS 2019 (Trends International Mathematics and Science Study), which measures the knowledge and skills of primary and middle school students in science and mathematics, placed Morocco among the latest countries in terms of learners' achievements in mathematics and science (Mullis et al., 2020).

Also, the report of the National Learning Assessment Program reveals that "In physics and chemistry, 74% of students in the third year of middle school have not acquired the minimum level of competencies required to continue their scientific studies in high school (secondary school)" (INE-CSEFRS, 2019). In addition, several studies have shown that there is a low performance of Moroccan students in physics at different educational levels (Chekour, Laafou & Janati-Idrissi, 2015; Nasser, Khouzai & Taoufik, 2017, Anwar et al., 2019).

On the other hand, the world today is rapidly developing. The information is widespread, and technology opens new opportunities and challenges every day (Sánchez-López, Pérez-Rodríguez & Fandos-Igado, 2019). Scientific research leads to many pedagogical innovations, which raises several questions about the appropriate methods for teaching science. Furthermore, both teachers and their quality of teaching are a crucial element in pupils' learning (Popova, Evans & Arancibia, 2016). Therefore, the preoccupation to improve the quality of teaching-learning is growing and it is accompanied by the emergence of a scientific debate on the choice of pedagogical and didactic approaches that can improve learners' performance (Segura-Robles, Parra-González & Gallardo-Vigil, 2020). To this end, the best academic performance is associated with the use of active teaching models and strategies (García & Arias, 2022).

However, several voices have called for a renewal of the teaching-learning process in physics to make it more attractive. Thus, they propose that this process should be based on students conducting their own investigations. All this is reflected today in the real implementation of new educational policies, in the impetus of new pedagogies and

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educational reforms of the teaching of experimental sciences, particularly physics, by seeking to make learning more active and motivating (Robine, 2009).

Thus, Moroccan teachers are forced to respond to the new needs and demands of these changes (INE-CSEFRS, 2021), and to evolve in their professional context. They are confronted with the evolution of the social, technological and especially pedagogical environment (Mili, Errouihane & Toubi, 2021). To this end, continuous training is a means of ensuring that teachers adapt to new pedagogical, didactic and scientific developments, and can renew their teaching methods, encourage innovation in education and mobilize elements of knowledge and expertise in teaching practices to enhance the quality of student learning (Wei et al., 2009; Mahdi, 2018).

In such a context, Morocco has undergone a profound reform of the education system called the Strategic Vision 2015–2030. One of the objectives of this reform is to move from a pedagogy based on the one-way transmission of knowledge, on filling in and memorizing, to a pedagogy that targets intelligence. Thus, it is the learner who participates in the construction of his or her learning, which develops creative interaction between the teacher and the learner, promotes the development of competencies related to know-how and soft skills such as observation, expression, criticism, research and synthesis, and encourages the learner's initiative and develops his or her autonomy and insight in the era of digital technology and the profusion of knowledge (CSEFRS, 2015).

Hence, the vision proposed in lever 9 of the second chapter: the renovation of the teaching, training and management professions by opting for several principles, including continuous training leading to qualifications throughout the professional career of teachers (CSEFRS, 2015). Afterwards, the framework law n°51.17, was adopted in July 2019 which takes up the main lines of the strategic vision, through the modernization of the quality of teaching based on diversified and constantly renewed continuous training and in adequacy with the needs of the professional world of today as well as tomorrow (Gouvernement Marocaine, 2019).

In this perspective and as part of a cooperation between the Moroccan Government and the Government of the United States of America (Compact II), the agency MCA-Morocco (Millennium Challenge Account-M) was created in 2016. It is a public institution, responsible for the implementation of the Compact II program. This program proposes, among others, a new integrated model for the improvement of high schools called "Lycée Attahadi", which aims, among other objectives, the strengthening of skills and professionalization of administrative and pedagogical executives. The module of continuous training of the didactics of Physics is part of this framework. The beneficiaries are the teachers of Physics of the middle and high school (Millennium Challenge Account-Morocco Agency) (Compact II, 2015). The main competence of this module is that " At the end of this training, the beneficiaries will be able to mobilize and reinvest the central concepts of the didactics of physics - chemistry (conceptions, conceptual change and modeling, in addition to an inquiry-based approach) to interpret, analyze

and act effectively in professional situations to promote student learning". The training concerning this module lasted five days with an hourly volume of six hours per day. However, continuous training is demanded by the majority of teachers (Mahdi et al., 2015).

Also, several studies have suggested that teachers should receive continuous training in order to keep up with new didactic developments. Moreover, its impact on teachers' pedagogical competencies and professional development have been demonstrated (OCDE, 2019; Popova et al., 2016). Nevertheless, many beneficiaries of these trainings are dissatisfied with its contribution. Indeed, the quality of these trainings presents several weaknesses, in terms of the topics addressed; the poor institutional planning; the difficulties of mobilizing trainers and contributors who require indemnities to participate in training, as well as the low or non-participation of teachers in the proposed activities (Mili et al., 2021; Mahdi, 2021). And as a result, continuous training does not seem to have a positive impact on students' achievements (INE-CSEFRS, 2019). Within this framework, this research aims to find out to what extent continuous training has changed teachers' classroom practices towards learner-centered practices. As well as to identify the factors that may block this change. Hence, our research question can be formulated as follows:

To what extent could this continuous training of physics teachers change their classroom practices towards more Learner-centered practices?

The questions that arise are the following:

1. What are the teachers' views on continuous training in general and in the project "Lycée Attahadi" in particular?
2. How much has this continuous training changed their classroom practices?
3. What are the factors that block this change?

Literature review

In this paragraph we will present the central concepts of the didactics of the physical sciences which were the object of this continuous training, namely: the conceptions; the conceptual change; the modeling and an active approach of learning which is the inquiry-based approach. also, we will speak about the structure of the Moroccan educational system.

Secondary education Grade

The Moroccan pre-university education system is structured in such a way that it is composed of two main grades (COSEF, 1999):

1. The primary education grade divided into two: primary education (six years) and preschool education (two years).
2. The secondary education grade is divided into two parts: middle secondary grade

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(three years) and qualifying secondary grade (three years), intended for elementary school graduates with primary school certificates

Conceptions

A conception is an underlying idea. It can explain various difficult situations to the learner (Astolfi, 1998). Similarly, Giordan & De Vecchi, (1987) define conceptions as a set of coordinated ideas and coherent, explanatory images used by learners to reason about problem situations, but more importantly he highlights the idea that this set reflects an underlying mental structure responsible for these contextual manifestations.

We can therefore conclude that conceptions are ideas specific to each person, and each person can construct a conception specific to him or her when faced with a situation

Conceptual change

Knowing the learners' pre-existing conceptions is the necessary starting point for any learning to be developed and changed. This change is called conceptual change. It is learning that modifies or restructures pre-existing conceptions. Learning is not just about gathering new knowledge or developing a new skill. In conceptual change, an existing conception is fundamentally changed, or even replaced, and becomes the conceptual framework that students use to solve problems, explain a phenomenon, and move through their world. To this end, Duit and Treagust (2003) consider that there are two types of conceptual change, named:

- Assimilation, weak restructuring of knowledge, or conceptual capture;
- Accommodation, strong (or radical) restructuring of knowledge, or conceptual exchange.

Modeling

The physical and chemical sciences, which aim to explain the material world, have recourse, in addition to theories and laws, to modeling. The model has become an important tool in the scientific process and consequently the teaching programs of the physical sciences give it a primordial place. Indeed, these programs propose the notion of model, as early as the college grade, for example the particle model of matter, which is taught from the first year of college. A scientific model is an abstract, simplified representation of a system of phenomena that makes its main characteristics explicit and visible and can be used to generate explanations and predictions (Harrison, 2000).

Inquiry-based approach

The investigative approach is an educational method that aims to prepare students and involve them in learning knowledge and skills by engaging in planned, structured and open activities and by carrying out missions in a realistic environment that helps them to

describe and understand the real world around them. Therefore, learning in taking this approach is done through a process which includes the following stages: the problem situation, the learner's appropriation of the problem, the formulation of explanatory assumptions, the investigation, presentation and exchange of results, knowledge structuring and mobilization (Raissouni, Abid & Chakir, 2021).

Methods

Research design

In this research, we used a quantitative methodology to collect and analyze data from all teacher beneficiaries. The survey was developed and finalized before being shared with the participants after three months of the training course (February 2022). The purpose of this research is to learn about the effect of continuing training on the practices of physics teachers and the issues that block this change. This design allowed us to explore teachers' perspectives to understand how much these trainings can change their classroom practices.

Instrument

In this study, we used a survey questionnaire, validated by three experts (two Physics pedagogical supervisors and a teacher with long teaching experience). It is mainly composed of four sections: The first processes personal data of the respondents and includes gender, teaching experience, teaching grades and working area. The second addresses the opinions of participating teachers regarding continuing training in general. The third discusses participating teachers' opinions of "Lycée Attahadi" training. The fourth concerns the effect of this training on the classroom practices change and the obstacles to this change. The questions varied between closed questions, such as five-point Likert scale questions, with the following responses: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree, semi-closed questions and open questions.

Procedure of the data collection

After developing our survey using the Google Forms tool, we shared it via WhatsApp with the physics teachers who benefitted from this training (3 months later). Data collected from the respondents was analyzed using Microsoft Excel and SPSS software.

Sample

The total number of participants for this research was sixty-two physics teachers who benefitted from this continuing training. Table 1 provides general information about the teachers in question.

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Table 1
Basic participants' data

		Percentage (%)
Type	Male	67
	Female	33
Experience	< 5 years	14.5
	Between 5 et 10 years	29
	Between 10 et 20 years	16.2
	> 20 years	40.3
Academic level	National Diploma (Bac + 2)	6.5
	Bachelor (Bac +3)	64.5
	Master	24.2
	PhD	4.8
Work grade	High school	41.9
	Middle school	58.1
Work area	Urban	82.3
	Rural	17.7
Regional Academy	Tanger-Tétouan-Al Hoceima	48.4
	Fès-Meknès	37.1
	Marrakech-Safi	14.5

The total population (n = 62) is composed of two-thirds men and one-third women. Also, the majority of the respondents were experienced teachers: 40.3% had been teaching for more than 20 years, while only 14.5% had been teaching for less than 5 years. Among all respondents according to academic level, 6.5% have a National Diploma, 64.5% have a bachelor's degree and 29% have a master's degree or higher, which shows that among the subjects of our survey there were quite a few teachers with high-level degrees. Regarding their work cycles, we found that the group is not homogeneous, it is composed of 41.9% of high school teachers compared to 58.1% of middle school. Of the total population based on school area, more respondents are teaching in the urban school area with 82.3% as compared to the respondents who are teaching in the rural school area with 17.7%. In the end, our population is distributed across the three pilot regions of "Lycée Attahadi" training: 48.4% from the Tangier-Tetouan-Al Hoceima, 37.1% from Fez-Meknes and 14.5% from Marrakech-Safi region.

Results

Our main objective is to study the impact of continuous training on teachers' classroom practices. To do this, we adopted a two-step approach. First, we analyzed respondents' views about continuous training in general. Second, we examined their specific views on the "Lycée Attahadi" training. Finally, we sought to determine the effect of this continuous training.

Teachers' views on continuing trainings

Ministerial continuous training days

One of the main objectives of the reforms which Morocco experienced, was the renewal of teaching methods by opting for several principles. Among these principles are the continuous qualifying trainings, but do these courses take place on a regular basis? Table 2 shows the number of continuous training days that the teachers received:

Table 2
Teachers training days

	0 days	Less than 6 days	Between 6 and 11 days	More than 11 days
Ministerial Training	45%	34%	11%	10%

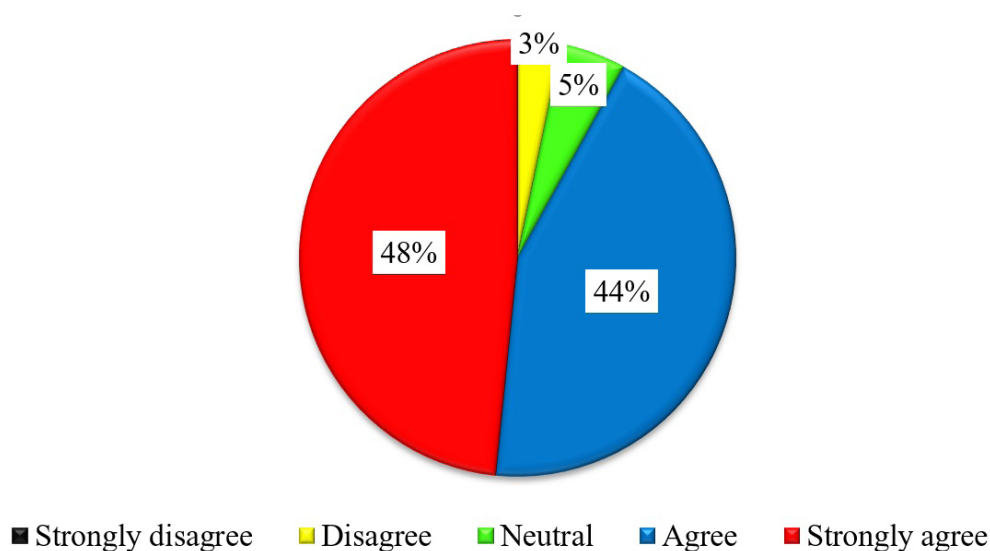
We note that almost half of the respondents have not received any continuing training (45%), while only 10% have received more than 11 days of training, which shows the enormous deficit in terms of continuing training programs.

The importance of continuous training for the enhancement of teachers' professional careers

Continuing training for teachers in general and physics teachers in particular can update them on all new approaches, and methods, and encourage innovation.

Figure 1 shows the opinion of the teachers regarding the importance of continuous training for the development of their professional careers by adapting to the pedagogical, didactic and scientific innovations

Figure 1
Importance of continuing training

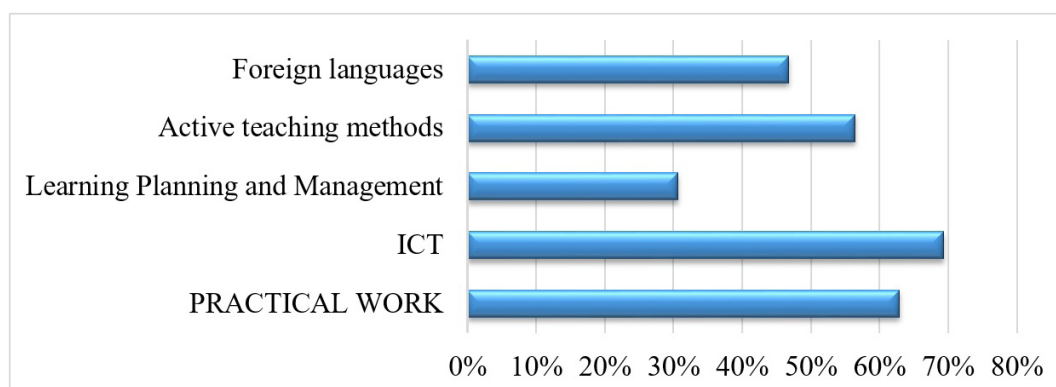


This figure shows that almost all teachers (92%) affirmed the importance of continuing training to develop their professional skills. These results are in perfect harmony with the results of other studies (Mahdi et al., 2014; Mili et al., 2021).

The needs of continuous training for teachers

For the success of any continuing training, the needs of the beneficiaries must first be taken into account. Figure 2 illustrates teachers' views on their main needs for continuing training.

Figure 2
Continuing training needs



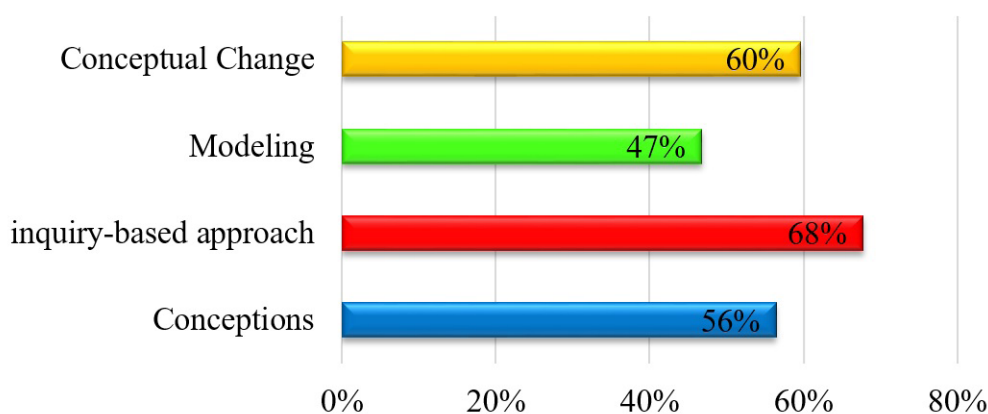
In terms of their continuing training needs, teachers first chose ICT and practical work (69% and 63% respectively), followed by active teaching methods and foreign languages (57% and 47% respectively). However, only 31% need training in education planning and lesson management. Therefore, the Ministry must take these points of view into account, and extend continuing training especially in ICT, practical work and active learning methods to improve the teaching and learning process.

Teachers' opinions on the proposed themes in the "Lycée Attahadi" training

Proposed topics

In the "Lycée Attahadi" training, four topics were proposed in the physics didactics module. The figure 3 shows the importance of the proposed topics for the beneficiary teachers.

Figure 3
Importance of the proposed topics



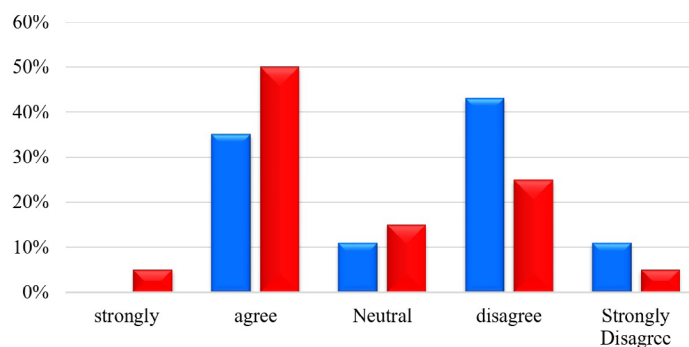
In the opinion of the teachers, the inquiry-based approach is the most important topic, followed by conceptual change and conceptions, while modelling is the least important topic. This shows the extent to which the inquiry-based approach is adopted by the teachers of Physics, especially since it is recently noted in the new programs of the middle school. This shows the importance of the investigative approach for teaching physics, which was recently noted in the new middle school curriculum (MEN, 2015).

The time and duration of the training

According to the statistical results concerning the opinion of teachers on the adequacy of the time and duration of training, differences were found between the opinions of teachers in the two cycles. Figure 4 shows their opinions.

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Figure 4
Time and duration of the training

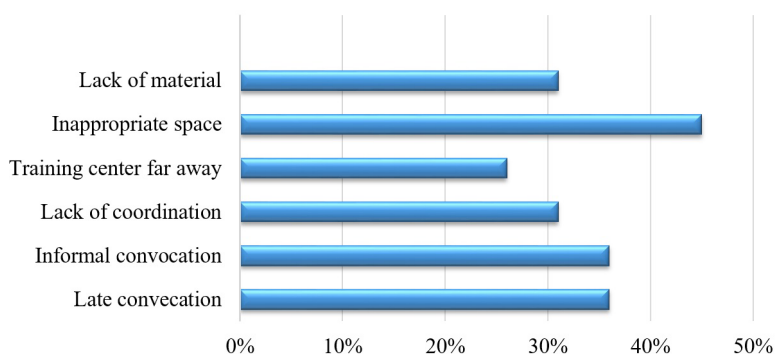


According to this figure, more than half of Middle school teachers find the training time and duration appropriate. Whereas, almost a quarter have a different opinion. However, high school teachers' view is practically the opposite (more than half find that the training time and duration inappropriate). This is due to several factors, mainly because of the difference in the curriculum lengths of the two grades.

Administrative problems encountered

During the training the majority of beneficiaries expressed their dissatisfaction because of several administrative problems, Figure 5 shows their opinions.

Figure 5
Administrative problems



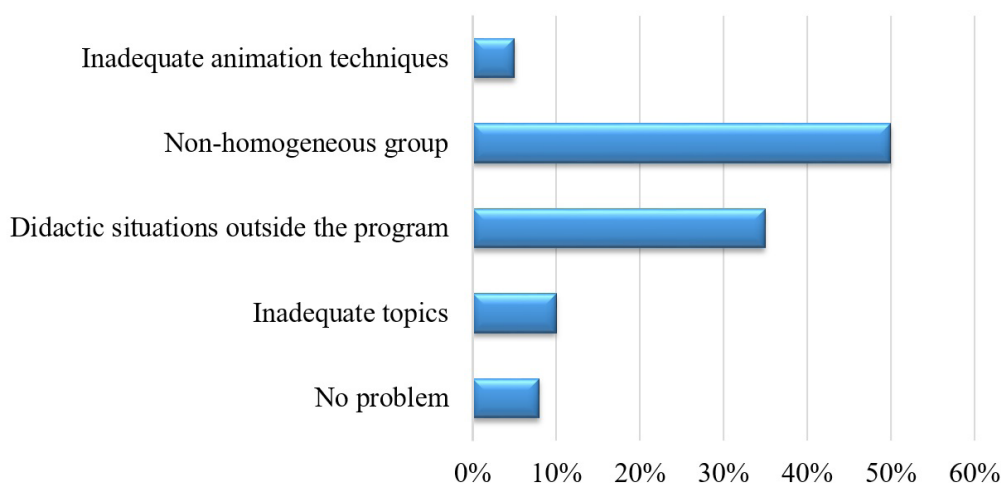
According to the teachers' opinions shown in figure 5, the main problem is due to inadequate workplace. Indeed, these spaces do lack basic infrastructure and necessary equipment, such as computers, internet access and well-equipped toilets. Moreover, some Continuing training was done in noisy primary schools. Also, beneficiaries express their dissatisfaction because of the late receipt of invitations (in most cases before one

day from the start of the training) and through a non-formal way (via WhatsApp for example). In addition, lack of coordination and the long distance from the training center are among the problems.

Didactic problems encountered

The main obstacles encountered during this training are didactic problems that can negatively influence the course of the training. Figure 6 shows these main problems:

Figure 6
Didactic problems



According to figure 6, the main didactic issue was the non-homogeneity of the training group of teachers from different teaching grades (Middle and High school), in addition to the didactic situations used outside the Moroccan school curriculum.

Impact and obstacle of "Lycée Attahadi" training

After three months of the mentioned training, we tried to find out how much this training has been able to change teachers' practices, as well as the main difficulties that block this change.

The impact of "Lycée Attahadi" training

Each continuing training course leads to a change in the behavior and teaching practices of the teachers involved. To this end, this continuing training aims to promote a shift in the teaching methods of physics teachers towards learner-centred approaches, in this case

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active learning methods, more specifically inquiry-based learning. Table 3 presents the participants' opinions on the real changes brought about in the beneficiaries' teaching practices.

Table 3
The opinions on teaching practices.

Mean	Standard Deviation	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	This continuing training program:
Percentage (%)							
2.06	0.20	1.6	4.9	16.1	53.2	24.2	1- has encouraged teachers to exploit students' conceptions
2.13	0.22	1.6	4.9	17.7	56.4	19.3	2- has encouraged teachers to begin lessons with a triggering situation
2	0.21	1.6	1.6	17.8	53.2	25.8	3- has encouraged teachers to encourage students to formulate hypotheses
2.03	0.21	1.6	1.6	19.4	53.2	24.2	4- has enabled teaching methods to evolve towards active methods
2.12	0.22	1.6	3.2	19.4	58.1	17.7	5- has enabled teaching practices to evolve towards learner-centred practices

This table indicates that a substantial number of respondents (77.4%) express disagreement or strong disagreement regarding the encouragement of teachers to exploit students' conceptions through the continuing training program. Similarly, a majority of participants (75.7%) disagree or strongly disagree with the idea that this training prompts teachers to commence lessons with triggering situations. Furthermore, nearly 79% of respondents strongly disagree or disagree with the notion that the training motivates teachers to prompt students to formulate hypotheses. Conversely, a significant portion of respondents (78.4%) either strongly disagree or disagree that the same training facilitates the evolution of teaching methods towards active methodologies. Finally, almost three-

quarters (75.8%) of respondents strongly disagree or disagree that the training contributes to the evolution of teaching practices towards learner-centered approaches.

The outcomes depicted in Table 3 indicate that a majority of participants (more than 75%) opted for responses like "Strongly disagree" or "Disagree" across all items. Notably, only a minority (less than 1.7%) opted for "Strongly agree." Among the five items, the highest mean pertained to item 2, where participants indicated that the continuing training program has prompted teachers to initiate lessons with a triggering situation, with a mean value of 2.13 and a standard deviation (SD) of 0.22. In contrast, the lowest mean was associated with item 3, suggesting that the training encourages teachers to prompt students to formulate hypotheses (Mean = 2; SD = 0.21).

Obstacles that hinder change in classroom practice

Teachers' views were explored to find out the main problems limiting the impact of this training. Figure 7 shows the main obstacles to this practice change.

Figure 7
Obstacles facing the change of practices

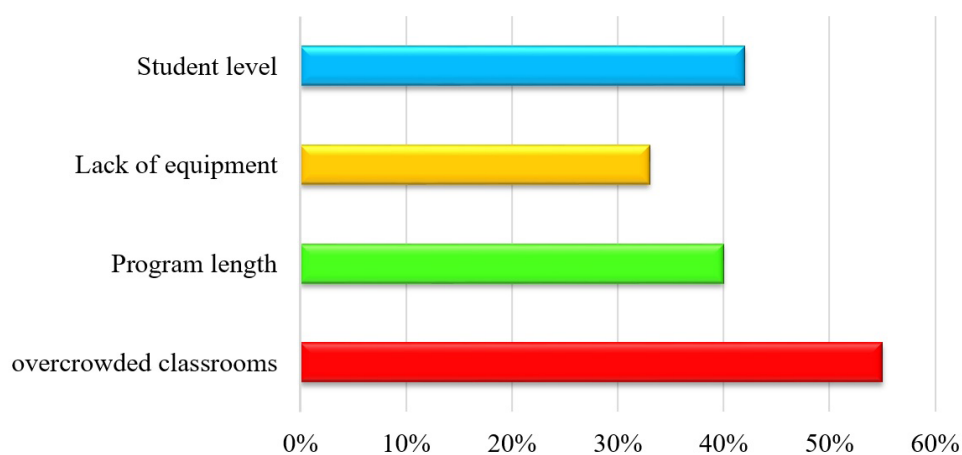


Figure 7 shows that having overcrowded classrooms is the first factor limiting the change in teachers' practices. To this end, several studies find it difficult to use active methods to teach physics in crowded classrooms (Raissouni, Abid & Chakir, 2021). The second factor is the students' low level. Indeed, Christine Couture et al. stated that the adoption of an inquiry-based approach to teaching physics and chemistry requires a certain autonomy of students, as well as a certain scientific background (Couture et al., 2015). The next factor is the length of the curriculum, which means that teachers have insufficient time to finish it, thus making it even more difficult to use active methods. These results are very similar to other research that indicates that time management problems are among the main obstacles to the use of the active methods in physics teaching

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(Monod-Ansaldi & Prieur, 2011). Finally, the last factor is the lack of materials, which limits practical work in Moroccan classes (Taoufik et al., 2016; Mahdi, 2021). Therefore, it blocks the integration of the inquiry-based approach.

Discussion

In this study, we aimed to find out to what extent continuous training for physics teachers could change their classroom practices towards more learner-centered practices. Our research showed that almost half of the respondents had not benefitted from any continuing training days. This shows the enormous deficit that exists in this area. However, almost all of the respondents (90%) expressed their needs, which focus mainly on ICT, practical work and active teaching methods. These results have a great similarity with the research findings of (Mahdi et al., 2015).

Regarding the Lycée Attahadi training, the participants encountered some administrative and logistics problems, mainly the late reception of the convocations by informal means; the lack of coordination and the long distance from the training center. In addition, didactic problems, mainly the heterogeneity of the group which is composed of middle and high school teachers, and the proposed didactic situations are beyond the Moroccan curriculum, which influences the participation of teachers in the proposed activities. These results are partially similar to the results of another study on a similar ministerial formation (Mahdi et al., 2014; Mili et al. 2021).

On the other hand, this training aimed to change the participants' classroom practices towards more learner-centered practices, but the results showed that its effect is minimal. The main obstacles were: the overcrowded classes, the low level of the students, the heavy-loaded curriculum and the lack of materials. These results are coherent with many previous studies (Raissouni, Abid & Chakir, 2021; Couture et al., 2015).

Conclusion and perspective

Although the Ministry of Education wants to establish a system of continuous training for teachers, based on the pilot experience named "Lycée Attahadi", to guarantee academic success. This training faces a series of obstacles that should be resolved in the future. Hence, in this research we first identified these main obstacles, then we gave some suggestions. This research reveals the following results:

- In Morocco, there is a huge deficit in terms of continuing training, although almost all the respondents (90%) have expressed their needs, which focuses mainly on ICT, practical work and active teaching methods;
- The teachers had encountered problems at the administrative level relating to the workspace, the late receipt and non-formal way of invitations, lack of coordination and long distance of the training center;
- The teachers encountered some didactic problems relating to the non-

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homogeneity of the training group (including teachers of middle and high schools) and to the didactic situations proposed outside the Moroccan school curriculum;

- The impact of this training on the practices of teachers in class is minimal (77% say that the impact is less than 40%) and the main obstacles to changes in practices are: overcrowded classes, low level of students, length of the program and lack of equipment.

It can be concluded that this training, which aimed to mobilize and reinvest the central concepts of the didactics of physics - chemistry, could not achieve all these objectives.

To remedy these problems, the main suggestions are as follows:

- Develop a sustainable and intensive annual continuous training schedule. taking into account the needs of teachers;
- The beneficiaries choose themselves the topics and the training period that suits them;
- Accompany beneficiaries after training to consolidate good practices;
- Take into account during training the real classroom conditions: the overcrowded classes, the low level of students, the length of the curricula and the lack of materials;
- Reduce the number of days and hours of training for quality training and not quantity;
- Each academy must have its own training center, well equipped and with its own human resources.
- Form homogeneous training groups according to their work cycle;
- Exploit the didactic situations of the Moroccan school curriculum.

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Khalid Mahdi – Investigation, Data curation, Writing – Original Draft. Khalid Mahdi was responsible for gathering data, curating it, and contributing to the initial draft of the manuscript.

Mohammed Abid – Validation, Visualization, Writing – Review & Editing. Mohammed Abid validated the results, created visual representations, and participated in the review and editing process of the manuscript.

Adnane Souri – Supervision, Project administration. Adnane Souri provided overall supervision of the project, managed administrative aspects.

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Assessment of Motor Development in Preschool Age: A Review of Assessment Tools

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Abstract

Introduction. This paper reviews tools used in psychological research to assess motor development in preschool children. This review discusses the concepts of motor development in children, including the following four components of motor development: physical activity, physical fitness, fundamental movement skills, and motor competence. The study describes the instruments used to assess each of these components. **Theoretical justification.** Searching for research on the subject of the review was carried out using the Elibrary and ResearchGate information platforms, as well as Scopus and Web of Science databases of information analysis resources. Special attention has been paid to research over the last 10 years. This review examined instruments for assessing physical activity and physical fitness (hardware tools and the Prefit test), and also described the most common tools for assessing fundamental movement skills and motor competence, including *Movement Assessment Test Battery for Children–2*, *Test of Gross Motor Development–2*, *Bruininks–Oseretsky test–2*, *Körperkoordinationstest für Kinder*, *Zurich Neuromotor Assessment*. **Discussion.** This review enabled the systematization of the existing instruments for assessing motor development in preschool age and the comparison of their limitations and the requirements for implementation. According to analysis, the *Movement Assessment Test Battery for Children–2* is the most convenient and informative tool to examine children in Russian kindergartens. This review is particularly important because it identifies and discusses the main areas of psychological research that apply the considered assessment tools. The prospects for further research using these instruments are described.

Keywords

motor development, physical activity, physical fitness, fundamental movement skills, motor competence, preschool age, tools, assessment

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Introduction

The study of motor development in children is an established area of research in child psychology (Bernstein, 1947; Zaporozhets, 1986; Goryacheva & Kuznetsova, 2016). In psychological research, the factors of motor development are considered as objectively observable manifestations of mental processes that provide purposeful, coordinated, and voluntary movements of a child (Goryacheva & Kuznetsova, 2016; Gorshkova & Ryzhova, 2019). In other words, movement coordination, accuracy, and efficacy help to assess the ability of children to self-regulate their bodies and movements.

The demand for tools for a reliable assessment of motor development in preschool age is due to a number of factors. First, preschool age is critical in terms of the formation of motor skills and habits associated with physical activity. Motor skills and habits are essential for cognitive development and are fundamental to health and social functioning throughout life (Malina, 2001). Secondly, the assessment of motor development is important for the timely detection of disorders and delays in motor development to plan further correctional interventions. In addition, disturbances and delays in motor development are often observed in mental and speech therapy disorders, and are sometimes their cause (Tomilov, 2019; Skoblo & Trushkina, 2022; Solovieva, Baltazar Ramos, & Quintanar Rojas, 2021). Thirdly, according to research results, digitalization represents a risk to the full-fledged physical activity of children (Kovalev & Starostina, 2020; Veraksa, Kornienko, Chichinina, Bukhalenkova, & Chursina, 2021; Belova & Shumakova, 2022; Sysoeva & Yaroshevskaya, 2022), which makes the study of motor development in children especially relevant. However, there are currently no Russian-language reviews of research that systematize and discuss the tools for assessing motor

development in preschool children. Thus, the lack of information and the importance of the issue determined the relevance of this review. In preschool education programs, great attention is always paid to the motor development of children, including activities for maintaining a normal level of physical activity, developing physical fitness components, and acquiring motor skills (From birth to school, 2019). This confirms the exceptional importance of the issue.

Basic components of motor development

Most studies distinguish the following four basic components of child motor development: physical activity, physical fitness, fundamental movement skills, and motor competence (Konstantinova, 2016; Reisberg, Riso & Jürimäe, 2021; Batez et al., 2021; Bai, Huang & Ouyang, 2022; Malambo, Nová, Clark & Musálek, 2022).

Physical activity combines all the movements that individuals perform in their life activities (Runova, 2004). In other words, these are any body movements produced by skeletal muscles that result in energy expenditure (Ortega, Ruiz, Castillo, & Sjostrom, 2008). Physical activity includes unstructured (outdoor games, any movements, etc.) and structured (for example, physical education) types of movement.

Physical fitness is the level of development of physical fitness components (strength, speed, agility, and flexibility) and a characteristic of the status of such parameters as body composition and cardiorespiratory fitness (Kolimechkov, 2017; Oberer, Gashaj & Roebbers, 2018).

Fundamental movement skills are the abilities to perform an organized series of movements automatically. The development of fundamental movement skills helps solve motor tasks optimally, focusing on the movement result rather than the components of this movement. Fundamental movement skills involve various parts of the body and include maintaining balance, running, jumping, galloping, catching, throwing a ball, kicking a ball (kicking a ball at a target), etc. (Yakovleva & Yudina, 2003). Fundamental movement skills develop between the ages of 1 and 7 years and are acquired through play and imitation (Staples, MacDonald, & Zimmer, 2012). Fundamental movement skills are the basis for achieving high motor skills, including the achievement of sporting excellence (Wick et al., 2017).

Motor competence is the next component of motor development (Scheuer, Herrmann & Bund, 2019). The term 'motor competence' describes the level at which a child can perform fundamental movement skills (Utesch, Bardid, Büsch, & Strauss, 2019). Motor competence is a latent construct because it cannot be directly observed or assessed. The level of development of motor competence is assessed on the basis of success in acquiring motor skills, which are determined by age norms (Herrmann, Heim & Seelig, 2019). The development of motor competence is a prerequisite for the development of sport-specific skills, as well as for other highly coordinated activities (Wälti et al., 2022).

Motor development in preschool childhood

Movement is one of the main manifestations of life activities, providing the possibility of an active interaction between individuals and the environment throughout their lives (Ermolaeva & Baranova, 2015). Motor development is most active during the preschool years (Stuhr, Hughes, & Stöckel, 2020).

During preschool age, motor development is important for both children's health and their cognitive and personality development (Ortega et al., 2008; Becker, McClelland, Geldhof, Gunter, & MacDonald, 2018; Ivleva, 2020; McNeill, Howard, Vella, & Cliff, 2020; Contreras-Osorio et al., 2021; Kushniruk, 2021; Kochukhova et al., 2021; Veraksa, Tvardovskaya, Gavrilova, Yakupova & Musálek, 2021; Bai et al., 2022). Movement enables children to actively interact with the environment, which has a positive effect on their cognitive development (Piaget & Inhelder, 1966). Thus, to explore the object-spatial environment, a child needs sufficiently developed motor skills. On the other hand, movement provides sensorimotor stimulation, increased blood flow, and oxygen supply to the brain, which also contributes to cognitive development in childhood (van den Berg, Saliassi, de Groot, Chinapaw & Singh, 2019; Korneev, Bukinich, Matveeva, & Akhutina, 2022). Studies have shown that motor development is associated with the development of regulatory functions (Veraksa et al., 2020; Tvardovskaya, Gabdulkhakov, Novik, & Garifullina, 2020), which in turn are an important predictor of children's success in school education and socialization (Best, Miller & Jones, 2009; Barenberg, Berse & Dutke, 2011; Chichinina & Gavrilova, 2022; Bukhalenkova, Almazova, & Veraksa, 2022; Dolgikh, Bayanova, Shatskaya, & Yakushina, 2022; Oshchepkova & Akhutina, 2022). In addition, motor development contributes to the successful implementation of the leading activity in preschool age – role-playing activity (Karabanova, 2005). Furthermore, in preschool age much of communication and learning is naturally achieved through imitation, which success is facilitated by motor development (Staples et al., 2012).

Relationship between motor development and mental development of children

Motor development components are often included as main or control variables in psychological studies involving preschool children. Thus, many studies examine the relationship between motor development and the development of regulatory functions in preschool children (Barenberg et al., 2011; Vandenbroucke, Seghers, Verschueren, Wijtzes & Baeyens, 2016; Wen et al., 2018; Kuzik, Naylor, Spence & Carson, 2020; McNeill et al., 2020; Veraksa et al., 2021; Li et al., 2022; Bai et al., 2022; Malambo et al., 2022; Spanou, Stavrou, Dania & Venetsanou, 2022; Zhang et al., 2022). Research has also focused on the relationship between motor and cognitive development (Kuzik et al., 2020; St Laurent, Burkart, Andre & Spencer, 2021; O'Hagan et al., 2022). Another common issue is the relationship between motor development and children's academic achievement (Mavilidi, Okely, Chandler, Cliff, & Paas, 2015; Oberer et al., 2018; Batez et al., 2021; Reisberg et al.,

2021; St Laurent et al., 2021). The relationship between motor development components and children's psychosocial development and psychological well-being has also been studied (Kuzik et al., 2020; McNeill et al., 2020; Visser et al., 2020; Salaj & Masnjak, 2022). A separate research direction aims to analyze the specific characteristics of motor development in children with mental disabilities, such as children with autism spectrum disorders or mental retardation (Staples et al., 2012; Thomas et al., 2022).

Theoretical justification

Aim

This review aims to analyze and systematize the tools used in modern psychological research to assess the main components of motor development in preschool children (motor activity, physical fitness, fundamental movement skills, and motor competence).

In addition to a content-based consideration of the instruments themselves, the task was also to take into account the requirements for their use, as well as to identify the existing limitations. The task was to examine tools from the perspective of focusing on the assessment of the process of movement and the assessment of its results (qualitative and quantitative assessment). This review particularly focused on the importance of assessing each component of motor development for psychological research. In other words, the additional task of the review is to answer the question of how each component of motor development is related to the mental development of children.

Methods

For this study, we selected the most frequently mentioned tools in reviews and empirical studies to assess motor development in preschool children. For each instrument mentioned in the research, corresponding methodological manuals have been found.

The search for publications was conducted using the Elibrary and ResearchGate information platforms, as well as Scopus and Web of Science databases of information analysis resources. The searching strategy was as follows: We selected the publications that examined the relationship between factors of motor and mental development in preschool children. In addition to scientific publications, we have searched for data on the instruments for assessing motor development from textbooks for physical education teachers in preschool institutions.

This review includes instruments for assessing physical activity (including hardware tools), instruments for assessing physical fitness (body composition, cardiorespiratory fitness, and physical fitness components, in particular the Prefit battery), instruments for assessing the level of development of fundamental movement skills and motor competence: Movement Assessment Test Battery for Children-2, Test of Gross Motor Development-2, Bruininks-Oseretsky test-2, Körperkoordinationstest für Kinder, Zurich Neuromotor Assessment.

Results

Instruments for assessing physical activity

To assess physical activity, there are objective (hardware) assessment tools and questionnaires.

The main devices for assessing the level of physical activity are the ActiGraph and pedometers. The ActiGraph monitors rest (sleep) and activity cycles (Zysset et al., 2018; Wen et al., 2018; Reisberg et al., 2021; Malambo et al., 2022). Pedometers provide less complete information. It only takes into account the number of steps. Therefore, it is used less frequently (Vandenbroucke et al., 2016).

Children over 7 years of age usually answer questionnaires to assess physical activity (Tucker et al., 2014). Meanwhile, preschoolers are still unable to correctly estimate the time of their physical activity in minutes or hours. In this regard, the questionnaires for assessing the physical activity of preschool children are more often completed by their parents (Alhusaini, Melam & Buragadda, 2020; Connelly, Manningham & Champagne, 2021; Ha et al., 2022).

Instruments for assessing the level of physical fitness

The physical fitness component includes body composition, cardiorespiratory fitness, and physical performance.

Body composition is assessed using anthropometric indicators. Height, body weight, skin-fold thickness, fat-fold thickness, as well as the girth of certain body circumferences are assessed. Then anthropometric indices are calculated, such as body mass index (BMI), waist-to-height ratio, shoulder muscle circumference, and others (Kolimechkov, 2017). Bioelectrical impedance analysis method is also used to determine body composition.

Cardiorespiratory fitness is the ability of the circulatory and respiratory systems to provide sufficient oxygen to working skeletal muscles during prolonged physical activity (Kolimechkov, 2017). Cardiorespiratory fitness is assessed using maximal oxygen uptake (VO₂ max). It is indicated in liters of oxygen per minute (absolute indicator) or relative to body weight in milliliters of oxygen per kilogram of human weight per minute (ml/kg/min) (Kolimechkov, 2017). Moreover, cardiorespiratory fitness can also be assessed using the 20-meter shuttle run test (Beep test), one-mile (1609 meters) walking at a maximum speed followed by heart rate measurement, as well as the Physical Working Capacity 170 (PWC 170) test conducted on a bicycle ergometer to measure physical capacity, at which a heart rate of 170 beats per minute is achieved (Kolimechkov, 2017).

Physical fitness components (strength, speed, agility, and flexibility) reflect the development of the musculoskeletal and nervous systems (Kolimechkov, 2017). The following key tests are commonly used to assess physical performance: (1) standing jump to assess lower extremity strength; (2) raising the body from a supine position to assess

abdominal strength; (3) shuttle running to assess speed and coordination; (4) sitting folds with straight legs to assess flexibility; (5) the Flamingo test to assess balance when one needs to stand on one leg while the other leg is bent at the knee (Shebeko, 2000; Tarasova, 2005; Stepanenkova, 2008; Veraksa et al., 2021).

The most widely used instruments to assess physical fitness components are Prefit (Cadenas-Sanchez et al., 2016), Eurofit (European Physical Fitness Test Battery) (Eurofit, 1993), FitnessGram (Cooper Institute, 2017) and Alpha-fit (Assessing Levels of Physical Activity) (Ruiz et al., 2010). All of these tools also include assessment of body composition and cardiorespiratory fitness. However, only the Prefit battery of tests is used to assess physical fitness in 3–5-year-old children (Kolimechkov, 2017); the other tests are aimed at children aged 6 years (Ruiz et al., 2010).

The Prefit battery uses the following tests: (a) the 20-meter shuttle run test to assess cardiorespiratory fitness, (b) hand grip strength to assess muscle strength of the upper extremities, (c) the standing long jump to assess muscular strength of the lower extremities, (d) speed-strength abilities are assessed using 40 m maximum shuttle run test, and (e) the one-leg standing test to assess balance (Cadenas-Sanchez et al., 2016). This test battery takes about 2 hours and 30 minutes to be administered by four assessors in a group of 20 children. However, this period is reduced if more experts conduct the assessment. Compared to girls, preschool boys have higher performance in tasks that assess strength and speed. Compared to boys, girls perform better in tasks that assess balance (Cadenas-Sanchez et al., 2019).

Instruments for assessing fundamental movement skills

Movement Assessment Test Battery for Children–2 (MABC–2)

One common tool for assessing the development of *fundamental movement skills* is the Movement Assessment Battery for Children–2 (MABC–2) (Henderson, Sugden, & Barnett, 2007). The test was created in 1960–1970 by physical education teachers to identify children with motor disorders, as reflected in the original version of the test – Test of Motor Impairment (Henderson et al., 2007). There are variations of the tool for children of different age groups (3–6 years old, 7–10 years old, and 11–16 years old). The instrument provides age standards for every six months from 3 to 4 years of age, and for every year from 4 to 16 years of age. Also, using this tool, children’s results can be classified into one of the following three zones: normal development, children at risk for motor disorders, children with motor disorders. For preschool children, assessment is carried out individually and requires 30–40 minutes. For preschool children, the assessment tool contains the following 3 blocks: fine motor skills (three tests: putting coins in a piggy bank at speed, stringing beads on a thread at speed, drawing a route inside given lines); accuracy and dexterity (two tests: throwing a special bag of sand weighing 200 grams at a target 10 times from a distance of 1.8 m, catching the same bag when an

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adult throws it to a child 10 times from a distance of 1.8 m); static and dynamic balance (three tests: maintaining balance on one leg, walking on tiptoes along a line for 15 steps, jumping from two legs to two legs from mat to mat at a distance of about half a meter). The instrument also includes a checklist with questions, which implies a qualitative assessment of children's daily motor skills under natural conditions. The checklist should be completed by a person who has been observing the child for a long time – a parent or a teacher. An important advantage of this technique is that it uses checklists to assess not only the results of motor movements, but also the process of their implementation under natural conditions. Another advantage of the test is that the expert uses various means to ensure that the child understands the task. Thus, it combines verbal instructions, visual demonstrations of adult performance and children's test attempts, allowing experts to correct mistakes in understanding tasks. The test manual provides common standards for boys and girls.

Test of Gross Motor Development–Second Edition (TGMD–2)

Test of Gross Motor Development–Second Edition (TGMD–2) is applied to children aged 3 to 10 years and 11 months (the test provides age norms for every six months) (Ulrich, 2000). The first objective to be achieved in the development of the test was to assess the skills often required of children in the process of preschool and primary school education. In addition, in the development of the test, the objective was to make it accessible to specialists from different areas and not require a long mastery. Assessment is also carried out individually and takes 15–20 minutes. The test consists of two subtests, each evaluating six skills. The first subtest (assessing the development of locomotion) includes the following movement skills: running, galloping, long jump with one leg, jump on one leg, horizontal jump with two legs, and sliding to the side. The second subtest includes movement skills for object control: hitting a stationary ball, dribbling a ball, kicking a ball, catching a special bag, throwing a ball from above, and rolling a ball from below. The advantage of the test is that the same tasks are offered for all ages, making it easier to assess progress. The test provides common standards for boys and girls.

Bruininks-Oseretsky test, second edition (BOT–2)

The Bruininks-Oseretsky test, second edition (BOT–2) is a tool for assessing psychomotor development in individuals aged 4 to 21 years (Jírovec, Musálek & Mess, 2019). The test helps to determine the level of development of fundamental movement skills in both typically developing children and children with mental disorders (Jírovec et al., 2019). BOT-2 exists in the full and short forms. Both forms have high reliability, $rel = 0.9–0.97$ (Jírovec et al., 2019). The short form is used more often as it requires 15–20 minutes per child, while the long form requires 45–60 minutes (Jírovec et al., 2019). The short form can be used as a screening tool. On the basis of the results of the short form, it can be decided whether further examination is necessary. The test evaluates fine motor skills,

hand coordination, body coordination, strength, and dexterity. In BOT-2, the general standard scores for each subtest are standardized according to gender and age.

Peabody Developmental Motor Scales Second Edition (PDMS-2)

The Peabody Developmental Motor Scales Second Edition (PDMS-2) is designed for children ages 0 to 5 years of age (Folio & Fewell, 2000). This instrument requires 45–60 minutes per child. Due to its duration, the technique is carried out in several steps with a break or during several days. The main goal of the tool is to identify children with delayed or impaired motor development for their further inclusion in a correctional program. The method contains tasks for both gross and fine motor skills. The technique is primarily intended for young children and takes time, limiting its use for preschool children.

The Körperkoordinationstest für Kinder

The Körperkoordinationstest für Kinder (KTK) (Kiphard & Schilling, 1974) is only available in German, but is widely used throughout the world. The test is used in work with both normally developing children and children with developmental disabilities. The test is aimed at children aged 5–14 years. Testing takes about 20 minutes. The test consists of four tasks: (1) walking backwards on beams of decreasing width from 6.0 cm to 4.5 cm to 3.0 cm; (2) single-leg jumps from side to side for 15 s; (3) moving sideways on wooden boards for 20 s; (4) single-leg high jumps over a foam obstacle with a successive increase in height by 5 cm.

Zurich Neuromotor Assessment (ZNA)

The Zurich Neuromotor Assessment (ZNA) is designed for 3–18-year-old children – ZNA3–5 for 3–5-year-old children and ZNA5–18 for 5–18-year-old children (Kakebeeke et al., 2013; Rousson, Gasser, Caflisch & Largo, 2008). The instrument includes the following tests: tests for fine motor skills, tests for gross motor skills (repetitive movements of the arms, legs and fingers, alternating movements of the arms and legs and sequential movements of the fingers), tests for static balance (stand on one leg with open and closed eyes) and dynamic balance (side jump, chair rise, and standing long jump) (Zysset et al., 2018). The examination is recorded on video, and the speed of the movement is determined from the video recordings using a stopwatch with a tenth of a second accuracy (Zysset et al., 2018). For each subtest, the exact start of the time measurement and the number of measured movements are specified (Zysset et al., 2018). In the ZNA, individual motor tasks are assessed not only quantitatively, but also qualitatively. Thus, the ZNA assesses the connectivity of the movement of the contralateral and ipsilateral limbs, face, head, and body. The rarer the accompanying movements and the less pronounced they are, the better the quality of the movement (Zysset et al., 2018). Concomitant movements are defined as involuntary movements in parts of the body that are not actively involved in task performance (Zysset et al., 2018). The qualitative assessment of the process of performing motor acts, and not only its result, is the strength of this technique.

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The main objective of the above instruments for assessing the development of basic motor skills and motor skills is to identify children who are behind their peers in motor development and require special correctional interventions, as well as to further assess the effectiveness of correctional and developmental activities (Ulrich, 2000; Henderson et al., 2007; Jírovec et al., 2019). These tools can be used by kinesiologists, physiotherapists, educators, and psychologists (Ulrich, 2000; Henderson et al., 2007; Jírovec et al., 2019; Wang, Lin & Su, 2009). These instruments also have great potential for use in longitudinal studies in psychology and other sciences. These methods are suitable for longitudinal studies because they provide age standards for each year or six months, and also because the repetition of the tasks of the tool once over a period of time does not affect the success of its implementation.

The comparison of methods enabled us to conclude that the Movement Assessment Test Battery for Children–2 has the greatest advantage in the assessment of preschool children. In particular, the strength of this technique is that it evaluates both the process of task performance and the results. The Zurich Neuromotor Assessment also involves a qualitative assessment, but it is more difficult to implement than the Movement Assessment Test Battery for Children–2. Another advantage of this technique is that it requires a relatively short time to perform a wide range of tasks.

The assessment of motor competence is carried out on the basis of an analysis of the performance of the instruments intended to assess the development of fundamental movement skills. This is because motor competence precisely reflects the level of mastery of fundamental movement skills.

Discussion

This review described commonly used tools for assessing motor development in preschool children. On the basis of this review, the assessment tools are divided into instruments that assess the process of movement and instruments that assess its results. The requirements for the use of tools and their limitations can also be discussed.

Assessing the result and the process of movement

Among all the described methods, we can distinguish those that assess the process and those that describe the result of movements. Assessing the level of physical activity is always an assessment of the process, while assessing the level of physical fitness is an assessment of the result achieved at a particular moment, an assessment of the current state. In methods that assess the level of development of fundamental movement skills and motor competence, the result of performing movements is primarily assessed. The result is recorded in terms of time spent on the task, distance, number of repetitions, number of hits on the target, number of errors, etc. This is not enough to fully understand the level of motor development of children. For the most informative assessment, observation of the

performance of various movements is also required, that is, a qualitative assessment of the movement process (Staples et al., 2012). After all, coordination, consistency, dexterity, as well as the pace of movement are factors in their effectiveness and indicate success in acquiring various movement skills required for games, writing, sports, dance, and any manipulation with cultural objects (Staples et al., 2012).

Requirements for assessment tools

There are several requirements for the use of instruments to assess the motor development of preschool children.

First, when tools are used to evaluate all components except motor activity, cardiorespiratory fitness and body composition indicators, it is important to create motivating conditions as close to nature as possible (Malina, 2004). For this purpose, game formats are used and praise plays an important role in the execution process. It is important to make sure that the child understands the instructions correctly. This often requires an individual approach. To ensure ecological validity, expert observations of children's movement in natural environment can be used to supplement tests (Staples et al., 2012).

Secondly, experts should pay attention to the physical condition of children during assessment procedures. If there are signs of illness, the examination must be interrupted. The assessment can only be made if the child is in good health.

Thirdly, specialists must create safe conditions for testing – to prevent possible injuries by properly organizing space, warming up before testing, and ensuring that children wear comfortable clothing for movement and wear sports shoes.

Fourthly, assessment procedures require special equipment and a large room.

Limitations of assessment tools

The lack of information on the standard for performing the tasks by children from different countries is a major limitation of the reviewed instruments. However, studies using these assessment tools have shown that cross-cultural differences exist (Saraiva, Rodrigues, Cordovil, & Barreiros, 2013; Ke et al., 2020). Therefore, establishing standards for the application of tools for children from different countries is a prospect for further work.

Moreover, a limitation of some of the instruments described is the absence of separate standards for performing the tasks by boys and girls. Separate standards for boys and girls are given for physical fitness parameters, as well as in the Bruininks-Oseretsky test (BOT-2). However, according to the results of some studies, there are gender differences in the development of fundamental movement skills and motor competence. For example, girls perform better in fine motor tasks and balance tasks of the Movement Assessment Test Battery for Children–2 (Hirata et al., 2018), and boys perform better in throwing and catching a bag (Ke et al., 2020; Rodrigues et al., 2019). We should note that the data on

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gender differences are somewhat different in different studies. This issue requires further study and is therefore a promising field of research.

Using considered instruments in psychological research: Associations between each component of motor development and children's mental development

The aim of the study was not only to describe the assessment tools, but also to analyze the use of these methods in psychological research. To this end, let us further consider how each component of motor development is related to the children's mental development.

In the context of the study of the mental development of children, it is important to determine the level of physical activity, especially because physical activity contributes to brain maturation through physiological mechanisms (van den Berg et al., 2019; Veraksa et al., 2021). In other words, the level of physical activity can be a factor affecting the cognitive development of a child.

In psychological research, the assessment of physical fitness is used because this component is also related to the mental development of children. Thus, children who are behind their peers in terms of the development level of this component may have difficulties communicating with peers and conducting joint activities (Larkin & Summers, 2004). Furthermore, children with low physical fitness find it difficult to develop the fundamental movement skills required for cultural exploration (Larkin & Summers, 2004).

Agility is the most 'psychological' parameter of physical fitness. Agility is the coordination of all movements, enabling children to react to tasks and adapt to changes in the environment. In other words, in order to ensure the agility of movements, it is necessary to coordinate work at all levels of construction and correction of movements (Bernstein, 1947; Malanov, 2011). We should note that preschool age is a sensitive period for developing agility (Malanov, 2011). Therefore, it is particularly important to evaluate the level of agility development at this age.

In psychological research, the development of fundamental movement skills is also important, since the formation of fundamental movement skills is a component of the child's mental development. Fundamental movement skills such as running, jumping, throwing, and catching are essential for everyday play (Larkin & Summers, 2004). Due to difficulties in learning fundamental movement skills, the child cannot be sufficiently involved in joint activities with the peers. Insufficient participation in joint activities can lead to insufficient integration into children's teams (Larkin & Summers, 2004). Compared to normally developing children, those with developmental coordination disorders are therefore less likely to play with their peers and more likely to assume the role of observers (Kennedy-Behr, Rodger & Mickan, 2011).

The relationship between the development of fine motor skills and the mental development of children is an independent and extensive subject of psychological research. The level of development of fine motor skills is assessed in both instruments aimed to determine the level of development of fundamental movement skills and methods aimed at assessing the development of motor fitness. Fine motor skills are very important in preschool childhood. Children with fine motor deficits have fewer opportunities to learn and experience the world, difficulties in learning writing, drawing, and other manual activities, and are therefore less popular as game partners (Kennedy-Behr et al., 2011; Tomilov, 2019).

The development of the ability to maintain balance (static and dynamic) is assessed both in terms of physical fitness development (in the Prefit battery) and in terms of fundamental movement skills and motor abilities (MABC-2, KTK, ZNA tests). Maintaining balance is a prerequisite for motor control (Henderson et al., 2007). Static balance is the ability to maintain the posture that a child requires, for example during education activities, where he needs to sit without moving, and during various games, where he needs to freeze. Dynamic balance is the ability to make smooth, precise, and controlled movements at the desired motor speed. This is necessary when mastering any dance, many games, such as hopscotch and any joint physical activity.

In this review of scientific research, we found that *the most common research topic* was the correlation between physical activity and the development of regulatory functions in preschool children (Barenberg et al., 2011; Vandenbroucke et al., 2016; Wen et al., 2018; Kuzik et al., 2020; McNeill et al., 2020; Malambo et al., 2022; Zhang et al., 2022). The relationship between all components of motor development was more often considered to be associated with the cognitive development of preschool children (Mavilidi et al., 2015; Oberer et al., 2018; Kuzik et al., 2020; Reisberg et al., 2021; St Laurent et al., 2021; Batez et al., 2021; O'Hagan et al., 2022) than with the emotional and personal development (Kuzik et al., 2020; McNeill et al., 2020; Visser et al., 2020; Salaj et al., 2022). At the same time, the potential impact of motor development on the emotional and personal development of children is significant. A potential for further research is therefore to study the relationship between all components of motor development and indicators of emotional and personal development in preschool children.

Conclusion

We reviewed tools for assessing the components of motor development in preschool children. This review contributes to the understanding of the four components used to describe motor development – physical activity, physical fitness, fundamental movement skills, and motor competence. We have shown how motor development components are related to mental development in children. This relationship determines the importance of assessing motor development in psychological research and psychological work.

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Conflict of Interest Information

The authors have no conflicts of interest to declare.