PSYCHOLOGY IN RUSSIA: STATE OF THE ART

Volume 17 Issue 2 2024

Psychology in Russia: State of the Art
Volume 17, Issue 2, 2024

Russian Psychological Society
Lomonosov Moscow State University

DEVELOPMENTAL PSYCHOLOGY

Parental Practices of Controlling and Supporting the Autonomy of Elementary School Children and Early Adolescents in Russia: A Qualitative Study

Anastasia K. Nisskaya[a*], Ekaterina M. Tsyganova[a]

[a]*HSE University, Moscow, Russia*

*Corresponding author. E-mail: anisskaya@hse.ru

Background. Children's and adolescents' development of autonomy depends on the relationship with their parents and the parents' child-rearing practices. These might be aimed towards supporting or restricting autonomy, as well as its different aspects, such as independence or volitional functioning.

Objective. To compare the practices described by foreign researchers as being the most beneficial for supporting autonomy with those used on a daily basis by Russian parents of primary school children and early adolescents.

Design. We conducted 26 semi-structured interviews with 16 mothers and 10 fathers of primary school children (n = 10) and early adolescents (n = 16).

Results. The practices of autonomy support and control used by parents were mostly similar to those described in foreign literature. However, new features were found: Guidance, Explanation of Patterns, and "Area of Responsibility". The behavior of Russian parents can be described through practices specific to different situations. Qualitative research suggests the absence of a unified style of behavior in relation to children's independence. Two types of autonomy support practices were used: encouraging independence and support for volitional functioning. Encouraging children's volitional functioning was perceived by parents as something that guides their behavior, yet mention of this practice was much less explicit than mention of encouraging independence.

Conclusion. Further reflection is required on the observed situationality of practices – whether it should be assessed as chaotic, hindering autonomy, or flexible, promoting it.

Keywords: parental practices, autonomy, independence, volitional functioning, autonomy support, autonomy control

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)
http://psychologyinrussia.com

Introduction

Numerous scholars have studied parental actions regarding children's autonomy (Kouros & Garber, 2014; Soenens et al., 2007; Van der Kaap-Deeder et al., 2017; Won & Yu, 2018). Their findings indicate that the relationship with parents and their methods of child-rearing play a crucial role in the development of autonomy in children and adolescents.

Two Aspects of Autonomy

Children's autonomy could be defined through two dimensions: "independence" and "volitional functioning" (Soenens et al., 2017). The first, technical, aspect is separation from adults and comes from the separation-individuation theory proposed by M. Mahler (Blos, 1967). The second aspect, goal-setting according to one's own desires, is based on self-determination theory (Ryan & Deci, 2000). These desires are correlated with basic psychological needs.

Two aspects of autonomy are also presented in the Russian approaches. The internalization of action (becoming independent in its performance) and starting a cooperative action with adults to develop this kind of action are regarded as two categories of autonomy in the Russian cultural-historical approach (Tsukerman & Elizarova, 1990). The foreign age-psychological approach also acknowledges two sides of autonomy: value components of action, taking responsibility for it in addition to independent behavior (Molchanov et al., 2017). However, the Russian approach is different in its objective, since it focuses on the process of establishing autonomy rather than on its outcomes, which are the focus of the foreign approach.

Parental Actions Regarding Children's Autonomy

Parental actions fostering and controlling autonomy could be defined differently depending on the approach. The first one is the "parenting styles" approach. Parenting styles are understood as typical, consistent types of parental interactions with a child. Among them, the most defined are: authoritarian, permissive, and authoritative (Baumrind, 1966). Intermediate, mixed variants of these styles are also discussed (Vasiou et al., 2023). Although the "parenting styles" approach is considered outdated nowadays because of the impossibility of capturing the full repertoire of situational fluctuations of parental behavior (Smetana, 2017), it is still broadly used in contemporary studies as it provides a clear definition of parental behavior (e.g., Niu et al., 2023; Vasiou et al., 2023).

In comparison, there is the approach of "parental practices", where contextual actions with a child are distinguished.

Promoting autonomy. There are several practices that are considered beneficial for autonomy: two types of autonomy support as well as attending to a child's other needs (competence and relatedness) and providing structure.

Autonomy support is manifested through supporting the child's initiative, providing freedom to solve problems independently that are within the child's capability, and being willing to look at a situation from the child's perspective (Grolnick & Pomerantz, 2009). The parent also responds empathically to the child's feelings and

expressions, provides opportunities for choice and self-expression, and explains the norms and reasons for limitations (Joussemet et al., 2008).

Autonomy support might be differentiated by types of autonomy promotion. Teaching rules, loosening control, and increasing emotional distance helps to ensure *independence*, while explaining the importance of norms and creating conditions for their integration supports *volitional functioning* (Soenens et al., 2007). Parents who support independence encourage the child's independent decisions in the same way as the parents who support volitional functioning. However, in the latter case, the parent actively accompanies the child in this process, letting go gradually, and fosters the formation of choices that are consistent with the child's interests.

Autonomy support promotes creativity (Armour et al., 2022), perseverance, long-term goal setting (Du et al., 2023), intrinsic goal setting, and intrinsic learning motivation (Ahn et al., 2023; Froiland, 2011). It is negatively associated with externalized problem behaviors in children (Feng & Lan, 2020) and positively with their psychological well-being (Vasquez et al., 2016). In the long term, autonomy support is associated with high levels of children's autonomy and competence and low levels of career indecision (Ahn et al., 2023).

Attending to a child's other needs occurs as parents acknowledge the sufficiency of the child's skills and abilities (competence), attend to the child, and provide opportunities for caring for others (relatedness) (Ryan & Deci, 2000). To do this, parents can use practices such as providing a variety of choices, recognizing the importance of a point of view, explaining if choices are limited, providing opportunities to care for another, providing nurturing, providing space, and creating situations of success. Doing so with a positive attitude may ensure the child's self-efficacy in learning and positive affect (Moè & Katz, 2018).

Parenting that promotes relatedness acts as a protective factor against an inability to regulate one's own emotions and behavior (Rothenberg et al., 2020), whereas practices that promote competence have a positive effect on children's academic performance in reading and mathematics in the future (Puccioni, 2018).

Providing structure. Grolnick and Pomerantz (2009) have proposed a distinction between strict control-domination, on the one hand, and restricting a child's autonomy through guidance and organizing the environment with clear rules and prohibitions, on the other. The latter they call "structure", which can be understood as consistent behavioral control through the provision of clear feedback, rules and norms understandable to the child (Farkas & Grolnick, 2008).

Setting structure, supporting needs, and promoting autonomy together are beneficial for the academic motivation of children and their self-regulated learning (Farooq & Asim, 2020). However, provision of structure and attending needs without autonomy support are not as effective as with it and cannot compensate for its absence (Hornstra et al., 2021).

Controlling Autonomy

Behavioral control is about regulation of children's behavior, pastimes, and whereabouts (Grolnick & Pomerantz, 2009). It allows setting a frame of reference to ensure that the environment is predictable for the child.

Parental behavioral control usually has beneficial effects: it positively affects adolescents' creativity and autonomous motivation (Chen et al., 2021). When psychological control is at a higher level, behavioral control might reduce the negative impact on adolescent life satisfaction (Leung & Shek, 2020). Some studies show that in conjunction with warmth, it predicts rule-breaking (at age 9) and aggression (at age 10) across cultures (Rothenberg et al., 2020). However, we assume that these results do not contradict the existence of child autonomy in indulging in these behaviors.

It might be difficult to distinguish between behavioral control and setting structure, as both restrict a child's autonomy by setting rules for their behavior, but because these practices only establish a comprehensible set of guidelines, they do not contradict children's needs. Therefore, while examining empirical data, we evaluated behavioral control and structure together as practices that support autonomy.

Psychological control defines a parent using manipulative strategies such as inducing guilt or shame, undermining the child's point of view, and withdrawing love (Soenens & Vansteenkiste, 2010). Through psychological control, a parent may be guided by his or her position in decision making and disregard the child's opinion, preventing the child from solving his or her own problems (Froiland, 2011).

Adolescents' psychological health, problematic behavior, emotion regulation, and academic performance correlate negatively with parental psychological control (Fang et al., 2021; Gao et al., 2021; Yan et al., 2020).

Table 1

Practices of Controlling Autonomy and Promoting Autonomy

Promoting autonomy	Controlling autonomy
Meeting the needs of the child • Providing a variety of choices • Explaining limited choices • Recognizing the importance of the child's point of view • Caring (for the child and enabling the child to care for someone else) • Providing space for initiative	**Psychological (internal) control** • Guilt induction and manipulation • Provoking anxiety • Devaluation of the child's viewpoint • Insensitivity to the child's needs
Structure and behavioral (external) control • Prohibitions and requirements • Sanctions and penalties • Deadlines • Rewards • Clear rules (prohibitions, requirements) • Help with tasks and self-organization • Help in decision making • Communication of confidence in the child's competence	

In Russian scholarly works, psychologically controlling practices and violence are presented as undermining autonomy, whereas promotion of autonomy and structuring the child's behavior are considered beneficial for autonomy development (Koroleva, 2023; Polivanova et al., 2020).

The Problem with Applying the "Parental Practices" Approach to Russian Parents

Several difficulties might arise in applying the "parental practices" approach to Russian parents.

First, even while the term "parental practices" seems more accurate than "parenting styles", there are issues with identifying these practices, because they are not as readily apparent as "parenting styles" and overlap in many areas. Also, the fact that the practices mentioned above are based on theoretical presumptions rather than real-world parenting scenarios makes it difficult to categorize situations in which to apply them. Given that independence can be more easily distinguished in real-world situations, autonomy might be frequently comprehended and fostered in terms of independence.

Second, it is not obvious how these practices would manifest in everyday life, particularly when it comes to Russian samples. Parents may use practices that are considered as culturally normative and beliefs about the legitimacy of their actions can shape their practices and contribute to a sense of self-efficacy (Lansford, 2022). There is evidence that autonomy support varies across cultures (Benito-Gomez et al., 2020; Marbell-Pierre et al., 2019) and behavioral control is culturally specific in its effects (not in all countries can it lead to an increase in externalization and internalization problems in children) (Rothenberg et al., 2020). Russian parents, for example, compared to U.S. parents, tend to be perceived as more controlling (Chirkov & Ryan, 2001) and feel the need to help children with school assignments up to grade 6, considering them not autonomous enough to cope on their own (Polivanova et al., 2023). So, we expect that Russian parents will be similar to foreign parents in the presence of constructs, yet autonomy-promoting practices, especially support for volitional functioning, will be less prominent than autonomy-controlling practices.

In addition, autonomy-supporting practices may differ depending on the age of the children, and autonomy-supporting practices with elementary school children have been relatively poorly studied (Vasquez et al., 2016).

Thus, based on the descriptions given, it is unclear how to differentiate between practices, and we may observe variations in their use in Russian parents' daily lives. Therefore, we want to reconstruct these practices from the lives of parents in order to comprehend their contextual differences – how they vary from one another in different situations — as well as the cultural distinctiveness of the application of these practices.

So, the purpose of the study was to compare the practices described by foreign researchers as the most favorable for autonomy support with the practices used by Russian parents of primary school children and early adolescents on a daily basis.

Research questions:

1. What are the specific features in autonomy support and control among Russian parents, compared to the examples presented in the foreign literature?
2. In what situations do Russian parents support and control children's autonomy?

We will use a deductive framework to address these issues, but we will look for additional in-vivo codes to extend the theory.

Methods

Participants

Informants were recruited via an online application form, which included a description of the study, terms of use of personal data, and questions about socio-demographic characteristics (name, sex, age, place of residence, age of the child, etc.), and consent to participate in the study. The pool of informants was created and then only those who met the key criteria were selected. Key conditions: mothers and fathers from different Russian cities (to balance socioeconomic state), with a child of primary school or early adolescent age. We tried to include both mothers and fathers to offset any discrepancy in the mentioned practices. Studies show that parents may differ in the warmth provided to children: mothers are predominantly more authoritative, while fathers are more authoritarian (Yaffe, 2020) and mothers might also show more autonomy support than fathers (Hughes et al., 2018).

Sixteen mothers and 10 fathers participated in the study. Some of them had two or more children, including both elementary schoolers and young adolescents; at the beginning of the interview they agreed to choose only one child for the further discussion. Ten parents described the experience of interaction with primary schoolchildren, 16 with early adolescents. Eleven informants lived in cities with a population of more than 1 million (Moscow, St. Petersburg, Chelyabinsk), 12 in large cities with a population ranging from 100,000 to 1 million (Irkutsk, Yuzhno-Sakhalinsk, Saratov), and 3 in small towns or rural areas (Kurgan region, Rostov region, Moscow region) (Table 2).

Table 2

Participants' Characteristics

Number	Sex	City/Region	The child about whom the parent was talking	Age of parent	Education	Number, age and sex of children F — female M — male
1	F	Rural area, Rostov region	Primary school child	36	Higher education	2 children: 7M and 2.5F
2	F	Small town, Moscow region	Primary school child	35	Higher education	3 children: 2M, 8M, and 13M
3	M	Moscow	Primary school child	39	Higher education	2 children: 6F and 9M
4	F	Moscow	Primary school child	37	Higher education	2 children: 9M and 6F
5	F	Chelyabinsk	Primary school child	39	Higher education	2 children: 10M and 5F
6	F	Irkutsk	Primary school child	36	Higher education	2 children: 6F and 10F
7	F	Small town, Moscow region	Primary school child	38	Higher education	2 children: 10M and 17M

Number	Sex	City/Region	The child about whom the parent was talking	Age of parent	Education	Number, age and sex of children F — female M — male
8	F	Saratov	Primary school child	43	Higher education	3 children: 23M, 18F, 10F
9	F	Small town, Moscow region	Primary school child	35	Higher education	2 children: 10M and 7M
10	M	Moscow	Primary school child	35	Higher education	2 children: 6F and 3M
11	M	Moscow	Primary school child	36	Higher education	2 children: 6M and 9M
12	M	Moscow	Primary school child	42	Higher education	1 child: 6F
13	F	Small town, Moscow region	Early adolescent	45	Higher education	2 children: 19F and 11M
14	M	Moscow	Early adolescent	35	Higher education	1 child: 11F
15	F	Moscow	Early adolescent	39	Higher education	1 child: 11F
16	M	Feodosia – Moscow	Early adolescent	32	Higher education	1 child: 11F
17	F	Kazan	Early adolescent	41	Higher education	3 children: 7F, 12F, and 15M
18	F	Moscow	Early adolescent	48	Higher education	3 children: 21F, 12F, and 10F
19	F	St. Petersburg	Early adolescent	35	Higher education	1 child: 12F
20	M	Yuzhno-Sakhalinsk	Early adolescent	39	Higher education	2 children: 13M and 17M
21	M	St. Petersburg	Early adolescent	44	Higher education	1 child: 12F
22	F	Moscow	Early adolescent	39	Higher education	1 child: 13M
23	F	Rural area, Kurgan region	Early adolescent	45	Secondary vocational education	2 children: 13F and 19M
24	F	Nizhny Novgorod	Early adolescent	36	Higher education	2 children: 9M and 13F
25	M	Yuzhno-Sakhalinsk	Early adolescent	41	Higher education	4 children: 6F, 13F, 14F, 17F
26	M	Yuzhno-Sakhalinsk	Early adolescent	49	Higher education	2 children: 13M and 6M

Procedure

Twenty-six semi-structured online interviews were conducted. The guide was developed on the basis of literature analysis and two focus groups with parents of primary schoolchildren and early adolescents. As a result of the focus group, a number of practices recommended by researchers and also used by parents were identified. Some of the practices considered beneficial for children's independence are not used by parents. Parents talked about such practices as reliance on the individual characteristics of the child, his or her interests, individual qualities; the gradual and phased transfer of responsibility for action to the child; the need to provide the child with skills and information for independent action. The practice of mutual compliance with agreements was also used, creating a sense of success in the child, the social significance of what he is doing, and the absence of harsh sanctions for taking excessive initiative. The identified practices and ideas formed the basis of the interview guide (Appendix 1).

Interviews were transcribed by an independent person outside the research team. Deductive thematic analysis (Fereday & Muir-Cochrane, 2006) was conducted using the MAXQDA2022 program (VERBI Software, 2021).

A post-positivist paradigm was implemented: the process of conducting and analyzing the interviews was accompanied by reflection on motives and expectations of researchers in order to minimize the influence of subjectivity in interpreting the material. The joint coding was carried out by the authors so that at least 30% of the interviews completely matched the codes. See code book in Appendix 2.

Results

Practices of the Child's Autonomy Control

Psychological control. Psychological control was found in 10 interviews and was mentioned when a child expressed a protest or requested independence and volition that were considered untimely by parents. Parents talked about inducing guilt, provoking anxiety, disregarding the child's point of view and need for autonomy. No one mentioned practices that could be interpreted as withholding love.

Inducing guilt and manipulation were found in situations where parents intended to influence the child's behavior at school and subject the child's behavior to social norms by enunciating certain emotions to be internalized. "...sometimes I use manipulation. I say, 'The teacher has provided you with such trust, you have been chosen' " (36-year-old mother of a 7-year-old boy, rural area).

Provoking anxiety was related to doubts about a child's ability to cope with household chores, self-organization, and moving around the area or city. It was also attributed to the need to clarify the significance of the parental role. Parents generated doubts about the child's competence, showing him or her that the challenges of taking care of oneself are too hard to overcome without parental assistance.

"He said, 'I'll come home by myself'. I said, 'How?' He said, 'I'll take a cab'. 'Who's gonna pay for it?' 'I'll take a shuttle'. 'Which one? You came home from school, what then? Will you warm up your food? Where will you warm it up, what will you warm up?' " (36-year-old mother of a 7-year-old boy, rural area).

Table 3

Frequencies of Initial Codes

Name	Definition	Frequency (number of interviews)
1. Psychological control		
Guilt induction and manipulation	Inducing guilt for actions or their outcome and manipulating child's emotions	5
Provoking anxiety	Provoking child's anxiety when he or she tries to do an action or make a choice or refrain from doing it	3
Insensitivity to the child's need for autonomy	Denying the right to behavior chosen by the child	3
Disregarding the child's point of view	Ridiculing or not considering the opinion of a child	2
Withholding love	Denying affection for a child	0
2. Behavioral control and structure		
Explicit prohibitions	Setting prohibitions	17
Punishment	When a prohibition is violated, parents impose a punishment in order to stop the unwanted behavior and deter future violations	16
Rewards	Setting rewards	7
Clear, consistent requirements and deadlines	Setting requirements and deadlines that are clear and manageable for the child	14
Helping with tasks and self-organization	Helping children with self-organization and completing tasks	20
Helping with making decisions	Helping children with making decisions	5
Conveying confidence in the child's competence	Conveying the confidence that a child can behave well and act independently	5
3. In vivo		
Encouraging reflection and analysis of the situation	Parent tells child to analyze the situation and draw conclusions from it	13
Guidance	Nudging in order to change unwanted non-autonomous behavior of a child	17
Explanation of patterns	Explaining outcomes of a certain behavior	20
"Area of responsibility"	Something that a child should do without parental assistance	10
4. Direct autonomy promotion and meeting other needs		
Providing a variety of choices	Demonstrating various possibilities of behavior and spheres of activity	9
Explanation when choices are limited	Explanation when child's choices are limited	12
Providing care and enabling care for another	Parents provided care for children and enabled their attempts to care for others	18
Providing space	Parent in a passive position and steps aside while giving the child freedom to do an activity or choose an option on their own	21

Insensitivity to the child's need for autonomy was expressed by denying the right to behavior chosen by the child in case of problems in learning, unwillingness to participate in a sports club or participate in extracurricular activities at school.

"The teacher asked him to do a little performance.... He dug in his heels: 'I'm not going to do that, that's the role of a moron'. I tried in a good way, at first I persuaded, I asked, I promised chocolates, sweets, and everything in the world. No. Then I just yelled at him. We had a fight for two and a half hours. Sometimes I was swearing, sometimes I calmed down, tried to move away, then again" (36-year-old mother of a 7-year-old boy, rural area).

Rejection of the child's point of view was described by parents if the child chose inappropriate online content ("nonsense") and refused to attend sports activities chosen by parents.

"I'm making decisions for you.... It's a fine line. Here you have autonomy, but when you cross this line, then no one needs your autonomy, sorry" (36-year-old mother of a 7-year-old boy, rural area).

The practices of psychological control are described relatively rarely by Russian parents. This suggests that Russian parents cannot be unambiguously described as more controlling than parents from other countries, at least with regard to psychological control.

Practices of the Child's Autonomy Promotion

Behavioral control and structure. Practices of this type were found in 25 interviews, suggesting that most parents use behavioral control and seek to set a clear framework within which the child can navigate and gain autonomy. There was rarely support for children's volitional behavior; instead, parents supported the volition of children in achieving goals in socially accepted spheres. Parental understanding of the practices sometimes differed from the theoretical one. For instance, explicit behavioral control was seen as providing space for choice.

Explicit prohibitions were used by parents to regulate the amount of screen time, its content, bedtime, and participation in cyber-aggression. Parents also prohibited health-threatening behaviors: getting tattoos before age 18, unlimited consumption of sweets, breaking traffic rules, traveling to remote areas or at night, going to potentially dangerous places (rallies, abandoned houses), smoking, drinking alcohol, and using profanities at home. Parents formulated prohibitions as: "Let me make a decision for you here" (39-year-old father of a 9-year-old child, megapolis), "We have decided that you will not do that" (37-year-old mother of a 9-year-old child, megapolis).

When describing ***punishment*** practices, parents talked about restricting smartphone, computer, and television use: "... I can take away the phone, take away the TV remote, tomorrow we will rest from TV, you will only draw, walk outside, play board games" (Mother of a primary school child, large city).

Punishment sometimes took the form of monetary sanctions for missed classes or bad grades: "We have a grading system ... an A is 100 rubles, a B is 50 rubles, a C is minus 50 rubles, and a D is minus 100 rubles" (44-year-old father of a 12-year-old adolescent, megapolis).

Parents described experiencing doubt while using punishments. A 36-year-old mother of a 10-year-old child (large city) said that taking a phone away from a child is "not right", because it "violates property", but that is what parents have to do in order "to make it clear that the child is not allowed" to spend too much time on the smartphone.

Through ***rewards*** (money, purchases, praise, and access to digital devices) parents strove to encourage and consolidate the child's successes in sports and studies, support initiatives in the classroom: "If you raise your hand more, you will have good grades.... And you can regulate your earnings…. You did a report, here's an A and another 100 rubles. And I transfer that money to your card'" (44-year-old father of a 12-year-old child, megapolis).

These practices are aimed at subordinating children's behavior, outlining a framework in which they can act independently of their parents, following established plans and rules.

Clear, consistent requirements and deadlines suggested that a child should prioritize homework, know where and when to take a walk, obey traffic regulations, work hard and put in effort at school and sports and reduce the amount of screen time.

"He knows that at 20:00 he has to sit down for homework, and when it is already five to 20:00, I remind him: 'It's time to do homework'. That's all, just at this time he finishes playing, and somewhere by 20:00 or 20:15 he is already sitting down" (38-year-old mother of a 10-year-old child, rural area).

There were two major areas where parents ***helped children with tasks and self-organization***: studying and initiating a new action. In studying, parents aimed to increase the child's self-regulation ("sit down for lessons", "it's time to start", "check") and strengthen motivation (to find meaning in not very pleasant activities). Parents helped in performing complex tasks, where the children found it difficult to cope on their own or asked for help.

Informants described ***helping children with making decisions*** about how much time to spend behind the screen and what smartphone game to choose, how to behave with other people, how to self-realize in hobbies. For this purpose, parents shared their own experience, explained common life patterns, encouraged children to imagine a certain situation and formulate their attitude to it, and showed techniques that facilitated making decisions.

Conveying confidence in the child's competence. Informants drew children's attention to their progress and the skills they have gained in order to show that the child can handle a new task. This practice is one of the most effective for supporting autonomy, according to parents: "The most effective thing is when we tell him: 'Look, you already know how to do this with someone else'. If you say that to him, some kind of electrical contact clicks inside and he's like, 'Yes, it's true!' " (35-year-old mother of a 10-year-old child, large city).

In addition to those described in the literature, other practices of behavioral control and structure were discovered.

Encouraging reflection and analysis of the situation. This technique was used when an uncomfortable circumstance needed to be adjusted in any way (whether a child couldn't handle the amount of activity or whether the advantages of an action

needed to be estimated). Parents motivated children to analyze forthcoming consequences to make a correct, thoughtful choice. This practice was presented in 13 interviews.

"When a child agrees to all extracurricular activities, and when it turns out that after school there is snowboarding, English, something else, and the child has no time left to socialize with peers. And then I say — well, let's think about what is more important for you" (41-year-old father of a 13-year-old adolescent, millionaire city).

In our opinion, these practices can be interpreted in two ways. On the one hand, they encourage children to analyze a situation; they provide space for formulating a child's opinions and attitudes to the situation. On the other hand, they are used to ensure that the child internally accepts and appropriates the parent's point of view. Therefore, encouraging reflection may indirectly contribute to volitional functioning, but it directly stimulates independence.

Guidance. This describes nudging in order to change unwanted non-autonomous behavior and is used when a child's behavior does not conform to socially accepted, "correct" actions or to the image of a desirable lifestyle. Guidance could be characterized as rejection of the child's point of view or as a structure aimed to promote autonomy by monitoring and rules (sometimes harshly) but in areas in which a parent wants to be present in the child's life. Guidance appeared in 17 interviews.

"If you see that in the child's activity there is a kind of result, expected, and expected is quite widely formulated, then it's fine, let him do it himself. If you see that he is not coping... And what does it mean, is not coping? Doesn't meet your expectations. That is, does not do his homework well, does not have friends, does not want to do anything in terms of hobbies, wants to just lie down, do nothing. So here it seems that we are already moving from autonomy to a kind of, well, well... Well, it's coercion, but not coercion" (42-year-old father of a 6.5-year-old primary school child, megapolis).

Explanation of patterns. This was described as explaining the outcomes of a certain behavior and is usually combined with behavioral control. Explanations were provided without encouraging any introspection, in contrast to encouraging reflection when a parent employed strategies to support a child's mental process. Thirteen parents mentioned this practice.

"I put the phone away, and the child immediately said, 'Mom, what?' I explain: 'You understand, it is bad for your health, for your eyes, and in general there is nothing good about being on [the phone]' " (45-year-old mother of a 13-year-old adolescent, small city).

"Area of responsibility". Parents frequently used the phrase "area of responsibility" to define some behaviors that children should routinely engage in on their own, free from adult supervision. It appeared in 10 interviews. The main "area of responsibility" was homework.

"I remember coming home and doing my homework, there were never any questions, no problems, nothing. That is, my parents were never interested in whether or not my homework was done; I had no other way, I always did everything. So I guess I'm still trying to instill in my child that his studies are his area of responsibility" (36-year-old mother of a 7-year-old child, small city).

Thus, behavioral control practices and structures in the behavior of Russian parents coexist with each other. Parents describe them as something that should help a child grow up to be independent. The types of behavioral control practices and structures are diverse and go beyond those described in the literature.

Direct autonomy promotion and meeting other needs. Statements demonstrating that parents strove to meet the child's basic needs, from the point of view of self-determination theory, were found in 26 interviews. Parents tried to create conditions that would lead to a long-lasting result in the form of volitional functioning, but their actual behavior "here and now" implied support for children's independent realization of goals set by their parents. Support for volitional functioning in real-life situations was only observed in certain situations.

Providing a variety of choices was characterized by demonstrating various possibilities of behavior, spheres of activity. This practice was used for spending pocket money and choosing hobbies or additional education.

"I asked my daughter: 'What do you think is important for you to do? We can stop going to the pool, in general, so that this situation does not occur anymore, when you get water in your ears and you have unpleasant sensations. Or you can continue with the classes, but exclude diving' " (48-year-old mother of a 12-year-old adolescent, megapolis).

Explanation when choices are limited. Informants said that in cases of restrictions and prohibitions (night time communication via smartphone, timing and content of computer games, sweets consumption, getting a tattoo), they explained their rationale to their children. The father (39-year-old) of a 9-year-old child (megapolis) mentioned that as he set restrictions for PlayStation time to his child, he warned him about the dangers of excessive playing: "it will be harder, the brain will not be able to cope, you will feel bad".

Parents talked about the importance of recognizing the child's point of view in choosing additional education, hobbies, and when to eat. Parents found it necessary to be guided by their children's opinion when building communication with them – speaking on equal terms as adults, apologizing if they feel they are wrong in a conflict.

"More often than not, we offer him things. He goes to the club of young engineers now ... he once went for a walk with his dad, saw this club, looked at it, evaluated it, was interested. But it was summer. In autumn we just reminded him, 'Will you go?' He said: 'Yes, I will'. So, we kind of pushed the idea forward" (36-year-old mother of a 9-year-old child, megapolis).

Providing care and enabling care for another. Parents showed concern for children's physical and psychological well-being, accompanied them at late hours, paid attention to their feelings, and tried to help with problem solving via conversation or sharing their own experience. This applied above all to children's relationships with their peers:

"I can explain why the boy acted this way [in response] to her actions. I tell her all the time that I, as a man, as a father, can give an explanation, an instruction, why it is the way it is. We need [to show] support, trust, our knowledge in relation to their life situations" (44-year-old father of a 12-year-old adolescent, megapolis).

Parents asked their children for help, where they themselves had difficulties, gave them the opportunity to take care of them, older or younger relatives, and pets:

"Doing my makeup is difficult for me. And then I had to go somewhere and I saw my daughter doing something, and I said: 'Bunny, help me'. And she did my makeup and hair!" (41-year-old mother of a 12-year-old adolescent, millionaire city).

Providing space. Parents were willing to reduce control and give space to children if they wanted to walk home from school, get extra classes, visit relatives, go out with friends. Digital monitoring and pre-teaching with a gradual decrease in monitoring was often an additional condition. Parents talked about letting children do their own lessons, choosing the order for themselves. This practice was described as a contribution to the child's future development of autonomy.

"And if she has the initiative to do 'the Environment' [subject at school]. Well, then do it if you like" (36-year-old Mother of a 10-year-old child, large city).

Russian parents encourage children's autonomy by providing space for independent action. They strive to expand the child's ability to act autonomously and make decisions, encouraging his or her initiative, ensuring the right to choose, as well as showing care and warmth.

Discussion

The aim of the study was to examine Russian parents of primary school children and early adolescents' autonomy support and control practices and compare them with practices studied by foreign researchers.

Significant similarity of Russian parents' practices of autonomy support and control with the types distinguished by foreign researchers was found. With the exception of "withholding love", all practices described in the literature were present in the interviews. In a significant proportion of interviews, parents talked about practices of autonomy support (two types, but predominantly independence), structure and behavioral control, while the use of psychological control was mentioned less frequently. International studies show that regardless of the cultural context, psychological control negatively affects children's development (Fang et al., 2021; Gao et al., 2021; Yan et al., 2020). Our study suggests that Russian children do not often face psychological control, which positively characterizes the conditions for the development of their independence. We assume that encouraging a child's autonomy might be a socially approved behavior for Russian parents, making them more willing to talk about this practice, while psychological control might be perceived as a socially disapproved practice.

International studies demonstrate that the influence of behavioral control on a child's autonomy is mediated by the cultural context (Lansford, 2022). Our data show that a feature of Russian parental practices is the wide representation and diversity of behavioral control and structure. Empirically, both of these behaviors are perceived as encouraging independence, which could be a culturally embedded pattern, common for collectivist and hierarchical countries (Marbell-Pierre et al., 2019). Parents strive to create a picture of the world that is understandable to the child, where there are stable requirements, reasonable restrictions and patterns of behavior. In such a world, as it seems to parents, children can make sense of their own behavior and regulate it, which will be their independence.

Manifestations of support for children's autonomous behavior, initiative, and independence are as common as behavioral control and structure practices. Support for autonomy is much more common in our sample than psychological control. It can be concluded that Russian parents more often support autonomy than limit it. At the same time, they equally support children's activity within existing structures and limitations (structure, behavioral control), and strive to satisfy the need for autonomy, competence, and belonging. Thus, the idea that Russian parents limit autonomy rather than support it is not justified.

We identified a variety of situations in which different practices were used. Psychological control practices were used when children attempted to reject school demands and expectations or were in a potentially dangerous setting for their mental and physical health. Behavioral control practices addressed time spent in digital environments, visiting dangerous places, substance use, school performance, and athletic success. Two types of autonomy support practices were used in areas such as independent mobility, studying, sports, doing chores, choosing additional education and hobbies, socializing with peers, and saving money. Practices were rarely presented in the narrative in a consistent and isolated way, which correlates with the paradigm of the absence of "pure" parenting styles (Smetana, 2017).

Several features emerged as parents talked about setting structure: Guidance, Explanation of Patterns and "Area of Responsibility". These practices show parental intention not only to set norms, but also to get children to internalize them and act accordingly, as well as reflect on their actions.

In terms of autonomy support, the prevalence of one type over another was apparent in responses from parents of children of both age groups. Despite the fact that parents saw encouragement of children's volitional functioning as something that directs their behavior, they mentioned it less vividly than encouragement of independence and articulated it in a more abstract manner. Parents promoted children's volitional functioning when it reflected a parental perception of correct actions (usually in domains of independent mobility, socializing, engaging in academics and sports (which were usually suggested by parents), and rarely in online space).

Such phenomena can be explained in different ways. In one case, we can assume the orientation of parents' actions to the needs of the children's ages: the leading activities in primary school age and younger adolescence are learning and assimilation of social norms, respectively (Elkonin, 1989). In another case, it can be argued that there is a mismatch between what the parents aim to nurture in the child and what they have to nurture in reality, given different contexts or based on their own emotional condition (Martorell & Bugental, 2006). Lastly, it could demonstrate that for Russian culture, parenthood primarily involves leadership and taking responsibility for children's well-being (Zakharova, 2008).

The situationality and variability of practices requires further reflection. On the one hand it can be interpreted as parental flexibility promoting autonomy, on the other hand as chaotic and inconsistent practices hindering it (Farkas & Grolnick, 2008; Soenens & Vansteenkiste, 2010).

The results can enrich the understanding of how Russian parents support the autonomy of their children. Direct opposition to autonomy is extremely rare. Most often, parents encourage independent behavior within the set norms and tasks, ori-

enting the child in existing patterns and limitations. In some situations, parents encourage the initiative of the child, give him or her freedom of choice and action.

The following findings of this work may be useful for parents and teachers working with children:

- Certain practices undermine autonomy (accusation, induction of guilt) or limit it (deadlines, prohibitions);
- The situationality of parental autonomy support can lead to a child's uncertainty about situation appropriate to be autonomous or not
- Child autonomy in different spheres can be formed heterochronously
- The flexibility of parents' practices should be consistent with the practices of teachers.

Conclusion

In this study we compared the practices stated by foreign researchers to be the most beneficial for autonomy support with those utilized on a daily basis by Russian parents of primary school children and early adolescents.

Specific features in the practices of autonomy support and control among Russian parents are:

- They often choose behaviors that should help their children become independent. They relatively rarely support volitional functioning;
- Behavioral control and structure practices and autonomy support practices are used with equal frequency;
- Psychological control practices are rarely used, so Russian parents cannot be called exclusively controlling.

Russian parents support their children's autonomy in situations where children move within the agreed boundaries, does their lessons, chooses and participates in additional education and hobbies, socializes with peers, manages their money, and participates in household chores.

Russian parents limit their children's autonomy when a child tries to visit dangerous places and engage in dangerous activities, violates school norms, is excessively involved in computer games or uses potentially harmful content, and also shows obstinacy and strong-willed behavior that does not coincide with the ideas of the parents. Parents forbid smoking and alcohol consumption.

We discovered the prevalence of support for independence in the answers of Russian parents. Volitional functioning support was less prominent and had some unique features: parents tended to promote initiative when it was regarded as "correct" or aligned with their own propositions.

We have gained evidence to suggest that parents may act in a variety of ways in different situations, and that there is both a consistent and contradictory mix of behaviors and beliefs. However, the question remains open as to the impact of this diversity on the child's autonomy. The identified practices and their specific descriptions could form the basis for a questionnaire, guidelines, or an educational program for parents.

Limitations

The main limitation of this work is the small sampling size. Unfortunately, the sample did not include respondents without higher education. Also, we did not directly address settings that influence parenting practices (family socioeconomic status, support system, presence of internal or externalizing problems in the child's behavior, parental anxiety, and child-parent relationships) as well as emotional and cognitive components of child-parent relationships. Such significant factors as the practices of teachers, the representations of peers and the children themselves, the formation of skills, and the real experience of self-service, movement, study, communication, etc., remained outside the scope of the study. Additionally, due to the specifics of the sample, fathers' practices may not have been sufficiently represented, which, however, opens the field for future work in this area: expanding the sample to include a larger proportion of men. Observing the daily behavior of parents could provide more objective information about autonomy promotion and control.

Ethics Statement

The study obtained ethics approval of the HSE Ethics Committee. All informants gave informed consent before participating in research.

Author Contributions

Nisskaya A.K. and Tsyganova E.M. conceived of the idea, developed the theory, performed interviews, and coded them. Both authors discussed the results and contributed to the final manuscript.

Conflict of Interest

No conflict of interests can be identified.

Acknowledgements

This research was supported by the Russian Science Foundation (project No. 22-18-00416).

References

Ahn, J.S., Plamondon, A., & Ratelle, C. (2022). Different ways to support and thwart autonomy: Parenting profiles and adolescents' career decision-making. *Journal of Family Psychology, 37*. https://doi.org/10.1037/fam0000982

Armour, J.A., Joussemet, M., Mageau, G.A., & Varin, R. (2023). Perceived parenting and borderline personality features during adolescence. *Child Psychiatry & Human Development, 54*(4), 927–938. https://doi.org/10.1007/s10578-021-01295-3

Barber, B.K., & Harmon, E.L. (2002). Violating the self: Parental psychological control of children and adolescents. In B.K. Barber (Ed.), *Intrusive parenting: How psychological control affects children and adolescents* (pp. 15–52). American Psychological Association. https://doi.org/10.1037/10422-002

Baumrind, D. (1966). Effects of authoritative parental control on child behavior. *Child Development, 37*(4), 887–907. https://doi.org/10.2307/1126611

Benito-Gomez, M., Williams, K., McCurdy, A., & Fletcher, A. (2020). Autonomy-supportive parenting in adolescence: Cultural variability in the contemporary United States. *Journal of Family Theory and Review*, *12,* 7–26. https://doi.org/10.1111/jftr.12362

Blos P. (1967). The second individuation process of adolescence. *The psychoanalytic study of the child*, *22,* 162–186. https://doi.org/10.1080/00797308.1967.11822595

Chen, P., Zhang, J., Li, H., & Fu, M. (2021). Relationships between parenting behaviors and adolescents' creativity in China: The mediating role of autonomous motivation. *The Journal of Psychology*, *155,* 457–472. https://doi.org/10.1080/00223980.2021.1902916

Chirkov, V., & Ryan, R. (2001). Parent and teacher autonomy-support in Russian and U.S. Adolescents. *Journal of Cross-Cultural Psychology*, *32*, 618–635. https://doi.org/10.1177/0022022101032005006

Du, W., Li, Z., Xu, Y., & Chen, C. (2023). The effect of parental autonomy support on grit: The mediating role of basic psychological needs and the moderating role of achievement motivation. *Psychology Research and Behavior Management*, *16,* 939–948. https://doi.org/10.2147/PRBM.S401667

Elkonin D.B. (1989). Izbrannye psikhologicheskie trudy [Selected psychological works]. M.: Pedagogy.

Fang, Q., Liu, C., Tang, Y., Shi, Z., Wang, Q., & Helwig, C.C. (2022). Types of parental psychological control and rural and urban Chinese adolescents' psychological well-being and academic functioning. *Child Development, 93*(2), 484–501. https://doi.org/10.1111/cdev.13699

Farkas, M.S., & Grolnick, W.S. (2010). Examining the components and concomitants of parental structure in the academic domain. *Motivation and Emotion, 34*(3), 266–279. https://doi.org/10.1007/s11031-010-9176-7

Farooq, M.S., & Asim, I. (2020). Parental involvement as predictor for self-regulated learning and academic achievement of students at secondary school level. *Journal of Educational Sciences & Research, 7*(1).

Feng, L., & Lan, X. (2020). The moderating role of autonomy support profiles in the association between grit and externalizing problem behavior among family-bereaved adolescents. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01578

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods, 5*(1), 80–92. https://doi.org/10.1177/160940690600500107

Froiland, J.M. (2011). Parental autonomy support and student learning goals: A preliminary examination of an intrinsic motivation intervention. *Child & Youth Care Forum, 40*(2), 135–149. https://doi.org/10.1007/s10566-010-9126-2

Gao, D., Bullock, A., & Liu, J. (2021). Cross-lagged panel analyses of maternal psychological control and young adolescents' emotion regulation. *Journal of Adolescence*, *87,* 52–62. https://doi.org/10.1016/j.adolescence.2021.01.001

Grolnick, W.S., & Pomerantz, E.M. (2009). Issues and challenges in studying parental control: Toward a new conceptualization. *Child Development Perspectives, 3*(3), 165–170. https://doi.org/10.1111/j.1750-8606.2009.00099.x

Hornstra, L., Stroet, K., & Weijers, D. (2021). Profiles of teachers' need-support: How do autonomy support, structure, and involvement cohere and predict motivation and learning outcomes? *Teaching and Teacher Education*, *99*, 103257. https://doi.org/10.1016/j.tate.2020.103257

Hughes, C., Lindberg, A., & Devine, R.T. (2018). Autonomy support in toddlerhood: Similarities and contrasts between mothers and fathers. *Journal of Family Psychology: JFP: Journal of the Division of Family Psychology of the American Psychological Association (Division 43), 32*(7), 915–925. https://doi.org/10.1037/fam0000450

Joussemet, M., Landry, R., & Koestner, R. (2008). A self-determination theory perspective on parenting. *Canadian Psychology/Psychologie Canadienne*, *49*, 194–200. https://doi.org/10.1037/a0012754

Koroleva, Ia.P. (2023). Rol' roditel'skikh stilei vospitaniia v podderzhanii i snizhenii urovnia samoreguliatsii u podrostkov [The role of parental parenting styles in the maintenance and decline of self-regulation in adolescents]. *Sovremennaia zarubezhnaia psikhologiia* [Modern foreign psychology], *12*(2), 137–147. https://doi.org/10.17759/jmfp.2023120213

Kouros, C.D., & Garber, J. (2014). Trajectories of individual depressive symptoms in adolescents: Gender and family relationships as predictors. *Developmental Psychology, 50*(12), 2633–2643. https://doi.org/10.1037/a0038190

Lansford, J.E. (2022). Annual Research Review: Cross-cultural similarities and differences in parenting. *Journal of Child Psychology and Psychiatry, 63*(4), 466-479. https://doi.org/10.1111/jcpp.13539

León-del-Barco, B., Mendo-Lázaro, S., Polo-del-Río, M.I., & López-Ramos, V.M. (2019). Parental psychological control and emotional and behavioral disorders among Spanish Adolescents. *Interna-*

tional Journal of Environmental Research and Public Health, 16(3), Article 3. https://doi.org/10.3390/ijerph16030507

Leung, J., & Shek, D. (2020). Parental control and adolescent wellbeing in Chinese adolescents in Hong Kong. *Child Indicators Research*, *13,* 703–727. https://doi.org/10.1007/S12187-019-09642-6

Marbell-Pierre, K.N., Grolnick, W.S., Stewart, A.L., & Raftery-Helmer, J.N. (2019). Parental autonomy support in two cultures: The moderating effects of adolescents' self-construals. *Child Development, 90*(3), 825–845. https://doi.org/10.1111/cdev.12947

Martorell, G.A., & Bugental, D.B. (2006). Maternal variations in stress reactivity: Implications for harsh parenting practices with very young children. *Journal of Family Psychology, 20*(4), 641–647. https://doi.org/10.1037/0893-3200.20.4.641

Moè, A., & Katz, I. (2018). Brief research report: Parents' homework emotions favor students' homework emotions through self-efficacy. *The Journal of Experimental Education, 86*(4), 597–609. https://doi.org/10.1080/00220973.2017.1409180

Molchanov S.V., Almazova O.V., Poskrebysheva N.N., & Zapunidi A.A. (2017). Personal autonomy as factor of developing responsibility in adolescence. *National Psychological Journal, 1*, 84–90. https://doi.org/10.11621/npj.2017.0110

Niu, X., Li, J., King, D.L., Rost, D.H., Wang, H.-Z., & Wang, J.-L. (2023). The relationship between parenting styles and adolescent problematic Internet use: A three-level meta-analysis. *Journal of Behavioral Addictions, 12*(3), 652–669. https://doi.org/10.1556/2006.2023.00043

Polivanova K.N., Mikhailova O.R., Strukova A.S., & Gavrilenko P.A. (2023). Lestnitsa uchebnoi samostoiatel'nosti: otsenka urovnia samostoiatel'nosti rossiiskikh shkol'nikov cherez analiz predstavlenii roditelei [The ladder of learning autonomy: assessing the level of autonomy of Russian schoolchildren through the analysis of parents' beliefs]. In A.A. Bochaver (Ed.), *Podrostok v megapolise: poisk voprosov i otvetov. Sbornik trudov XVI mezhdunarodnoi nauchno-prakticheskoi konferentsii* [The adolescent in a megapolis: search for questions and answers. Proceedings of the XVI International Scientific and Practical Conference] (pp. 94–97). Natsional'nyi issledovatel'skii universitet "Vysshaia shkola ekonomiki" [HSE University]. https://conference.perekrestok.info/wp-content/uploads/2023/09/Sbornik-PvM-2023.pdf

Polivanova K.N., Bochaver A.A., & Pavlenko K.V. (2020). Razvitie povedencheskoi avtonomii podrostkov i roditel'skii kontrol' na primere nezavisimykh peremeshchenii po gorodu [Development of adolescents' behavioral autonomy and parental control as exemplified by independent movements around the city]. *Sovremennaia zarubezhnaia psikhologiia* [Modern foreign psychology], *9*(4), 45–55. https://doi.org/10.17759/jmfp.2020090404

Puccioni, J. (2018). Parental beliefs about school readiness, home and school-based involvement, and children's academic achievement. *Journal of Research in Childhood Education, 32*(4), 435–454. https://doi.org/10.1080/02568543.2018.1494065

Rothenberg, W.A., Lansford, J.E., Bornstein, M.H., Chang, L., Deater-Deckard, K., Di Giunta, …, & Bacchini, D. (2020). Effects of parental warmth and behavioral control on adolescent externalizing and internalizing trajectories across cultures. *Journal of Research on Adolescence, 30*(4), 835–855. https://doi.org/10.1111/jora.12566

Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55,* 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Sheldon, K.M., Elliot, A.J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Journal of Personality and Social Psychology, 80*(2), 325–339. https://doi.org/10.1037/0022-3514.80.2.325

Skinner, E., Johnson, S., & Snyder, T. (2005). Six dimensions of parenting: A motivational model. *Parenting–Science and Practice*, *5*. https://doi.org/10.1207/s15327922par0502_3

Smetana, J.G. (2017). Current research on parenting styles, dimensions, and beliefs. *Current Opinion in Psychology*, *15*, 19–25. https://doi.org/10.1016/j.copsyc.2017.02.012

Soenens, B., & Vansteenkiste, M. (2010). A theoretical upgrade of the concept of parental psychological control: Proposing new insights on the basis of self-determination theory. *Developmental Review, 30*(1), 74–99. https://doi.org/10.1016/j.dr.2009.11.001

Soenens, B., Deci, E.L., & Vansteenkiste, M. (2017). How parents contribute to children's psychological health: The critical role of psychological need support. In L. Wehmeyer, T.D. Little, S.J. Lopez,

K.A. Shogren, & R. Ryan (Eds.), *Development of self-determination through the life-course* (pp. 171–187). Springer. https://doi.org/10.1007/978-94-024-1042-6_13

Soenens, B., Vansteenkiste, M., & Sierens, E. (2009). How are parental psychological control and autonomy-support related? A cluster-analytic approach. *Journal of Marriage and Family, 71*(1), 187–202. https://doi.org/10.1111/j.1741-3737.2008.00589.x

Soenens, B., Vansteenkiste, M., Lens, W., Luyckx, K., Goossens, L., Beyers, W., & Ryan, R.M. (2007). Conceptualizing parental autonomy support: Adolescent perceptions of promotion of independence versus promotion of volitional functioning. *Developmental Psychology*, *43,* 633–646. https://doi.org/10.1037/0012-1649.43.3.633

Tsukerman, G.A., & Elizarova, N.V. (1990). O detskoi samostoiatel'nosti [About children's autonomy]. *Voprosy psikhologii* [Issues of Psychology]. http://www.voppsy.ru/issues/1990/906/906037.htm

Van der Kaap-Deeder, J., Vansteenkiste, M., Soenens, B., & Mabbe, E. (2017). Children's daily well-being: The role of mothers', teachers', and siblings' autonomy support and psychological control. *Developmental Psychology, 53*(2), 237–251. https://doi.org/10.1037/dev0000218

Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of autonomy and control among Chinese learners: Vitalizing or immobilizing? *Journal of Educational Psychology, 97*(3), 468–483. https://doi.org/10.1037/0022-0663.97.3.468

Vasiou, A., Kassis, W., Krasanaki, A., Aksoy, D., Favre, C.A., & Tantaros, S. (2023). Exploring parenting styles patterns and children's socio-emotional skills. *Children, 10*(7), 1126. https://doi.org/10.3390/children10071126

Vasquez, A., Patall, E., Fong, C., Corrigan, A., & Pine, L. (2016). Parent autonomy support, academic achievement, and psychosocial functioning: A meta-analysis of research. *Educational Psychology Review*, *28*, 605–644. https://doi.org/10.1007/S10648-015-9329-Z.

VERBI Software. (2021). *MAXQDA 2022 [computer software]*. Berlin, Germany.

Wei, S., Teo, T., Malpique, A., & Lausen, A. (2022). Parental autonomy support, parental psychological control and Chinese university students' behavior regulation: The mediating role of basic psychological needs. *Frontiers in Psychology, 12.* https://doi.org/10.3389/fpsyg.2021.735570

Won, S., & Yu, S.L. (2018). Relations of perceived parental autonomy support and control with adolescents' academic time management and procrastination. *Learning and Individual Differences, 61*, 205–215. https://doi.org/10.1016/j.lindif.2017.12.001

Yaffe, Y. (2020). Systematic review of the differences between mothers and fathers in parenting styles and practices. *Curr Psychol 42*, 16011–16024. https://doi.org/10.1007/s12144-020-01014-6

Yan, F., Zhang, Q., Ran, G., Li, S., & Niu, X. (2020). Relationship between parental psychological control and problem behaviours in youths: A three-level meta-analysis. *Children and Youth Services Review, 112,* 104900. https://doi.org/10.1016/j.childyouth.2020.104900

Zakharova, E.I. (2008). Razvitie lichnosti v khode osvoeniia roditel'skoi pozitsii [Personality development in the course of assimilating the parental position]. *Kul'turno-istoricheskaia psikhologiia* [Cultural and Historical Psychology], *4*(2), 24–29. https://psyjournals.ru/journals/chp/archive/2008_n2/chp_2008_n2_Zakharova.pdf

Original manuscript received March 18, 2023
Revised manuscript accepted May 27, 2024
First published online June 1, 2024

To cite this article: Nisskaya, A.K., Tsyganova, E.M. (2024). Parental Practices of Controlling and Supporting the Autonomy of Elementary School Children and Early Adolescents in Russia: A Qualitative Study, *Psychology in Russia: State of the Art*, *17*(2), 3–22. DOI: 10.11621/pir.2024.0201

Psychology in Russia: State of the Art
Volume 17, Issue 2, 2024

Russian Psychological Society
Lomonosov Moscow State University

CLINICAL PSYCHOLOGY

Mental Health Stigma and Mental Health Literacy in Russia: Their Prevalence and Associations with Somatic, Anxiety, and Depressive Symptoms

Alena Zolotareva[a*], Natalia Maltseva[b], Svetlana Belousova[c], Olga Smirnikova[d]

[a] *HSE University, Moscow, Russia*
[b] *City Clinical Hospital no. 6, Chelyabinsk, Russia*
[c] *Chelyabinsk State University, Russia*
[d] *Sechenov First Moscow State Medical University (Sechenov University), Russia*

*Corresponding author. E-mail: alena.a.zolotareva@gmail.com

Background. Mental health stigma and mental health literacy can be potential targets of public education and health development. These areas are culturally specific and have so far been almost unexplored in Russia.

Objective. This study aimed at examining mental health stigma and mental health literacy in Russia, their prevalence, and their associations with somatic, anxiety, and depressive symptoms.

Design. The participants were 1,068 Russian adults. They completed the online questionnaire with measures assessing their mental health stigma (Perceived Devaluation and Discrimination Scale; Link et al., 2001); somatic symptoms (Somatic Symptom Scale-8; Gierk et al., 2014); anxiety symptoms (Generalized Anxiety Disorder-7; Spitzer et al., 2006); and depressive symptoms (Patient Health Questionnaire-9; Kroenke et al., 2001). To examine their mental health literacy, we used a series of questions exploring a person's awareness of mental health and mental health problems.

Results. Mental health stigma was found in 67% of the participants, who were less confident that most mental disorders can be prevented and more confident that mental disorders can be cured in most cases. Higher devaluation, discrimination, and mental health stigma were related to more severe somatic symptoms. Lower mental health literacy and higher devaluation, discrimination, and mental health stigma were associated with more severe anxiety and depressive symp-

Keywords: mental health stigma, mental health literacy, somatic symptoms, anxiety symptoms, depressive symptoms

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)
http://psychologyinrussia.com

toms. These associations were the same when adding covariates such as sex, age, partnership, parenthood, and educational background.

Conclusion. This study highlighted the obvious need for measures to reduce mental health stigma and improve mental health literacy in Russian society. In general, these measures can contribute to the promotion of better mental health in Russia.

Introduction

The concept of stigmatization dates back to the writings of Erving Goffman. He noted that every society has normative expectations and that people with special characteristics may suffer from stigma, or a label that is deeply discrediting (Goffman, 1963). Initially, scientists believed that stigma is inherent for people with physical and infectious diseases, such as cancer (Huang et al., 2021), visible skin diseases (Germain et al., 2021), HIV, and AIDS (Alonzo & Reynolds, 1995). Further research highlighted that people with mental disorders face mental health stigma, expressed in disgrace, social disapproval, or social discrediting due to their mental health problems (Subu et al., 2021). Shame and embarrassment caused by mental health stigma aggravate the course and outcomes of mental disorders, hinder the sufferer's search for treatment, and limit the chances of recovery and essential life opportunities (Sartorius, 1998). Mental health stigma may explain the associations between mental disorders and social problems such as social isolation (Jenkins et al., 2023), crime, joblessness, homelessness (Draine et al., 2002), and difficulties in family and intimate relationships (Sell et al., 2021; Hortal-Mas et al., 2022).

Naturally, mental health stigma is the opposite of mental health literacy. Fear and distrust of patients with mental disorders can be combined with ignorance about the causes, treatment, and prevention of mental disorders (Yin et al., 2023). Greater mental health literacy is associated with less public stigma and social distance toward persons with depressive disorders (Svensson & Hansson, 2016); less mental health stigma and less severe stress, anxiety, and depressive symptoms (Tambling et al., 2021); higher intentions to use mental health services; and higher rates of detection of mental disorders (Krakauer et al., 2020). With limited health literacy, people often express false beliefs that mental disorders are contagious and can be explained by an evil spirit, witchcraft, or God's punishment (Tesfaye et al., 2021).

Mental health stigma and mental health literacy have cultural specificity and should be examined with respect to particular cultures and countries (Krendl et al., 2020; Ran et al., 2021; Vovou et al., 2021). Previous studies have shown that Russian participants are less tolerant of people with mental disorders than British respondents (Shulman & Adams, 2002), and more often than American participants, label people with mental disorders as "weak-willed" and leading an "immoral lifestyle" (Nersessova et al., 2019). Russian youth with affective disorders admitted that they have refused medical care and treatment for fear of a negative reaction and labeling from people in their social environment (Cantarero-Arévalo et al., 2020). Considering the obvious burden of mental health stigma and limited mental health literacy in Russia, as well as the lack of existing evidence of the relationship between men-

tal health stigma, mental health literacy, and mental health problems (Alonso et al., 2008; Guo et al., 2023; Haruyama et al., 2022), this study aimed at examining mental health stigma and mental health literacy in Russia, and their prevalence and associations with somatic, anxiety, and depressive symptoms.

Methods

Participants

The data were collected from June to November 2023. We distributed a link to an electronic questionnaire on social networks (Telegram, VKontakte) and invited Russians 18 years and older to take part in the study. There were 1,110 participants, but 32 respondents were excluded due to their failing to complete the questionnaire. The participants were 1,068 Russian respondents, including 673 women and 395 men age 18 to 50 years (M = 21.43, SD = 6.13). Most of the participants had not received any higher education (n = 673; 63%), were in a marital or romantic relationship (n = 545; 51%), and did not have children (n = 989; 93%).

Measures

The participants completed questionnaires measuring their degree of mental health stigma, mental health literacy, and mental health problems.

Mental health stigma was examined with the Perceived Devaluation and Discrimination Scale (PDD; Link et al., 2001). The PDD is a 12-item measure assessing the beliefs that others will devalue or discriminate against a person with a mental disorder. The items are rated on a four-point Likert scale ranging from 0 ("strongly disagree") to 3 ("strongly agree"). Mental health stigma is considered high with a score of 2.5 or more (Brohan et al., 2010). We used the translated Russian version of the PDD. In this study, the Cronbach's alpha was .718.

Mental health literacy was examined with a series of questions assessing a person's awareness of mental health and mental health problems. The respondents had to agree ("yes") or disagree ("no") with the following statements: "Mental health is linked to a healthy lifestyle;" "Stress is not the cause of all mental disorders;" "Mental disorders can be cured in most cases;" "Most mental disorders can be prevented;" and "Mood stability is one of the signs of mental health." The higher the sum of positive responses, the higher the score on mental health literacy.

Somatic symptoms were examined with the Somatic Symptom Scale-8 (SSS-8; Gierk et al., 2014). The SSS-8 is an 8-item measure assessing burden of somatic symptoms during the past seven days (*i.e.,* "stomach or bowel problems," "pain in arms, legs, or joints," "feeling tired or having low energy"). The items are rated on a five-point Likert scale ranging from 0 ("not at all") to 4 ("very much"). We used the Russian version of the SSS-8 (Zolotareva, 2022). In this study, the Cronbach's alpha was .820.

Anxiety symptoms were examined with the Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006). The GAD-7 is a 7-item measure evaluating burden of anxiety symptoms during the past two weeks (*i.e.,* "trouble relaxing," "not being able to stop or control worrying"). The items are rated on a four-point Likert scale rang-

ing from 0 ("not at all") to 3 ("nearly every day"). We used the Russian version of the GAD-7 (Zolotareva et al., 2023a). In this study, the Cronbach's alpha was .910.

Depressive symptoms were examined with the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). The PHQ-9 is a 9-item measure assessing burden of depressive symptoms during the past two weeks (i.e., "poor appetite or overeating," "little interest or pleasure in doing things"). The items are rated on a four-point Likert scale ranging from 0 ("not at all") to 3 ("nearly every day"). We used the Russian version of the PHQ-9 (Zolotareva et al., 2023b). In this study, the Cronbach's alpha was .876.

Data analysis

The data were analyzed using SPSS for Windows v. 27.0. Since the participants who did not fully complete the questionnaire were excluded, there were no missing data. Means and standard deviations for continuous variables and frequencies, and percentages for categorical variables, were calculated to describe the participants' characteristics and the prevalence of their mental health stigma and mental health literacy. We used Pearson's χ^2 test to assess differences in mental health literacy based on low and high mental health stigma. Multiple linear regression analyses by forced inclusion were performed to examine how independent variables (mental health stigma and mental health literacy) predicted the dependent variables (somatic, anxiety, and depressive symptoms).

Results

The prevalence of mental health stigma was 67%. *Table 1* presents the prevalence of mental health literacy. The participants with low mental health stigma were less confident that most mental disorders can be prevented (χ^2 (1) = 8.671, p = .003) and more confident that mental disorders can be cured in most cases (χ^2 (1) = 9.574, p = .002) than participants with mental health stigma. There was no difference in the participants' agreement that mental health is linked to a healthy lifestyle (χ^2 (1) = .111, p = .739), that stress is not the cause of all mental disorders (χ^2 (1) = 3.466, p = .063), and that mood stability is one of the signs of mental health (χ^2 (1) = .167, p = .683).

Table 1

Prevalence of mental health literacy

	Items	Total	Low MHS	Hight MHS
1	Mental health is linked to a healthy lifestyle	85%	85%	86%
2	Stress is not the cause of all mental disorders	60%	55%	61%
3	Mental disorders can be cured in most cases	72%	78%	69%
4	Most mental disorders can be prevented	79%	74%	81%
5	Stable mood is one of the signs of mental health	86%	86%	85%

Note. MHS = mental health stigma. The cut-off score of PDD ≥ 2.5 shows high MHS.

Table 2 illustrates the results of the linear regression analyses. Higher devaluation, discrimination, and mental health stigma predicted higher somatic symptoms ($R^2 = .013$). Lower mental health literacy and higher devaluation, discrimination, and mental health stigma predicted higher anxiety symptoms ($R^2 = .030$). Similarly, lower mental health literacy and higher devaluation, discrimination, and mental health stigma predicted higher depressive symptoms ($R^2 = .037$). These patterns were the same when adding the covariates for somatic symptoms ($R^2 = .084$), anxiety symptoms ($R^2 = .083$), and depressive symptoms ($R^2 = .092$).

Table 2

Results of the linear regression analyses

	Somatic symptoms	Anxiety symptoms	Depressive symptoms
	β (95% CI)	β (95% CI)	β (95% CI)
Unadjusted model			
Devaluation	.212*	.271**	.355***
Discrimination	.259***	.287***	.356***
Mental health stigma	.372***	.380***	.503***
Mental health literacy	–.038	–.099**	–.080**
Adjusted model			
Devaluation	.200*	.258**	.338***
Discrimination	.235***	.265***	.338***
Mental health stigma	.327***	.335****	.459***
Mental health literacy	–.042	–.101**	–.085**

*Note. The following covariates were included in the adjusted model: sex, age, partnership, parenthood, education background. * p < .05; ** p < .01; *** p < .001.*

Discussion

This study aimed to examine mental health stigma and mental health literacy in Russia, their prevalence, and their associations with somatic, anxiety, and depressive symptoms. Some key findings can be identified.

First, both mental health stigma and mental health literacy were common in this Russian sample. The prevalence of mental health stigma was 67%, which is similar to the prevalence of mental health stigma in 75% of the South Indian population (Venkatesh et al., 2015) and is much higher than the prevalence of self-stigma in people living with mental illness (29%) (Alemu et al., 2023) and in caregivers of children and adolescents with mental illness (39%) (Minichil et al., 2021). There is reason to suppose that people who know the nature of mental illness are less likely to stigmatize persons with mental disorders. In 60-86% of cases, our sample gave correct answers to questions about mental health and mental disorders. These values coincide with the prevalence of mental health literacy in university students in Bangladesh (62%)

(Siddique et al., 2022) and in people living in Ethiopian communities (55%) (Tesfaye et al., 2021).

Second, Russians with mental health stigma were less confident that mental disorders can be cured and more confident that most mental disorders can be prevented. This means that people with mental health stigma blame patients with mental disorders for not preventing their mental health disorders and coheres with the fact that self-blame is associated with psychological distress in patients with mental health disorders (Jannati et al., 2020). Conversely, people with low mental health stigma generally believe that patients with mental disorders can recover under certain circumstances. This belief is realistic, because studies have shown that 10% of patients with a lifetime history of psychopathology have reported optimal psychological functioning, and 5% of patients with suicidal ideation, 6% of patients with anxiety disorders, and 7% of patients with depressive disorders experienced optimal well-being following recovery after mental disorders (Devendorf et al., 2022).

Third, higher mental health stigma, but not lower mental health literacy was associated with higher somatic symptoms. Public stigma is higher for patients with depression than for patients with symptoms of somatic symptom disorder, regardless of the type of symptom and existence of an earlier somatic disorders (von dem Knesebeck et al., 2018). Although people often recognize the psychological nature of their somatic symptoms and do not try to hide or "mask" their psychological ill-health and discomfort (Skapinakis & Araya, 2011), in many cultures somatic disease is justified, and mental illness is condemned. Therefore, somatization has cultural value and social effectiveness, helping a person avoid public stigma and labels of mental disorders (Kleiman, 1986). This explains the positive association between public stigma and somatic symptoms (McNealy & Lombardero, 2020).

Fourth, higher mental health stigma and lower mental health literacy were associated with higher anxiety and depressive symptoms. This result coheres with those from other studies. For example, suffering from anxiety or depressive symptoms almost doubles mental health stigma, and the comorbidity of anxiety and depressive symptoms further increases these associations according to Alonso et al. (2008). Regarding the Saudi population, studies have found that 88% of people had lack of mental health literacy, 59% expressed a negative perception of mental illness, 67% reported negative attitudes toward mentally ill patients, and 55% experienced negative attitudes toward professional help-seeking (Abolfotouh et al., 2018). These findings also determined that mental health literacy interventions reduce mental health stigma (Ma et al., 2023) as well as anxiety and depressive symptoms (Magallón-Botaya et al., 2023), improve competencies for maintaining mental health, and encourage seeking help in the case of mental health problems (Beukema et al., 2022).

In general, the high prevalence of mental health stigma and limited mental health literacy, and their close relationship with somatic, anxiety, and depressive symptoms in Russians may have a deep cultural and historical roots. In Medieval Russia, the holy fool was celebrated as someone who refused earthly comforts and told the truth about what was happening, but in the 18th century the holy fools were locked up in "yellow houses" because they were considered crazy and socially dangerous (Brintlinger & Vinitsky, 2007). Russian psychiatry, which has had a dramatic history since the 18th century, despite social, economic, and political difficulties, is currently

actively developing and humanizing (Krasnov & Gurovich, 2012). Well-designed cultural and historical features can influence Russians even in the context of the current state of psychiatry and the revival of a humane societal attitude toward patients with mental disorders.

Conclusion

To our knowledge, ours is the first study highlighting the prevalence of mental health stigma and mental health literacy in Russia. We found that the majority of Russians in our sample had mental health stigma and limited mental health literacy. In addition, we showed that mental health stigma and limited mental health literacy were associated with mental health problems such as somatic, anxiety, and depressive symptoms. These findings may determine the prospects for a closer examination of mental health stigma, mental health literacy, and mental health problems in Russia.

Limitations

This study had a number of limitations. Its cross-sectional nature limits judgments about causal relationships between mental health stigma, mental health literacy, and mental health problems. Furthermore, the participants were mostly young women, which may distort the findings. Previous research has shown that women and younger people show less stigmatization and more literacy about mental health issues than men (Chandra et al., 2006; Hadjimina & Furnham, 2017; Ricciardelli et al., 2021). Finally, mental health literacy was measured using small questions and should probably be studied more thoroughly in future research.

Clinical implications

The findings of this study highlight the obvious need for measures to reduce mental health stigma and improve mental health literacy in Russia. Traditional anti-stigma campaigns have focused on raising mental health literacy, but recently scientists have identified equally important strategies such as expanding social contacts, advocacy by influential figures or groups, and the enactment of anti-discriminatory laws (Shahwan et al., 2022). Considering the fact that somatic, anxiety, and depressive symptoms appear to be more common to people with mental health stigma and limited mental health literacy, such campaigns can contribute to the promotion of better mental health in Russia.

Ethics Statement

The study was approved by the HSE Institutional Review Board (minutes of the meeting of December 13, 2022). Informed consent was obtained from all study participants.

Author Contributions

A.Z. conceived the idea, developed the theory, performed the computations, analyzed the data, drafted the manuscript. N.M., O.S. and S.B. gathered the data and

discussed the results. All authors have read and agreed to the published version of the manuscript.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgements

This study received no external funding.

References

Abolfotouh, M.A., Almutairi, A.F., Almutairi, Z., Salam, M., Alhashem, A., Adlan, A.A., & Modayfer, O. (2019). Attitudes toward mental illness, mentally ill persons, and help-seeking among the Saudi public and sociodemographic correlates. *Psychology Research and Behavior Management, 12*, 45–54. https://doi.org/10.2147/PRBM.S191676

Alemu, W.G., Due, C., Muir-Cochrane, E., Mwanri, L., & Ziersch, A. (2023). Internalised stigma among people with mental illness in Africa, pooled effect estimates and subgroup analysis on each domain: Systematic review and meta-analysis. *BMC Psychiatry, 23*, 480. https://doi.org/10.1186/s12888-023-04950-2

Alonso, J., Buron, A., Bruffaerts, R., He, Y., Posada-Villa, J., Lepine, J.-P., … & the World Mental Health Consortium (2008). Association of perceived stigma and mood and anxiety disorders: Results from the World Mental Health Surveys. *Acta Psychiatrica Scandinavica, 118*(4), 305–314. https://doi.org/10.1111/j.1600-0447.2008.01241.x

Alonzo, A.A., & Reynolds, N.R. (1995). Stigma, HIV and AIDS: An exploration and elaboration of a stigma trajectory. *Social Science and Medicine, 41*(3), 303–315. https://doi.org/10.1016/0277-9536(94)00384-6

Beukema, L., Tullius, J.M., Korevaar, L., Hofstra, J., Reijneveld, S.A., & de Winter, A.F. (2022). Promoting mental health help-seeking behaviors by mental health literacy interventions in secondary education? Needs and perspectives of adolescents and educational professionals. *International Journal of Environmental Research and Public Health, 19*(19), 11889. https://doi.org/10.3390/ijerph191911889

Brintlinger, A., & Vinitsky, I. (2007). *Madness and the mad in Russian culture*. University of Toronto Press.

Brohan, E., Elgie, R., Sartorius, N., & Thornicroft, G. (2010). Self-stigma, empowerment and perceived discrimination among people with schizophrenia in 14 European countries: The GAMIAN-Europe study. *Schizophrenia Research, 122*(1–3), 232–238. https://doi.org/10.1016/j.schres.2010.02.1065

Cantarero-Arévalo, L., Kingod, N., & Bakshinskayte, M. (2020). I am a psycho if I need to take pills: Stigma experience in Russian youth with affective disorders. *European Journal of Public Health, 30*, ckaa165.276. https://doi.org/10.1093/eurpub/ckaa165.276

Chandra, A., & Minkovitz, C.S. (2006). Stigma starts early: Gender differences in teen willingness to use mental health services. *Journal of Adolescent Health, 38*(6), 754.E1–754.E8. https://doi.org/10.1016/j.jadohealth.2005.08.011

Devendorf, A.R., Rum, R., Kashdan, T.B., & Rottenberg, J. (2022). Optimal well-being after psychopathology: Prevalence and correlates. *Clinical Psychological Science, 10*(5), 981–996. https://doi.org/10.1177/2167702622107887

Draine, J., Salzer, M.S., Culhane, D.P., & Hadley, T.R. (2002). Role of social disadvantage in crime, joblessness, and homelessness among persons with serious mental illness. *Psychiatric Services, 53*(5), 565–573. https://doi.org/10.1176/appi.ps.53.5.565

Germain, N., Augustin, M., François, C., Legau, K., Bogoeva, N., Desroches, M., … & Sommer, R. (2021). Stigma in visible skin diseases – a literature review and development of a conceptual model.

Journal of the European Academy of Dermatology and Venereology, 35(7), 1493–1504. https://doi.org/10.1111/jdv.17110

Gierk, B., Kohlmann, S., Kroenke, K., Spangenberg, L., Zenger, M., Brähler, E., & Löwe, B. (2014). The somatic symptom scale-8 (SSS-8): A brief measure of somatic symptom burden. *JAMA Internal Medicine, 174*(3), 399–407. https://doi.org/10.1001/jamainternmed.2013.12179

Goffman, E. (1963). Stigma: Notes on the management of spoiled identity. N.Y.: Prentice-Hall.

Guo, C., Ciu, Y., Xia, Z., Hu, J., Xue, Y., Huang, X., … & Zhang, S. (2023). Association between health literacy, depressive symptoms, and suicide-related outcomes in adolescents: A longitudinal study. *Journal of Affective Disorders, 327*, 15–22. https://doi.org/10.1016/j.jad.2023.01.054

Hadjimina, E., & Furnham, A. (2017). Influence of age and gender on mental health literacy of anxiety disorders. *Psychiatry Research, 251*, 8–13. https://doi.org/10.1016/j.psychres.2017.01.089

Haruyama, Y., Miyagi, E., Kobashi, G., Obata, S., Umazume, T., Yoshimi, A., … & Yamada, H. (2022). Impact of health literacy on anxiety and depressive symptoms in pregnant women in Japan during the COVID-19 pandemic. *Scientific Reports, 12*, 14042. https://doi.org/10.1038/s41598-022-18405-3

Hortal-Mas, R., Moreno-Poyato, A.R., Granel-Giménez, N., Roviralta-Vilella, M., Watson-Badia, C., Gómez-Ibáñez, R., … & Leyva-Moral, J.M. (2022). Sexuality in people living with a serious mental illness: A meta-synthesis of qualitative evidence. *Journal of Psychiatric and Mental Health Nursing, 29*(1), 130–146. https://doi.org/10.1111/jpm.12700

Huang, Z., Yu, T., Wu, S., & Hu, A. (2021). Correlates of stigma for patients with cancer: A systematic review and meta-analysis. *Support Care Cancer, 29*, 1195–1203. https://doi.org/10.1007/s00520-020-05780-8

Jannati, Y., Nia, H.S., Froelicher, E.S., Goudarzian, A.H., & Yaghoobzadeh, A. (2020). Self-blame attributions of patients: A systematic review study. *Central Asian Journal of Global Health, 9*(1), e419. https://doi.org/10.5195/cajgh.2020.419

Jenkins, G.T., Janich, N., Wu, S., & Shafer, M. (2023). Social isolation and mental health: Evidence from adults with serious mental illness. *Psychiatric Rehabilitation Journal, 46*(2), 148–155. https://doi.org/10.1037/prj0000554

Kleiman, A. (1986). *Social origins of disease and distress: Depression, neurasthenia, and pain in modern China*. New Haven, CT: Yale University Press.

Krakauer, R.L., Stelnicki, A.M., & Carleton, R.N. (2020). Examining mental health knowledge, stigma, and service use intentions among public safety personnel. *Frontiers in Psychology, 11*, 949. https://doi.org/10.3389/fpsyg.2020.00949

Krasnov, V.N., & Gurovich, I. (2012). History and current condition of Russian psychiatry. *International Review of Psychiatry, 24*(4), 328–333. https://doi.org/10.3109/09540261.2012.694857

Krendl, A.C., & Pescosolido, B.A. (2020). Countries and cultural differences in the stigma of mental illness: The East-West divide. *Journal of Cross-Cultural Psychology, 51*(2), 149–167. https://doi.org/10.1177/0022022119901297

Kroenke, K., Spitzer, R.L., & Williams, J.B.W. (2001). The PHQ-9. Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Link, B.G., Struening, E.L., Neese-Todd, S., Asmussen, S., & Phelan, J.C. (2001). Stigma as a barrier to recovery: The consequences of stigma for the self-esteem of people with mental illnesses. *Psychiatric Services, 52*(12), 1621–1626. https://doi.org/10.1176/appi.ps.52.12.1621

Ma, K.K.Y., Anderson, J.K., & Burn, A.-M. (2023). Review: School-based interventions to improve mental health literacy and reduce mental health stigma – a systematic review. *Child and Adolescent Mental Health, 28*(2), 230–240. https://doi.org/10.1111/camh.12543

Magallón-Botaya, R., Méndez-López, F., Oliván-Blázquez, B., Carlos Silva-Aycaguer, L., Lerma-Irureta, D., & Bartolomé-Moreno, C. (2023). Effectiveness of health literacy interventions on anxious and depressive symptomatology in primary health care: A systematic review and meta-analysis. *Frontiers in Public Health, 11*, 1007238. https://doi.org/10.3389/fpubh.2023.100723

McNealy, K.R., & Lombardero, A. (2020). Somatic presentation of mental health concerns, stigma, and mental health treatment engagement among college students. *Journal of American College Health, 68*(7), 774–781. https://doi.org/10.1080/07448481.2019.1590372

Minichil, W., Getinet, W., & Kassew, T. (2021). Prevalence of perceived stigma and associated factors among primary caregivers of children and adolescents with mental illness, Addis Ababa, Ethiopia: Cross-sectional study. *PLoS ONE, 16*(12): e0261297. https://doi.org/10.1371/journal.pone.0261297

Nersessova, K.S., Jurcik, T., & Hulsey, T.L. (2019). Differences in beliefs and attitudes toward depression and schizophrenia in Russia and the United States. *International Journal of Social Psychiatry, 65*(5), 388–398. https://doi.org/10.1177/0020764019850220

Ran, M.S., Hall, B.J., Su, T.T., Prawira, B., Breth-Peterson, M., Li, X.-H., & Zhang, T.-M. (2021). Stigma of mental illness and cultural factors in Pacific Rim region: A systematic review. *BMC Psychiatry, 21*, 8. https://doi.org/10.1186/s12888-020-02991-5

Ricciardelli, R., Haynes, S.H., Burdette, A., Keena, L., McCreary, D.R., Carleton, R.N., … & Groll, D. (2021). Mental health, stigma, gender, and seeking treatment: Interpretations and experiences of prison employees. *Applied Psychology in Criminal Justice, 16*(1), 107–127.

Sartorius, N. (1998). Stigma: What can psychiatrists do about it? *Lancet*, 352(9133), 1058–1059. https://doi.org/10.1016/S0140-6736(98)08008-8

Sell, M., Daubmann, A., Zapf, H., Adema, B., Busmann, M., Stiawa, M., … & Wiegand-Grefe, S. (2021). Family functioning in families affected by parental mental illness: Parent, child, and clinician ratings. International *Journal of Environmental Research and Public Health, 18*(15), 7985. https://doi.org/10.3390/ijerph18157985

Shahwan, S., Goh, C.M.J., Tan, G.T.H., Ong, W.J., Chong, S.A., & Subramaniam, M. (2022). Strategies to reduce mental illness stigma: Perspectives of people with lived experience and caregivers. *International Journal of Environmental Research and Public Health, 19*(3), 1632. https://doi.org/10.3390/ijerph19031632

Shulman, N., & Adams, B.A. (2002). Comparison of Russian and British attitudes towards mental health problems in the community. *International Journal of Social Psychiatry, 48*(4), 266–278. https://doi.org/10.1177/002076402128783307

Siddique, A.B., Ovi, M.R., Ahammed, T., Chowdhury, M.A.B., & Uddin, J. (2022). Mental health knowledge and awareness among university students in Bangladesh. *Heliyon, 8*(10), e11084. https://doi.org/10.1016/j.heliyon.2022.e11084

Skapinakis, P., & Araya, R. (2011). Common somatic symptoms, causal attributions of somatic symptoms and psychiatric morbidity in a cross-sectional community study in Santiago, Chile. *BMC Research Notes, 4*, 155. https://doi.org/10.1186/1756-0500-4-155

Spitzer, R.L., Kroenke, K., Williams, J.B.W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine, 166*(10), 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Subu, M.A., Wati, D.F., Netrida, N., Priscilla, V., Dias, J.M., Abraham, S., … & Al-Yateem, N. (2021). Types of stigma experienced by patients with mental illness and mental health nurses in Indonesia: A qualitative content analysis. *International Journal of Mental Health Systems, 15*, 77. https://doi.org/10.1186/s13033-021-00502-x

Svensson, B., & Hansson, L. (2016). How mental health literacy and experience of mental illness relate to stigmatizing attitudes and social distance towards people with depression or psychosis: A cross-sectional study. *Nordic Journal of Psychiatry, 70*(4), 309–313. https://doi.org/10.3109/08039488.2015.1109140

Tambling, R.R., D'Aniello, C., & Russell, B.S. (2021). Mental health literacy: A critical target narrowing racial disparities in behavioral health. *International Journal of Mental Health and Addiction,* Nov 11: 1-15. https://doi.org/10.1007/s11469-021-00694-w

Tesfaye, Y., Agenagnew, L., Anand, S., Tucho, G.T., Birhanu, Z., Ahmed, G., … Yitbarek, K. (2021). Knowledge of the community regarding mental health problems: A cross-sectional study. *BMC Psychology, 9*, 106. https://doi.org/10.1186/s40359-021-00607-5

Venkatesh, B.T., Andrews, T., Mayya, S.S., Singh, M.M., & Parsekar, S.S. (2015). Perception of stigma toward mental illness in South India. *Journal of Family Medicine and Primary Care, 4*(3), 449–453. https://doi.org/10.4103/2249-4863.161352

von dem Knesebeck, O., Lehmann, M., Löwe, B., & Makowski, A.C. (2018). Public stigma towards individuals with somatic symptom disorders – Survey results from Germany. *Journal of Psychosomatic Research, 115*, 71–75. https://doi.org/10.1016/j.jpsychores.2018.10.014

Vovou, F., Hull, L., & Petrides, K.V. (2021). Mental health literacy of ADHD, autism, schizophrenia, and bipolar disorder: A cross-cultural investigation. *Journal of Mental Health, 30*(4), 470–480. https://doi.org/10.1080/09638237.2020.1713999

Yin, H., Wardenaar, K.J., Xu, G., Tian, H., & Schoevers, R.A. (2023). Mental health stigma and mental health knowledge in Chinese population: A cross-sectional study. *BMC Psychiatry, 20*, 323. https://doi.org/10.1186/s12888-020-02705-x

Zolotareva, A.A. (2022). Faktornaia struktura russkoiazychnoi versii shkaly somaticheskikh simptomov (somatic symptom scale-8, sss-8) [Factor structure of the Russian version of the Somatic Symptom Scale-8 (SSS-8)]. Konsul'tativnaia psikhologiia i psikhoterapiia [*Counseling Psychology and Psychotherapy], 30*(3), 8–20. https://doi.org/10.17759/cpp.2022300302 (

Zolotareva, A.A. (2023a). Adaptatsiia russkoiazychnoi versii shkaly generalizovannogo trevozhnogo rasstroistva (Generalized Anxiety Disorder-7) [Adaptation of the Russian version of the Generalized Anxiety Disorder-7]. Konsul'tativnaia psikhologiia i psikhoterapiia [*Counseling Psychology and Psychotherapy], 31*(4), 31–46. https://doi.org/10.17759/cpp.2023310402

Zolotareva, A.A. (2023b). Diagnostika depressii: psikhometricheskaia otsenka russkoiazychnoi versii oprosnika zdorov'ia patsienta (Patient Health Questionnaire-9, PHQ-9) [Diagnosis of depression: Psychometric examination of the Russian version of the Patient Health Questionnaire (PHQ-9)]. Konsul'tativnaia psikhologiia i psikhoterapiia [*Clinical Psychology and Special Education], 12*(4), 107–121. https://doi.org/10.17759/cpse.2023120406

Original manuscript received February 23, 2024
Revised manuscript accepted May 30, 2024
First published online June 1, 2024

To cite this article: Zolotareva, A., Maltseva, N., Belousova, S., Smirnikova, O. (2024). Mental Health Stigma and Mental Health Literacy in Russia: Their Prevalence and Associations with Somatic, Anxiety, and Depressive Symptoms, *Psychology in Russia: State of the Art*, *17*(2), 23–33. DOI: 10.11621/pir.2024.0202

Psychology in Russia: State of the Art
Volume 17, Issue 2, 2024

Russian Psychological Society
Lomonosov Moscow State University

Resilience and Post-traumatic Growth among Cancer Patients: A Moderated Mediation Analysis through Perceived Social Support and Stress

Kaneez Zahra[a], Saira Khan[b], Rayna Sadia[c*], Irum Aslam[a]

[a] *National Institute of Psychology, Quaid-i-Azam University, Islamabad, Pakistan*
[b] *Riphah International University, Gullberg Greens Campus, Islamabad, Pakistan*
[c] *Rawalpindi Women University, Rawalpindi, Pakistan*

*Corresponding author. E-mail: rayna.sadia@f.rwu.edu.pk

Background. A cancer diagnosis is a powerful, unanticipated, and occasionally traumatic event which impacts an individual with evidence of a life-threatening illness. As a potentially terminal illness, cancer entails substantial physical, emotional, and psychological costs. Even though psychological resources such as social support and resilience promote post-traumatic growth, chronic stressors experienced by cancer patients have the potential to weaken the function of such positive resources. Therefore, it is crucial to assess how stress impacts post-traumatic growth among cancer patients.

Objective. The present study aimed to examine the moderating effect of stress on post-traumatic growth and resilience among cancer patients mediated by perceived social support.

Design. A cross-sectional research design and purposive sampling technique was used to collect data on Urdu versions of the Short Form of the Post-traumatic Growth Inventory, Brief Resilience Scale, Multidimensional Scale of Perceived Social Support, and Stress subscale of the Depression, Anxiety, Stress Scale. Cancer patients ($N = 200$) were approached and recruited from public and private hospitals in Rawalpindi, Islamabad, and Gilgit Baltistan to participate in the research.

Results. Post-traumatic growth had a positive association with resilience and perceived social support. However, stress was negatively related to all study variables. Moderated mediation analysis highlighted that high levels of stress decrease the indirect impact of resilience on post-traumatic growth through perceived social support.

Conclusion. The study's findings imply that stress must be given considerable attention while fostering post-traumatic growth among cancer patients. Based on these findings, future studies should also take into account specific age range of the sample, types of cancer (and other terminal illnesses), the cross-sectional nature of the study, and individual differences in coping with illness for a comprehensive understanding of post-traumatic growth among cancer patients.

Keywords: cancer, Post-Traumatic Growth (PTG), stress, resilience, social support

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)
http://psychologyinrussia.com

Introduction

Cancer, a potentially terminal illness caused by the mutation of DNA, is among the leading causes of death across the globe. Growing issues related to rapid aging populations (Altunal & Şahiner, 2022; Khan et al., 2023), increasing numbers of inactive lifestyles (Yang et al., 2023), unhealthy lifestyles (Cusinato et al., 2020), and air pollution (Gu et al., 2023), pose a threat of more cancer cases. Excluding non-melanoma skin cancer, which accounted for 18.1 million cases, approximately 10 million people of the projected 19.3 million new cases of cancer in 2020 died from the disease (Merrigan et al., 2023).

Recent evidence suggests that the interplay between genetic and environmental factors contributes to the development of cancer (Boyce et al., 2021; Ugai et al., 2022). Genetic variables such as alleles, chromosome number, or location, Single Nucleotide Polymorphisms (SNPs), and RS number interact with environmental factors such as exposure to arsenic, benzene, polychlorinated biphenyl (PCB), polycyclic aromatic hydrocarbons (PAHs), chlorinated dioxin, etc. Modifying factors involving poor diet, smoking, physical inactivity, and other lifestyle factors also impact the risk of developing cancer (Boyle, 2020; Mbemi et al., 2020).

Pakistan has 118,442 deaths from cancer and an estimated 178,388 new cancer cases per year (Ayub et al., 2022). Furthermore, the country exhibits the highest regional breast cancer incidence and mortality rate in Asia (Rashid et al., 2021), with one in every nine women currently at a lifetime risk of developing breast cancer (Sarwar et al., 2018). In Pakistan, oral cancer ranks second in terms of prevalence and is more common among men (15.9%) (Anwar et al., 2020). Lung, lips, mouth, and intestinal cancer account for most adult cases, regardless of gender (Niaz et al., 2017).

Despite the alarming prevalence of the disease, cancer patients remain at a disadvantage in Pakistan in terms of screening and treatment; this is due to lack of awareness (Hirani et al., 2021), poor socioeconomic status (Shamsi et al., 2020), the poor availability and affordability of cancer medicine (Sawrar et al., 2018), and limited treatment options. In addition, the Shaukat Khanum Memorial Cancer Hospital is the only hospital providing free treatment to cancer patients, but due to its limited capacity, only some patients can get accommodated there. Thus, in addition to the burden of the disease itself, cancer patients in Pakistan have to deal with numerous additional stressors that collectively exert a detrimental impact on their well-being and illness outcomes.

A cancer diagnosis is a powerful, unanticipated, and occasionally terrifying experience that affects the person and provides evidence of a potentially fatal illness (Cao et al., 2018; Gori et al., 2021). The crucial stages of diagnosis and treatment influence both the physical and mental functioning of the patient (Harrington & Venta, 2020). Whether or not the experience of receiving a diagnosis turns into a trauma depends on several factors, such as the prognosis, any direct or indirect experiences the patient may have previously had with cancer, available treatment options, and the patient's personal coping resources, including support from family and friends (Fabi et al., 2020). Empirical findings imply an association between cancer and trauma with typical short- and long-term consequences (Harmon & Venta, 2021; Liu et al., 2020).

Studies have demonstrated that, following a cancer diagnosis and treatment, patients may report positive improvements in addition to psychological distress (Tu et al., 2020l; Wolfson et al., 2020). Broadly defined, Post-Traumatic Growth (PTG) is a beneficial psychological shift brought on by overcoming extremely difficult life situations. These constructive adjustments can be broadly divided into three distinct domains: changes in life philosophy, interpersonal connections, and self-perception. PTG is commonly identified in cancer patients, and accounts for 60% to 95% of cases (Peng et al., 2019). Numerous cancer survivors perceive personal gains from their illness, including better quality of relationships, a more profound understanding of life, and a more positive view of themselves. However, PTG is influenced by a variety of internal and external factors, including levels of social support (Cao et al., 2018), resilience (Zhang et al., 2019), and stress (Oh et al., 2021).

PTG is often described as a form of resilience (Atay Turan et al., 2023; O'Briien & Taku, 2023). In the context of cancer, resilience is characterized as a person's adaptive characteristics and/or personal attributes that enable an effective adjustment of the disease. Optimism, positive emotions, self-worth, self-efficacy, cognitive flexibility, coping mechanisms, social support, and spirituality are a few indications of such traits (Seiler & Jeewein, 2019). Active interventions based on resilience might be a favorable option for cancer patients because they are based on characteristics that promote positivity (Festerling, 2023).

Cancer patients with extensive social support networks possess a greater ability to manage the demanding nature of their treatment, to maintain a positive outlook, and to achieve a better sense of self and life (Yang et al., 2023). Perceived social support is described as the conviction that supportive behaviors that come naturally—such as love, care, and attachment—are given when needed, usually by family, friends, or other important sources of support (Alfasi, 2023). Tedeschi and Calhoun's (2004) social-cognitive processing model emphasized that children and adolescents' cognitive adaptation and successful confrontation of psychological difficulties following a traumatic event can be facilitated by perceived social support, which ultimately fosters PTG. Empirical evidence confirms the favorable association between perceived social support, resilience, and PTG (Gu et al., 2023; Ning et al., 2023; Pak et al., 2020).

Stress is characterized as an individual's mental, physical, and/or psychological response to stressors in his or her environment (Lu et al., 2021). Cancer-related stressors, in contrast to acute traumatic events with clear onsets and terminations, are complex, ongoing, and difficult to pinpoint (for example, ongoing threats, fear of recurrence, and prospective worries) (Tometich et al., 2020). Even if cancer patients have an abundance of positive personal attributes, the external and internal stressors they encountered tend to exert a detrimental impact on their illness outcomes (Lee et al., 2023). The routines and responsibilities of daily life, such as work, family, and finances, can be common sources of stress. External factors such as poor living conditions, exposure to unhealthy environmental conditions, poverty, discrimination, and inequalities in the social determinants of health are additional stressors. Studies conducted with varying samples show that high levels of stress are negatively associated with positive attributes such as resilience and social support (Cusinato et al., 2020; Haynen et al., 2020; Yalçın et al., 2022).

According to the Transactional Model of Stress and Coping (Folkman & Lazarus, 1984), transactions (or interactions) between a person and their environment have an impact on a person's ability to deal with challenges and eventually adapt to them. In the context of cancer patients in Pakistan, the level of pre-existing disease-specific distress may be exacerbated by financial and treatment-related challenges. Subsequently, the ability to effectively cope with the disease and grow past the trauma may be altered even in the presence of coping and personal resources (such as social support and resilience).

The Life Crisis and Personal Growth Model developed by Schaefer and Moos (1992) posits that a person's internal systems and external resources collaborate to impact event-related factors when a crisis takes place. The individual's coping strategies and cognitive evaluation are altered as a result, resulting in a positive outcome. The interdependence of external resources and human systems directly influences positive results. Based on this theory, patients with cancer combine their personal systems (resilience) and external resources (social support) to achieve positive outcomes (PTG).

However, because the diagnosis of cancer is a major stressor itself and is accompanied by various other stressors (including financial concerns, lack of access to treatment in developing countries like Pakistan, death anxiety, and disease-related distress), the impact of positive sources such as perceived social support and resilience on post-traumatic growth may be affected. The present study, therefore, proposed a moderated mediation model to examine the moderating effect of stress on the association between resilience and post-traumatic growth mediated by perceived social support. The conceptual model of the study is presented in *Figure 1*.

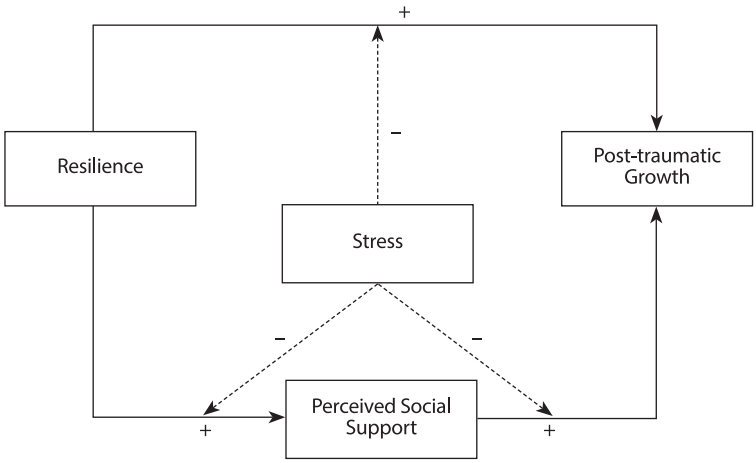


Figure 1. Conceptual Framework of the Study

Hypothesis of the Study

Based on the literature, we hypothesized that stress moderates the indirect effect of resilience on post-traumatic growth among cancer patients mediated by perceived social support.

Method

Participants

The study was cross-sectional and correlational in nature, and the purposive sampling technique was used to collect the data. The eligibility criteria for inclusion in the study were : 1) patients clinically diagnosed with any type of cancer; and 2) cancer patients with the ability to read and write. Patients living with any other terminal disease, or a psychiatric illness, were excluded from the study.

In the study group ($N = 200$), the age of participants ranged between 18 and 100 years ($M = 50.30$, $SD = 14.26$). The percentage of male and female participants was roughly equal (48% and 52% respectively), and the large majority were married (90%). The majority of participants were graduates (42%), followed by the uneducated (31%) and post-graduates (27%). More than half of the participants were residing in extended family situations (57.5%). Regarding their specific cancer profiles, some participants had a history of a one-time relapse (12.3%). The duration of cancer for most of the participants was 1–3 years (88%) while the most common stage of cancer was stage 2 (38%). The commonly utilized methods of treatment included chemotherapy (87.7%), surgery (52%), and radiotherapy (51.5%). The frequently occurring comorbid illnesses included hypertension (23%) and diabetes

Table 1

Demographic Characteristics of the Sample (N = 200)

Variable	*n (f)*	Variable	*n (f)*
Gender		Duration of Cancer	
Male	96 (48%)	1–3 years	176 (88%)
Female	104 (52%)	4 years or more	24 (12%)
Education		Stage of Cancer	
Graduates	84 (42%)	Stage 1	44 (22%)
Postgraduates	54 (27%)	Stage 2	76 (38%)
Uneducated	62 (31%)	Stage 3	38 (19%)
Marital Status		Stage 4	42 (21%)
Married	180 (90%)	Mode of Treatment	
Unmarried	20 (10%)	Surgery	106 (52.0%)
Family System		Chemotherapy	179 (87.7%)
Nuclear	85 (42.5%)	Radiotherapy	105 (51.5%)
Joint	115 (57.5%)	Bone Marrow Transplant	1 (.05%)
Family History of Cancer		Immunotherapy	4 (2%)
Yes	68(34%)	Comorbid Illnesses	
No	132(66%)	Diabetes	*39(19.1%)*
History of Relapse	25(12.3%)	Hypertension	47(23%)
Hospital Type		Obesity	9(4.4%)
Government	138(69%)	Other Complications	1(.05%)
Private	62(31%)		

(19.1%). Additionally, many participants were seeking treatment from government hospitals (69%). Detailed demographic characteristics of the sample are presented in *Table 1*.

Procedure

Considering the convenience of the researcher and potential difficulties that may arise while approaching cancer patients, 200 cancer patients were included in the study. The patients were personally approached by the researcher, who visited various public and private hospitals in Islamabad, Rawalpindi, and Gilgit Baltistan. The data collection was carried out between January and June 2023. The study plan was approved by the Ethical Committee of the Quaid-i-Azam University, Islamabad.

Questionnaires

Self-report measures were employed in the operationalization of the study variables. Considering the diverse nature of the sample, Urdu versions of the scales were used in the study. All the scales were translated by their respective authors using the forward and backward translation approach and found to be empirically valid and reliable measures of their respective constructs. Each scale is briefly described below.

Sociodemographic Information. Sociodemographic and disease-related information was collected by the researcher.

Brief Resilience Scale (BRS). The 6-item BRS (Smith et al., 2008) was used to assess resilience. The scale was translated into Urdu language by the researcher before it was used in the present study. The construct validity and the factor structure of the translated scale was established through Confirmatory Factor Analysis (See *Table 2*). In the present study, the Cronbach's reliability of the scale was .70.

Short Form of the Post-Traumatic Growth Inventory (PTGI-SF). Post-Traumatic Growth was assessed using the 10-item PTGI-SF (Cann et al., 2010). The Urdu-translated version of the scale was used (Aslam & Kamal, 2019). The scale assesses post-traumatic growth on a 6-point scale across five domains, including: 1) relationships with others; 2) realizing new possibilities in life; 3) perception of increased individual strength; 4) appreciation of life; and 5) spiritual change. In the present study, Cronbach's alpha for the scale was .96.

Multidimensional Perceived Social Support Scale (MPSS). Perceived social support was assessed using the 12-item MPSS (Zimet et al., 1988). The Urdu version translated by Shahid (2010) and assessed stress on a 7-point scale. The MPSS comprises three subscales including family support, friend support, and support by others. A composite score is obtained after summing the scores for all items, with high scores indicating greater perceptions of social support. In the present study, Cronbach's alpha for the scale was .96.

Depression, Anxiety, Stress Scale (DASS). Stress was assessed using the 7-item stress subscale of the DASS (Lovibond & Lovibond, 1995). The current study utilized the Urdu version of the subscale translated by Aslam (2007). The subscale evaluates trouble in relaxing, nervousness, irritability, and agitation on a 4-point rating scale. The Cronbach's alpha for the scale was .93 in the current study.

Results

Confirmatory Factor Analysis (CFA) was conducted to validate the Brief Resilience Scale (Smith et al., 2008) in the Urdu language, determine its construct validity in the indigenous culture, and appraise its factor structure. The Analysis of Moment Structure (AMOS Graphic 26) was used for carrying out the CFA. The model was assessed using the Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), the Incremental Fit Index (IFI), the Goodness of Fit Index (GFI), and the Root Mean Square Error of Approximation (RMSEA). According to the criteria set by numerous researchers (Dattalo, 2013; Hoyle & Isherwood, 2013), fit indices in the social sciences include the values of RMSEA, which are typically categorized and interpreted as follows: a close fit (.00 –.05); a fair fit (.05 –.08); a mediocre fit (.08 –.10); and a poor fit (over .10). The CFI, TLI, IFI and GFI should have values of .90 or higher.

The results presented in *Table 2* show that the values of the fit indices demonstrated a good fit of the model to the observed data. The factor loadings of all items (as presented in the path diagram, *Figure 2*) ranged from .90 – .95. In conclusion, the fit indices and the factor loadings justified the factorial validity of translated Brief Resilience Scale (Smith et al., 2008).

Table 2

Model Fit Indices for Confirmatory Factor Analysis of the Brief Resilience Scale (N = 200)

Model	χ^2	*df*	*p*	CMIN/*df*	Fit Indices				
					CFI	*GFI*	*TLI*	*IFI*	*RMSEA*
Model 1	15.22	9	.04	1.69	.99	.97	.99	.99	.05

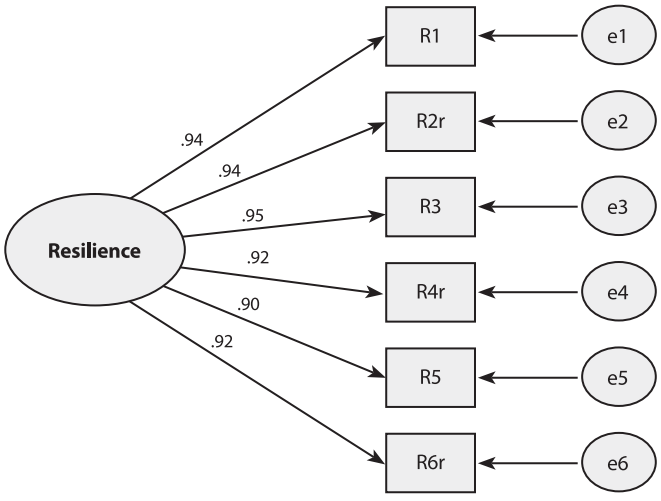


Figure 2. Measurement Model of Brief Resilience Scale

The data was later analyzed using SPSS to compute the internal consistency reliabilities of the measures, and gauge the directional relationship among the study variables. The normality of the data was checked using descriptive statistics. Indices of skewness and kurtosis demonstrated normal distribution of the data, which were within the range of -2.69 to +2.96 as per the criteria given by Field (2009). Finally, the proposed moderated mediation model was tested using Process *Macro* (Model 59) (Hayes, 2013).

Correlation analysis was run to find the direction and trend in relationships among the study variables. The results showed that post-traumatic growth was positively associated with resilience ($r = .68$, $p < .01$) and perceived social support ($r = .79$, $p < .01$), but negatively associated with stress ($r = -.55$, $p < .01$). Stress was found to be negatively associated with resilience ($r = .83$, $p < .01$) and perceived social support ($r = -.58$, $p < .01$). Moreover, resilience was positively associated with perceived social support ($r = .71$, $p < .01$). Detailed results along with descriptive characteristics (including mean, standard deviation, and reliability statistics) of the variables are presented in *Table 3.*

Table 3

Correlation Among Study Variables (N = 200)

	Variables	1	2	3	4
1	Post-traumatic Growth	–	.68**	.79**	–.55*
2	Resilience	–	–	.71**	–.83**
3	Perceived Social Support	–	–	–	–.58**
4	Stress	–	–	–	–
	α	.96	.70	.96	.93
	M	31.46	20.77	61.20	8.71
	SD	14.00	8.04	17.76	5.69

*$p < .05$, **$p < .01$.

The conceptual model was subjected to empirical testing of the proposed paths. The current study used a bootstrapping analysis with 10,000 resamples of the SPSS Macro PROCESS Model 59 to test the moderated mediation model and determine the 95% Confidence Intervals (CIs). The results showed that the conditional indirect effect of resilience on PTG through perceived social support was significant with high levels of stress (B = .69). The indirect effect of resilience on PTG through perceived social support decreased with an increase in levels of stress. Moreover, the mod graphs (See *Figure 3* and *4*) illustrate the strength of positive association between PTG and resilience. However, PTG and perceived social support decrease with the increase in levels of stress. In addition, the change in explained variance showed that the moderated mediation model uniquely explains a 17% variance in post-traumatic growth. Detailed results are presented in *Table 4.*

Table 4

Conditional Direct and Indirect Effect of Resilience on Post-traumatic Growth through Perceived Social Support Moderated by Stress (N = 200)

Predictor	Moderator (Stress)	Mediator			Dependent		
		Perceived Social Support			PTG		
			95% CI			95% CI	
		B	*LL*	*UL*	B	*LL*	*UL*
Constant		–.63	–3.71	2.46	33.89**	31.92	35.87
Resilience		1.74**	1.33	2.16	.13	–.17	.45
Stress		.18	–.41	.77	.05	–.32	.43
Perceived Social Support					.55**	.45	.64
Resilience * Stress		–.02	–.08	.05	.09**	.05	.14
Perceived Social Support* Stress					–.02**	–.04	–.01
Conditional Indirect Effect	Low				1.23	.56	1.82
	Medium				.95	.59	1.29
	High				.69	.39	.98
R^2		.51			.68		
F		69.29**			83.94**		
ΔR^2		.00			.01		

*$p < .05$, **$p < .01$. Note. PTG = Posttraumatic Growth*

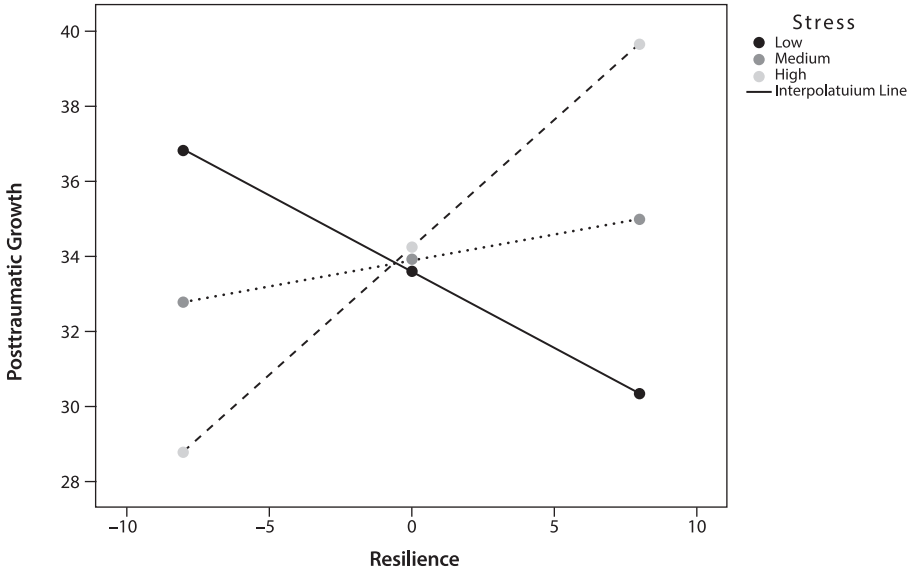


Figure 3. Moderating Effect of Stress on the Association between Resilience and Post-traumatic Growth

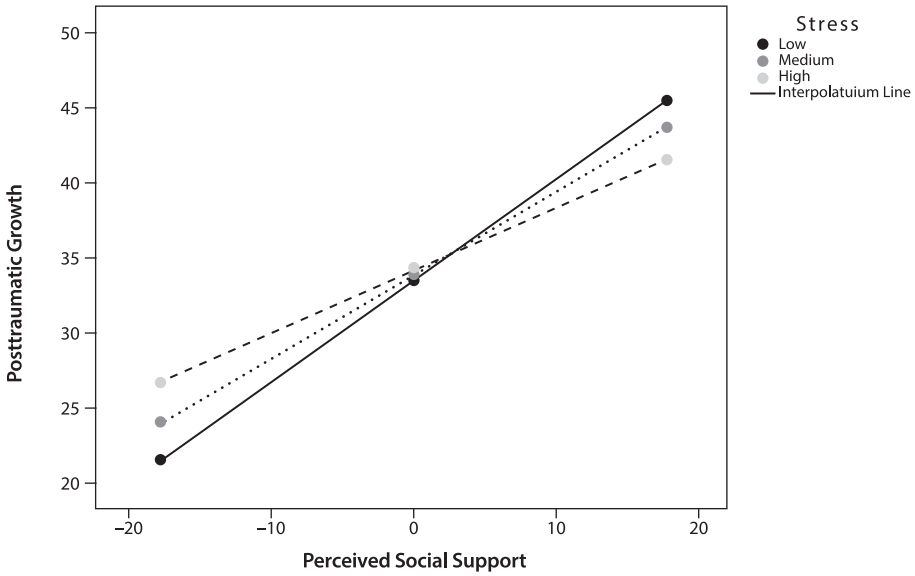


Figure 4. Moderating Effect of Stress on the Association between Perceived Social Support and Post-traumatic Growth

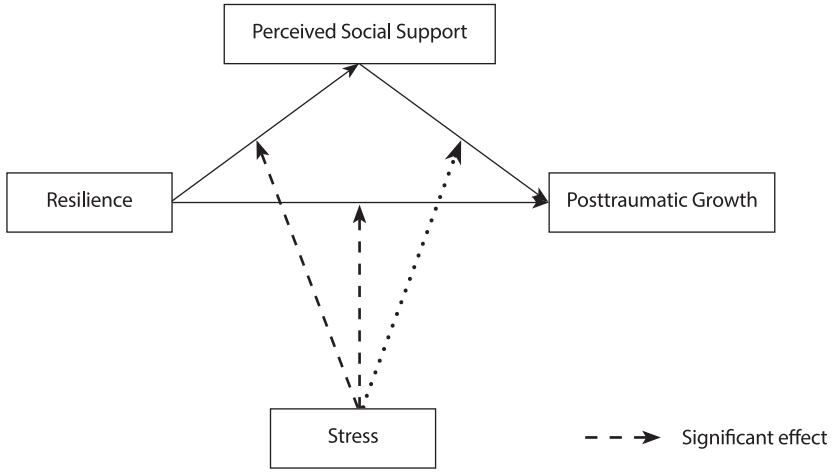


Figure 5. Conditional Direct and Indirect Effect of Resilience on Post-traumatic Growth through Perceived Social Support Moderated by Stress

Discussion

The present study aimed to examine the moderating effect of stress on the relationship between resilience and PTG among cancer patients through perceived social support. Empirical studies have consistently demonstrated the positive impacts of protective factors including resilience and social support on beneficial outcomes after

encountering traumatic experiences such as cancer (Cao et al., 2018; Dai et al., 2020). The findings of the present study are in line with those studies since the results of correlation analysis affirmed the positive association between PTG, resilience, and perceived social support. In a study conducted by Sultan and colleagues among survivors (2021), social support — particularly from friends and family – was shown to foster positive psychological changes among trauma survivors.

The abundant stressors accompanied by cancer tend to suppress the favorable effect of personal (resilience) and external resources (perceived social support) on post-traumatic growth among cancer patients. The present study proposed a moderated mediation analysis positing that stress moderates the effect of resilience on PTG through perceived social support. Our findings support the conclusion that high levels of stress weaken the indirect effect of resilience on PTG through perceived social support.

In socially disadvantaged countries such as Pakistan, healthcare remains a neglected issue (Khan et al., 2023). The differences in access to high-quality cancer care among Pakistan's marginalized cancer patients can be attributed to an assortment of issues, including financial limitations, delayed diagnosis, limited access to high-quality treatment, fragile or fragmented health care systems, and social inequality. Due to the recent advances in immunotherapy and targeted therapeutic approaches, cancer treatments are becoming highly expensive. Additionally, cancer results in indirect financial losses for patients, their families, and caregivers due to missed workdays and decreased productivity (Pak et al., 2023). Thus, in low-income countries like Pakistan, the financial distress and availability of limited resources hinder the access to treatment, thereby exerting a negative impact on post-traumatic growth (Bovero et al., 2023).

Even though the literature is relatively silent about the moderating influence of stress on PTG, some studies provide indirect support for our conceptual model. According to the results of a study conducted by Eisma et al. (2019) among bereaved adults, the number of those who experienced PTG was restricted by high distress levels. Another study found that among cancer patients, moderate levels of general stress are linked to the highest PTG when compared to low or high levels of stress (Coroiu et al., 2016). In addition, current studies on the impact of stress on resilience and social support show that high-stress environments and stress accumulation will weaken the effect of resilience (Ciydem et al., 2023; Merrigan et al., 2023) and social support (Dai et al., 2020), which suggests that stress levels may change between positive resources and health consequences. Conclusively, empirical evidence provides sufficient support for the conceptual model to suggest that high levels of stress mitigate the positive effect of resilience on PTG among cancer patients through perceived social support.

Conclusion

The present study illustrated that stress moderates the effect of resilience on PTG mediated by perceived social support. The results suggest that intervention and treatment programs that promote PTG among cancer patients must consider the detrimental impacts of various stressors on cancer patients' well-being.

Implications of the Study

The current study provides a comprehensive framework for understanding the factors that may help in developing PTG. Its findings can be used to educate healthcare providers about how to encourage patients to talk about their feelings and emotions during the diagnosis and treatment process, thereby reducing negative effects of cancer like stress, loss of trust in family and friends, and depression. Considering the moderating effect of stress highlighted in our study, more steps should be taken at government levels to provide assistance for treatment to reduce stress.

Limitations and Future Directions

Although the majority of the study's conclusions are derived from empirical evidence, there are a few major limitations that should be taken into consideration when evaluating the results. The data was collected using self-report measures. It is plausible to assume that participants may not have responded accurately due to response or positive recollection bias. Furthermore, PTG develops over time, but it was assessed at only one point in time in the study. Hence, the longitudinal nature of its development was not reflected due to methodological limitations. Future studies should utilize more objective measures and consider assessments of PTG at multiple points in time.

Another important limitation of the study was the broad age range of the sample. It is reasonable to expect that cancer diagnosis and the treatment procedure exert differential impacts on people from varying age groups. Moreover, tolerance and survival rates differ across age and type of cancer. Future studies can be conducted with cancer patients from specific age groups and those diagnosed with specific types of cancer to generalize the findings to the specific age group.

Additionally, the study only focused on positive constructs without taking individual differences into account. Empirical studies have demonstrated that factors such as personality traits (Knauer et al., 2022), coping styles (Gori et al., 2021), and emotional regulation strategies (Vinderlind et al., 2020) influence post-traumatic growth among cancer patients. Thus, future studies must consider the mentioned limitations before replicating the findings of the current study.

Ethics Statement

The present study was reviewed by the Ethics Committee of the National Institute of Psychology, Quaid-i-Azam University, Islamabad. Permissions were gotten from the hospital administrations before we conducted the study, and the participants were informed of the voluntary nature of their participation, as well as the purpose and nature of the study. All participants signed an informed consent form before completing the questionnaires independently.

Author Contributions

S.K. and K.Z. conceived of the idea and developed the theory. R.S. verified the data analysis and revised the initial manuscript. I.A. wrote the initial draft.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgments

The authors thank the participants for their time and cooperation in this research.

References

Alfasi, Y. (2023). We only know that we don't know attachment patterns and psychological coping during the COVID-19 pandemic–the mediation role of intolerance of uncertainty. *The Journal of Social Psychology, 163*(6), 806–825. https://doi.org/10.1080/00224545.2022.2061326

Ali, M.S., Yildirim, M., Hussain, S.A., & Vostanis, P. (2020). Self-reported mental health problems and post-traumatic growth among children in Pakistan care homes. *Asia Pacific Journal of Social Work and Development*, *30*(1), 62–76. https://doi.org/10.1080/02185385.2019.1710726

Altunal, C., & Şahiner, İ.T. (2022). The relationship of breast cancer deaths with age groups and urbanization of the population: a multi-country analysis. *Journal of Health Sciences and Medicine*, *5*(4), 973–976. https://doi.org/10.32322/jhsm.1087030

Anwar, N., Pervez, S., Chundriger, C., Anwar, S., Moatter, T., & Ali, T.S. (2020). Oral cancer: clinicopathological features and associated risk factors in a high risk population presenting to a major tertiary care center in Pakistan. *Plos One, 15*(8). https://doi.org/10.1371/journal.pone.0236359

Aslam, N. (2007). *Psychological disorders and resilience among earthquake affected individuals* (Unpublished MPhil Dissertation). National Institute of Psychology, QAU, Islamabad, Pakistan.

Aslam, N., & Kamal, A. (2019). Assessing positive changes among flood affected individuals: translation and validation of post-traumatic growth inventory-short form (PTGI-SF). *Pakistan Journal of Medical Research, 58*(2), 59–65. https://www.researchgate.net/publication/334446402_Assessing_Positive_Changes_among_Flood_Affected_Individuals_Translation_and_Validation_of_Post-traumatic_Growth_Inventory_-Short_Form

Atay Turan, S., Sarvan, S., Akcan, A., Guler, E., & Say, B. (2023). Adolescent and young adult survivors of cancer: relationship between resilience and post-traumatic growth. *Current Psychology*, *42*, 25870–25879. http://dx.doi.org/10.1007/s12144-022-03649-z

Ayyub, H., Kazmi, S.M.A., & Murtaza, F. (2022). I can beat this cancer: Role of grit, social support and post-traumatic growth in the quality of life of cancer patients in Pakistan. *Journal of Social Sciences Review*, *2*(3), 15–23. https://doi.org/10.54183/jssr.v2i3.55

Bibi, A., Kalim, S., & Khalid, M.A. (2018). Post-traumatic stress disorder and resilience among adult burn patients in Pakistan: A cross-sectional study. *Burns & Trauma*, *6*(8). https://doi.org/10.1186/s41038-018-0110-7

Bovero, A., Balzani, S., Tormen, G., Malandrone, F., & Carletto, S. (2023). Factors Associated with Post-Traumatic Growth during the COVID-19 Pandemic: A systematic review. *Journal of Clinical Medicine*, *13*(1). https://doi.org/10.3390/jcm13010095

Boyce, W.T., Levitt, P., Martinez, F.D., McEwen, B.S., & Shonkoff, J.P. (2021). Genes, environments, and time: The biology of adversity and resilience. *Pediatrics*, *147*(2). https://doi.org/10.1542/peds.2020-1651

Boyle, E.M. (2020). *The genetic architecture of plasma cell disorders* [Doctoral dissertation, Université de Lyon]. HAL. https://hal.univ-lorraine.fr/THESES_LYON1/tel-03543967v1

Cann, A., Calhoun, L.G., Tedeschi, R.G., Taku, K., Vishnevsky, T., Triplett, K.N., & Danhauer, S.C. (2010). A short form of the Posttraumatic Growth Inventory. *Anxiety, Stress, & Coping, 23*(2), 127–137. https://doi.org/10.1080/10615800903094273

Cao, W., Qi, X., Cai, D.A., & Han, X. (2018). Modeling posttraumatic growth among cancer patients: The roles of social support, appraisals, and adaptive coping. *Psycho-oncology*, *27*(1), 208–215. https://doi.org/10.1002/pon.4395

Ciydem, E., Ozturk, E., Usta, O., & Derin, G. (2023). The mediating role of resilience and perceived stress in the relationship between childhood traumas and depression in young adults. *Medicine Science*, *12*(3), 730–736. https://doi.org/10.5455/medscience.2023.06.096

Coroiu, A., Körner, A., Burke, S., Meterissia, S., & Sabiston, C.M. (2016). Stress and posttraumatic growth among survivors of breast cancer: A test of curvilinear effects. *International Journal of Stress Management*, *23*(1), 84–97. https://doi.org/10.1037/a0039247

Cusinato, M., Iannattone, S., Spoto, A., Poli, M., Moretti, C., Gatta, M., & Miscioscia, M. (2020). Stress, resilience, and well-being in Italian children and their parents during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*. *17*(22). https://doi.org/10.3390/ijerph17228297

Dai, S., Mo, Y., Wang, Y., Xiang, B., Liao, Q., Zhou, M., ... & Zeng, Z. (2020). Chronic stress promotes cancer development. *Frontiers in Oncology*, *10*. https://doi.org/10.3389/fonc.2020.01492

Dattalo, P. (2013). *Analysis of multiple dependent variables*. Oxford University Press, USA. https://doi.org/10.1093/acprof:oso/9780199773596.001.0001

Eisma, M.C., Lenferink, L.I.M., Stroebe, M.S., Boelen, A.P., & Schut, H.A.W. (2019). No pain, no gain: cross-lagged analyses of posttraumatic growth and anxiety, depression, posttraumatic stress and prolonged grief symptoms after loss. *Anxiety, Stress, & Coping*, *32*(3), 231–243. https://doi.org/10.1080/10615806.2019.1584293

Fabi, A., Bhargava, R., Fatigoni, S., Guglielmo, M., Horneber, M., Roila, F., ... & Ripamonti, C.I. (2020). Cancer-related fatigue: ESMO clinical practice guidelines for diagnosis and treatment. *Annals of Oncology*, *31*(6), 713–723. https://doi.org/10.1016/j.annonc.2020.02.016

Field, A. (2009). *Discovering statistics using SPSS*. SAGE Publications. https://books.google.com.pk/books/about/Discovering_Statistics_Using_SPSS.html?id=a6FLF1YOqtsC&redir_esc=y

Festerling, L., Buentzel, J., Fischer von Weikersthal, L., Junghans, C., Zomorodbakhsch, B., Stoll, C., … & Hoppe, C. (2023). Resilience in cancer patients and how it correlates with demographics, psychological factors, and lifestyle. *Journal of Cancer Research and Clinical Oncology*, *149*, 5279–5287. https://doi.org/10.1007/s00432-022-04480-6

Gori, A., Topino, E., Sette, A., & Cramer, H. (2021). Pathways to post-traumatic growth in cancer patients: moderated mediation and single mediation analyses with resilience, personality, and coping strategies. *Journal of Affective Disorders*, *279*, 692–700. https://doi.org/10.1016/j.jad.2020.10.044

Gori, A., Topino, E., Sette, A., & Cramer, H. (2021). Mental health outcomes in patients with cancer diagnosis: Data showing the influence of resilience and coping strategies on post-traumatic growth and post-traumatic symptoms. *Data in Brief*, *34*. https://doi.org/10.1016/j.dib.2020.106667

Gu, Y., Bie, F., Hu, M., Huang, L., Chen, J., Hu, X., … & Ye, Z. (2023). Social support and posttraumatic growth among postoperative patients with breast cancer: A latent profile and moderated mediation analysis. *Perspectives in Psychiatric Care*. https://doi.org/10.1155/2023/9289446

Harmon, J., & Venta, A. (2021). Adolescent posttraumatic growth: A review. *Child Psychiatry & Human Development*, *52*, 596–608. https://doi.org/10.1007/s10578-020-01047-9

Harrington, S.E., Stout, N.L., Hile, E., Fisher, M.I., Eden, M., Marchese, V., & Pfalzer, L.A. (2020). Cancer rehabilitation publications (2008–2018) with a focus on physical function: A scoping review. *Physical Therapy & Rehabilitation Journal*, *100*(3), 363–415. https://doi.org/10.1093/ptj/pzz184

Havnen, A., Anyan, F., Hjemdal, O., Solem, S., Riksfjord, M.G., & Hagen, K. (2020). Resilience moderates negative outcome from stress during the COVID-19 pandemic: A moderated-mediation approach. *International Journal of Environmental Research and Public Health*, *17*(18). https://doi.org/10.3390/ijerph17186461

Hirani, S., Khan, S., Sidra, A., Naozer, V.S., Ayoub, S.P., Ehsun, N., … & Imtiaz, J. (2021). Knowledge, awareness, and practices of cervical cancer, its risk factors, screening, and prevention among women in Karachi, Pakistan. *European Journal of Cancer Prevention*, *30*(1), 97–102. https://doi.org/10.1097/CEJ.0000000000000590

Hoyle, R.H., & Isherwood, J.C. (2013). Reporting results from structural equation modeling analyses in Archives of Scientific Psychology. *Archives of Scientific Psychology*, *1*(1), 14–22. https://doi.org/10.1037/arc0000004

Khan, S.J., Asif, M., Aslam, S., Khan, W.J., & Hamza, S.A. (2023). Pakistan's healthcare system: A review of major challenges and the first comprehensive universal health coverage initiative, *Cureus, 15*(9). https://doi.org/10.7759/cureus.44641

Knauer, K., Bach, A., Schäffeler, N., Stengel, A., & Graf, J. (2022). Personality traits and coping strategies relevant to posttraumatic growth in patients with cancer and survivors: a systematic literature review. *Current Oncology*, *29*(12), 9593–9612. https://doi.org/10.3390/curroncol29120754

Lee, Y.S., Roh, S., Hsieh, Y., & Park, Y. (2023). Determinants of life satisfaction and quality of life among American Indian women cancer survivors: The role of psychosocial resources. *Journal of Evidence-Based Social Work*, *20*(4), 536–555. https://doi.org/10.1080/26408066.2023.2185561

Liu, Z., Doege, D., Thong, M.S.Y., & Arndt, V. (2020). The relationship between posttraumatic growth and health-related quality of life in adult cancer survivors: A systematic review. *Journal of Affective Disorders*, *276*, 159–168. https://doi.org/10.1016/j.jad.2020.07.044

Lu, S., Wei, F., & Li, G. (2021). The evolution of the concept of stress and the framework of the stress system. *Cell Stress*, *5*(6), 76-85. https://doi.org/10.15698/cst2021.06.250

Mbemi, A., Khanna, S., Njiki, S., Yedjou, C.G., & Tchounwou, P.B. (2020). Impact of gene-environment interactions on cancer development. *International Journal of Environmental Research and Public Health*, *17*(21). https://doi.org/10.3390/ijerph17218089

Merrigan, J.J., Quatman-Yates, C., Caputo, J., Daniel, K., Briones, N., Sen, I., … & Klatt, M. (2023). Assessment of virtual mindfulness-based training for health care professionals: Improved self-reported respiration rates, perceived stress, and resilience. *Global Advances in Integrative Medicine and Health*, *12*. https://doi.org/10.1177/27536130231187636

Niaz, K., Maqnool, F., Khan, F., Bahadar, H., Hassan, F.I., & Abdollahi, M. (2017). Smokeless tobacco (paan and gutkha) consumption, prevalence, and contribution to oral cancer. *Epidemiology Health, 39*. https://doi.org/10.4178/epih.e2017009

Ning, J., Tang, X., Shi, H., Yao, D., Zhao, Z., & Li, J. (2023). Social support and posttraumatic growth: A meta-analysis. *Journal of Affective Disorders*, *320*, 117–132. https://doi.org/10.1016/j.jad.2022.09.114

O'Brien, C.J., & Taku, K. (2023). Distinguishing between resilience and posttraumatic growth: perceptions of and attitudes toward depression. *Psychology, Health & Medicine*, *28*(6), 1487–1494. https://doi.org/10.1080/13548506.2022.2064521

Oh, J.M., Kim, Y., & Kwak, Y. (2021). Factors influencing posttraumatic growth in ovarian cancer survivors. *Supportive Care in Cancer*, *29*, 2037–2045. https://doi.org/10.1007/s00520-020-05704-6

Pak, S., Yurtbakan, T., & Acarturk, C. (2023). Social support and resilience among Syrian refugees: the mediating role of self-efficacy. *Journal of Aggression, Maltreatment & Trauma*, *32*(3), 382–398. https://doi.org/10.1080/10926771.2022.2061882

Pak, T.Y., Kim, H, & Kim, K.T. (2020). The long-term effects of cancer survivorship on household assets. *Health Economics Review*, *10*. https://doi.org/10.1186/s13561-019-0253-7

Peng, X., Younglin, S., Wenxia, H., & Xiaolin, H. (2019). Status and factors related to posttraumatic growth in patients with lung cancer: A STROBE-compliant article. *Medicine*, *98*(7). https://doi.org/10.1097%2FMD.0000000000014314

Rashid, A., Aqeel, M., Bushra, M.,& Salim, S. (2021). The prevalence of psychiatric disorders in breast cancer patients; A cross-sectional study of breast cancer patients experiences in Pakistan. *Nature-Nurture Journal of Psychology, 1*(1), 1–7.

Sarwar, M.R., Iftikhar, S., & Saqib, A. (2018). Availability of anticancer medicines in public and private sectors, and their affordability by low, middle and high-income class patients in Pakistan. *BMC Cancer*, *18*. https://doi.org/10.1186/s12885-017-3980-3

Seiler, A., & Jenewein, J. (2019). Resilience in cancer patients. *Frontiers in Psychiatry*, *10*. https://doi.org/10.3389/fpsyt.2019.00208

Shahid, H. (2010). *Perception of social support, marital satisfaction and coping strategies among infertile couples* (Unpublished MPhil Dissertation). National Institute of Psychology, QAU, Islamabad, Pakistan.

Shamsi, U., Khan, S., Azam, I., Usman, S., Maqbool, A., Gill, T., … & Callen, D. (2020). Patient delay in breast cancer diagnosis in two hospitals in Karachi, Pakistan: Preventive and life-saving measures needed. *JCO Global Oncology*, *6*, 873–883. https://doi.org/10.1200/GO.20.00034

Smith, B.W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine, 15*, 194–200. https://doi.org/10.1080/10705500802222972

Sultan, H., Hussain, M.S., Ishaq, G., Adil, A., & Chaudhry, R. (2021). Social support, resilient coping and post-traumatic growth in road accident survivors. *Rawal Medical Journal*, *46*(4), 991–994.

Tedeschi, R.G., & Calhoun, L.G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, *15*(1), 1–18. https://doi.org/10.1207/s15327965pli1501_01

Tometich, D.B., Hyland, K.A., Soliman, H., Jim, H.S.L., & Oswald, L. (2020). Living with metastatic cancer: A roadmap for future research. *Cancers*, *12*(12), 3684–3706. https://doi.org/10.3390/cancers12123684

Tu, P.C., Yeh, D.C., & Hsieh, H.C. (2020). Positive psychological changes after breast cancer diagnosis and treatment: The role of trait resilience and coping styles. *Journal of Psychosocial Oncology*, *38*(2), 156–170. https://doi.org/10.1080/07347332.2019.1649337

Ugai, T., Sasamoto, N., Lee, H.Y., Ando, M., Song, M., Tamimi, R.M., … & Ogino, S. (2022). Is early-onset cancer an emerging global epidemic? Current evidence and future implications. *Nature Reviews Clinical Oncology*, *19*, 656–673. https://doi.org/10.1038/s41571-022-00672-8

Vanderlind, W.M., Millgram, Y., Baskin-Sommers, A.R., Clark, M.S., & Joormann, J. (2020). Understanding positive emotion deficits in depression: From emotion preferences to emotion regulation. *Clinical Psychology Review*, *76*. https://doi.org/10.1016/j.cpr.2020.101826

Wolfson, P.E., Andries, J., Feduccia, A.A., Jerome, L., Wang, J.B., Williams, E., … & Doblin, R. (2020). MDMA-assisted psychotherapy for treatment of anxiety and other psychological distress related to life-threatening illnesses: A randomized pilot study. *Scientific Reports*, *10*. https://doi.org/10.1038/s41598-020-75706-1

Yalçın, I., Can N., Çalışır, Ö.M., Yalçın, S., & Çolak, B. (2022). Latent profile analysis of COVID-19 fear, depression, anxiety, stress, mindfulness, and resilience. *Current Psychology*, *41*, 459-469. https://doi.org/10.1007/s12144-021-01667-x

Yang, K., Ren, Y., Peng, W., Wang, X., Du, Z., Wang, J., & Jiang, J. (2023). Subjective well-being among Chinese breast cancer patients: The unique contributions of death anxiety, self-esteem, and social support. *Journal of Health Psychology*, *29*(3), 213–224. https://doi.org/10.1177/13591053231195391

Zhang, C., Gao, R., Tai, J., Li, Y., Chen, S., Chen, L., … & Li, F. (2019). The relationship between self-perceived burden and posttraumatic growth among colorectal cancer patients: The mediating effects of resilience. *BioMed Research International*, *2019*(1), 6840743. https://doi.org/10.1155/2019/6840743

Zimet, G.D., Dahlem, N.W., Zimet, S.G., & Farley, G.K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, *52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2.

Original manuscript received May 3, 2023
Revised manuscript accepted June 12, 2024
First published online June 30, 2024

To cite this article: Zahra, K., Khan, S., Sadia, R., Aslam, I. (2024). Resilience and Post-traumatic Growth among Cancer Patients: A Moderated Mediation Analysis through Perceived Social Support and Stress, *Psychology in Russia: State of the Art*, *17*(2), 34–49. DOI: 10.11621/pir.2024.0203

Psychology in Russia: State of the Art
Volume 17, Issue 2, 2024

Russian Psychological Society
Lomonosov Moscow State University

PERSONALITY PSYCHOLOGY

Materialism, the Dark Triad Traits, and Money Management among Undergraduate Students

Dmitriy S. Kornienko[a*], Milena V. Baleva[b], Nadezhda P. Yachmeneva[a]

[a] *Russian Presidential Academy of National Economy and Public Administration, Moscow, Russia*
[b] *Perm State University, Russia*

*Corresponding author. E-mail: kornienko-ds@ranepa.ru

Background. Previous studies have assumed that a materialistic value orientation is correlates with personality traits such as honesty, neuroticism, and agreeableness. Less is known about the relationship between features of a materialistic orientation such as acquisition centrality, acquisition as the pursuit of happiness, and possession-defined success, and the Dark Triad traits. This article presents a study on the relationship between materialism, the Dark Triad traits (Machiavellianism, narcissism, and psychopathy), and money management.

Objective. The study aimed to investigate whether groups exhibiting various combinations of materialism and Dark Triad traits have disparities in financial control and accountability, which serve as indicators of money management.

Design. Questionnaire-based surveys were conducted online, with a total of 442 undergraduate students age 18 to 25 participating. The participants filled out the Short Dark Triad measure, the Material Values Scale, and the Money Management Scale, in addition to providing their demographics.

Results. Four combinations of materialistic and Dark Triad traits were revealed (Bright and Dark Materialists and Non-materialists). Bright and Dark Materialists were more self-centered and manipulative than Non-materialists. Strong materialism, paired with the lowest degree of Dark Triad characteristics, resulted in the worst financial management. On the contrary, individuals with low materialistic tendencies in addition to high Dark Triad traits tended to have better ability to managing their finances.

Conclusion. It is possible to assume that materialism is a strategy for obtaining riches, positions, and reputation at the cost of others in the case of "dark" personalities. Nevertheless, those with low levels of materialism and low Dark Triad characteristics showed better abilities to handle their finances in terms of control and responsibility.

Keywords: materialism, the Dark Triad (DT), money management, personality, narcissism, Machiavellianism, psychopathy, Material Values Scale (MVS)

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)
http://psychologyinrussia.com

Introduction

Materialism is defined by Richins and Dawson (Richins & Dawson, 1992) as "the importance a person places on possessions and their acquisition as a necessary or desirable form of conduct to reach desired end states" (p. 307). According to the value-oriented approach to materialism (Richins, 2004; Richins & Dawson, 1992), this concept contains three elements or values: acquisition centrality, acquisition as the pursuit of happiness, and possession-defined success. Materialistic individuals believe that the quantity and quality of their material goods may measure their personal success. Possessing and consuming things can be their primary life goal and crucial to their life satisfaction and well-being.

A comprehensive review of materialism studies showed positive associations between materialistic values and compulsive consumption behavior (Kasser, 2016) or emotional buying (Donnelly et al., 2013). Materialistic individuals strived to have more and better things than others in order to gain positive self-appraisal and affect (Martin et al., 2019).

Concerning social life, high materialism is positively associated with shorter and low-quality relationships, low empathy, and manipulativeness (Kasser, 2016; Ouyang et al., 2020). In their relationships, materialists are oriented to external factors (appearances and status), and are self-centered (less giving, less engaged with relationships) (Tatzel, 2002).The link between materialism and well-being has been explained by self-determination theory (Ryan & Deci, 2000). People who prefer materialistic values show poor satisfaction levels in relation to psychological demands for autonomy, competence, and relatedness, which leads to low levels of well-being (Christopher et al., 2009; Dittmar et al., 2014; Kasser, 2016).

Materialism and personality traits

Materialism has shown negative associations with traits in the HEXACO model, particularly with Honesty-Humility, but also with Agreeableness, Openness to Experience, and Conscientiousness (Ashton & Lee, 2008). The Big Five traits also correlate variously with materialistic values (*e.g.,* extraversion correlates positively) (Ashton & Lee, 2008). The combination of high extraversion and neuroticism with low openness and agreeableness predicts materialism (Otero-López & Villardefrancos, 2013). A recent study of materialism and personality traits revealed the mediating role of neuroticism and narcissism in connection with materialism and well-being (Górnik-Durose & Pyszkowska, 2020).

Materialism-personality types

Different types of materialism, depending on their combination with HEXACO traits, were extracted by M. Górnik-Durose and I. Pilch (2016). These researchers identified two types of materialistic individuals, "Peacocks" and "Mice," who differ primarily in their levels of extraversion and emotionality (neuroticism). The "Mice" types are more concerned with money as a source of stability and fulfillment of their desires and aspirations. "Peacocks" are a more narcissistic type who use money and luxury items to promote themselves. The time perspective of these two types of materialistic personalities differs as well. Materialists of the "Peacock" type have a present-

hedonistic time perspective, whereas "Mice" materialists have a past-negative time perspective (Watson, 2020).

These studies support the idea of a dual-nature model of materialistic personality proposed by M. Górnik-Durose and I. Pilch (2016). The dual nature of materialism is rooted in two contrasting life experiences: 1) avoiding scarcity and 2) seeking to show off (Górnik-Durose & Pilch, 2016); and it is exposed in personality traits and the individual's evaluation of past, present, or future experience, and well-being (Watson, 2020). The concept of materialist types intersects with the "money worlds" hypothesis (Tatzel, 2002) in money spending, allowing us to identify "Mice" as thrifty spenders and "Peacocks" as free spenders.

Materialism and the Dark Triad

The desire for money, status, and prestige are the significant motivating factors for people with a configuration of narcissism, Machiavellianism, and psychopathy, the combination known as the Dark Triad (Paulhus & Williams, 2002). Each of these traits may indicate a different approach to acquiring material goods and possessions. Machiavellianism is associated with maximizing long-term personal benefits, and is correlated with representing money as an indicator of success, wealth, and motivational factors (Maggalatta & Adhariani, 2020). Psychopathy is manifested as reckless impulsivity in gaining advantages along with taking needless risks for minimal gain. Narcissism expresses itself as over-self-confidence and is associated with drives for reward-seeking and novelty (Jones, 2013).

Highlighting the common core of Honesty-humility and the Dark Triad traits (Machiavellianism, narcissism, and psychopathy), K. Lee (Lee et al., 2013) analyzed the effectiveness of HEXACO and the Big Five traits, in combination with the Dark Triad, in predicting the money factor in personality make-up (materialism and conspicuous consumption). The Dark Triad traits added more predictability than the Big Five traits (Lee et al., 2013).

Other research has revealed that Dark Triad traits and its facets accounted for 36% of the variance in materialism and 21–32% of the variance in materialism facets (Pilch & Górnik-Durose, 2016). Individuals high in narcissism and Machiavellianism demonstrate a materialistic orientation, but materialism cannot be the motivational drive for psychopaths in general. However, the combination of boldness (as a psychopathic feature) and narcissism increases the materialistic orientation. In evaluating the incremental validity of the Dark Triad over the HEXACO traits in measuring materialism, the same study found that adding narcissism, Machiavellianism, and psychopathy enhanced the predictive value of Honesty-Humility when Agreeableness and Extraversion were removed from the model. Despite that, the DT characteristics accounted for just a 3% percentage of variance in addition to the personality dimensions mentioned above (Pilch & Górnik-Durose, 2016).

Materialism, personality, and financial behavior

Materialism relates to different aspects of personal finance and money. More materialistic people tend to spend more money, have a higher amount of debt (Garðarsdóttir & Dittmar, 2012), and need more money to satisfy their needs (Richins &

Dawson, 1992). Generalizing personal, cultural, and economic dispositions towards money, M. Tatzel proposed a "money worlds" theory based on two strategies of personal financial behavior - tight and loose – as the core of an individual's economic behavior. These strategies, in combination with materialism level, describe four types of consumers. The Value-seeker tries to find the best low price and compare prices. The Non-spender worries about budget and is ready to sacrifice product quality. The Big Spender enjoys spending money on luxury and high-quality goods, and the Experiencer tends to spend for self-development and recreation. Each approach can be regarded as an adaptation strategy, but when extreme, these values may be dysfunctional (Tatzel, 2002). The differences between the "Peacocks" and "Mice" materialism-personality types in money spending were found for attitudes toward money, spending preferences, and the importance of brand (Górnik-Durose & Pilch, 2016).

In a series of studies, G. Donnelly and colleagues (2012) examined how money management, savings, debt, and compulsive buying are predicted by the Big Five traits and materialistic values. Across these studies, more materialistic people, especially when they believed that materialistic possession provides happiness, had poor money management. Among the Big Five traits, conscientiousness played the leading role in predicting money management (Donnelly et al., 2012). Among the Dark Triad traits, narcissism and psychopathy correlated with overall earnings (Jonason et al., 2018), risky money behavior (Crysel et al., 2013), and gambling (Jones, 2013), while Machiavellianism had a weak correlation or was uncorrelated with money- related features (gambling, risk) because of its commitment to strategy and long-term planning (Jones & Paulhus, 2009).

Research problems in the present study

Following the "money worlds" theory by M. Tatzel (2002), the model of materialism proposed by Gornik-Durose and Pilch (2016), and the associations between materialism and the Dark Triad (Pilch & Górnik-Durose, 2016), the current study tried to investigate the potential combination of materialism values and Dark Triad traits. The combination of endorsement of materialistic values with Machiavellianism, narcissism, and psychopathy may not only clarify the features of materialistic individuals, but also the non-materialistic. Depending on the types of materialism-Dark Triad combinations, it can be possible to identify the different strategies in personal money management.

Therefore, we posed the following research hypotheses:

RQ 1. The same set of analyses used by Gornik-Durose and Pilch (2016) can be expected to distinguish groups of people with different combinations of materialism and the Dark Triad traits. Additionally, we assumed that the groups would demonstrate differences in Machiavellianism, narcissism, and psychopathy, as well as in facets of materialism that shed light on the group's characteristics.

RQ2. Considering the correlations between Dark Triad traits and materialism facets, and the different incremental predictive validity of Dark Triad traits and materialism facets reported in prior research, it is possible to specify the different correlation patterns in potential subgroups.

RQ3. Given the links between various financial behaviors, materialism, and personality, is it fair to anticipate differences in personal financial control and financial responsibility across the potential subgroups?

These research questions were tested with cluster analysis and discriminant function analysis, correlation analysis, and ANOVA on the software R (R Development Core Team 2013)

Methods

Participants

The study sample included 442 undergraduate students from local universities age 18 to 25 (M = 20.7, SD = 1.67; 83% female). Participants received the link to an online survey consisting of self-report measures, demographic details, and questions assessing their Dark Triad traits, materialism, and money management. Each participant was informed of the nature of the study, and signed an online letter of informed consent. The study procedure complied with the ethical research code of the institution where the participants were recruited.

Procedure

Questionnaires

The Dark Triad traits

The Dark Triad traits were assessed using the Russian version of Short Dark Triad measure (Egorova et al., 2015; Jones & Paulhus, 2014). The questionnaire consists of 27 items, nine for each of the Dark Triad traits: 1) Machiavellianism (*e.g.*, "I like to use clever manipulation to get my way"); 2) narcissism (*e.g.*, "I like to get acquainted with important people"); and 3) psychopathy (*e.g.*, "People who mess with me always regret it"). Participants indicated their agreement with each statement using a five-point Likert type scale (1 = strongly disagree; 5 = strongly agree). The items were averaged to create indicators of narcissism, Machiavellianism, and psychopathy.

Materialism

The Russian version of the Material Values Scale (Khashchenko, 2016; Richins, 2004) was used to measure materialism and its dimensions. The scale consists of 12 items (4 items for each subscale). The answer was given on a 5-point scale (from 1 = strongly disagree to 5 = strongly agree).

The Success sub-scale assesses a person's perception of possessions as markers of life success and achievement (*e.g.*, "I admire people who own expensive homes, cars, and clothes"). The Centrality sub-scale assesses how important it is to pursue and acquire material goods as a primary objective in life ("I like a lot of luxury in my life"). The Happiness sub-scale assesses a person's belief in the ability of material possessions to bring happiness ("I'd be happier if I could afford to buy more things"). To create indices of centrality, happiness, and success, the corresponding items were averaged. All items were averaged to create an index of materialism.

Money management

Participants completed the Money Management Scale (MMS; Donnelly et al., 2012) to assess their financial practices, and control and responsibility over their incomes and expenses. The scale measured participants' sense of financial responsibility (*e.g.*, "When I reflect on my past buying behavior, I have been most likely to overspend" [reverse-coded]) and the degree to which they monitor their financial accounts (*e.g.*, "Some people strive for financial clarity: knowing account balances, monthly expenses, loan interest rates, fees and fines"). Participants used seven-point Likert-type scales ranging from 1 (not at all) to 7 (a great deal). The average of all items and for each parcel (financial responsibility and financial control) were calculated.

Results

Materialism and the Dark Triad configuration

The initial exploratory phase of the analysis was to identify homogeneous groups of people contrasting with one another in terms of both the Dark Triad and materialism.

K-means cluster analysis (with Schwarz's Bayesian Criterion) and two-step clustering were performed using standardized scores of the index of materialism scores along with the overall Dark Triad score (*Figure 1*). A four-cluster solution identified the following groups: 1) high scores in materialism and high overall Dark Triad; 2) low materialism and high overall Dark Triad; 3) high materialism but low overall Dark Triad; and 4) low scores in both materialism and overall Dark Triad.

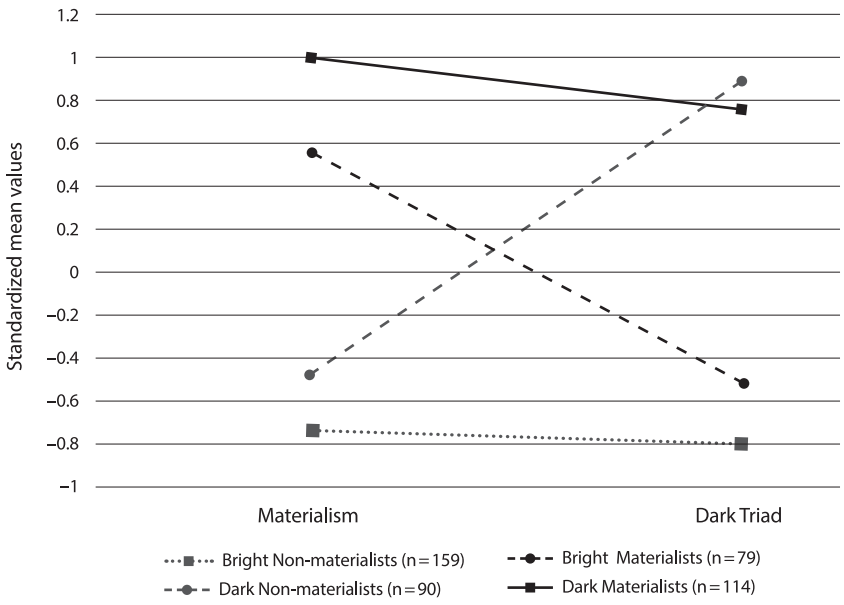


Figure 1. Materialism and Dark Triad configurations for the four groups

The one-way ANOVA results indicated significant differences between clusters in relation to summed materialism scores ($F(3, 438) = 182.6$; $p < .01$) and overall Dark Triad score ($F(3, 438) = 204.9$; $p < .01$).

To simplify the description of groupings, we named the first group the Dark Materialists (N = 114); the second the Dark Non-materialists (N = 90); the third the Bright[1] Materialists (N = 79); and the fourth the Bright Non-materialists (N = 159).

Table 1

Results of discriminant analysis

Discriminating variables	Wilks' Lambda	F	β			Total structure coefficients		
			1	2	3	1	2	3
Machiavellianism	.61	93.37***	.529	–.240	.010	**.518**	–.309	–.049
Narcissism	.74	52.77***	.283	–.438	.505	.303	–.381	**.433**
Psychopathy	.67	73.67***	.363	–.363	.192	**.429**	–.357	.212
Success (materialism)	.60	97.49***	.448	.251	–.398	**.542**	.174	–.461
Happiness (materialism)	.73	53.04***	.303	.083	–.476	.376	.067	**–.615**
Centrality (materialism)	.55	118.43***	.400	.768	.483	.319	**.756**	.549

Bold values indicate dominant variables in Function 1, Function 2, and Function 3.
*Note: N = 442; *** — p < .001*

Next, discriminant function analysis was performed to examine the underlying differences between the four groups identified in the previous analysis. The scores on the three MVS subscales (centrality, success, and happiness) and the three Dark Triad traits (Machiavellianism, narcissism, and psychopathy) were used to discriminate the groups (see the λ coefficients in *Table 1*). Function 1 had 64.1% of the variance (eigenvalue = 2.04; canonical correlation = .819; Wilk's $\lambda = .142$, $\chi^2 = 852.06$, $df = 18$, $p < .001$). Function 2 contained 30% of the variance (eigenvalue = .955; canonical correlation = .70; Wilk's $\lambda = .431$, $\chi 2 = 367.26$, $df = 10$, $p < .001$). Function 3 had only 5.9% of the total discriminating power (eigenvalue = .187; canonical correlation = .397, Wilk's $\lambda = .842$, $\chi 2 = 74.87$, $df = 4$, $p < .001$).

The total structure coefficients showed that the material value of success, Machiavellianism, and psychopathy were dominant variables in Function 1. The material value of centrality was the dominant variable in Function 2. With Function 3, the

[1] We use the word "bright" to identify the groups with low values of Dark Triad traits; it is not to be confused with the Light Triad of personality proposed by S.B. Kaufman (Kaufman, S.B., Yaden, D.B., Hyde, E., & Tsukayama, E. (2019). The Light vs. Dark Triad of Personality: Contrasting Two Very Different Profiles of Human Nature. Frontiers in Psychology, 10, 467. https://doi.org/10.3389/fpsyg.2019.00467)

main variables were the material value of happiness and narcissism (in opposition to each other).

Function 1 indicated a distinction between the materialistic value of acquisition as a primary predictor of success, and its correlations with manipulativeness and non-clinical psychopathy. Function 2 revealed a further disparity between high and low participants in the materialistic values of acquiring material possessions as a primary life goal (centrality). Function 3 indicated low happiness as a materialistic value of acquisition along with narcissism.

The analysis correctly classified an overall 91% of cases; 96.2% of cases low in materialism and low in Dark Triad (Bright Non-materialists); 86.1% of cases high in materialism and low in Dark Triad (Bright Materialists); 86.7% of cases low in materialism and high in Dark Triad (Dark Non-materialists); and 90.4% of cases high in both materialism and Dark Triad (Dark Materialists).

Group differences in the materialism facets and the Dark Triad traits

Next, the one-way ANOVA and post hoc comparison were used to reveal the differences in materialism values scales (success, happiness, and centrality) and Dark Triad traits (Machiavellianism, narcissism, and psychopathy). The results indicated significant differences between the four groups in relation to the most listed traits ($p < 0.05$). The means and standard deviations are presented in *Table 2*.

Table 2

Descriptive statistics for study variables

Variables	Total sample (N=442)		Bright Non-materialists (N=159)		Bright Materialists (N=79)		Dark Non-materialists (N=90)		Dark Materialists (N=114)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Machiavellianism	3.32	.54	2.97	.43	3.10	.48	3.59	.39	3.74	.39
Narcissism	3.06	.57	2.77	.51	2.87	.42	3.51	.38	3.24	.58
Psychopathy	3.00	.48	2.71	.38	2.82	.34	3.32	.38	3.28	.44
Success (materialism)	3.09	.73	2.64	.62	3.13	.57	2.93	.57	3.82	.50
Happiness (materialism)	3.45	.78	3.14	.73	3.31	.69	3.26	.67	4.12	.54
Centrality (materialism)	2.44	.92	1.93	.53	3.53	.64	1.97	.69	2.77	.88
Financial responsibility (money management)	3.88	1.15	4.26	.96	3.52	1.07	3.95	1.20	3.56	1.25
Financial control (money management)	5.22	1.12	5.37	1.02	4.77	1.12	5.48	.82	5.10	1.35
Money management (composite)	9.10	1.87	9.63	1.54	8.30	1.75	9.43	1.69	8.66	2.20
Materialism (composite)	2.99	.57	2.57	.40	3.32	.36	2.72	.35	3.57	.39
Dark Triad (composite)	3.13	.39	2.82	.27	2.93	.20	3.47	.20	3.42	.29

All groups differed on the success subscale ($F(3, 438) = 97.49$; $p < .001$) except for the post hoc comparison between the Bright Materialist and Dark Non-materialist

groups. The happiness scale differed ($F(3, 438) = 53.3$; $p < .001$) among all groups, but the effect only appeared when comparing the group with high materialism and high overall Dark Triad (Dark Materialists) with the other three groups. The centrality value differed among all groups ($F(3, 438) = 118.4$; $p < .001$), but post hoc analysis didn't reveal any differences between the Bright Non-materialist and Dark Non-materialist groups.

Machiavellianism ($F(3, 438) = 97.37$; $p < .001$) and narcissism ($F(3, 438) = 52.77$; $p < .001$) differed among all groups. The comparison of the psychopathy scores showed the differences ($F(3, 438) = 73.67$; $p < .001$), except for the post hoc comparison of the Bright Materialists and Non-materialists, with the Dark Materialists and Non-materialists.

Correlation of the Materialism facets and the Dark Triad traits

The zero-order correlations between the materialism values scales and Machiavellianism, narcissism, and psychopathy were calculated for the groups extracted in the previous cluster analysis. The analysis was made for each group, and the same correlations of the difference between two independent correlation coefficients were tested using the technique described by Cohen et al., (2002). Narcissism positively correlated with material possession as a marker of success for groups of Bright Non-materialists ($r = .17$, $p < .05$), Bright Materialists ($r = .23$, $p < .05$), and Dark Materialists ($r = .22$, $p < .05$). There were no significant differences in correlations within each group ($z = –.42$:.07, $p < .67$:.95).

Psychopathy negatively correlated with material possession as a marker of success in the Bright Materialist ($r = –.31$, $p < .05$) and Dark Non-materialist ($r = –.26$, $p < .05$) groups, but positively with the Dark Materialist group ($r = .20$, $p < .05$). The correlation within the Dark Materialist group significantly differed from the other two groups ($z = –3.28$: -3.07, $p < .01$:.001). A positive correlation between the centrality of material values and psychopathy was found in the Dark Materialist group ($r = .20$, $p < .05$).

Materialism, and the Dark Triad shapes the Money management

Significant differences between the groups with different configurations of materialism and the Dark Triad were found in the overall money management scores ($F(3, 438) = 13.18$, $p < .001$) and their components, *i.e.*, financial responsibility ($F(3, 438) = 12.16$, $p < .001$), and financial control ($F(3, 438) = 7.48$, $p < .001$).

Post hoc comparisons indicated that Bright Non-materialists and Dark Non-materialists differed from both Bright and Dark Materialists in money management. The same results pertained to the post hoc analysis of financial responsibility. The post hoc analysis for financial control showed differences between Bright Materialists and Bright and Dark Non-materialists.

Discussion

Our primary research goal was to discover how the characteristics of materialism and the Dark Triad combine to affect money management. The four groups were sepa-

rated along the axes of materialism and negative personality characteristics (Machiavellianism, narcissism, and psychopathy). Despite the general differences in overall materialism and the Dark Triad, the combinations of features described different personality types.

The highest value of manipulativeness characterized the group of Dark Materialists. They evaluated their own and others' success and happiness based on the number and quality of possessions acquired. Among the Dark Triad traits, their Machiavellianism was higher than their narcissism and psychopathy.

The Dark Non-materialists tended to exploit people and manipulate others for personal benefit, and they had a stronger sense of entitlement and superiority to others than the Dark Materialists. On the other hand, material things did not have a key position in their lives and did not serve as their primary source of happiness or discontent.

In manipulativeness, feeling of superiority, and cold-bloodedness, Bright Materialists and Non-materialists exhibited the same low values, but a difference arose in their materialistic values. In contrast to the Bright Materialists, the Bright Non-materialists did not put material possession at the center of their lives, nor did they judge their level of success by the amount and quality of goods they had collected.

Concerning the associations between Dark Triad traits and facets of materialism, the association of narcissism with material possession as a marker of success characterized the two materialistic groups, as well as the Dark Triad level and the Bright Non-materialist group. This finding lends credence to the idea that narcissism may be the root of materialistic ownership, as previously proposed (Górnik-Durose & Pilch, 2016). For comparison, for groups of Bright Materialists and Dark Non-materialists, more self-control, reduced impulsiveness, and boldness were correlated with a lower assessment of their success in gaining tangible possessions. In contrast, the prevalence of psychopathic characteristics in Dark Materialists resulted in a higher evaluation of success in terms of financial gain and a greater emphasis on material possessions.

Thus, narcissism may be viewed as a necessary personality feature for those with solid materialistic priorities. The combination of solid narcissism and psychopathy increases attachment to material possessions, indicating their value as signals for the Dark Triad individuals in gaining status and domination. An evolutionary viewpoint may be used to investigate the relationship between materialism and the Dark Triad (Pilch, & Górnik-Durose, 2016). The link between persons possessing strong Dark Triad features and their ability to accumulate greater wealth could be viewed as a sign of qualities that may be inherited by their offspring. Consequently, those qualities become attractive in the eyes of a potential partner and deter rivals from competing.

Comparing money management in groups with various combinations of the Dark Triad traits and materialism leads to the assumption that low materialistic values are preferable for accounting and comprehending one's current financial situation, purchase planning, and saving. In detail, the combination of a robust materialistic drive and a low level of negative personality traits may lead to financial disorganization. Individuals with a high materialistic orientation and high Dark Triad traits demonstrated low financial responsibility but reasonable financial control. The most financially responsible and controlling were non-materialistic people with low

Machiavellianism, narcissism, and psychopathy, followed by the individuals with the combination of low materialistic orientation and high Dark Triad traits.

We can also analyze our results in the context of life history theory (Figueredo et al., 2005). Research within that theoretical framework has shown that Dark Triad traits are positively associated with the fast spectrum of life history strategies (Pilch, & Górnik-Durose, 2016). Individuals with high levels of Dark Triad traits use materialism as a strategic tool to make quick life trade-offs, which explains the poor money management in groups with high materialism and high Dark Triad traits. The pursuit of material possessions, combined with an antagonistic personality, led to acquiring and owning goods with a short-term outlook, lacking long-term planning. On the other hand, the lower the level of materialism (even if the Dark Triad traits are high), the better the financial management as a part of the slow life history strategy.

A direct comparison of our results with the materialism-personality types discovered by Górnik-Durose and Pilch (2016) and the "money worlds" types identified by M. Tatzel (Tatzel, 2002) would be speculative, but based on key characteristics of the types, we may propose the following. Overall, materialists are receptive to externals (appearances and status) and self-centered (less giving, less concerned with relationships than those lower in materialism), qualities which also characterize individuals with high Dark Triad traits. According to our results, people with high Machiavellianism, narcissism, and psychopathy may have opposite materialistic values. Dark Materialists may be compared to "Peacocks," whereas Bright Materialists can be compared to "Mice." Even though Dark Non-materialists have the highest level of narcissism they couldn't be compared directly with "Peacocks" type because of low materialistic values.

Taking into account the distinctions in money management across the different Dark Triad — materialism groups, the other possible comparison is with M. Tatzel's consumer styles. Bright Non-materialists are closer to Non-Spenders because they are in control of their budget and spending, just as they are in control of themselves, and are not motivated by the need to influence or impress others. While Dark Non-materialists are good at money management, they tend to manipulate people and show off their superiority. Such a personality type is comparable to the Experiencer in terms of seeking status, power, and prestige through outward excessive spending but not through tangible possessions. Although Dark Materialists are similar to the Value seeker in terms of acquisition as the pursuit of happiness and possession-defined success, they are not particularly adept at money management. However, their tendencies to manipulate others and show off, as well as their lack of control, place them close to the Experiencer type. Due to their strong materialism beliefs and poor money management, particularly in financial control, Bright Materialists might be likened to the Big Spender type.

Conclusion

This study aimed to determine the relationship between materialistic ideals and unpleasant personality characteristics. When materialism and personality characteristics were combined, we gained more evidence of the disparities in personal money

management practices. Machiavellianism and narcissism were more prevalent in the Bright and Dark Materialists than in the Non-materialists, and materialistic ideals were more strongly endorsed in the Dark Materialists. Regarding the "dark" personalities, it is possible to argue that materialism may be viewed as a strategy to obtain resources, position, and prestige at the expense of others, as shown by the specific pattern of correlation between them. Interestingly, the combination of high materialism and low Dark Triad characteristics resulted in the weakest financial control. Contrary to this, the combination of low materialism and high Dark Triad qualities resulted in better money management, which gives credence to the concept that the Dark Triad traits might improve financial behavior.

Limitations

To begin with, the research was cross-sectional. However, due to the exploratory nature of the study, the collected data may serve as the initial body of evidence for future studies. Second, the use of self-report methods in accounting was limited by the cross-sectional design. Self-report measures are commonly used in studies focusing on personality traits and materialism. Third, the sample consisted of more than 80% females, thus limiting its generalizability. In addition, there was an unequal distribution of sexes among the subgroups. The group with high materialism and low Dark Triad traits contained the smallest percentage of men (5%), while men made up 29% of the other three groups. Future studies might attempt to avoid this issue by forming a more balanced sample and using objective measures of financial behavior.

Ethics Statement

Our procedures met the ethical standards adopted at the Russian Presidential Academy of National Economy and Public Administration, and Perm State University. Participants took part in the research voluntarily and gave written consent to participate in the study before testing.

Author Contributions

D.K. and M.B. came up with the research idea and study design, N.Y. collected the data and formed the database. M.B. made a statistical analysis of the data and D.K. drafted the manuscript. D.K., M.B. and N.Y. revised the manuscript together and approved the submitted version.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgements

The article was prepared as part of a research project on a state assignment from Russian Presidential Academy of National Economy and Public Administration

References

Ashton, M.C., & Lee, K. (2008). The prediction of Honesty–Humility-related criteria by the HEXACO and Five-Factor Models of personality. *Journal of Research in Personality*, *42*(5), 1216–1228. https://doi.org/10.1016/j.jrp.2008.03.006

Christopher, A.N., Saliba, L., & Deadmarsh, E.J. (2009). Materialism and well-being: The mediating effect of locus of control. *Personality and Individual Differences*, *46*(7), 682–686. https://doi.org/10.1016/j.paid.2009.01.003

Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2002). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (Eds.). Routledge. https://doi.org/10.4324/9780203774441

Crysel, L.C., Crosier, B.S., & Webster, G.D. (2013). The Dark Triad and risk behavior. *Personality and Individual Differences*, *54*(1), 35–40. https://doi.org/10.1016/j.paid.2012.07.029

Dittmar, H., Bond, R., Hurst, M., & Kasser, T. (2014). The relationship between materialism and personal well-being: A meta-analysis. *Journal of Personality and Social Psychology*, *107*(5), 879–924. https://doi.org/10.1037/a0037409

Donnelly, G., Iyer, R., & Howell, R.T. (2012). The Big Five personality traits, material values, and financial well-being of self-described money managers. *Journal of Economic Psychology*, *33*(6), 1129–1142. https://doi.org/10.1016/j.joep.2012.08.001

Donnelly, G., Ksendzova, M., & Howell, R.T. (2013). Sadness, identity, and plastic in over-shopping: The interplay of materialism, poor credit management, and emotional buying motives in predicting compulsive buying. *Journal of Economic Psychology*, *39*, 113–125. https://doi.org/10.1016/j.joep.2013.07.006

Egorova, M.S., Sitnikova, M.A., & Parshikova, O.V. (2015). Adaptation of the Short Dark Triad. *Psikhologicheskie Issledovaniya*, *8*(43), 1.

Figueredo, A.J., Vásquez, G., Brumbach, B.H., Sefcek, J.A., Kirsner, B.R., & Jacobs, W.J. (2005). The K-factor: Individual differences in life history strategy. *Personality and Individual Differences*, *39*(8), 1349–1360. https://doi.org/10.1016/j.paid.2005.06.009

Garðarsdóttir, R.B., & Dittmar, H. (2012). The relationship of materialism to debt and financial well-being: The case of Iceland's perceived prosperity. *Journal of Economic Psychology*, *33*(3), 471–481. https://doi.org/10.1016/j.joep.2011.12.008

Górnik-Durose, M.E., & Pilch, I. (2016). The dual nature of materialism. How personality shapes materialistic value orientation. *Journal of Economic Psychology*, *57*, 102–116. https://doi.org/10.1016/j.joep.2016.09.008

Górnik-Durose, M.E., & Pyszkowska, A. (2020). Personality matters — Explaining the link between materialism and well-being in young adults. *Personality and Individual Differences*, *163*, 110075. https://doi.org/10.1016/j.paid.2020.110075

Jonason, P.K., Koehn, M.A., Okan, C., & O'Connor, P.J. (2018). The role of personality in individual differences in yearly earnings. *Personality and Individual Differences*, *121*, 170–172. https://doi.org/10.1016/j.paid.2017.09.038

Jones, D.N. (2013). What's mine is mine and what's yours is mine: The Dark Triad and gambling with your neighbor's money. *Journal of Research in Personality*, *47*(5), 563–571. https://doi.org/10.1016/j.jrp.2013.04.005

Jones, D.N., & Paulhus, D.L. (2014). Introducing the Short Dark Triad (SD3): A Brief Measure of Dark Personality Traits. *Assessment*, *21*(1), 28–41. https://doi.org/10.1177/1073191113514105

Jones, D.N., & Paulhus, D.L. (2009). Machiavellianism. In M. R. Leary & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 102–120). New York: Guilford.

Kasser, T. (2016). Materialistic Values and Goals. *Annual Review of Psychology*, *67*(1), 489–514. https://doi.org/10.1146/annurev-psych-122414-033344

Khashchenko, V.A. (2016). The Russian version of the questionnaire for materialism orientation. *Sotsial'naia i Ekonomicheskaia Psikhologiia* [Social and Economical Psychology], *1*(2), 79–98.

Leary, M.R., & Hoyle, R.H. (2009). *Handbook of Individual Differences in Social Behavior*. Guilford Publications. https://books.google.ru/books?id=VgcGZ5sCEcIC

Lee, K., Ashton, M.C., Wiltshire, J., Bourdage, J.S., Visser, B.A., & Gallucci, A. (2013). Sex, Power, and Money: Prediction from the Dark Triad and Honesty–Humility. *European Journal of Personality*, *27*(2), 169–184. https://doi.org/10.1002/per.1860

Maggalatta, A., & Adhariani, D. (2020). For love or money: Investigating the love of money, Machiavellianism and accounting students' ethical perception. *Journal of International Education in Business*, *13*(2), 203–220. https://doi.org/10.1108/JIEB-09-2019-0046

Martin, C., Czellar, S., & Pandelaere, M. (2019). Age-related changes in materialism in adults – A self-uncertainty perspective. *Journal of Research in Personality*, *78*, 16–24. https://doi.org/10.1016/j.jrp.2018.09.007

Otero-López, J.M., & Villardefrancos, E. (2013). Five-Factor Model personality traits, materialism, and excessive buying: A mediational analysis. *Personality and Individual Differences*, *54*(6), 767–772. https://doi.org/10.1016/j.paid.2012.12.013

Ouyang, M., Cai, X., Yin, Y., Zeng, P., Chen, Y., Wang, X., …, & Wang, P. (2020). Student-student relationship and adolescent problematic smartphone use: The mediating role of materialism and the moderating role of narcissism. *Children and Youth Services Review*, *110*, 104766. https://doi.org/10.1016/j.childyouth.2020.104766

Paulhus, D.L., & Williams, K.M. (2002). The dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, *36*(6), 556–563.

Pilch, I., & Górnik-Durose, M.E. (2016). Do we need "dark" traits to explain materialism? The incremental validity of the Dark Triad over the HEXACO domains in predicting materialistic orientation. *Personality and Individual Differences*, *102*, 102–106. https://doi.org/10.1016/j.paid.2016.06.047

R Core Team (2013). R: A language and environment for statistical computing [Computer software manual]. Vienna, Austria Available from http://www.R-project.org/.

Richins, M.L. (2004). The Material Values Scale: Measurement Properties and Development of a Short Form. *Journal of Consumer Research*, *31*(1), 209–219. https://doi.org/10.1086/383436

Richins, M.L., & Dawson, S. (1992). A Consumer Values Orientation for Materialism and Its Measurement: Scale Development and Validation. *Journal of Consumer Research*, *19*(3), 303–316. https://doi.org/10.1086/209304

Ryan, R.M., & Deci, E.L. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, *25*(1), 54–67. https://doi.org/10.1006/ceps.1999.1020

Tatzel, M. (2002). "Money worlds" and well-being: An integration of money dispositions, materialism, and price-related behavior. *Journal of Economic Psychology*, *23*(1), 103–126. https://doi.org/10.1016/S0167-4870(01)00069-1

Watson, D.C. (2020). Well-Being, Temporal Orientation, and the Dual Nature of Materialism. *Imagination, Cognition and Personality*, *40*(1), 65–86. https://doi.org/10.1177/0276236620911602

Original manuscript received January 16, 2023
Revised manuscript accepted May 11, 2024
First published online June 1, 2024

To cite this article: Kornienko, D.S., Baleva, M.V., Yachmeneva, N.P. (2024). Materialism, the Dark Triad Traits, and Money Management among Undergraduate Students, *Psychology in Russia: State of the Art*, *17*(2), 50–63. DOI: 10.11621/pir.2024.0204

Psychology in Russia: State of the Art
Volume 17, Issue 2, 2024

Russian Psychological Society
Lomonosov Moscow State University

Classifying the Perception of Difficult Life Tasks: Machine Learning and/or Modeling of Logical Processes

Ekaterina V. Bityutskaya[a*], Elyar E. Gasanov[a], Kseniia V. Khazova[a], Nikita A. Patrashkin[a]

[a] *Lomonosov Moscow State University, Russia*

*Corresponding author: *bityutskaya_ew@mail.ru*

Background. Although quite a few classifications of coping strategies have been proposed, with different premises, much less is known about the methods of interpretation and how people using different types of coping perceive their life difficulties.

Objective. To develop a verifiable algorithm for classifying perceived difficulties. The proposed classification was developed deductively, using "approach–avoidance" as the basis for cognitive activity aimed at taking on (approaching) a difficult situation or escaping from it, avoiding a solution to the problem. The classification comprises 1) driven, 2) maximal, 3) optimal, 4) ambivalent, and 5) evasive types of perception of difficult life tasks (DLTs). Types 1, 2, and 3 correspond to approaching a difficult situation, and 5 to avoiding it. Type 4 involves a combination of approach and avoidance.

Design. The type is determined by an expert psychologist in a complex way, based on a combination of 1) the respondent's profile according to the "Types of Orientations in Difficult Situations" questionnaire (TODS) and 2) features that are significant for the type as shown in qualitative data — descriptions of DLTs (answers to open questions). Machine learning methods and A.S. Podkolzin's computer modeling of logical processes are used to develop the algorithm. The sample comprised 611 adult participants (M_{age} = 25; SD = 5.8; 427 women).

Results. Using machine-learning algorithms, various options were tested for separation into classes; the best results were obtained with a combination of markup and questionnaire features and sequential separation of classes. Using computer modeling of logical processes, classification rules were tested, based on the psychologist's description of the features of the type of perception. The classification accuracy using these rules of the final algorithm is 77.17% of cases.

Conclusion. An algorithm was obtained that allows step-by-step tracing of the process by which a classification problem is solved by the psychologist. We propose a new model for studying situational perception using a mixed research design and computer-modeling methods.

Keywords: situation perception, difficult life task, orientation in a difficult situation, coping, machine learning, modeling of logical processes, complex diagnostics, coping classification, decision tree

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)
http://psychologyinrussia.com

Introduction

The development of typologies for the psychology of coping is a significant trend in current research. Such typologies are important because they allow us to generalize the different ways that people interact with stressful (and difficult) situations, as well as to develop evidence-based recommendations for psychological care. In this paper, we present a typology that is based on quantitative and qualitative data and allows us to describe people's conceptions of coping in the structure of a perceived situation.

Classifications in the Psychology of Coping

Considering the development of views on types of coping, we can identify various approaches to classifications and their justification. In earlier studies, the main question involved a search for the structure of coping. That is, solutions were found to the tasks of describing a) the features that make it possible to systematize lists of coping strategies, and b) levels of the coping structure (Pearlin & Schooler, 1978; Skinner et al., 2003).

Among the best-known premises used in the deductive approach to classification are *the functions of coping* in the adaptation process, which allow us to distinguish between problem-oriented and emotion-oriented variants of coping (Lazarus & Folkman, 1984); and a focus on approaching a stressful situation or avoiding it. This dimension (approach–avoidance) — "topological features" (Skinner et al., 2003, p. 225) — originates from work on exploratory behavior (Barnett, 1958). Later, those features began to be used to denote cognitive and emotional activity that is either focused on the perception of a stressor or on diverting attention from it (Roth & Cohen, 1986). By correlating approach–avoidance and coping strategies, the authors distinguish between ways of, on the one hand, facilitating contact with a stressful situation and, on the other, avoiding the problem. These types of behavior are not mutually exclusive, but can complement each other (Skinner et al., 2003).

The inductive way of grouping and structuring coping strategies is associated with the use of content analysis for qualitative data (for example, Daglas et al., 2024) and statistical procedures for processing quantitative data (exploratory and confirmatory factor analysis). One of the most recent trends proposes identifying types of coping by analyzing not the coping strategies themselves, but their combination or the profile which is determined from questionnaires using latent profile analysis and cluster analysis (Doron et al., 2015; Kavčič et al.; 2022; Muniandy et al., 2022; Nagy & Balázs, 2023). The basic idea is to measure and highlight typical coping patterns that appear in human behavior under stressful conditions. The profile is the combination of coping strategies revealed by the questionnaire. Such studies are most often performed in the context of a person-centered approach to coping, which means identifying *groups of people* with similar profiles, as opposed to the grouping of variables. This approach is also often based on the study of stable personality traits (Muniandy et al., 2022; Nagy & Balázs, 2023).

Thus, in the field of coping, quite a few options have been accumulated for solving the problem of classifying coping strategies. In some cases, classifications incor-

porate perceived characteristics of a situation (for example, perceptually controlling or changing the meaning of a problem as one coping reaction, in Pearlin & Schooler, 1978) or use correlations of the level of perceived stress with latent coping profiles or coping clusters (Chen et al., 2022; Doron et al., 2015; Muniandy et al., 2022). Nevertheless, the perception and interpretation of the difficult situation that the subject is coping with remain little-studied phenomena. Meanwhile, not only in the situational, but also in the person-oriented approach to the understanding of coping, there is a recognition of the leading role of "the interaction between an individual and the environment, involving subjective perception and assessment of stressors" (Lecic-Tosevski et al., 2011, p. 290).

Conceptualization of an Image of the Difficult Life Situation

As E.A. Skinner and colleagues note, one of the most important features of the classifications of coping allows us to distinguish between different types of activity. Activity, which in this case is considered in the context of the German tradition as an "action schema," is not identical to "behavior," but also includes individuals' emotions, attention, and goals. It is the goal and motivation that establish the directionality of behavior. The same coping behavior can reflect different types of activity if it is performed in the service of different goals (Brandstädter, 1998; Skinner et al., 2003). This approach is expressed in the following statement: "The structuring of coping modes as active behaviour patterns resulting from perception and cognitive processing is another arbitrary definition. Coping modes are in fact part of the overall coping process, but they constitute the behaviour patterns which can be actually observed, that is, which manifest themselves as the consequences of the entire process" (Heim, 1995, p. 147). Leontiev's general psychological activity theory, which is close to this tradition, also postulates that activity is mediated by one's image of the world (Leontiev, 1979).

In general, this approach makes it possible to consider coping as part of a more complex system — a perceived situation (or image of the situation), including sensory images, meanings, and personalized meanings regarding the event. Coping with a difficult life situation itself turns out to be a consequence of how this image functions (Asmolov et al., 2023). Using this approach in the present study allows us to study *the types* as *patterns of perception of difficult situations*. According to J. Rauthmann and R. Sherman, to the extent that there are individual differences in the perception of situations, people with similar levels or patterns of situation perception may be grouped together (Rauthmann & Sherman, 2019).

Computer Modeling in Studies of the Psychology of Coping

Machine learning is used for various tasks in current studies on the psychology of coping: identifying predictors of stress (Tigga & Garg, 2022), studying behavioral patterns in response to stressors (Zhao et al., 2022), developing chatbots that teach coping skills (Fardouly, Crosby, & Sukunesan, 2022). At the time of writing, we were unable to find classifications of the perception of difficult or stressful situations, cre-

ated using machine learning. [1] However, the topic is being actively developed in basic medicine. Models are being proposed that are designed to facilitate medical diagnostics and provide support for clinical decisions. Despite the recognition of the capabilities of data analysis using machine learning, it is noted that models are often based on a "black box" of decision making. Therefore, the need for interpretable models has been posed (Chen et al., 2021).

One of the approaches that makes it possible to achieve greater understanding of a model and to explain the path to a specific solution is Explainable AI (artificial intelligence). That is a general term for a wide range of computational instruments designed to improve understanding of the underlying mechanisms that drive predictions based on machine learning (C Manikis et al., 2023). Algorithms are used that create an interpretable model, for example, decision tree or logistic regression.

Another approach — the modeling of logical processes — is being developed by Russian mathematician A.S. Podkolzin. The author asserts that the central problem of artificial intelligence is the algorithmization of knowledge, and the main opportunity to create effective problem solvers is computer modeling of the logic of human reasoning (Podkolzin, 2008, p. 13). Let us note the fundamental difference between 1) Explainable AI and 2) the modeling of logical processes. The application of the first is associated with explanation of the proposed AI solution, as well as its comparison with expert opinion and common sense. The second approach is an explication of the human decision-making algorithm and modeling of this decision. We used modeling of logical processes to explicate the psychologist's algorithm.

The Present Study

The classification of perceived difficulties that is presented in this work was developed based on information about difficult life tasks (DLTs). This is a type of difficult life situation involving an elevated and significant goal and the possibility of subjective control by the subject. The classification is based on the following theoretical premises: a conceptual model of types of orientation to a difficult situation (Bityutskaya, 2018), as well as the "approach–avoidance" dimension. While conducting the research and analyzing the empirical data, it turned out that the majority of respondents report simultaneously approaching and avoiding a difficult situation. Therefore, an ambivalent type was also identified, which involves a combination of features of both approach and avoidance. Thus, our classification includes three major types of perception: approach, avoidance, and ambivalent perception. "Approach" is further divided into three subtypes: driven, maximal, and optimal (*Figure 1*).

The purpose of the study is to develop a verifiable, reproducible algorithm for identifying types of perceptions of DLTs.

For our study, it is the situational context that is important, not stable personality traits. We proceed from the assumption that a number of common characteristics

[1] Search in databases: https://pubmed.ncbi.nlm.nih.gov/; https://psycnet.apa.org/; https://elibrary.ru/. Search queries on the topics "psychology": perceived stress, coping classification, machine learning, decision tree, logistic regression). Accessed: 2023.

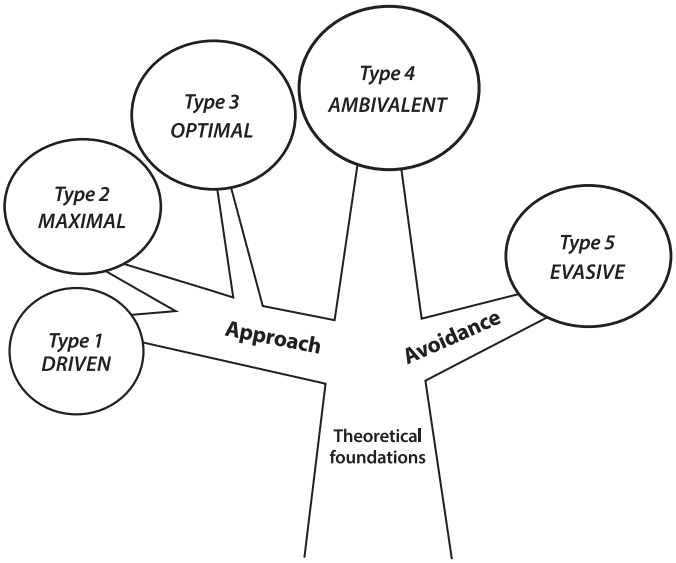


Figure 1. Types of perception of difficult life tasks

that we have identified for groups of people allow us to describe similar patterns of perception of DLTs. We are studying coping in the structure of the subject's image of the situation. This differs from studying coping strategies alone, and allows us to consider perception of and coping with a difficult life situation holistically. We consider the following components in the structure of the image of a subjective situation.

Situational context (time, place, life situation — for example, occupational difficulties, illness, etc.).

Perception per se — cognitive and emotional activity aimed at either perceiving/approaching a difficult task or avoiding a solution to it (orientations), emotions, appraisal of its difficulty (including criteria and degree of difficulty, valence of appraisal).

Objective — what results need to be achieved in this situation.

Coping — how the objective is to be achieved.

Conditions of the task — help from the social environment, opportunities and limitations.

Probable outcomes — the best-case and worst-case scenarios for the situation.

Methods

Design

Study of the perception of a situation involves, on the one hand, consideration of a combination of different components, and on the other, analysis of individual parameters. The best solution seems to be a combination of quantitative and qualitative methods. Our study therefore adopted a mixed-methods research design using computer modeling. *Figure 2* demonstrates a convergent parallel research design. We collected quantitative and qualitative data simultaneously about one current DLT

from each respondent. Initially, these data (the individual profile according to the questionnaire and the corresponding description of the DLT) were compared by a psychologist, who classified each case as one of the five types. The psychologist's decisions were largely based on implicit knowledge. Then, using machine-learning methods, we tested different classification options, including some that the psychologist did not use. Based on A.S. Podkolzin's approach, we developed a verifiable algorithm for assigning each description of DLTs to a certain type, explicating the psychologist's solution to the problem in the process of algorithm development.

The need to use expert opinion at the beginning and computer modeling in the following stages arises due to the multidimensional nature of the data, the need to compare them and consider them holistically (187 qualitative data analysis units and 8 questionnaire scales are used). Data were integrated in two ways: through assessments by an expert psychologist and based on computer modeling.

Study Participants and Material

The study involved 611 people, 184 men and 427 women (aged 19–52; M = 25; SD = 5.8), university students as well as working professionals with higher and secondary specialized education, residents of Moscow and Moscow Oblast. All respondents confirmed their voluntary participation in the study by giving informed consent. Each participant described one difficult life task that was relevant to them. The material provided for the study comprised various sorts of life difficulties: occupational, material, interpersonal, intrapersonal, and others.

Data Collection

The Structured Description of a Situation includes introductory instructions about the formulation of a difficult life task and six open-ended questions about it (see Appendix). The method operationalizes the perception of difficult life situations and allows us to obtain qualitative data in the form of a *description of the DLT*. Each participant first described a relevant situation based on these questions, and then analyzed the same situation based on the questionnaire.

The "Types of Orientations in Difficult Situation" questionnaire (TODS; Bityutskaya & Korneev, 2020) was designed to diagnose how respondents perceive the difficult situation that they describe as relevant to them. The questionnaire comprises 65 items which respondents must answer relative to the situation described and assess on a Likert scale from 0 to 3 (0 — "absolutely wrong," 1 — "somewhat wrong"; 2 — "somewhat right," and 3 — "absolutely right"). The theoretical basis of the questionnaire provides a model of types of orientation (Bityutskaya, 2018). The model describes two types of cognitive and emotional activity: 1) approaching a difficult situation (focusing on it, to direct one's efforts to change the situation), and 2) avoiding it (cognitive evasiveness, allowing one to ignore the difficulty and expend less effort). Based on the TODS, eight orientations can be identified. The first type pertains to the drive, thoroughness, and opportunity orientations; and the second type to rejection, inaction, and insouciance. Two scales — threat alert and obstacle orientation — can be combined with the orientations of both the first and the second types. When we tested the factor structure of the questionnaire, acceptable indica-

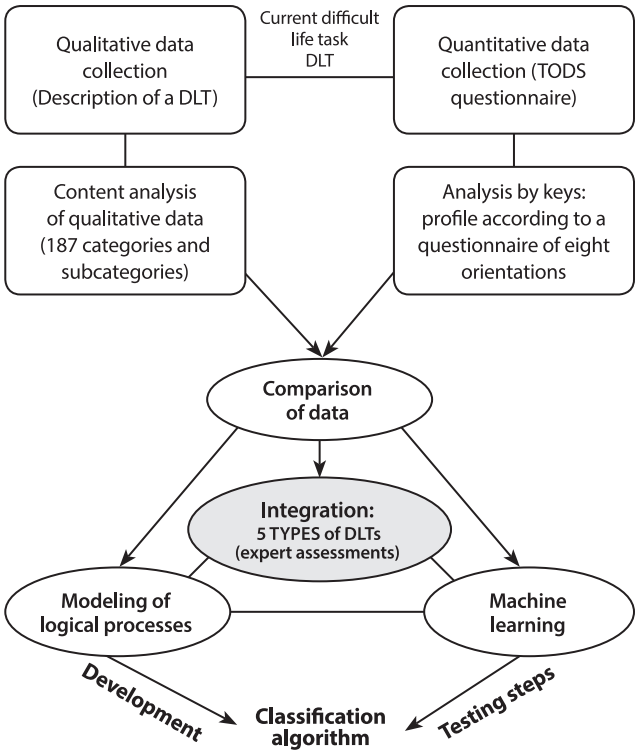


Figure 2. Mixed-methods research design

tors of fit of the confirmatory model to empirical data were obtained: RMSEA = .049, CFI = .900, χ^2 (1171) = 3068.835.

Data Analysis

The profile of the TODS study participants was considered comprehensively, as a *combination* of expressed orientations. Since orientations to threats and obstacles can apply to both approach and avoidance, we differentiated six scales: those related to approach (drive, thoroughness, opportunity orientation) and to avoidance (rejection, inaction, insouciance). At first, the types of perception of DLTs were identified based on the values on the scales in the individual profile, derived from the instruction scale (from 0 to 3 points), where 1.5 is the mean value. Accordingly, scores of 1.5 and higher were interpreted as expressions of an orientation.[2]

Content analysis (continuous counting) was used to process the qualitative data. The coding instructions for content analysis were developed by E.V. Bityutskaya and N.G. Malysheva using a bottom-up approach. Independent raters were used in development of the coding system, and consensus was reached on how to code unclear entries. The instructions include categories related to 1) description of the situation

[2] The choice of this limit (rather than the sample average) is justified by the fact that it is important for us to correlate the respondent's indicators with the frequency rating scale specified in the instructions, and not to compare these indicators with relative values for the sample.

as a whole, and 2) individual issues. Thus, the unit of context was descriptions of situations (for the first type of categories) and answers to each question (for the second type of categories). The categories of the first type included emotions, time, energy, degree and essence of the difficulty. The categories of the second type were the nature of the situation, coping, several categories of appraisal, goals, opportunities, limitations, and others. The coding instruction includes 187 units of analysis — categories and subcategories. All 600 cases were independently coded by two coders, and the markings were then compared. Discrepancies were resolved through consensus. Content analysis was used for *the markup* from which the computer modeling was performed.

Methods for Computer Classification of Difficult Life Tasks

We used two approaches to classify difficult life tasks:

1) Machine-learning algorithms (decision tree, logistic regression) for the purpose of modeling different classification variants;
2) A.S. Podkolzin's modeling of logical processes in order to simulate the decision-making of a psychologist performing a classification task, and to optimize the procedure.

Machine learning was implemented in Python (Python Software Foundation) (Pedregosa, 2011). First, we applied the basic configurations of machine-learning algorithms — a set of default parameters in the scikit-learn library of the Python programming language. Then, each algorithm was tuned to improve classification accuracy.

A decision tree is a binary tree, each internal node of which is assigned a certain rule, which, according to the object to be classified, determines which of the branches to move on to. The decision tree is built from the training sample so as to classify the objects of the training sample as well as possible. If you choose a tree depth large enough, then, as a rule, it is possible to achieve 100% classification of the training sample; but this can lead to overfitting. Therefore, before constructing a decision tree, it is usually decided that its depth should not exceed a certain constant; in our work the depth should not exceed the number 4.

Logistic regression is a linear classifier for two classes — i.e., a classifier in which the surface separating two classes is a hyperplane in the feature space. The decisive rule for logistic regression is the following: all objects lying above the dividing hyperplane belong to the first class, and everything below belongs to the second. If the space of the features has a small dimension, then the coefficients describing the separating hyperplane can be interpreted and explained. Therefore, logistic regression can be considered to be Explainable AI.

We solved the problem of overfitting (the ability of machine-learning algorithms to adjust to the training sample so as to almost always give the correct answer for it) by using the cross-validation method. Our solution involves dividing the entire sample into training and testing parts in a ratio of 4:1, while accuracy is measured only on the testing part. This division was randomly performed 500 times, and the results were averaged.

A.S. Podkolzin's approach involves the formulation and mathematical verification of simple, clear "decision rules" for the division into types. To establish classification accuracy, we measured the number of matches between *the expert's assessments* of the case attribution and *the results of the decisive rule*. For example, an accuracy of 0.88 means that the rule can classify 88% of cases in a way that matches the expert's opinion.

Determining the Types of Perception of Difficult Life Tasks

The types were determined based on analysis of the indicators by an expert psychologist: 1) the respondent's profile according to the TODS questionnaire, and 2) indicators significant for the type in the descriptions of the DLT.[3] The latter are highlighted on the basis of a conceptual model of types of orientation in difficult situations (Bityutskaya, 2018); the following features were used:

1 driven (n = 67) — striving for difficulty associated with a feeling of drive. In the TODS respondent's profile, the *drive* scale has the highest (or high) scores in combination with the expression of other orientations of approach to difficulties and a lack of expression of avoidance orientations. Qualitative data present indicators of positive assessments and emotions, self-development, increased energy, and high results.

2 maximal (n = 89) — multitasking and achieving a perfectionist goal with the greatest expenditure of effort. In the TODS profile, the *thoroughness* orientation is strongly expressed in combination with other orientations of approach to difficult situations and no expression of an avoidance orientation. The most significant features in the qualitative data are high achievement, a need to do everything, and multitasking.

3 optimal (n = 139) — focus on achieving a difficult goal with optimal efforts (no more, no less than required by the task conditions). In the TODS profile, orientations of approach to difficulties are expressed (with the highest indicator for *orientation towards opportunities*) and orientations of avoidance are not expressed. Frequent mention of planful problem solving and positive reappraisal of the situation, and goals expressing an approach orientation, are characteristic in the descriptions of DLTs.

4 ambivalent (n = 245) — fluctuation between approaching a difficulty and avoiding it (expressed by one, two or three orientations of approach in combination with one, two or three orientations of avoidance). The qualitative data show frequent mention of negative emotional states, which require time and effort to overcome; both the goals of approaching something pleasant and avoiding something unpleasant are described. Fluctuations in activity and passivity are possible when achieving a difficult goal.

5 evasive (n = 60) — avoidance of difficult emotional experiences that consume the consciousness, avoidance of a difficult situation (one, two or three scales of avoidance of difficulties are expressed, and scales of approach are not expressed). Intense negative emotions, coping, and avoidance goals are particularly common in the qualitative data.

[3] In this case, knowledge about the type as a whole was used, in accordance with the conceptual model, regardless of the markup.

A few descriptions of DLTs (n = 11) were not analyzed because they were not assigned to any of the types listed. The study was performed on a sample of 600 cases.

When the questionnaire profile and the indicators pointed to different types, a decision was made based on the questionnaire alone if the description was too brief (such cases accounted for no more than 1.5% of all descriptions). The remaining cases containing such a discrepancy were classified based on the DLT descriptions. There were also combinations in which both the questionnaire profile and the indicators equally pointed to two types — that is, the case turned out to be mixed. It was assigned to one of the two classes.

Results

As a preliminary step, descriptive statistics were analyzed for a subsample of each type and for the entire sample (*Appendix*, *Table A1*). The expected results were obtained, according to which the most clear-cut scores are for those orientations that act as indicators of types. Orientations to threat signals and to obstacles have the smallest range of mean values (from 1.83 to 2.21 and from 1.53 to 1.89, respectively).

Classification of Difficult Life Tasks Based on Machine-Learning Algorithms

Results of the Basic Configuration of the Algorithms

Table 1 presents the results of the first stage — applying the basic configurations of the algorithms separately to two training samples: by markup (187 features; 1m) and by the questionnaire (8 features; 1q). In this way, one can see insufficiently high classification accuracy rates.

Table 1

Results of classification of DLTs based on machine-learning algorithms

Algorithm	Classification Accuracy		
	1m	1q	2k
Logistic regression	.445	.675	.712
Decision tree	.420	.658	.608

Notes: 1m, 1q — the first stage, the results of applying the algorithms to the training set with a full set of features: 1m — according to markup, 1q — according to the questionnaire; 2k — the second stage, the results of applying the algorithms to a training set with 11 features: a combination of markup and questionnaire features.

Combination of Questionnaire Features and Markup

At the second stage, all the attributes we had were combined and an attempt was made to select the best ones for classification using the "sequential feature selection"

method. This identified 11 features that provide the best accuracy: 6 TODS approach and avoidance scales and 5 markup features.

The results of applying the algorithms to the training set with 11 features are presented in *Table 1* (2k). Feature reduction and combination actions improved the classification accuracy score to **.712** (logistic regression).

Sequential Separation of Classes

At the third stage, we tested an alternative variant, involving sequential (rather than simultaneous) separation of classes. To identify patterns in data distribution, we visualized the training sample of the questionnaire. *Figures 3a* and *3b* show images of the types in three-dimensional space, created on the basis of the indicators of the approach and avoidance scales of the TODS.

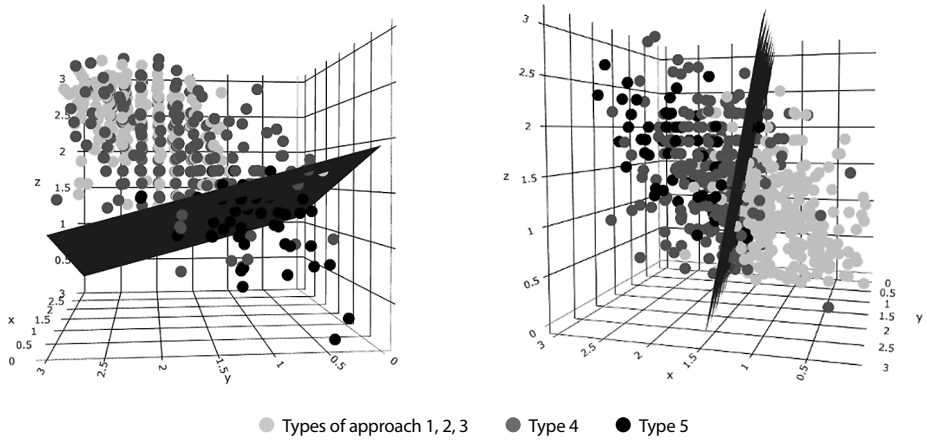


Figure 3a. Visualization of types in three-dimensional space of TODS approach scales

Figure 3b. Visualization of types in three-dimensional space of TODS avoidance scales

In the figures we see that the type *5* can be linearly separated from the other types by features of approach (*Figure 3a*), and the three types of approach (*1, 2, 3*) by features of avoidance (*Figure 3b*). Therefore, in the first step, we try to divide the sample into three parts, first by separating type *5*, and second the types of approach. The third, remaining, part contains ambivalent cases. In the next steps it is necessary to separate the three types of approaching. In this case, first we separate types *1* and *2* from *3*, and then we separate *1* and *2*. Testing this model using the decision tree algorithm on a training set using the 11 features described above showed classification accuracy of **.783**. *Table 2* presents the results of the sequential class separation.

Thus, in the machine-learning process, the best results were obtained by combining features and sequentially separating the classes. This division corresponds to the psychologist's logic when determining the types, and we used it at the stage of modeling logical processes.

Table 2

Classification algorithm using machine learning (decision tree)

Step	Action	Classification accuracy at each step
1	We combine cases from the first three classes into one class (approaching) and divide the sample into 3 classes: 1,2,3 — 4 — 5	.895
2	We separate the 1st and 2nd classes from the 3rd: 1,2 — 3	.827
3	We separate classes 1 and 2: 1 — 2	.791
	Cumulative indicator	.783

Classification of Difficult Life Tasks Based on Computer Modeling of Logical Processes

At this stage, we test the accuracy of the classification using decision rules created based on the features of case categorization provided by the psychologist (see section "Determining the Types of Perception").

Development of a Classification Algorithm

In *the first step* of classification, based on the concepts of approach, avoidance, and ambivalent perception, the psychologist suggests using the following first rule:

- if in the TODS profile at least one of the approach orientations is expressed, and none of the avoidance orientations, then the case belongs to the types of approach (*1, 2, 3*);
- if at least one of the orientations of avoidance is expressed, and none of the orientations of approach, then the case belongs to type *5*;
- if at least one of the orientations of avoidance is expressed, and at least one of the orientations of approach, then the case belongs to type *4*;
- cases containing a profile in which no orientation is expressed are considered unclassifiable in this work.

Analysis of the training sample shows that this rule performs the classification correctly in **84.83%** of cases.

Next, to refine the orientation expression thresholds on the TODS, we perform a search of all possible sets of threshold boundaries of scales ranging from 1.0 to 2.1 in increments of 0.05. This analysis shows that if we consider *thoroughness* to be expressed when its corresponding number is greater than 1.65, and *insouciance* to be expressed when its corresponding number is greater than 1.85, while keeping the remaining thresholds equal to 1.5, then the rule described above in our sample produces correct classification in **88.5%** of cases. Therefore, in the first step we use the rule described above with refined expression thresholds.

In *the second step*, we separate the first two types related to approaching, from the third. In so doing, we proceed from the following features of the types. Types *1* and *2*

are distinguished by the fact that the subject sets a high goal in a difficult situation; it involves expenditure of effort to a greater extent than the situation demands. Type *3* assumes that when achieving a difficult goal, as much effort is expended as required by the conditions of the task. Types *1* and *2* are identified by maximum expression in the TODS profile of the *drive* and *thoroughness* scales. In addition, analysis of the empirical data showed that the nature of situations corresponding to *1* and *2* is not characterized by a description of extreme situations: threats to life and health, illnesses, loss of loved ones (category F6 markup).

Based on what has been discussed above, we formulate the second rule, which is based on the TODS respondent's profile vector, and also takes into account the mention of category F6:

- if in the description of the DLT there is no category F6 ($F6 = 0$) and in the profile the maximum value among the approach scales is obtained on the "drive" and/or "thoroughness" scales, then we classify the case as belonging to the first two classes (driven and maximal types *1, 2*);
- otherwise we classify the case as type *3*.

The accuracy of separating approach types based on this rule is **76.92%** of cases.

It remained for us to separate the first two types (driven and maximal). In *the third step*, we use only the markup vector to solve this problem. The psychologist described 16 subcategories which characterize types *1* and *2* (we denote them "Dictionary 1" and "Dictionary 2," respectively), and assigned a weight to each subcategory from 1 (least significant) to 3 (most significant). Lists of subcategories (Dictionaries 1 and 2) are given in the Appendix (*Table A2*). The *third rule* is formulated as follows:

- using the respondent's markup vector, we calculate the weighted sums of the subcategories for each type;
- if the weighted sum of the subcategories of Dictionary 1 turns out to be greater than the weighted sum of the subcategories of Dictionary 2, then we classify the case as *1*;
- otherwise we classify it as type *2*.

Table 3

Classification confusion matrix using the resulting algorithm

Classes	1st* class	2nd* class	3rd* class	4th* class	5th* class	Total	Correctly defined
1	38	10	10	9	0	67	56.7%
2	1	43	22	23	0	89	48.3%
3	7	18	98	16	0	139	70.5%
4	0	1	4	233	7	245	95.1%
5	0	0	0	9	51	60	85.0%

*Note. * — the class to which the final algorithm assigned the cases; the number of matches to the expert's assessment is highlighted by shading.*

The accuracy of separation of the first and second types, obtained at this stage by applying the third rule, is **88.04%** of cases.

Overall, on the available training set, this procedure correctly classifies **77.17%** of cases (cumulative indicator). The decision tree of the final algorithm is presented in *Figure 4. Table 3* shows the classification confusion matrix.

Analysis of the confusion matrix allows us to present two reasons for the inconsistency of cases with the rules of the final algorithm: 1) insignificant (.01–.03) excesses of the value of one scale relative to the threshold of expression; 2) the description of the DLT and the profile according to the questionnaire indicated different types, while the psychologist, when deciding on assignment to a type, relied on the description; 3) a mixed type, which could have been attributed, among other things, to the type to which the algorithm assigned it. We see from the table that the largest number of "errors," or cases that do not correspond to the final algorithm, belong to types of approach that are difficult to separate. The highest rate of agreement between expert and algorithm assessments was obtained for the ambivalent type.

Discussion

In this study, we solved the task of developing a reproducible, verifiable algorithm for determining the types of perception of DLTs. Two computer modeling approaches were used: 1) machine learning and 2) logical process analysis.

The use of machine-learning algorithms made it possible to consider and evaluate the accuracy of different options for separating the data array into classes, and also to determine the optimal three-step path (*Table 2*).

In the context of Explainable AI, it is interesting to analyze the 11 features that were identified during the machine-learning process. Six of them are correctly defined by the TODS scales, which matched the opinion of the psychologist. Of particular interest are 5 features isolated from a set of 187 markup features. Analysis shows that this set includes the following features:

- 1D4 — subcategory "planful coping," whose frequency of mention in the qualitative data allows us to distinguish types *1, 2, 3* from *4, 5*;
- Two features separating *1, 2* from *3* are C6 — a subcategory that describes the need to achieve maximum results, and F6 — the category "threat to life and health," which is not found in descriptions corresponding to types 1, 2;
- Two features that uniquely characterize type *1* (A1 — subcategory "positive intense emotions") and type *2* (1B9 — subcategory of "necessity"), which the psychologist also identified on the basis of content analysis and rated as highly significant for these types.

Overall, this decision seems logical and comprehensible. Note the absence of markup signs distinguishing type *5*. This is justified, because among all types it is distinguished with the greatest accuracy from the rest of the array, according to the TODS data.[4]

[4] Additionally, we separated each class from all others using the logistic regression algorithm (the training sample of the questionnaire, 6 features). The best result was demonstrated by class 5 — accuracy 0.92.

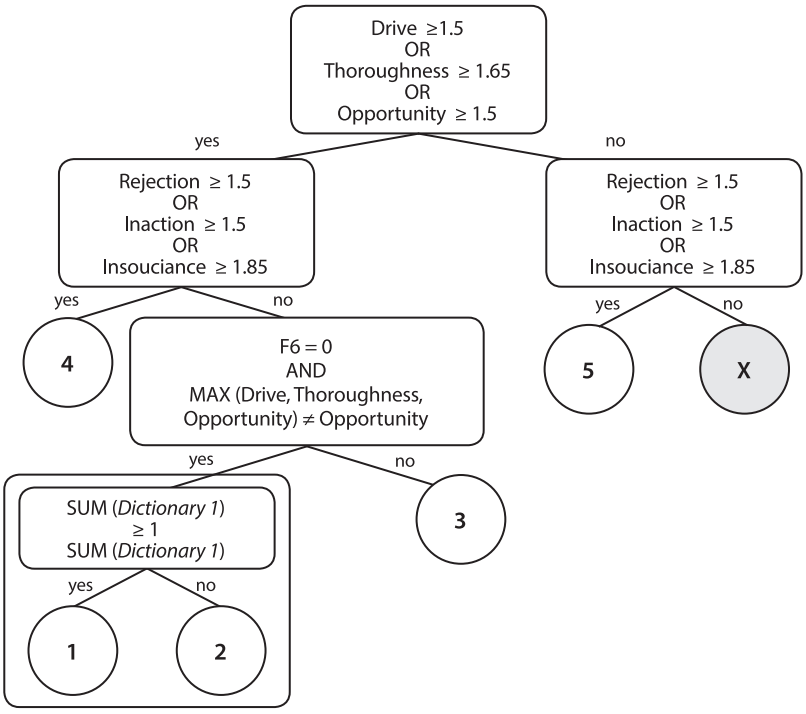


Figure 4. Decision tree of the final classification algorithm (modeling of logical processes)

A.S. Podkolzin's approach allowed us to test variants of rules based on the description of features by a psychologist and to work out a final decision-making algorithm. It turned out that at the first step of separation into three large types, the classification accuracy was quite high. However, the accuracy decreased in the second step, when dividing types *1, 2 – 3*. There are two reasons for this: 1) similar semantic characteristics for the types of approach (manifested both in the similarity of profiles and semantic themes in the descriptions of DLTs); 2) mixed types (there are features of two types in one description).

Let us first analyze the semantic reasons. The first and second types, striving to achieve a goal that exceeds the requirements of the situation, tend to overestimate the efforts required, which is probably based on an overestimation of their own strengths and capabilities. In this case, it seems that we are dealing with positive illusions, which are associated with beliefs about the world and about oneself that are poorly supported by the facts, and form a more positive view on the part of the subject than is justified (Jefferson, Bortolotti, & Kuzmanovic, 2017). That is, one of the semantic reasons why it is difficult to separate the three types of approaching, relying only on a questionnaire, is if there are some illusory assessments of the situation and one's capabilities in this situation, characteristic of people who perceive DLTs according to the driven and maximal types. The person *would thus like* to optimize their efforts, but *in reality* uses more effort than the situation requires. As a result, statements that relate to opportunity orientation can be rated as highly as items from the *drive* and

thoroughness scales, as confirmed by analysis of the descriptive statistics (*Table A1*). At the same time, in accordance with our final algorithm, even with a slight advantage (by 0.01) of the score on the opportunity scale (compared to drive and thoroughness), the case should be classified as an optimal type.

The issue of *mixed types* requires separate analysis. Regarding psychological classifications, the idea of the rarity of "pure" types, sometimes the impossibility of identifying them in life (but only with a theoretical description), has become a truism. In our data, some cases were identified as a classification error by the final algorithm, precisely due to the *mixed type*. For such cases, as a rule, one can detect not only a discrepancy between the case and the rule, but also significant features of two types in the descriptions of DLTs. For example, quite often drive or maximum cases containing a description of emotional burnout and physical exhaustion (which characterizes ambivalent perception) were classified as ambivalent based on the first rule. Analysis of the data, including a detailed confusion matrix (with case numbers), showed that in our sample, at least 25% of the total number of respondents could be classified as mixed cases.

This analysis allows us to propose a graph metaphor for visual representation of the typology (*Figure 5*). Considering the significant number of cases of mixed types, this metaphor reflects more fully than a tree the idea of classification that we arrived at as a result of the study. However, this classification option requires further analysis and description. In particular, it remains to be determined whether specific traits can be described for mixed subtypes or whether they rather involve a combination of the two types of traits.

Conclusions

This study uses a method for studying situational perception that involves a combination of 1) qualitative and 2) quantitative data. The first corresponds to the need to embrace the diversity of people's individual conceptions. The second involves studying the profile derived from a questionnaire, which allows us to take into account the complex interaction of a person with a difficulty.

A final algorithm was developed that opens up the possibility of determining the type of perception of a difficulty, and not just individual parameters of the perceived situation. The approach to developing the algorithm used in this work, A.S. Podkolzin's computer modeling of logical processes, makes it possible to optimize the classification of perceived difficult situations into certain types, and also to trace the process of a psychologist solving the classification problem step by step. This is a more meaningful classification option than using machine-learning methods. Its simplicity (including computational simplicity) and the greater ease of interpretation of the modeling of logical processes allow us to recommend this particular method for practical use. It involves taking into account scale thresholds and following the resulting algorithm.

In accordance with the results of the study, in order to divide the array of responses into three large types — 1) approach, 2) avoidance, 3) ambivalent perception of DLTs — it is possible to implement a rule that uses the results of the questionnaire, that is, the part of the data that is the least labor-intensive to process. Approach

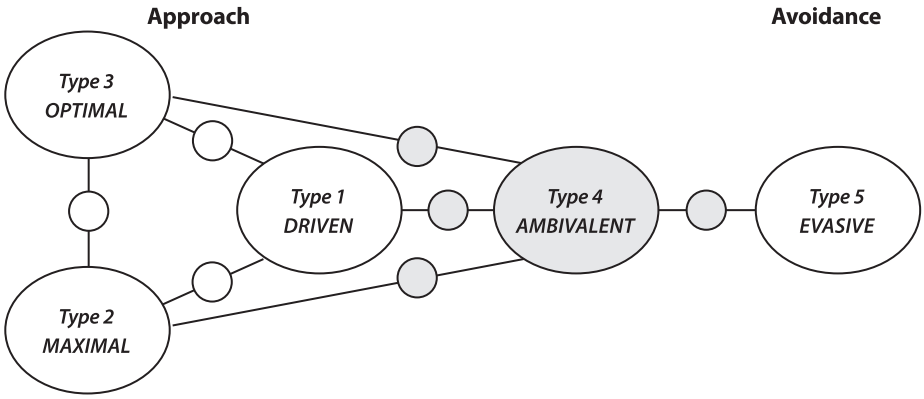


Figure 5. Visualization of the five main and mixed types in the form of a graph
Note. The small circles indicate mixed subtypes, with the shading indicating the ambivalence of the subtype when mixed.

includes three more subtypes; two of them are separated from the third also on the basis of the questionnaire, with the addition of one markup feature. Conducting a structured description of a situation involving the collection of qualitative data is necessary more to separate the first two types of approach (the driven and maximal types, to which 24% of the total sample in this study belonged).

Limitations

The proposed classification is based on an analysis of the life difficulties of mostly young people living in a Russian metropolis who have or receive higher education. It is possible that analysis of other life contexts and age categories could highlight other types of perceived difficulties. There are also limitations to the methods. The reliability of conclusions based on machine learning could be increased by increasing the sample size. There are no such restrictions for modeling logical processes, but it would be important to check the classification accuracy using the final algorithm on a new data set. This is the perspective of this study.

Ethics Statement

The authors stated that this study was conducted in accordance with current ethical standards and is based on the principles of confidentiality, awareness, and voluntary consent of the study participants. The study was approved by the Ethical Committee of the Department of General Psychology, Faculty of Psychology, Lomonosov Moscow State University (Moscow, Russia), meeting No. 1, held Oct. 10, 2018.

Author Contributions

E.B. and E.G. conceived and designed the study. E.B. substantiated the psychological theory, developed a classification of perception of difficult life tasks, collected and processed data (including content analysis), carried out initial calculations, and

wrote the original draft. E.G., K.K., and N.P. performed computer modeling. All authors jointly developed the final algorithm, discussed the results, and approved the final manuscript.

Conflict of Interests

The authors declare no conflict of interests.

Acknowledgements

The study was funded by the Russian Science Foundation, project number 23-28-01255.

References

Asmolov, A.G., Bityutskaya, E.V., Bratus, B.S., Leontiev, D.A., Ushakov, D.V. (2023). Dialogues on/in the field of meanings: to the 120th anniversary of Alexey Nikolayevich Leontiev. Lomonosov Psychology Journal, 2(46), 5–22. https://doi.org/10.11621/LPJ-23-13

Barnett, S.A. (1958). Exploratory behavior. British Journal of Psychology, 49, 289–310. https://doi.org/10.1111/j.2044-8295.1958.tb00667.x

Bityutskaya, E.V. (2018). Tipy orientatsiy v trudnykh situatsiyakh [Types of orientation in difficult situations]. Voprosy Psikhologii, 5, 41–53.

Bityutskaya, E.V., & Korneev, A.A. (2020). Diagnostika vospriiatiia zhiznennykh trudnostei: situatsionnyi oprosnik "Tipy orientatsii v trudnoi situatsii" [Diagnostics of perception of life events: the situational version of the questionnaire "types of orientations in difficult situation"]. Vestnik Moskovskogo gosudarstvennogo oblastnogo universiteta (elektronnyi zhurnal) [Bulletin of Moscow Region State University (e-journal)], 4, 141–163. https://doi.org/10.18384/2224-0209-2020-4-1047

Brandtstädter, J. (1998). Action perspectives on human development. In W. Damon & R. M. Lerner (Ed.), Handbook of child psychology: Vol. 1. Theoretical models of human development (pp. 807–863). New York: Wiley

Chen, B.W., Gong, W.J., Lai, A.Y., Sit, S.M., Ho, S.Y., Wang, M.P., &, Lam, T.H. (2022). Patterns of Perceived Harms and Benefits of the COVID-19 Outbreak in Hong Kong Adults: A Latent Profile Analysis. International Journal of Environmental Research and Public Health, 19(7):4352. https://doi.org/10.3390/ijerph19074352

Chen, T., Shang, C., Su, P., Keravnou-Papailiou, E., Zhao, Y., Antoniou, G., …, & Shen, Q. A. (2021). Decision Tree-Initialised Neuro-fuzzy Approach for Clinical Decision Support. Artificial Intelligence in Medicine, 111, 101986. https://doi.org/10.1016/j.artmed.2020.101986

C Manikis, G.C., Simos, N.J., Kourou, K., Kondylakis, H., Poikonen-Saksela, P., Mazzocco K., …, & Fotiadis D. (2023). Personalized Risk Analysis to Improve the Psychological Resilience of Women Undergoing Treatment for Breast Cancer: Development of a Machine Learning–Driven Clinical Decision Support Tool. Journal of Medical Internet Research, 25, 43838. https://doi.org/10.2196/43838

Daglas, Z., Lu, S., Gresham, D., Tatnell, R., Stanley, B.H., & Melvin, G.A. (2024). Classifying coping strategies from suicide prevention safety plans. Suicide and Life- Threatening Behavior. https://doi.org/10.1111/sltb.13039

Doron, J., Trouillet, R., Maneveau, A., Ninot, G., & Neveu, D. (2015). Coping profiles, perceived stress and health-related behaviors: a cluster analysis approach. Health Promot International, 30(1), 88–100. https://doi.org/10.1093/heapro/dau090

Fardouly, J., Crosby, R. D, & Sukunesan, S. (2022). Potential benefits and limitations of machine learning in the field of eating disorders: current research and future directions. Journal of Eating Disorders, 10(1), 66. https://doi.org/10.1186/s40337-022-00581-2

Heim, E. (1995). Coping-based intervention strategies. Patient Education and Counseling, 26(1–3), 145–151. https://doi.org/10.1016/0738-3991(95)00733-g

Jefferson, A., Bortolotti, L., & Kuzmanovic, B. (2017). What is unrealistic optimism? Consciousness and Cognition, 50, 3–11. https://doi.org/10.1016/j.concog.2016.10.005

Kavčič, T., Avsec, A., & Zager, K.G. (2022). Coping profiles and their association with psychological functioning: A latent profile analysis of coping strategies during the COVID-19 pandemic. Personality and Individual Differences, 185, 111287. https://doi.org/10.1016/j.paid.2021.111287

Lecic-Tosevski, D., Vukovic, O., & Stepanovic, J. (2011). Stress and personality. Psychiatriki, 22(4), 290–297.

Leontiev, A.N. (1979). Psikhologiia obraza [Psychology of the image]. Vestnik Moskovskogo gosudarstvennogo universiteta. Seriia 14. Psikhologiia [Bulletin of Moscow State University. Psychology], 2, 3–13.

Muniandy, M., Richdale, A.L., & Lawson, L.P. (2022). Coping-resilience profiles and experiences of stress in autistic adults. Autism Research, 15(11), 2149–2166. https://doi.org/10.1002/aur.2817

Nagy, L., & Balázs, K. (2023). Typical coping patterns: A person-centered approach to coping. New Ideas in Psychology, 70, 101023. https://doi.org/10.1016/j.newideapsych.2023.101023

Pedregosa, F., Varoquaux, G., Gramfort, A., Michel, V., Thirion, B., Grisel, O., …, & Duchesnay, É. (2011). Scikit-learn: machine learning in Python. Journal of Machine Learning Research, 12(85), 2825–2830. https://doi.org/10.3389/fninf.2014.00014

Pearlin, L.I., & Schooler, C. (1978). The structure of coping. Journal of Health and Social Behavior, 19, 2–21.

Podkolzin, A.S. (2008). Komp'iuternoe modelirovanie logicheskikh protsessov. Arkhitektura i iazyki reshatelia zadach [Computer simulation of logical processes. Architecture and languages of the problem solver]. M.: Fizmatlit.

Rauthmann, J., & Sherman, R. (2019). Toward a research agenda for the study of situation perceptions: A variance componential framework. Personality and Social Psychology Review, 23(3), 238–266. https://doi.org/10.1177/1088868318765600

Roth, S., & Cohen L. (1986). Approach, avoidance, and coping with stress. American Psychologist, 41(7), 813–819. https://doi.org/10.1037//0003-066x.41.7.813

Skinner, E.A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. Psychological Bulletin, 129(2), 216–269. https://doi.org/10.1037/0033-2909.129.2.216

Tigga, N.P., & Garg, S. (2022). Prediction of Global Psychological Stress and Coping Induced by the COVID-19 Outbreak: A Machine Learning Study. Alpha Psychiatry, 23(4), 193–202. https://doi.org/10.5152/alphapsychiatry.2022.21797

Zhao, Y., Ding, Y., Shen, Y., Failing, S., & Hwang, J. (2022). Different coping patterns among us graduate and undergraduate students during COVID-19 pandemic: A machine learning approach. International Journal of Environmental Research and Public Health, 19(4), 2430. https://doi.org/10.3390/ijerph19042430

Original manuscript received May 22, 2023
Revised manuscript accepted June 12, 2024
First published online June 15, 2024

To cite this article: Bityutskaya, E.V., Gasanov, E.E., Khazova, K.V., Patrashkin, N.A. (2024). Classifying the Perception of Difficult Life Tasks: Machine Learning and/or Modeling of Logical Processes, *Psychology in Russia: State of the Art*, *17*(2), 64–84. DOI: 10.11621/pir.2024.0205

Appendix A

Structured Description of a Situation

Think of a situation in your life that involves a difficult task, requiring a solution in a given period of time:

1. How do you perceive it, evaluate it, experience it emotionally, and overcome it (what actions help you overcome the situation or your condition)?
2. What are your goals in this situation?
3. What opportunities and limitations do you have in achieving your goal?
4. Do you need help (support) from people around you in this situation?
5. If everything goes wrong, what will it be like? (Maximum failure).
6. Describe what would achieve the maximum success and would resolve the situation for you.

Table A1

Descriptive statistics of the TODS scales for types and the entire sample

Scales	Types					All
	1	*2*	*3*	*4*	*5*	
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Drive	2.46* (.32)	2.00 (.52)	1.86 (.53)	1.49 (.53)	.89 (.39)	1.70 (.64)
Thoroughness	2.15 (.46)	2.46* (.39)	2.07 (.48)	1.83 (.57)	1.11 (.40)	1.94 (.61)
Opportunity orientation	2.24 (.43)	2.32 (.41)	2.35* (.38)	2.00 (.47)	1.21 (.33)	2.07 (.54)
Obstacle orientation	1.53 (.47)	1.77 (.49)	1.70 (.54)	1.89 (.57)	1.68 (.52)	1.77 (.55)
Threat alert	2.04 (.51)	2.21 (.52)	2.14 (.43)	2.05 (.54)	1.83 (.55)	2.07 (.52)
Rejection	.98 (.44)	1.22 (.41)	1.14 (.35)	1.90 (.42)	2.24* (.42)	1.55 (.59)
Inaction	.65 (.46)	.74 (.43)	.83 (.37)	1.15 (.53)	1.43 (.54)	.99 (.53)
Insouciance	1.02 (.55)	.93 (.57)	.86 (.47)	1.39 (.62)	1.71 (.51)	1.19 (.63)

*Note. * — the most significant scale for determining this type, in accordance with the conceptual model; for type 4 there is no such scale, because in an individual profile classified as type 4, different scales of approach and avoidance can be expressed.*

Table A2

Subcategories characterizing types 1 and 2

Dictionary 1			Dictionary 2		
Category	**Subcategory**	**Weight**	**Category**	**Subcategory**	**Weight**
Energy	1. High energy level	3	Energy	1. Low energy level	1
	2. Energy is rising	3		2. Need for energy expenditure	1
Emotions	3. Positive intense	3	Time	3. Mentioned	2
	4. Positive non-intense	3		4. Temporary, transient situation	1
Valence of appraisal	5. Positive appraisal of the situation	3	Nature of the situation	5. Time allocation	3
	6. Ambivalent appraisal	1	Essence of the difficulty	6. To be able to do everything	3
Criteria of appraisal	7. Control of the situation	2		7. Need to succeed	3
Basis of appraisal	8. Dimensions	3		8. Need to achieve the maximum result	1
	9. Challenge	3	Basis of appraisal	9. Necessity	3
Coping	10. Positive reappraisal	2	Coping	10. “Struggle”	1
Goal	11. Development, expansion	3		11. To encourage oneself	1
Opportunities	12. It is noted that there are many opportunities	2	Goal	12. Preservation of what one has	1
	13. Self-development as an opportunity	3	Limitations	13. Work/study schedule limitations	1
Limitations	14. No limitations	2		14. A great deal to do and the inability to refuse multiple tasks	2
Prediction of failure	15. Impossibility of failure	2	Nature of failure	15. Postponement of the result to a later date	1
Nature of success	16. Fanciful success	1	Nature of success	16. To finish	1

Psychology in Russia: State of the Art
Volume 17, Issue 2, 2024

Russian Psychological Society
Lomonosov Moscow State University

The Emotional Intelligence of the GPT-4 Large Language Model

Gleb D. Vzorin[a,b*], Alexey M. Bukinich[a,c], Anna V. Sedykh[a], Irina I. Vetrova[b], Elena A. Sergienko[b]

[a]*Lomonosov Moscow State University, Russia*
[b]*Institute of Psychology of Russian Academy of Sciences, Moscow, Russia*
[c]*Federal Scientific Center of Psychological and Interdisciplinary Research, Moscow, Russia*

*Corresponding author. E-mail: vzorin.g@gmail.com

Background. Advanced AI models such as the large language model GPT-4 demonstrate sophisticated intellectual capabilities, sometimes exceeding human intellectual performance. However, the emotional competency of these models, along with their underlying mechanisms, has not been sufficiently evaluated.

Objective. Our research aimed to explore different emotional intelligence domains in GPT-4 according to the Mayer–Salovey–Caruso model. We also tried to find out whether GPT-4's answer accuracy is consistent with its explanation of the answer.

Design. The Russian version of the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) sections was used in this research, with questions asked as text prompts in separate, independent ChatGPT chats three times each.

Results. High scores were achieved by the GPT-4 Large Language Model on the Understanding Emotions scale (with scores of 117, 124, and 128 across the three runs) and the Strategic Emotional Intelligence scale (with scores of 118, 121, and 122). Average scores were obtained on the Managing Emotions scale (103, 108, and 110 points). However, the Using Emotions to Facilitate Thought scale yielded low and less reliable scores (85, 86, and 88 points). Four types of explanations for the answer choices were identified: Meaningless sentences; Relation declaration; Implicit logic; and Explicit logic. Correct answers were accompanied by all types of explanations, whereas incorrect answers were only followed by Meaningless sentences or Explicit logic. This distribution aligns with observed patterns in children when they explore and elucidate mental states.

Conclusion. GPT-4 is capable of emotion identification and managing emotions, but it lacks deep reflexive analysis of emotional experience and the motivational aspect of emotions.

Keywords: artificial empathy, artificial psychology, ChatGPT, emotional intelligence (EI), emotional quotient (EQ), GPT-4, machine behavior

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)
http://psychologyinrussia.com

Introduction

Artificial Intelligence (AI), a branch of computer science focused on creating systems capable of performing tasks that typically require human intelligence, has made significant strides in recent decades. Current machine learning models can successfully generate human-like text and complete human-like tasks (Bubeck et al., 2023; Dillion et al., 2023). This progress has resulted in the growing integration of AI into everyday human activities and the social fabric (Diederich, 2021; Brinkmann et al., 2023). Consequently, it is imperative for AI agents to possess not just "general intelligence," but also "emotional intelligence" (EI). They must be equipped to handle specific intellectual tasks while also displaying empathetic behaviors and accurately recognizing human emotions (Erol et al., 2019; Shank et al., 2019; Kerasidou et al., 2020).

There are two approaches to developing the emotional competency of AI and measuring it. According to the first one, a specific AI system may be trained based on the established psychological models (see Kowalczuk & Czubenko, 2016) and engineering frameworks such as affective computing (Picard, 2000) or social signal processing (Vinciarelli et al., 2009). These narrow-ability models are usually tested by their creators using specific benchmarks, which are directly related to the model's architecture and objectives. An example of such a benchmark is the accuracy rate in identifying emotions on human faces.

In compliance with the second approach, emotional competency may arise as an emergent ability in complex AI systems. It has been shown that large language models (LLMs) can be equal to or even outperform human participants in various cognitive psychology tasks (for review, see Dhingra et al., 2023; Binz & Schulz, 2023). These abilities were not explicitly programmed into the model but emerged as a property of the vast amounts of text data the model was trained on. Similarly, the capacity to perceive and process human emotions might develop not through deliberate engineering efforts, but as a byproduct of the learning process.

This phenomenon points to the "black box" nature of AI, comparable to the unpredictability of living creatures, where traditional engineering benchmarks are not appropriate. Instead, we should apply methodologies akin to those used in the natural sciences: experiments, tests, population-based statistics, sampling paradigms, and observational causal inference. This approach has been named "machine behavior" (Rahwan et al., 2019) and is further explored in psychological contexts as "artificial psychology" (Crowder, Carbone & Friess, 2020) or "machine psychology" (Hagendorff, 2023).

When considering an AI model as a "living" entity with an enigmatic cognitive architecture, the initial step is to assess its capabilities using tests designed for humans, such as EI tests. In psychological literature, it is common to distinguish three types of EI models (Kanesan & Fauzan, 2019): the ability model, the trait model, and the mixed model. Across these models, evaluation techniques vary. The trait model emphasizes self-perceived abilities and is usually measured through self-report questionnaires. The ability model conceptualizes EI as a cognitive ability that can be measured by the performance tests. Thus, the issue of the criterion for correctness arises. Most of the tests use an a posteriori statistical criterion, where correct answers are derived from the average answers of human participants.

Several attempts to measure EI in LLMs with standardized tests were performed. Elyoseph et al. (2023) discovered Emotional Awareness, the ability to conceptualize and describe one's own emotions and those of others, in ChatGPT using the Levels of Emotional Awareness Scale (LEAS). ChatGPT demonstrated significantly higher performance than the general human population on all the LEAS scales (Z-score = 2.84). One month later, ChatGPT's performance significantly improved, almost reaching the maximum possible LEAS score (Z-score = 4.26). In another study (Wang et al., 2023b) different LLMs' abilities to evaluate complex emotions in realistic scenarios were evaluated using SECEU, a novel psychometric assessment based on the Emotion Understanding scale of Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT, Mayer, Salovey & Caruso, 2002). The GPT-4 model exceeded 89% of human participants with an Emotional Quotient (EQ) of 117. In another study (Elyoseph et al., 2024), ChatGPT-4 demonstrated its effectiveness in the area of visual mentalizing, showing results that were comparable to human performance standards.

Further steps require comparison of human and artificial EI test performance patterns to reveal possible differences or similarities in their underlying cognitive mechanisms. In the study mentioned above (Wang et al., 2023b), multivariate pattern analysis indicated that some LLMs may not utilize mechanisms like humans to achieve comparable performance, as their representational patterns were distinctively different from those of humans. Thus, a more comprehensive examination of the various facets of EI performance and their association with AI reasoning processes is essential.

The current study aimed to evaluate the detailed aspects of EI in GPT-4 (OpenAI, 2023b) as outlined in the Mayer–Salovey–Caruso model (2002), utilizing the original standardized MSCEIT. This model is recognized as one of the most thoroughly researched EI models in psychology. The model assumes that EI is closely intertwined with cognitive abilities and cannot be viewed separately. The standardized results were obtained from a human sample, meaning that measuring EI ability in GPT-4 involved comparing it to human data.

Conducting the first comprehensive analysis of LLM performance on this test could provide new insights into its artificial cognitive architecture, abilities, and potential. Particularly, we hypothesized that the less integrated mechanisms in LLMs (Dell'Acqua et al., 2023) might lead to a disconnect between answer accuracy and the correctness of explanations for these answers. In other words, the processes governing the selection of answers and the formulation of explanations for them could be distinct and have different origins.

Methods

Materials

The Russian version of the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT V.2.0) was used in this research with reliability and validity described by Sergienko and Vetrova (2017). We used the Russian version of this test to evaluate the model's inference abilities and to avoid simple answer repetition. The Russian test

data are uncorrupted and the probability of finding the exact correct answer in Russian is lower due to the smaller volume of training data in this language.

The test contains several sections (A-H) measuring different EI domains: Perceiving emotions (sections A, E), Understanding emotions (sections C, G), Using emotions to facilitate thought (sections B, F), and Managing emotions (sections D, H) (Mayer et al., 2002). Each domain score is assessed in terms of an Emotional Quotient (EQ), which has a mean of 100 and a standard deviation of 15. Sections A and E contain photographs with faces and abstract situations that are associated with emotions requiring identification. Other sections represent verbal tasks exploring abilities to manage emotions (section D for personal emotions, section H for other people's emotions); to understand the dynamics of emotions or to analyze blended feelings (sections C and G, respectively); or, finally, to choose feelings relevant to successful performance in a particular activity (section B) and relate various feeling sensations to emotions (section F).

Test Sections A and E were excluded from the study due to GPT-4's current inability to handle images effectively. In Sections C and G, after GPT-4 responded to the questions in the third (final) run, it was asked to provide explicit explanations for its choices.

Due to the absence of results in sections A and E, it was possible to calculate three scales representing EI domains (Using emotions to facilitate thought, Managing emotions, and Understanding emotions) from the 4-factor model (Mayer et al., 2002) and a scale representing the strategic area from the 2-factor model (Salovey, Brackett, & Mayer, 2004).

Procedure

Survey questions were asked to GPT-4 using the chats interface in ChatGPT (OpenAI, 2023a). The full text of each question, including answer choices, was sent to GPT-4 as a chat message (prompt). Questions from sections B, C, and D were asked without a general instruction ("Please select an answer to each of the questions"), because every case contained a question GPT-4 could answer independently. Each question was asked separately as a prompt in a new chat to avoid interference due to GPT-4's ability to retain context within a single chat. This approach ensured that no learning was possible between questions.

Every question was asked three times (in three different chats) with minimal time intervals to test the GPT-4's answers reliability. Different questions were grouped into runs, resulting in three runs of all questions. Each run provided results that were calculated into scales and graded according to human norms described by Sergienko and Vetrova (2017). In cases where GPT-4 provided unclear responses, such as suggesting two potential answers to a single question, it was prompted to select the more appropriate option. This approach consistently yielded a suitable answer. An example of a ChatGPT prompt translated from Russian into English containing a survey question (section C) is provided below.

Complete a sentence by choosing the most appropriate word from the list. Maria was captured with a sense of shame, and she began to feel her worthlessness. Then she felt...

a. oppressed
b. depressed
c. ashamed
d. shy
e. frustrated

Results

Reliability analysis & EQ score

After calculating the raw score of all sections and EI domains in all three runs, a reliability analysis was conducted. In each section, a binary variable was computed for every question, assigning a value of "1" if all three responses to the repeated question were identical, and "0" if at least one response differed. The percentage of mismatched answers was calculated for each section, representing the proportion (%) of "0" values. Along with this proportion, a Cohen's kappa coefficient was calculated for each section. This statistic measures the reliability of raters' agreement if the rating is done using a nominal scale. We considered each run as a unique rater and calculated Cohen's kappa for each section.

The R software (R version 4.3.0, RStudio version 2023.03.1+446) and R package *irr* were used to calculate Kendall's W and Cohen's kappa.

The reliability analysis revealed differing levels of reliability across the test sections. *Table 1* presents the results of this analysis, including the percentage of mismatches, which represents the proportion of answers that varied across different test runs. The statistical significance (p-values) and effect size of Cohen's kappa are also presented in *Table 1*. Due to the significant results on Cohen's kappa, the results of the three runs could be treated as reliable. However, Sections B and F showed lower reliability through the three test runs as shown by the lower Cohen's kappa coefficient (effect size) and the higher mismatch proportion. Sections C, D, H, G, and the whole test showed sufficient agreement between three runs.

Table 1

Sections' reliability analysis results. The second row represents the mismatch percentage

Section	B	C	D	F	G	H	Whole test
Mismatch	40%	10%	15%	40%	25%	0%	22%
Cohen's kappa	.608	.866	.720	.569	.767	.876	.785
p-value	< .001	< .001	< .001	< .001	< .001	< .001	< .001

The third and the fourth rows contain Cohen's kappa test results.

The outcomes for each of the three runs are detailed in *Table 2*, which shows variations across the test sections compared to the average human scale values, set at 100 for each scale. The standard deviation for all scales was 15 points. Section D, F,

and H results were close to the mean scale values. Section B results were more than 1 standard deviation below the mean scale values. Most of Sections C and G results were more than 1 standard deviation above the average.

Table 2

Results of MSCEIT by available sections split by runs

	Section B	**Section C**	**Section D**	**Section F**	**Section G**	**Section H**
Run 1	81	116	107	90	120	106
Run 2	73	120	106	100	123	101
Run 3	74	116	112	104	110	106

The distortion index was calculated representing variation (homogeneity) of individual answers. Raw integral section points were turned into the section percentiles based on a Russian standardization sample (N = 3827). Then the mean percentile was calculated. Next, the mean of the modulo differences between the mean percentile and section percentiles was calculated. Thus, we get the raw point measuring the scatter (distortion) of points inside each section. For the Russian sample, the mean for this distortion in the raw points scale was 18.97, and the standard deviation was 5.99. These values became the basis for standardization of the distortion index into a scale with mean 100 and standard deviation 15 using classical standardization formula.

Integral results for available MSCEIT scales calculated from separate sections are presented in *Table 3*, together with the Distortion index. Values for these integral scales also varied by sections in comparison to mean scale values, which are 100 for each scale. The standard deviation for all scales was also 15 points. The Using Emotions to Facilitate Thought scale was calculated from Sections B and F. The results of this scale were lower than the mean value at the boundary of one standard deviation. The Understanding Emotions scale was calculated from Sections C and G. The results of this scale were more than one standard deviation higher than the mean value.

Table 3

Results of MSCEIT by available scales and factors split by runs

	Using emotions to facilitate thought	**Understanding emotions**	**Managing emotions**	**Strategic EI**	**Distortion index**
Run 1	85	124	108	122	118
Run 2	86	128	103	121	113
Run 3	88	117	110	118	103

The Managing Emotions scale was calculated from Sections D and H. The results of this section were close to the mean value. The Strategic EI scale was calculated from Sections C, D, G, and H, so that it united the Understanding Emotions and Managing Emotions scales. The results indicated that GPT-4 Strategic EI points were more than one standard deviation higher than the mean value. The distortion index varied by runs. The first run index (118) was more than one standard deviation higher than expected value. The second run index (113) was also close to being one standard deviation higher than expected value but was little lower than standard deviation boundary. The third run index was close to the mean value.

Answer choice and explanation consistency

Text explanations of the answer choices on Sections C and G were qualitatively analyzed in the next step. Two experts with degrees in psychology jointly identified categories for the answers and then categorized all explanations independently. To assess the agreement between their evaluations, a Kendall's W-coefficient of concordance was calculated. The number of categories were computed for Sections C and G, as well as for the entire test separately for correct and incorrect answers. Notably, the analysis was only conducted for the third of three runs, so the information provided below should be viewed as a case study with limited explanatory power.

The qualitative analysis of GPT-4's answer explanations identified four categories:

1. **Meaningless Sentences (MS):** Explanations comprised of nonsensical sentences that failed to clarify the reason behind the answer.
2. **Relation Declaration (RD):** Explanations acknowledged a connection between a feeling and an event or situation but lacked a cause-effect rationale, rendering the stated relationship superficial.
3. **Implicit Logic (IL):** Explanations showed a logical relationship between cause and effect or concepts, yet this connection was not explicitly detailed.
4. **Explicit Logic (EL):** Explanations clearly articulated the logical relationship between cause and effect or concepts.

These categories facilitated the creation of an explanation rationality scale, arranged as MS < RD < IL < EL. This scaling allowed for the computation of Kendall's W-coefficient to assess the concordance of the experts' evaluations, which was .971 ($p = .004$), indicating a high agreement. The experts' classifications diverged in only 4 out of 25 cases (16%), and these discrepancies were always by one level (*e.g.,* between MS and RD or IL and EL).

To illustrate categories of the explanations, examples for each one are given below (*Table 4*). The key phrases that influenced the classification of each explanation are in *italics*. A short comment explaining the expert classification decision is presented for each example.

The number of explanation categories varied across Sections; this data is presented in *Table 5*. Notably, the number of IL and EL explanations was quite similar in both sections. However, the number of MS explanations was lower in Section C and higher in Section G, while RD explanations showed the reverse pattern.

Table 4

Explanation categories examples

Explanation category	Answer text	Comment
MS	Option "c" is chosen because the word "ashamed" most accurately describes Mary's condition after feeling ashamed and worthless. *This word reflects that Mary feels ashamed and feels diminished in dignity because of her actions or behavior. The other variants are also related to negative emotions, but they are less accurate in conveying Mary's feelings about the situation.*	Comment: the explanation contains question paraphrase and sentences that do not explain the reason of a particular choice.
RD	Nicholas felt satisfied, thinking about his life, and the more he thought about the good he could do for other people, the happier he felt. *This is because the help and support of other people bring a sense of deep satisfaction and gratitude. Thus, happiness is the natural result of the realization of one's own positive influence on others and performance of good works.*	Comment: the relationship between happiness and some acts is declared but not explained.
IL	I chose the option "e. Thought" because it is the most appropriate in this situation. The [question] description states, Natalia experienced a great shock, but then recovered and realized the opportunity to benefit from the situation. *Thinking in this context means that she has begun to think and plan, how best to use the situation to her advantage.*	To benefit from the situation Natalia must think how to do it. GPT-4 does not manifest this connection but uses it the right way.
EL	You already indicated in your question that Tatiana was irritated that her colleague had taken out a loan for his own purposes. *When he did it again, it is natural to assume that her feelings of irritation increased as his actions were repeated, and they continued to violate her expectations or standards.* The other feelings (anger, frustration, fright, depression) may be possible reactions, but they were not mentioned in the original context.	This explanation contains reference to the connection of Natalia's colleague act and Natalia's feeling mentioned in the question. GPT declares that if one element of already stated connection appears, the other element will appear too.

Table 5

Number of explanation categories across Sections

	Meaningless sentences	Relation declaration	Implicit logic	Explicit logic
Section C	3	5	2	3
Section G	6	1	2	3

Analysis examining the consistency between answer correctness and explanation category revealed that the incorrect answers were associated with only two of the four explanations (*Table 6*). These were either Meaningless Sentences, or Explicit Logic explanations. In contrast, correct answers were accompanied by all types of explanations, displaying no distinct pattern. Moreover, all correct answers with an

Table 6

The distribution of Explanation categories in relation to the correctness of answers

	Meaningless sentences	Relation declaration	Implicit logic	Explicit logic
Correct answers	5	6	4	4
Wrong answers	4	0	0	2

EL explanation were equal across all three runs, indicating high reliability. Answers associated with Meaningless Sentences were less reliable, with only half of them remaining consistent across runs. This observation, though, should be taken cautiously due to the limited sample sizes (2 and 4 for EL and MS explanations, respectively).

Correct answers include only the most correct answers, while Wrong answers include all other answer types (see more in Measures).

Discussion

General analysis of the GPT-4 MSCEIT results revealed that this LLM can exhibit verbal behaviors similar to those of humans by effectively responding to the Emotional Intelligence inventory. The study was conducted as a case study with three runs of the MSCEIT, thus limiting possible inferences. However, the high reliability score suggests that the results are valid for broader generalization.

It is crucial to note that the model encountered the questions for the first time (they were not previously disclosed), so the results stemmed from GPT's ability to generalize emotional rules and apply them to novel situations, rather than merely replicating known answers. This observation prompts a deeper inquiry into the nature of emotional competency exhibited by GPT, questioning whether it is a result of emergent "understanding" or sophisticated pattern recognition (Ho, 2022). Our research contributes to addressing this question by comparing the response patterns of humans and AI, thereby emphasizing the distinctions between them.

The performance of GPT-4 exhibited inconsistency in two distinct aspects: high variability and a disconnect between answer choices and their explanations. Regarding variability, its EQ was significantly higher than that of humans in some areas, yet lower in others. More specifically, GPT-4's performance in Understanding Emotions was notably high, surpassing the average human result by one standard deviation. In Managing Emotions, it aligned with the human average, while in Using Emotions to Facilitate Thought, its performance was one standard deviation below the human average.

This result aligns with the concept of the "jagged technological frontier" (Dell'Acqua et al., 2023), which suggests that AI can easily handle certain tasks while struggling with others that appear similarly challenging. This observation lends support to our hypothesis that GPT's actual emotional competence and the rationale behind its answers originate differently. This implies that in terms of human psychology, we are not assessing a psychological construct of EI in GPT-4, as it lacks one. Instead, GPT-4's responses are context-driven, allowing it to mimic the answers

of individuals with varied personality traits. While humans can also perform this mimicry, the underlying mechanisms appear to differ between GPT-4 and humans.

One intriguing tentative conjecture about the mechanism of artificial EI may be derived from the low performance of GPT-4 in Using Emotions to Facilitate Thought. This EI branch, as described by Salovey, Mayer, and Caruso (2002), is a part of Experiential domain. Unlike the more conscious and rationally accessible branches of EI found in the Strategic domain, the Experiential domain relies heavily on subconscious processes and diverse individually acquired social experiences. Consequently, this type of knowledge cannot be easily acquired through common knowledge datasets available on the Internet, possibly explaining why GPT-4, despite its advanced capabilities, scores lower in this area. Conversely, the Strategic domain, involving verbal understanding and manipulation of emotions, aligns more closely with the strengths of language-based models like GPT-4.

The notion that GPT lacks EI in a human sense suggests that the functional role of such emotional competence in Large Language Models (LLMs) should be viewed differently. It is well known in human psychology that emotions do not comprise an isolated system. They play an essential role in cognitive processes and self-regulation (Pessoa, 2008; Lantolf & Swain, 2019). Expressed empathy as a social signal is closely related to other emotional abilities (*e.g.*, Kornilova & Quiqi, 2021). So, in humans, empathy, EI, and emotions are closely related and represent different aspects of an indivisible psychological reality.

If a neural network, on the other hand, is trained to give adequate emotional responses, it does not imply that emotions serve the same functional role in its information processing as they do in humans. In other words, while the network may mimic emotional responses effectively, these responses do not necessarily integrate with or influence its cognitive processes in the way that emotions do in human psychological functioning. Although AI may have its own functional equivalents of emotions (*e.g.*, Sloman & Croucher, 1981; Czerwinski et al., 2021; Assuncao et al., 2022), these artificial "emotions" should differ significantly from human real emotions and EI in human sense as the ability to understand human feelings and manage them. These two separate emotion-related topics represent communicative aspects and architectural aspects in AI (Scheutz, 2014).

The communicative aspect of EI in AI still plays a crucial role in human-computer interaction. For instance, automatic emotion recognition can aid cognitive training for clinical populations with EI impairments (Elyoseph et al., 2023; Abdollahi et al., 2022). Understanding emotions is particularly relevant in digital psychotherapy (Uludag, 2023; Wang et al., 2023a; Darcy et al., 2022; Possati et al., 2022), where clients learn to recognize the link between their emotions, automatic thoughts, and events. Moreover, Managing emotions is tied to behaviors that progressively alleviate negative feelings, mitigate anxiety, and prevent aggression. GPT-4 is now capable of solving such tasks.

However, our research indicates that its performance in the emotion management domain is average so it may fail to tackle complex problems. Difficulties may also arise in situations requiring a nuanced understanding of deep, non-obvious emotions. In standard scenarios associated with typical emotional responses, GPT-4 can assist in elucidating the nature of an emotion, along with potential feelings and sensations.

Nevertheless, in atypical cases that demand a conscious analysis of feelings and sensations, GPT-4 might provide formal or inaccurate responses due to a lack of experiential knowledge.

The second peculiarity we identified in our study was the disconnect between GPT's answer choices and their explanations. We found that correct answers from GPT were accompanied by various explanations without a dominant category. In contrast, incorrect answers often led to explanations categorized as meaningless sentences or explicit logic. This pattern could be interpreted as distinguishing GPT from humans. However, it is akin to human behavior patterns, as similar types of responses have been observed in our study of children's abilities to navigate and understand mental states, which include processing emotions in different scenarios, false beliefs, deceit, and intentions (Sergienko et al., 2020). This similarity suggests that the disconnect might not be a unique feature of GPT but rather a characteristic it shares with human cognitive processes.

In particular, a child's misunderstanding of a task, followed by incorrect answer, is comparable to the Meaningless Sentences category; partial understanding of the task corresponds to the Relation Declaration category; intuitive understanding without explanation of cause-and-effect relationships looks comparable to Implicit Logic category; and finally, integral understanding and explanation of the cause of an event or state and the Explicit Logic category also coincide. The ability of children to understand cause-and-effect relationships increased by the age of 6-7, which indicated the development of their ability to infer mental states. Such an analogy to artificial intelligence's answers may indicate the presence of different levels of inferences (or their artificial equivalents) in EI tasks.

The alignment of the answers with two distinct categories of explanations mirrors real-world dynamics. Typically, a person may err for two broad reasons. The first reason involves a deficiency in rational understanding, where cognitive biases, subjective notions, and underdeveloped conceptualizations of the situation prevail. The second reason is the application of unconventional logic, guided by unique and/or hidden criteria. The categories of "Meaningless sentences" and "Explicit logic" might correspond to these reasons for errors, representing a lack of rational comprehension and the use of atypical logic, respectively. However, the validity of the described connection is discussed under Limitations.

It is noteworthy that the Distortion index decreased across the test runs, with the first and third runs showing a difference of one standard deviation. This trend might suggest a self-improvement capability in ChatGPT. In support of this notion, Elyoseph et al. (2023) observed a significant enhancement in ChatGPT's performance one month after the initial assessment. However, in our study, the three test runs were conducted consecutively with minimal time intervals and showed no improvement in results (no learning curve), indicating that any observed improvement might be coincidental. Nevertheless, due to the lack of publicly available documentation on the operational logic of GPT-4 and ChatGPT, we cannot conclusively determine the nature of these findings.

One promising direction for further research is evaluating the construct validity of the EI test using a sufficient sample of LLM responses. By employing structural equation modeling, we can determine whether the internal factor structure of artificial EI domains aligns with that of humans.

Conclusion

Our examination of GPT-4's performance on the Russian version of the Mayer–Salovey–Caruso Emotional Intelligence Test underscores the model's capability to exhibit verbal behaviors that mimic human EI, particularly in novel situations where it generalizes emotional rules. The findings accentuate GPT-4's nuanced capabilities in understanding and managing emotions, while revealing low capabilities in using emotions to facilitate thought. This research delineates the artificial nature of GPT-4's emotional competence, which, while impressive, fundamentally differs from human emotional processing.

Our study also reveals peculiarities in GPT-4's response patterns, particularly the disconnect between its answer choices and explanations, which intriguingly mirrors certain human cognitive behaviors. This observation suggests that while GPT-4's processing mechanisms are distinct from human cognition, they can produce similar outcomes on emotional understanding tasks.

This study contributes to the broader discourse on AI and EI, offering insights into the capabilities and limitations of AI in emulating human-like emotional responses and the implications for human-computer interaction. Further research is needed to provide ecological validity of these test-achieved results, specifically regarding the emotional competence of LLMs in practical tasks such as digital psychotherapy. A more theoretical contribution is essential for the development of a unified approach to the estimation and conceptualization of machine behavior. This involves creating comprehensive frameworks that can systematically assess and interpret the actions and responses of AI systems, bridging the gap between computational capabilities and behavioral outcomes.

Limitations

A significant limitation to consider is GPT-4's proficiency in English compared to Russian, which suggests that testing results could vary depending on the language used. In this context, GPT-4 might have performed better or more consistently if the tasks were presented in English. Notably, Russian-speaking testees did not have top results in completing tasks from sections C and G. At first, we attributed this fact to English-Russian translation artifacts. But later, the Russian inventory TEI (Sergienko et al., 2019), which is based on the EI ability model and Plutchik's concept of emotions, and which has a similar structure to the MSCEIT, also showed low Cronbach's alpha scores in the sections related specifically to understanding complex emotions. Thus, it may indicate the presence of some cultural specificity.

The next limitation is connected to the separation of the questions. This was done in order to prevent GPT-4 from context memorizing. If such memorizing occurred, the last answers in a series would be strongly influenced by previous context. On the one hand, this would make evaluation clearer. The questions were created as independent from each other, and that is how they were answered by GPT-4. But on the other hand, humans answer questions with the aid of memorizing previous questions and answers, and the whole context of evaluation.

It is also important to note that there were only three runs of MSCEIT on GPT-4. Thus, this study is considered to be more like a case study, with limited inferences

possible about construct consistency over time, and without the clear possibility of estimating the internal structure of EI through factor analysis.

The final limitation pertains to the current inability to assess EI in domains that necessitate the recognition of emotions in images of faces and situations. This aspect of EI evaluation is crucial, yet it remains unaddressed in the current version of GPT. However, it is anticipated that subsequent versions of GPT will have the capability to perform such assessments, broadening the scope of EI measurement in AI.

Ethics Statement

The study was approved by the local ethics committees of the Institute of Psychology of Russian Academy of Sciences (protocol No 25-14 on 17.04.2024).

Author Contributions

G.V. conceived the idea and performed the literature analysis. A.S. conducted tests on ChatGPT. A.B. analyzed the data and discussed the theory. I.V. and E.S. verified the theory and analytical methods. All authors discussed the results and contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgements

The authors would like to thank Olga V. Teplinskaya and Marco Holst for providing access to premium version of ChatGPT, that enabled the authors to test GPT-4. The authors are very grateful to the Director of the Institute of Psychology Russian Academy of Sciences, academician of the Russian Academy of Sciences, Professor Dmitriy V. Ushakov for theoretical guidance.

References

Abdollahi, H., Mahoor, M., Zandie, R., Sewierski, J., & Qualls, S. (2022). Artificial emotional intelligence in socially assistive robots for older adults: a pilot study. *IEEE Transactions on Affective Computing, 14*(3), 2020–2032. https://doi.org/10.1109/TAFFC.2022.3143803

Assuncao, G., Patrao, B., Castelo-Branco, M., & Menezes, P. (2022). An Overview of Emotion in Artificial Intelligence. *IEEE Transactions on Artificial Intelligence, 3*(6), 867–886. https://doi.org/10.1109/TAI.2022.3159614

Binz, M., & Schulz, E. (2023). Using cognitive psychology to understand GPT-3. *Proceedings of the National Academy of Sciences, 120*(6). https://doi.org/10.1073/pnas.2218523120

Brinkmann, L., Baumann, F., Bonnefon, J.F., Derex, M., Müller, T.F., Nussberger, A.M., … & Rahwan, I. (2023). Machine culture. *Nature Human Behaviour, 7*(11), 1855–1868. https://doi.org/10.1038/s41562-023-01742-2

Bubeck, S., Chandrasekaran, V., Eldan, R., Gehrke, J., Horvitz, E., Kamar, E., … & Zhang, Y. (2023). *Sparks of Artificial General Intelligence: Early experiments with GPT-4* (arXiv:2303.12712). arXiv. https://doi.org/10.48550/arXiv.2303.12712

Crowder, J.A., Carbone, J., & Friess, S. (2020). *Artificial Psychology: Psychological Modeling and Testing of AI Systems. Springer International Publishing.* Springer. https://doi.org/10.1007/978-3-030-17081-3

Czerwinski, M., Hernandez, J., & McDuff, D. (2021). Building an AI That Feels: AI systems with emotional intelligence could learn faster and be more helpful. *IEEE Spectrum, 58*(5), 32–38. https://doi.org/10.1109/MSPEC.2021.9423818

Darcy, A., Beaudette, A., Chiauzzi, E., Daniels, J., Goodwin, K., Mariano, T.Y., ... & Robinson, A. (2022). Anatomy of a Woebot®(WB001): agent-guided CBT for women with postpartum depression. *Expert Review of Medical Devices, 19*(4), 287–301. https://doi.org/10.1080/17434440.2022.2075726

Dell'Acqua, F., McFowland, E., Mollick, E.R., Lifshitz-Assaf, H., Kellogg, K., Rajendran, S. … & Lakhani, K.R. (2023). Navigating the Jagged Technological Frontier: Field Experimental Evidence of the Effects of AI on Knowledge Worker Productivity and Quality. *Harvard Business School Technology & Operations Mgt. Unit Working Paper No. 24-013*. https://doi.org/10.2139/ssrn.4573321

Dhingra, S., Singh, M., SB, V., Malviya, N., & Gill, S.S. (2023). Mind meets machine: Unravelling GPT-4's cognitive psychology. *Bench Council Transactions on Benchmarks, Standards and Evaluations, 3*(3). https://doi.org/10.1016/j.tbench.2023.100139

Diederich, J. (2021). *The psychology of artificial superintelligence*. Springer Nature. https://doi.org/10.1007/978-3-030-71842-8

Dillion, D., Tandon, N., Gu, Y., & Gray, K. (2023). Can AI language models replace human participants? *Trends in Cognitive Sciences, 27*(7), 597–600. https://doi.org/10.1016/j.tics.2023.04.008

Elyoseph, Z., Hadar-Shoval, D., Asraf, K. & Lvovsky, M. (2023). ChatGPT Outperforms Humans in Emotional Awareness Evaluations. *Frontiers in psychology, 14*. https://doi.org/10.3389/fpsyg.2023.1199058

Elyoseph, Z., Refoua, E., Asraf, K., Lvovsky, M., Shimoni, Y., & Hadar-Shoval, D. (2024). Capacity of generative AI to interpret human emotions from visual and textual data: pilot evaluation study. *JMIR Mental Health, 11*. https://doi.org/10.2196/54369

Erol, B.A., Majumdar, A., Benavidez, P., Rad, P., Choo, K.K.R., & Jamshidi, M. (2019). Toward artificial emotional intelligence for cooperative social human-machine interaction. *IEEE Transactions on Computational Social Systems, 7*(1), 234–246. https://doi.org/10.1109/TCSS.2019.2922593

Hagendorff, T. (2023). *Machine psychology: Investigating emergent capabilities and behavior in large language models using psychological methods*. arXiv preprint arXiv:2303.13988. https://doi.org/10.48550/arXiv.2303.13988

Ho, M.T. (2022). What is a Turing test for emotional AI? *AI & SOCIETY*, *1–2*. https://doi.org/10.1007/s00146-022-01571-3

Kanesan, P., & Fauzan, N. (2019). Models of emotional intelligence: A review. *e-BANGI Journal*, *16*(7).

Kerasidou, A. (2020). Artificial intelligence and the ongoing need for empathy, compassion and trust in healthcare. *Bulletin of the World Health Organization*, *98.* https://doi.org/10.2471/BLT.19.237198

Kornilova, T.V., & Qiuqi, Z. (2021). Empatiia i implitsitnye teorii ėmotsii i lichnosti (na kitaiskoi vyborke) [Empathy and implicit theories of emotions and personality in a Chinese sample]. *Vestnik Moskovskogo Universiteta. Seria 14. Psychologiya* [Moscow University Psychology Bulletin, Series 14], *1*, 114–143. https://doi.org/10.11621/vsp.2021.01.05

Kowalczuk, Z., & Czubenko, M. (2016). Computational approaches to modeling artificial emotion-an overview of the proposed solutions. *Frontiers in Robotics and AI, 3*(21). https://doi.org/10.3389/frobt.2016.00021

Lantolf, J.P., & Swain, M. (2019). On the emotion-cognition dialectic: a sociocultural response to prior. *The Modern Language Journal*, *103*(2), 528–530. https://doi.org/10.1111/modl.12574

Mayer, J.D., Salovey, P. & Caruso, D.R. (2002). *Mayer-Salovey-Caruso Emotional Intelligence. Intelligence Test (MSCEIT) User's Manual*. Toronto, Canada: MHS Publishers.

OpenAI. (2023a). ChatGPT (May 3 version) [Large language model]. https://chat.openai.com/chat. Accessed May 05, 2024.

OpenAI. (2023b). *GPT-4 Technical Report.*

Pessoa, L. (2008). On the relationship between emotion and cognition. *Nature reviews neuroscience*, *9*(2), 148–158. https://doi.org/10.1038/nrn2317

Picard, R.W. (2000). *Affective computing*. MIT press. https://doi.org/10.7551/mitpress/1140.001.0001

Possati, L.M. (2022). Psychoanalyzing artificial intelligence: The case of Replika. *AI & Society*, *38*, 1725–1738. https://doi.org/10.1007/s00146-021-01379-7

Rahwan, I., Cebrian, M., Obradovich, N., Bongard, J., Bonnefon, J.F., Breazeal, C., ... & Wellman, M. (2019). Machine behaviour. *Nature*, *568*(7753), 477–486. https://doi.org/10.1038/s41586-019-1138-y

Salovey, P., Brackett, M., & Mayer, J.D. (2004) *Emotional Intelligence: Key readings on the Mayer J. D., Salovey P. Model*. Port Chester. New York: Dude Publishing. https://doi.org/10.1002/9780470939338.ch28

Salovey, P., Mayer, J.D., & Caruso, D. (2002). The positive psychology of emotional intelligence. In C.R. Snyder & Shane J. Lopez (Eds.), *Handbook of positive psychology* (pp. 159–171). New York: Oxford University Press. https://dx.doi.org/10.1093/oxfordhb/9780195187243.013.0022

Scheutz, M. (2014). Artificial emotions and machine consciousness. In K.Frankish & W.M. Ramsey (Eds,). *The Cambridge Handbook of Artificial Intelligence (pp.* 247–266). Cambridge University Press. https://doi.org/10.1017/CBO9781139046855.016

Sergienko, E., Khlevnaya, E., Vetrova, I., & Migun, J. (2019). Emotsional'nyi intellekt: razrabotka russkoiazychnoi metodiki TEI (Test emotsional'nogo intellekta) [Emotional Intelligence: Development of the Russian-language TEI-method (Test of Emotional Intelligence)]. *Psikhologicheskie issledovaniia [Psychological Studies], 12*(63). https://doi.org/10.54359/ps.v12i63.241

Sergienko, E.A., Lebedeva, E.I., & Ulanova, A.U. (2020) *Model' psikhicheskogo. Struktura i dinamika* [The theory of mind. Structure and Dynamics]. Monography, Institut psikhologii RAN [Institute of Psychology, Russian Academy of Sciences], Moscow.

Sergienko, E.A., & Vetrova, I.I. (2017). *Russkoiazychnaia adaptatsiia testa Dzh. Meiera, P. Seloveia, D. Karuzo "Emotsional'nyi intellekt" (MSCEIT V2.0). Metodicheskoe posobie* [Russian-language adaptation of J. Mayer, P. Salovey, and D. Caruso's Emotional Intelligence Test (MSCEIT V2.0). Handbook], Smysl, Moscow.

Shank, D.B., Graves, C., Gott, A., Gamez, P., & Rodriguez, S. (2019). Feeling our way to machine minds: People's emotions when perceiving mind in artificial intelligence. *Computers in Human Behavior*, *98*, 256–266. https://doi.org/10.1016/j.chb.2019.04.001

Sloman, A., & Croucher, M. (1981). Why Robots Will Have Emotions. *International Joint Conference on Artificial Intelligence.*

Uludag, K. (2023). The use of AI-Supported chatbot in psychology. *Social Science Research Network*. https://doi.org/10.2139/ssrn.4331367

Vinciarelli, A., Pantic, M., & Bourlard, H. (2009). Social signal processing: Survey of an emerging domain. *Image and vision computing, 27*(12), 1743–1759. https://doi.org/10.1016/j.imavis.2008.11.007

Wang, M., Chen, H., Yang, F., & Li, J. (2023a). Effects of digital psychotherapy for depression and anxiety: A systematic review and bayesian network meta-analysis. *Journal of Affective Disorders*. https://doi.org/10.1016/j.jad.2023.06.057

Wang, X., Li, X., Yin, Z., Wu, Y., & Liu, J. (2023b). Emotional intelligence of large language models. *Journal of Pacific Rim Psychology, 17*. https://doi.org/10.1177/18344909231213958

Original manuscript received April 18, 2024
Revised manuscript accepted June 13, 2024
First published online June 15, 2024

To cite this article: Vzorin, G.D., Bukinich, A.M., Sedykh, A.V, Vetrova, I.I., Sergienko, E.A. (2024). The Emotional Intelligence of the GPT-4 Large Language Model, *Psychology in Russia: State of the Art*, *17*(2), 85–99. DOI: 10.11621/pir.2024.0206

Psychology in Russia: State of the Art
Volume 17, Issue 2, 2024

Russian Psychological Society
Lomonosov Moscow State University

EDUCATIONAL PSYCHOLOGY

The Features of Modeling Mediation in Digital Support for Formation of Multiplicative Concepts

Elena Vysotskaya[a], Maria Yanishevskaya[a], Anastasia Lobanova[a*]

[a] *Federal Scientific Centre of Psychological and Multidisciplinary Research, Moscow, Russia*

*Corresponding author. E-mail: andelobanova@yandex.ru

Background. The formation of multiplicative concepts of complex structure is a challenge for educational design. Students' typical mistakes and strategies spontaneously obtained through hands-on trials in solving balance scale problems have been at the center of many studies within this trend. However, the consideration of relevant concept-mediated actions based on Learning Activity Theory (Davydov) remains a relevant problem.

Objective. We aimed to develop a feasible framework for digital support of students' learning actions in this domain. The productiveness of individual and joint forms of work with dynamic objects in a digital environment, mediated with conceptual modeling tools, was compared.

Design. The participants were 181 fifth-grade students (11–12 years old). The first group (123 students) was taught a special procedure of modeling, which they then could test during individual computer-supported problem-solving. The second group (58 students) worked in pairs (jointly), using the same procedure. The pre- and post-tests included challenging problems on prediction of the balance state and ways to regain equilibrium.

Results. Comparison of the pre- and post-test results of the joint computer-supported activity instruction revealed students' progress in solving critical tasks as guided by the conceptual modeling procedure of load evaluation instead of "empirical" correlations of weights and distances. The individual computer-supported work, however, failed to overcome the belief of some students in the efficacy of trial-and-error methods as applied to the digital simulation with instant feedback.

Conclusion. The special organization of the computer-supported concept-mediated joint activity may promote multiplicative concept formation.

Keywords: multiplicative concepts, balance scale problem, joint activity, concept formation, computer-supported learning

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)
http://psychologyinrussia.com

Introduction

With this research we contribute to studying some important issues of introducing computers to teaching. Based on the activity approach in education (Davydov, 2008; Davydov et al., 1983; Engeness, 2021; Galperin, 1989; Leontiev, 2003; Rubtsov, 1996; Rubtsov & Ulanovskaya, 2021; Talyzina, 1988), which proved to be productive for understanding concept formation, we consider the necessary stages of concept acquisition and develop a feasible framework for digital support of students' learning actions in this domain.

Our study regards the prerequisites of complex multiplication-based concept formation within the context of balance scale problems. This task, introduced by B. Inhelder and J. Piaget (1958), and later developed by R.S. Siegler (2013), has become a classical context to examine the structure of complex concepts and the operations behind them, and strategies for solving some particular tasks of balancing scales. Much attention has been paid to the analysis of students' mistakes, based on flaws in logical multiplication in application to operating quantities (Kloosterman, 2010; Lamon, 2020; Siegler & Chen, 2008). Following J. Piaget, all the researchers attributed the efficacy of handling such concepts to the "age-dependent" ability of students to distinguish the two latent parameters that affect the balance, and to consider them simultaneously (Bonawitz et al., 2012; Boom et al., 2001; Howe et al., 2011; Jansen & van der Maas, 2002; Siegler, 2013; Wachsmuth et al., 1983). The specifics of cooperative hands-on actions in moving weights along the arms of the lever to balance it were studied by V.V. Rubtsov and L. Martin (Rubtsov et al., 1991). Recently, the examination of joint activity within the same context was continued by A.V. Konokotin (2021) in respect to its potential benefits for the development of learning communication.

The approach to computer support in educational design has been developed within Activity Theory since 1980 by V.V. Rubtsov and his colleagues (Rubtsov, 1996). This approach suggested that the efficacy of digitalization depends on what components of students' actions will be scaffolded by the computer. Within this approach, the necessity of special modeling actions in forming concepts of complex structure was justified and the provision of appropriate space for learning actions became one of the important missions of computer support (Rubtsov & Ulanovskaya, 2021; Vysotskaya, 1996).

In our research, we focus on model mediation, which plays a central role in concept acquisition (Davydov, 2008; El'konin & Davydov, 1966), and the ways to scaffold it, through use of computers in particular. Modern computer simulations often present digital objects, which primarily prompt students to perform common "trial and error" practical probes, while they search for a way to solve the problem. An example of such an approach for the balance scale task is considered in the study of J. van der Graaf (2020), who described students' strategies of balancing the lever in cases when they were allowed to check their solutions through the simulation.

However, if we aim to scaffold students' acquisition of the "learner's position" and influence the quality of the learning process, supported by the computer, we should consider the mediation of practical trials through special modeling work. The assessment of students' ability to adopt the required modeling tools may thus be prognostic

of the efficacy of their promotion through practical tasks within a digital environment.

Our research goal was to examine the potential of the balance scale problem and the features of its digital simulation, as a means to help students adopt the conceptual way of acting and avoid falling into the trap of the common "trial and error" method that is often prompted by the availability of practical probes.

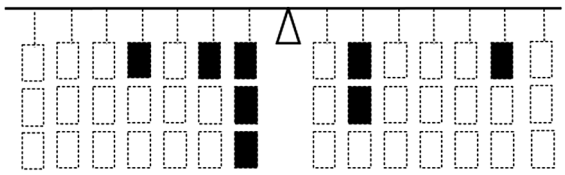
We find tasks with "scattered" weights (when the weights are distributed over several suspension points) (Siegler, 2013), which prohibit application of simple rules and strategies that students can easily grasp, crucial for assessment purposes. Moreover, we assume students' work on these tasks to be essential to switch them from "empirical" to "conceptual" consideration of the matter presented through the computer.

Organization, Procedure, and Methods of Research

The goal of our current research was to examine the ways in which students acquire the concepts of complex (multiplicative) structure due to adoption of special conceptual means, which cannot be "invented" by students spontaneously. We assume that success in solving specially designed diagnostic tasks will be indicative of mastery of these means. Thus, our tasks were: to devise learning materials and appropriate diagnostic procedures to study the efficacy of our approaches to computer-supported teaching on a sample of fifth-grade students and to analyze students' performance in pre- and post-test tasks (with the same types of problems, but altered numbers of weights).

Diagnostic Procedure

We designed a special set of diagnostic tasks in order to assess the initial quality of students' understanding of equilibrium. Each task presented a picture of a lever with some identical weight units attached. The first type of task (Type I, six problems) required evaluating the balance state of the given weight configuration (*Figure 1*).



a) Yes, the weights are balanced
b) No, the left side will go down
c) No, the right side will go down

Figure 1. Type I task example: "A student wanted to balance the lever and placed the weights as presented. Will this configuration make the lever balanced?"

The second type of task (Type II, four problems) asked students to find a way to rearrange the given configuration of weights (add, remove or relocate a weight) or to place all given weights on the lever to make it balanced within the restrictions

posed by the task (*Figure 2*). Some special conditions were introduced to prevent students from applying simple strategies of balance (e.g., symmetrical positioning of the weights): a different number of weights for opposite sides of the lever, blocked locations for weight placement.

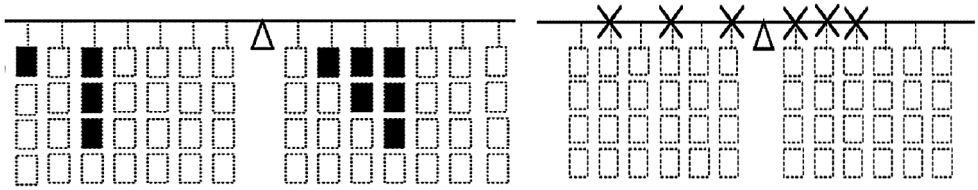


Figure 2. Type II task example: (a) a configuration of weights is provided; move one of them to make it balanced; and (b) balance five weights (the crosses mark places where weights cannot be attached).

181 fifth-grade students (11–12 years old, average academic achievement, from two Moscow schools) participated in the pre-test. First, a physical lever was demonstrated to the class. The experimenter set up the unbalanced configuration of weights and then showed that it can be balanced by rearranging, removing, or adding weights. Then students received individual fill-in blanks with 10 tasks (6 tasks of the first type, 4 tasks of the second type). The instruction was to consider the presented configurations as having been set up by someone who was trying to reach a balanced state. Students were to make their own guesses about whether the balance was achieved (task Type I) and to suggest corrections needed to balance the lever (task Type II). The percentage of correct answers for the tasks of both types was calculated. The results are presented in *Figure 3*.

The success rate of the first type of task (33.6%) does not differ significantly from the probability of guessing the correct answer among three variants. The second type

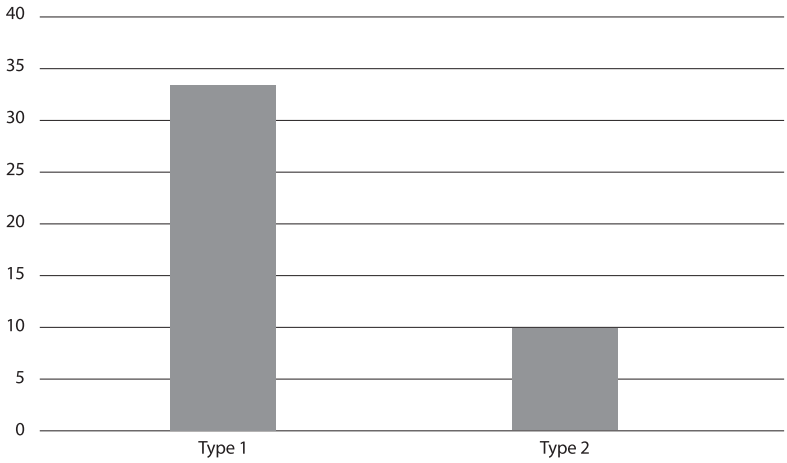


Figure 3. Students' performance on the pre-test tasks (percentage of correct answers to tasks of each type)

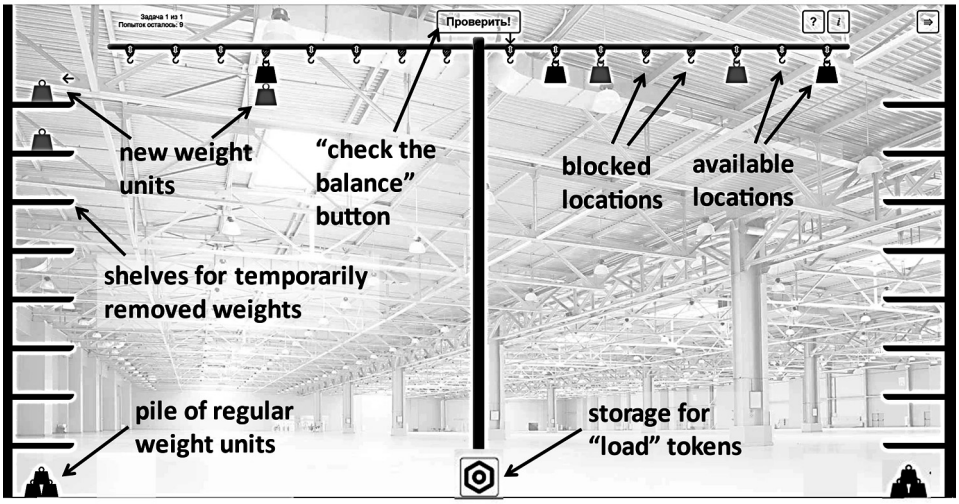


Figure 4. The screen of the digital lever simulation

of task proved to be crucial for assessment: the answers could not be easily guessed; thus, the success rate was very low (9.75%).

The pre-test was conducted to confirm that our participants were not capable of solving balance scale problems on their own, by spontaneous insights.

Teaching Strategy

All students were taught with the help of the digital lever simulation that we designed (Vysotskaya et al., 2023). The digital support ran on the web on a standard browser and was developed using HTML/JavaScript. The materials were deployed on a web-based learning management system, which could also log all the participant's actions (https://lever.digitar.ru[1]). The computer simulation reproduced the balancing of a lever with several weights and allowed students to change the configuration of weights and see the outcome, as if a real lever was being used (see *Figure 4*). The screen view included the lever with eight locations for a maximum of eight weight units on each arm, shelves for removed weights, unlimited piles of weights (if the conditions of the task allowed their use). The lever was always in a "locked" state, with no immediate reaction to any of the changes performed, until the final configuration of the weights had been settled (according to the task restrictions). A student could either place or remove weight units and check the balance state of the lever (hitting a special button). Part of the operations could be limited depending on the task conditions: certain locations for weights could be locked, some of the weights could be attached to the lever and their rearrangement prohibited, the number of weights could be limited or not, etc. Another varied condition was the presence of different types of weight units with a pre-set ratio of their masses (Vysotskaya, 1996; Vysotskaya, Lobanova, & Yanishevskaya, 2022; Vysotskaya, Lobanova, & Yanishevskaya, 2023).

[1] A demo version of the tasks is available here: https://lever.digitar.ru/game/sn9tj8q7ai15

The tasks that we posed through the digital simulation mostly exploited configurations of scattered weights, as opposed to the common approach to task design where the weights are attached to only one position on each arm at a time (Filion & Sirois, 2021; Konokotin, 2021; Normandeau et al., 1989, and others). The task with several locations for weights is considered to be the most difficult, as no intuitive strategies and rules that students are able to invent themselves will work (Boom et al., 2001; Normandeau et al., 1989; Siegler, 2013) and no "workaround" ways of solving the problems would be of any help. Most children have an idea of the symmetrical placement of weights as the simplest strategy to achieve balance. Moreover, many students have a general notion that a larger weight is balanced by a smaller one placed at a greater distance from the fulcrum. Changes of both parameters (weight and distance) while dealing with several scattered weights simultaneously requires conceptual consideration: students have to evaluate the ratio between them quantitatively. The simple rule (inverse proportion), which students may also refer to, does not help here either, since the weights are placed in an improper way.

We assume that the evaluation of the "load" created by each object on the lever according to its placement and weight, and its contribution to the achievement of equilibrium, is at the core of the concept-mediated action that is necessary for handling the scattered-weights situation. The "load" is the "third magnitude", which is not as salient as the extensive «first» and «second» magnitudes (the weight or distance) directly presented by the task data. However, the consideration of its "hidden" value is necessary for dealing with the magnitudes involved: it makes it possible to introduce specific modeling tools. The essential role of magnitudes of this kind was highlighted by V.V. Davydov (El'konin & Davydov, 1966) in regard to solving problems which required calculation of coordinated changes of two magnitudes (not rare for primary math curricula). Thus, we focused on introducing the idea of counting the load as the "third magnitude" and developed a special tool for assessment and reassessment of each weight's contribution to the would-be equilibrium state, which mediates students' reasoning about balance. Alongside the computer simulation, special counting tokens were introduced to explicate and measure a weight's contribution to the total load on the left and on the right and to confirm the equivalence of the load on both sides, despite the obvious difference in the number of weight units and their location[2]. Moving each weight unit has to be reflected by altering the number of tokens used to predict the resulting change of load. In this case, the created load has to be evaluated with tokens: each step (a shift to the next mark on the scale) made by the weight unit towards or away from the fulcrum has to be recorded with an added or removed token (the "making steps" rule). Thus, the "third magnitude" is made tangible and subject to examination, so that students can guide their solution by adjusting their future actions to the equivalence of the load value for both sides of the lever.

The goal of the first series of the experimental teaching instruction (the "explanation and trial" approach) was to test ways of introducing conceptual orientation tools

[2] The tokens could be either magnets on the blackboard, or marbles, or drawings, or special digital tokens, available in the computer simulation (*Figure 4*).

to students' practical work with the balance-the-lever tasks in a digital environment. The development of the learning situation (problematization) started with balancing the lever with an uneven number of weights provided. An "imaginary partner" has already done the corresponding part of the work by attaching weights to the lever on the left side (*Figure 5*). Now students have to complete the task by attaching the other two weights on the right side of the lever.

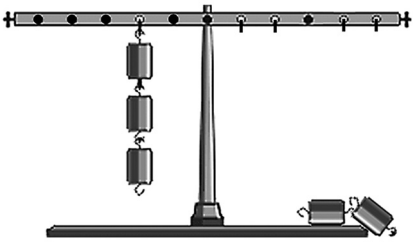


Figure 5. Students were asked to place two weights on the right arm (where the third position has been blocked) in order to balance the three weights on the left arm (placed beforehand by an "imaginary partner")

The teacher confirmed that students knew how to balance the three weights on the left with the same number of weights on the right, but had only a vague idea of how to balance them with only two weight units. For example, students suggested moving the two weights further from the fulcrum (guessing that this would somehow increase "their weight"), to the third place – but there was no such option in the simulation provided (because of the "blocked" slot). The practical validation of other ideas (to move the two weights even further) brought the students to the conclusion that the task was unsolvable. After the preliminary discussion, the "making steps" rule was demonstrated: the teacher counted steps that moved each of the three weights away from the fulcrum. In this way, six tokens (magnets on the blackboard) to mark each step, increasing the load of each weight, were put on the board. Students were now asked to suggest the placement for each of the two remaining weight units, marking their moves with tokens, in order to obtain the same load as the "imaginary partner" had created by his three weights on the left side. If a particular configuration that a student would suggest, is evaluated as requiring more or fewer than six tokens, students can ascertain that the lever will not be balanced. Equilibrium is achieved, thus, by placing the weight units at the second and fourth positions, or at the first and the fifth, posing the idea that the load is created by each weight independently. The solution of all the tasks which followed each time required the student to assess the placement of all weights and the total load with tokens.

Students then received a series of individual training tasks presented through the digital media described above, and a set of counting tokens for the load evaluation to scaffold their solution. The tasks required that they balance the left arm, which already had some weights on it, by attaching all the given weights to the right arm of the lever. Simple solutions through copying the preset configuration of weights were excluded by providing a different number of weights for the other arm

or by locking up some of the positions on it. The tasks required students to determine the configuration of several scattered weights, and the success of their practical trials obviously depended on the use of tokens. After the balance was achieved (by recurring probes with the digital lever), students were asked to draw the right configuration on their handouts and mark the loads on both arms with special tokens according to the preset rule of "making steps" (the fill-in blank for tokens was provided for each task, but students could mark tokens in any convenient form). The last two tasks in the series required balancing the lever in only one attempt. The teacher reminded students to draw all the obtained balanced configurations and mark the corresponding tokens.

The procedure took one teaching session: two school lessons successively for problematization and individual work with the computer series (10 practical tasks). 123 students from our pre-test sample were taught according to this strategy. After a month or so, the post-test was given (the set of 10 tasks similar to those in the pre-test).

The other teaching procedure (the "joint work" instruction) involved the remaining 58 students from the surveyed sample and used the activity-oriented approach, which seeks to form concepts purposefully through special arrangement of students' own actions, specifically joint work within the learning task that reconstructs the material circumstances of the concept origin (Davydov, 2008; Rubtsov, 1996; Solovieva & Quintanar, 2021). It included the same problematization, but differed in the task variation and the organization of students' substantial interactions in pairs with one PC. Three school lessons were conducted for each group of these students, as additional time was needed for the joint work arrangement. As the digital simulation described above could support two users simultaneously by sharing the operations with weights available between them, we assigned each student to one side of the lever, where he or she could add or remove the weights within the restrictions posed by the tasks. The task variation was also enriched with problems aimed to intensify students' coordination: instead of a configuration ready-made by an "imaginary partner", there was an opportunity to change both arms, using a number of weights from a shared stack to balance an empty lever in particular, as well as the requirement to balance new units of unknown weight.

The 58 students who were taught according to the second strategy also participated in a delayed post-test.

Results and Discussion

The results of the post-test (the overall percent of successful tasks solutions) for both groups of students, who were taught according to different strategies, are presented in *Figure 6*.

The post-test diagnostics revealed that students' progress in critical tasks was dependent on the instructions they received. The diagram shows that the organization of substantial interactions among partners solving one shared task was more effective than the "explanation and trial" instruction. Both approaches, however, implied active approbation of an additional procedure of counting load with tokens. Yet, the difference between students' performance of critical tasks (Type II) is significant ($p < 0.05$,

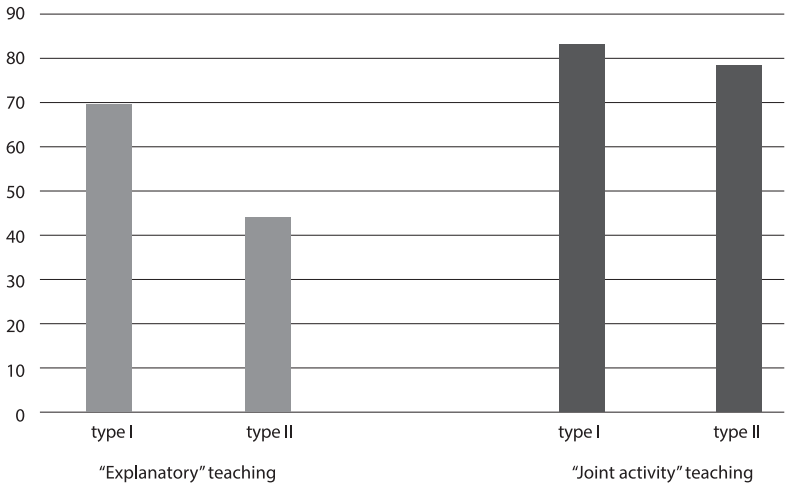


Figure 6. Students' post-test performance in the two groups taught according to either the "explanation and trial" or "joint activity (substantial interactions)" approach

Mann-Whitney U test). To explain these results, we will refer to the analysis of classroom observations and students' written works during the experimental teaching.

In the first teaching series (the "explanation and trial" instruction), students successfully completed the training series. Their filled-in blanks mostly contained the required answers and corresponding token notation, showing that the load for each weight had been calculated (*Figure 7*). A remarkable feature though, was a considerable number of solutions with correct balanced weight configuration, but an irrelevant token notation (*Figure 8*). We assume that such notations could have been made after the balance was achieved through practical trials within the digital simulation of the lever. Thus, the procedure of load-assessment could be performed "formally"

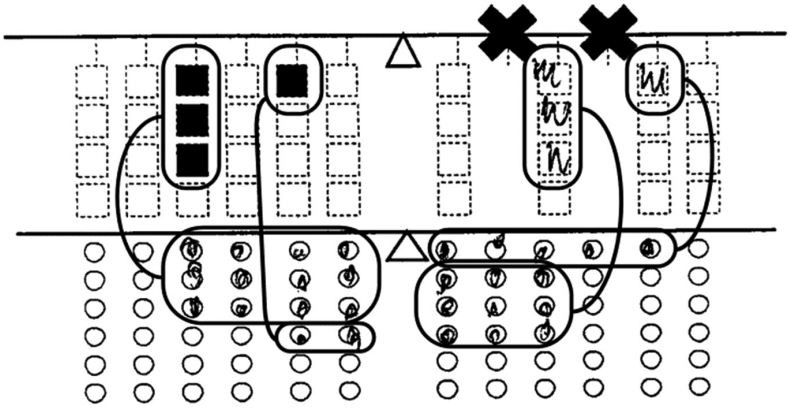


Figure 7. An example of the appropriate token (dots) notation to the balanced distribution of weights

Note: The curves link weights and their load contributions

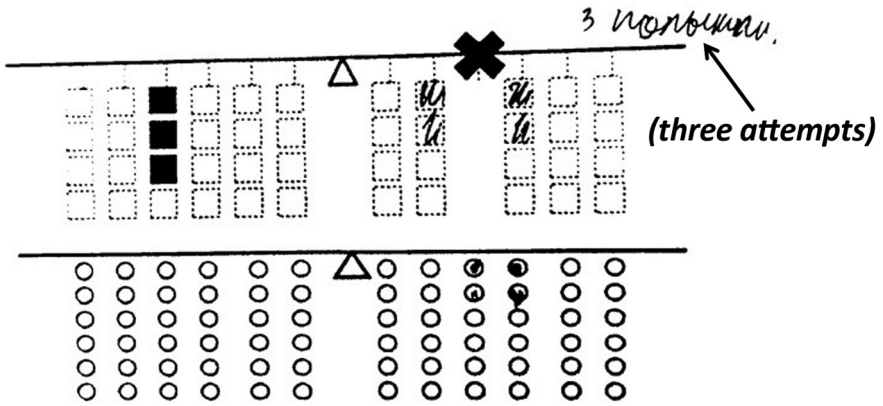


Figure 8. An example of token notation (four dots) that is irrelevant to the balanced distribution of weights, achieved by the student by means of practical trials

Note: The task was to balance the given configuration of three weights on the left with four weights provided. The student tried to copy the weight units' location from above with the token notation directly.

after the teachers' prescription (by about 30% of students, judging by their written works). Perhaps the students understood that the token notation corresponded to the equilibrium state: there were an equal number of tokens on both sides in some solutions, but this did not match the correct distribution of weights achieved by practical trials. The last two tasks, with only one attempt allowed to balance the lever, were mostly failed by the students: the correct configurations, however, were mostly followed by relevant token notation.

Analysis of the post-test filled-in blanks revealed that the wrong solutions (especially for Type II tasks) were mostly without any token notations, or with inappropriate ones, while the correct solutions coincided with the correct token notation. The results of the first teaching series confirmed that successful solution of complicated tasks, in which testing the balance through trials was disabled, depended on the seemingly troublesome and excessive procedure of marking "steps" of weights with tokens. The initial variant of teaching strategy showed that almost half of our sample learned to estimate, predict, and achieve the balance, referring to the load evaluation. However, it is disturbing that a significant number of students chose not to follow the simple and effective "step" rule and ignored the tokens, and consequently performed poorly. This made us search for and design a special learning situation to scaffold the adoption of the load evaluation procedure by students as their own thinking tool.

Analysis of students' work throughout the second teaching strategy, which supported students' joint problem-solving based on the distribution of the possible operations on different sides of the lever, confirmed that students relied on the counting-tokens procedure more than those in the first teaching series. We assume that it is the necessity to change the weights' position on both sides of the lever simultaneously that made students refer to the load evaluation procedure as the only means to coordinate their joint work, rather than a mere illustration of the obtained equilibrium. The contradiction between the intended relocation of weights, planned by each partner, and the ensuing conflicts, was resolved by the preliminary counting with tokens,

which allowed students to evaluate the possible load inflicted by their weights, before they were even placed on the lever, and to agree on their solution beforehand. Thus, the "common" coordinated scheme of load, created by weights configurations on both sides of the lever, served as a sound basis for handling the balance of the lever directly and allowed the students to reassess the task conditions through the lens of each operation's necessary contribution to the creation of equivalence within the restrictions presented. By adjusting one's own actions and the actions of one's partner to achieve equal load on both sides of the lever with an unequal amount of weight units, students managed to succeed in tasks even when the available number of practical trials was limited.

Conclusion

Our study focused on the general features of students' adoption of conceptual ways of thinking, which mediate dealing with complicated tasks based on the purposeful transformations of independent magnitudes, contributing to the required change of a dynamic object's state. Students' spontaneous attempts to find solutions for such problems lead to a series of rules and strategies (Boom et al., 2001; Filion & Sirois, 2021, Siegler, 2013), developing into an entangled tree of reasoning and gradually crashing over the scattered-weight task. Introduction of hands-on trials with a real or digital lever entertains students, but the conceptual way of handling the matter can hardly be invented by school students through mere trial and error. The torque concept is presented in natural science classes as the simple law of the lever (the multiplication of weight and distance for both sides), but its application is reduced to formula memorization. Studies show that difficulties with multiplicative concepts are still present in adulthood (Siegler, 2013). The researchers referred to the early school years, when students were not yet taught the balance rule and examined their ability to operate with two independent magnitudes simultaneously in solving a practical task and to grasp their contribution to the balance. In these studies, no means for achieving an equilibrium state evaluation were provided. Our design of the appropriate teaching strategy (Vysotskaya et al., 2023) started from the introduction of the "third magnitude" (Davydov, 1966), which coordinates changes of the independent parameters of an object. Thus, we aimed to define the structure of the modeling space, which will allow students to explicate transformations of this latent magnitude, and to embed it in their solutions to practical tasks.

However, even the direct demonstration (the first part of our study) of the adequate and effective means to build up the coordination between adding and moving weights, which could help to solve even the trickiest problems, is not enough to convince a considerable number of students to adopt them. Such students, who chose to rely on hands-on probes rather than on the procedure of load evaluation and viewed counting of tokens as a purely formal act, makes us pay special attention to the content of actions that mediate the adoption of this knowledge as new ways of thinking. The second part of our study slightly clarifies the mechanism of assimilation of conceptual ways of thinking as actual mediators of handling the matter through the introduction of special restrictions to the tasks, among which the most essential was the organization of students' interactions based on the distribution of operations

with the weights and the necessity to make the final decision: "The configuration is ready! Let's try it!". The functions of the load evaluation procedure shift from additional "illustrative" ones to essential "predictive" ones, towards the integrated result (the balance state) of the independent changes (weights' rearrangement) performed by the partners.

The significant gap in the post-test results of the two teaching series (especially in critical tasks) highlighted the difference in acquisition of the modeling tools and proves the need to design software that will establish for students the problem of the approbation and application of conceptual modeling tools as the only way to deal with the challenge of joint work. Recent research reviews (Belolutskaya, 2023, Benavides-Varela, 2020; Qureshi et al., 2021, and others) convince us that the issue of effectiveness as depending on digitalization of learning is urgent. We assume that an approach to computer support design, based on the preliminary analyses of the students' actions and on explication of their conceptual mediation, may be productive in terms of problem-solving and concept change.

The principles that we relied upon to design a learning situation that will scaffold students' adoption of the provided modeling tools according to their actual role as mediator of problem-solving, may contribute to the design of relevant educational mediation, digital mediation in particular. The purposeful changing of the model object, performed by a student explicitly, is to be considered as the initial form of action, responsible for concept acquisition. In regard to the balance task, it is the examination of ways to regain equilibrium for a lever within a variety of task conditions. The organization of joint learning activity requires a substantial distribution of the possible operations with the object, which poses the necessity to coordinate the model representation of the partial changes planned by the partners in order to achieve an integrated result. The formation of the concept and of the conceptual mediation for comprehension of the changes performed upon the object, therefore, should be based on the introduction of symbolic means to present the partial actions of the partners and their contribution to the general result within a special modeling space.

Limitations

A delayed post-test of students' model mediation quality was conducted only for part of our sample; the pilot results showed that students' later performance in balance tasks did not differ from their immediate results. However, we plan to conduct the delayed post-test for all our participants to assess the retention of the acquired concepts and their possible transition to related topics.

The integration of the designed module into the regular physics curriculum would be of interest, but was left out of this paper's scope. The influence of the multiplicative concepts formed within the equilibrium module on the transformation of the related physics' content is also to be examined in future studies.

Ethics Statement

The study followed the ethical guidelines of the institutional ethics review board and obtained approval. The research procedures involved no more than minimal risk for participants.

Informed Consent from the Participants' Legal Guardians (If the Participants Were Minors)

Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Conflict of Interest

The authors declare no conflict of interest.

References

Belolutskaya, A., Vachkova, S., & Patarakin, E. (2023). The connection of the digital learning component with the development of preschool and school-age children: A review of research and international educational practices. *Education and Self Development, 18*(2), 37–55. https://doi.org/10.26907/esd.18.2.04

Benavides-Varela, S., Zandonella Callegher, C., Fagiolini, B., Leo, I., Altoè, G., & Lucangeli, D. (2020). Effectiveness of digital-based interventions for children with mathematical learning difficulties: A meta-analysis. *Computers & Education, 157*, 103953. https://doi.org/10.1016/j.compedu.2020.103953

Bonawitz, E.B., van Schijndel, T.J., Friel, D., & Schulz, L. (2012). Children balance theories and evidence in exploration, explanation, and learning. *Cognitive Psychology, 64*(4), 215–234. https://doi.org/10.1016/j.cogpsych.2011.12.002

Boom, J., Hoijtink, H., & Kunnen, S. (2001). Rules in the balance: Classes, strategies, or rules for the balance scale task? *Cognitive Development, 16*(2), 717–735. https://doi.org/10.1016/S0885-2014(01)00056-9

Davydov, V.V. (2008). *Problems of developmental instruction*. Nova Science Publishers.

Davydov, V.V., Zinchenko, V.P., & Talyzina, N.F. (1983). The problem of activity in the works of A.N. Leontiev. *Soviet Psychology, 21*(4), 31–42. https://doi.org/10.2753/RPO1061-0405210431

Elkonin, D.B., & Davydov, V.V. (1966). *Vozrastnye vozmozhnosti usvoeniia znanii (mladshie klassy shkoly)* [Age capabilities in knowledge acquisition (early school grades)]. Prosveshchenie [Education].

Engeness, I. (2021). *P.Y. Galperin's development of human mental activity: Lectures in educational psychology*. Springer Nature. https://doi.org/10.1007/978-3-030-64022-4

Filion, V.M., & Sirois, S. (2021). Children's (Mis) understanding of the balance beam (Online Edition). *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.702524

Gal'perin, P.Y. (1989). Mental actions as a basis for the formation of thoughts and images. *Soviet Psychology, 27*(3), 45–64. https://doi.org/10.2753/RPO1061-0405270345

Howe, C., Nunes, T., & Bryant, P. (2011). Rational number and proportional reasoning: Using intensive quantities to promote achievement in mathematics and science. *International Journal of Science and Mathematics Education, 9*, 391–417. https://doi.org/10.1007/s10763-010-9249-9

Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books. https://doi.org/10.1037/10034-000

Jansen, B.R.J., & van der Maas, H.L.J. (2002). The development of children's rule use on the balance scale task. *Journal of Experimental Child Psychology, 81*, 383–416. https://doi.org/10.1006/jecp.2002.2664

Kloosterman, P. (2010). Mathematics skills of 17-year-olds in the United States: 1978 to 2004. *Journal for Research in Mathematics Education, 41*, 20–51. https://doi.org/10.5951/jresematheduc.41.1.0020

Konokotin, A.V. (2021). The use of computer tools in assessing the development of learning interactions in primary schoolchildren. *Psychological Science and Education, 26*(4), 5–19. https://doi.org/10.17759/pse.2021260401

Lamon, S.J. (2020). *Teaching fractions and ratios for understanding: Essential content knowledge and instructional strategies for teachers*. Routledge. https://doi.org/10.4324/9781003008057

Leontiev, A.N. (2003). Students' mastering of scientific concepts as the problem of educational psychology. In A.A. Leontiev, D.A. Leontiev, & E.E. Sokolova (Eds.), *The Formation of Psychology of Activity* (pp. 316–350).

Normandeau, S., Larivée, S., Roulin, J. L., & Longeot, F. (1989). The balance-scale dilemma: Either the subject or the experimenter muddles through. *The Journal of Genetic Psychology, 150*(3), 237–250. https://doi.org/10.1080/00221325.1989.9914594

Qureshi, M. I., Khan, N., Raza, H., Imran, A., & Ismail, F. (2021). Digital technologies in education 4.0. Does it enhance the effectiveness of learning? A systematic literature review. *International Journal of Interactive Mobile Technologies (iJIM), 15*(4), 31–47. https://doi.org/10.3991/ijim.v15i04.20291

Rubtsov, V.V. (Ed.). (1996). *Kommunikativno-orientirovannye obrazovatel'nye sredy. Psikhologiia proektirovaniia* [Communication-oriented educational environments. Design psychology]. Psychological Institute of RAE.

Rubtsov, V.V., Martin, L.M., & Hall, M.J.T. (1991). *Learning in children: Organization and development of cooperative actions.* Nova Science Publishers.

Rubtsov, V.V., & Ulanovskaya, I.M. (Eds.). (2021). *Collaborative learning and child development*. FGBOU VO MGPPU.

Siegler, R. (2013). *Children's thinking: What develops?* Lawrence Erlbaum Associates, Inc.

Siegler, R.S., & Chen, Z. (2008). Differentiation and integration: Guiding principles for analyzing cognitive change. *Developmental Science, 11*(4), 433–453. https://doi.org/10.1111/j.1467-7687.2008.00689.x

Solovieva, Yu.V., & Quintanar, L. (2021). Organization of learning process according to activity theory: Method in practice. *Lomonosov Psychology Journal*, *4*, 143–191. https://doi.org/10.11621/vsp.2021.04.05

Talyzina, N.F. (1988). *The psychology of learning.* Progress.

Van der Graaf, J. (2020). Inquiry-based learning and conceptual change in balance beam understanding. *Frontiers in Psychology, 11,* 1621. https://doi.org/10.3389/fpsyg.2020.01621

Vysotskaya, E.V. (1996). Predmetno-orientirovannye uchebnye sredy dlia formirovaniia poniatii v sovmestnoi uchebno-issledovatel'skoi deiatel'nosti [Object-oriented learning environments for concept-formation within joint learning inquiry activity]. In V.V. Rubtsov (Ed.), *Kommunikativno-orientirovannye obrazovatel'nye sredy. Psikhologiia proektirovaniia* [Communication-oriented educational environments. Design psychology] (pp. 92–131). Psychological Institute of RAE. https://psychlib.ru/inc/absid.php?absid=9161

Vysotskaya, E.V., Lobanova, A.D., & Yanishevskaya, M.A. (2022). Mastering models in a quasi-learning situation of problem-solving. *Psychological Science and Education, 27*(1), 27–36. https://doi.org/10.17759/pse.2022270103

Vysotskaya, E.V., Lobanova, A.D., & Yanishevskaya, M.A. (2023). *Propedevticheskii uchebnyi modul' "Ravnovesie": podderzhka kollektivno-raspredelennoi uchebnoi deiatel'nosti v formirovanii kognitivnykh i kommunikativnykh metapredmetnykh rezul'tatov* [Propaedeutic educational module "Equilibrium": support for joint learning activities in the formation of cognitive and communicative meta-subject results]. Author's Club.

Wachsmuth, I., Behr, M., & Post, T. (1983). Children's perception of fractions and ratios in grade 5. *Proceedings of the international group for the psychology of mathematics education VII*, 164–169. https://pub.uni-bielefeld.de/record/1779318

Original manuscript received March 5, 2023
Revised manuscript accepted May 12, 2024
First published online June 1, 2024

To cite this article: Vysotskaya, E., Yanishevskaya, M., Lobanova, A. (2024). The Features of Modeling Mediation in Digital Support for Formation of Multiplicative Concepts, *Psychology in Russia: State of the Art*, *17*(2), 100–113. DOI: 10.11621/pir.2024.0207

Psychology in Russia: State of the Art
Volume 17, Issue 2, 2024

Russian Psychological Society
Lomonosov Moscow State University

Career Orientations of Pre-Service Teachers: Exploring the Influence of Different Types of Universities

Roza A. Valeeva[a,b],*, Gulfiia G. Parfilova[a],
Faina M. Kremen[c], Sergei A. Kremen[c]

[a] *Kazan Federal University, Russia*
[b] *Federal Scientific Center of Psychological and Multidisciplinary Research, Kazan Branch, Russia*
[c] *Smolensk State University, Russia*
*Corresponding author. E-mail: valeykin@yandex.ru

Background. More than half of future teachers in our country receive professional training in classical universities, which determines a great variability of motivational-professional and planned career trajectories. At the same time, the type of university (federal or regional) significantly influences the conditions for forming a professional teacher. This study identifies career orientations of students attending classical universities of different types in order to determine trends in career preferences according to choice of university type.

Objective. This study aims to identify the peculiarities of career orientations of students studying at pedagogical bachelor degree programs of classical universities of different types (federal and regional), determining the interrelations of their indicators with socio-demographic and motivational-professional characteristics of the test subjects.

Design. The study was conducted in the form of a comparison of career orientations of the first-year students in teacher education programs (83 students of Kazan Federal University and 89 students of Smolensk State University). The empirical methods used included the adapted Schein's career anchors tool and a questionnaire revealing socio-demographic and motivational-professional variables to identify factors related to career orientations.

Results. The obtained results revealed common preferences for both universities in career orientations on the *service*, job stability and *lifestyle integration* scales, indicating stable trends in choosing the teaching profession. Students at both universities, who chose the teaching profession and plan to work in their specialty, demonstrate a readiness for professional development and overcoming difficulties. However, the university is an independent factor which determines differences ac-

Keywords: teaching profession, teacher education, professional career, career orientations, student of pedagogical bachelor degree, federal university, regional university

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)
http://psychologyinrussia.com

cording to the scales of *entrepreneurship*, *autonomy* and *management*. Students at a federal university are characterized by greater independence and initiative, but also more uncertainty in choosing a profession, in contrast to students at a regional university.

Conclusion. Considering student career orientations according to their socio-demographic and motivational-professional characteristics, allows us to obtain an objective and comprehensive picture of the professional choices of students from different types of universities, leading to more effective delivery of their professional development.

Introduction

By the beginning of the 21st century, most of the developed world has established diverse and flexible systems of teacher education. Meanwhile, the problems of teacher shortage and retention are still relevant (Watt & Richardson, 2023). In Russia, there is a shortage of teachers in schools despite a sufficient number of graduates in pedagogical specialties. A significant number of young teachers change their field of activity in the first years of work. These issues highlight the need for conscious and purposeful self-determination during professional education, since professional choice and professional education are closely interrelated and interdependent. Future career opportunities are determined by both the choice of training direction and the institution where the professional qualification is obtained.

In 2023, teacher training programs lasting four or five years were offered in 285 Russian universities (Vuzoteka, 2023). However, more than half of the country's students receive education not in specialized pedagogical universities but in traditional ones (Nazarov & Soboleva, 2020), which, due to the optimization processes of higher education, are categorized into federal, research, and regional universities. The Federal State Educational Standard for higher education ensures substantive consistence for teacher preparation programs across the university sector. However the type of university has an effect on factors such as faculty qualifications, opportunities for using innovations, and the material and technical equipment of the educational process, which collectively influences the quality of education (Shibanova et al., 2023). The diversity of pedagogical programs creates conditions for obtaining professional training in universities with different levels and statuses.

This study questions the impact of attending different types of universities for pedagogical education on students' career orientations, including their value perceptions of the profession, development prospects and motivation to work as a teacher (Valeeva et al., 2022).

This study is based on the *anchor model of professional development* (Super, 1990; Holland, 1997; Schein, 1990), within which career orientations are an element of self-concept, reflecting the direction of professional advancement chosen by the individual, based on their needs, motives, interests, abilities, and the social-cognitive career theory (Lent et al., 1994), which focuses on the interaction between people, their behavior, and the environment. According to this theory, the professional development of an individual is formatively influenced by the environment in which he realizes his agency (Minina et al., 2021).

Career orientations. Schein's Career Anchor Theory

In recent decades, the focus in career research has increasingly shifted towards studying the internal or subjective characteristics of a person: values, attitudes, and beliefs, rather than organizational aspects (Cappellen & Janssens, 2010). Highlighting these subjective elements in the career structure has focused attention on the study of career orientations, which, in the context of professional self-determination and professionalization, are considered a semantic disposition that serves to prioritize the direction of professional advancement and holds stable life meaning for the individual (Zhdanovich, 2008).

Schein proposed the concept of a *career anchor*, that is, "a combination of perceived areas of competence, motives, and values that [an individual] would not give up [because] they represent [his or her] real self" (Schein, 1990, p. 1). Career anchors are stable and long-term factors and reflect an individual's understanding of their strengths, weaknesses, competencies, value system and vision of a desired career. They are formed through accumulated experiences involving learning and self-development processes, family and environmental influences. The fit between career anchors and the work environment leads to positive outcomes such as job performance and job satisfaction (Schein, 1996).

The conceptualization of Schein's ideas involved examining how different anchors combine their complementarity, or incompatibility. Ramakrishna & Potosky (2003) showed in their study that proximity or opposite anchors have different effects on career outcomes. Wils et al. (2014) systematized the classification by identifying two perpendicular axes that form four quadrants: bureaucratic, change, careerist, and social. The first axis denotes the poles of individual and collective orientation, and the second axis denotes normative and affective orientation. Accordingly, the orientations included in the social quadrant are based on collective values and values of social relations. Researchers tested this model on employees working in different fields including, healthcare (Wils et al., 2014), management (Wils et al., 2016), and IT professionals (Igbaria & Baroudi, 2012; Chang & Wu, 2022). There has been no research on teacher career orientation in the context of this framework of analysis, although it can be assumed that career anchors, specific to the teaching profession, are concentrated in the social quadrant.

Russian researchers (Egorova, 2017; Sheveleva, 2019; Solovyova & Zausenko, 2015; Tsaritsentseva, 2014; Yurtaeva, 2012) used an adapted Schein's questionnaire for identifying career orientations among universities students. Career orientation in students is characterized by insufficient awareness and depend on the orientation and period of professional training (Polyanskaya & Ernazarova, 2019). However, Bukova & Chiker (2022) confirmed the relationship between career orientations and orientation but did not find statistically significant differences depending on the course of study.

Factors influencing career choices

Researchers have identified individual and contextual factors that influence career choices. Super (1990) argues that both individual (professional values, abilities, needs), and environmental factors (the influence of significant others) influ-

ence career choices. Socio-cognitive career theory (Lent et al., 1994) as a strand of Bandura's (1986) general socio-cognitive theory substantiate the relationship of vocational interest formation and academic and career choices and performance in educational and professional endeavors. They identify personal and extra-personal factors that help individuals develop their careers. The former include self-efficacy, expected outcomes, and goal-setting mechanisms, which may be influenced by gender, support from loved ones, learning experiences, and other contextual factors (Lent et al., 1994).

Personal factors

Research has extensively explored the relationship between personality characteristics and different aspects of career direction (Lent et al., 2019), identifying which personality traits (Lounsbury et al., 2005) and personal values (Fearon et al., 2018) are prerequisites for university students' career choices. Coleman et al. (2023) identified personality traits that influence career decisions and career indecision. Lounsbury et al. (2005) revealed that career choice is positively correlated to subjective well-being and successful transition from school to work. Students who are more deliberate in successfully pursuing career opportunities in their chosen career field tend to have higher levels of work-life satisfaction (Li et al., 2019).

Motivation has a significant influence on the formation of professional identity, beliefs, and opportunities in teacher career development (Thomson & Palermo, 2014). Traditionally, altruistic, intrinsic, and extrinsic motivations are considered the primary ones for the teaching profession. Altruistic motives such as serving society, contributing to its development and helping and supporting students are the most important factor in choosing the teaching profession. Internal motives are also significant and include an inherent interest in teaching, pleasure from the activity, an interest in the subject area of instruction, desire to work with children, and opportunities for professional or personal self-development. External motives include opportunities to combine work and family, job security and good working conditions (Fray & Gore, 2018).

Watt and Richardson (2007) developed the *factors influencing teaching choice* methodological approach (FIT-Choice). Numerous studies have identified that the most significant of these factors include, the values of social utility and intrinsic value of teaching, self-assessment of teaching abilities, positive previous experience of teaching and learning, values of personal utility. Teaching as a fallback and social influence is found to be the least effective (Fray & Gore, 2018).

A number of studies have examined the relationship of extrinsic and intrinsic values with the career management processes of university students. Jackson and Tomlinson (2019) found the leading importance of intrinsic career values in career planning. Sortheix et al. (2013) showed the relationship of intrinsic career values with work engagement.

The explanation of career decision making based on Holland's interest typology (Holland, 1997) involves finding a match between one's skills and interests and the profile of the relevant specialty (Nauta, 2010; Nye, et al., 2017). Students tend to enter higher education based on subject interest without having decided on a career path

(Vulperhorst et al., 2020). Research by Quinlan et al. (2022) shows that interest in a subject shapes the desire to maintain and develop it in a future career, ensuring proactivity in learning activities.

Contextual factors

Contextual factors also have a significant impact on career choice and development. In particular, culture (Guan et al., 2018), gender and past experiences (Lee et al., 2023) are significant. Other studies have linked social status (Duffy et al., 2018), social support (Dalla Rosa et al., 2019) and family influence (Marks et al., 2018) to career vocation. The influence of these contextual factors on young people's career self-efficacy, outcome expectations, career interests and goals has been proven (Kenny & Medvide, 2013).

Contextual factors influencing teacher career preference have sociocultural differentiation. In particular, in traditional cultures, a career as an educator is more in line with the female role because it is easier to combine it with family roles (Fray & Gore, 2018).

There are practically no studies that consider the choice of university for obtaining a profession as an independent variable. Most research has focused on the career expectations and intentions of foreign students (Ayoobzadeh et al., 2021). Ishakove and Kosheleva (2023) construct a typology of students' career trajectories in the correlation of local and global aspects. Bukova and Chiker (2022) compare career orientations of Russian students studying in various disciplines in metropolitan and regional universities. Al Tamimi et al. (2023) found that when choosing a university its reputation is a more significant factor compared to location and infrastructure. Examples of research on students' career orientations, considering the specific characteristics of the university (specialized, classical, federal, regional) are sporadic (Valeeva et al., 2022).

The combination of personal and contextual factors in choosing a teaching program and a university

It is obvious that there is a close relationship between the choice of specialty and the choice of university, but it is reasonable to consider them separately, as they are conditioned by different factors.

According to Russian studies, the choice of direction for applicants is on average more important than the choice of university (Shibanova et al., 2023). Teacher education remains one of the most popular, geographically widespread and provided with budgetary places in the Russian structure of higher education. Preservation of the average score (68 points) (Quality of admission to Russian universities, 2022) along with an increase in the number of applicants for both budget and extra-budget places testifies to the unchanged demand for teacher education in the regional labor markets, and the presence of its *target group* of applicants (Quality of admission to Russian universities, 2021). Despite the positive dynamics of the passing score, the pedagogical field remains less prestigious and is in demand primarily among families with less cultural capital (Shibanova et al., 2023). The influence of socioeconomic status, education, and professional status of parents on career and educational choices

is proven in a number of foreign (Ginevra et al., 2015) and Russian (Khavenson & Chirkina, 2019) studies.

However, individual factors such as an interest in a particular field which matches one's aptitudes, abilities, and school performance often mediate the influence of family socioeconomic characteristics (Bogdanov & Malik, 2020).

In Kuzmina's study (2013), students from less educated and well-off families were more prevalent among those in pedagogical specialties compared to engineering and economic specialties. At the same time, the students' motives for entering the pedagogical specialty include the needs of personal development, gaining new knowledge, the importance of the future profession, and external motives such as ease of entry or training and the desire to increase their social status (Kuzmina, 2013; Shibanova et al., 2023). The last group of motives, where the choice of university and specialty is primarily driven by the guarantee of obtaining a higher education diploma, is not uncommon for Russian entrants. However, this decision is often ineffective and limits their further career opportunities (Minina & Pavlenko, 2023). Another specific feature characteristic of teacher education is the perception of the teaching profession as predominantly female, which obviously affects the choice of this field by young people of different genders (Kremen & Kremen, 2021).

When choosing a university, a significant factor is the reputation of the educational organization, traditionally associated with the quality of education. This quality encompasses a wide range of parameters: the level of qualification of the faculty, technological equipment of the educational process, employment prospects of graduates (Shibanova et al., 2023).

If we talk about teacher training in classical universities, it is obvious that universities of different types: federal and regional have unequal opportunities to implement teacher education programs. The task of federal universities is to carry out scientific and innovative activities. Accordingly, the training of teachers in such universities is carried out with a wide use of the most modern educational technologies, integration of science and practice on the basis of experimental sites, which are the best educational institutions in the regions. Located in large cities, these universities are attractive for young people not only in their region and federal district, but also in the whole country. However, the most common type of classical universities is regional universities where teacher education has an *intra-regional* character and is characterized by a low level of education migration between regions (Nazarov & Soboleva, 2020).

Indicators of high quality activities in higher education institutions (HEI) include their ranking their special status, inclusion in various state projects, the Unified State Exam (USE) pass rates, competition for admission, and demand for graduates in the labor market. Higher status and prestigious HEIs are perceived as more selective. In Russian universities, selectivity is characterized by the absence of specific requirements imposed on applicants for admission (Bugakova & Prakhov, 2021). The key indicator of selectivity is an average USE score of at least 70 points, which indicates the quality of professional training through the demand for educational programs by applicants with high academic performance (Malinovskii & Shibanova, 2023).

Not only academic performance and USE results, but also various family characteristics influence the choice of a university. Families with higher incomes and

educational and professional status are willing to financially support their children if budget places are unavailable (Shibanova et al., 2023) and/or moving to another city is required. Families with medium and high socioeconomic status are more interested in educating their children at prestigious, selective universities (Eldegwy et al., 2022; Khavenson & Chirkina, 2019). Conversely, a low financial status acts as an external barrier to enroll in paid education or move to another region. Given that selective universities are not available in every region, the territorial factor can become a serious barrier to choosing a university (Malinovskii & Shibanova, 2023), not only because of financial difficulties, but also because of problems with psychological adaptation to another city. It is obvious that applicants with low USE scores from families with medium and low economic prosperity prefer programs with budgetary places at universities in their regions. According to the longitudinal study *Trajectories in Education and Profession* (Shibanova et al., 2023), applicants with an average USE score below 70 more frequently cite not only the quality of education but also their interest in a particular profession. This motivation may be conditioned by the certainty of career trajectory, which guarantees a job after graduation.

Purpose of the study

To identify the peculiarities of career orientations of students studying at pedagogical undergraduate programs of classical universities of different types (federal and regional), and to determine the interrelations of their indicators with socio-demographic and motivational-professional characteristics of the test subjects.

Research Questions

1. What are the differences in socio-demographic and motivational-professional characteristics of students enrolled in pedagogical programs in federal and regional universities?
2. Is there a single "career profile" specific for student-future teachers, regardless of the type of university?
3. Are social-demographic and motivational-professional characteristics linked to career orientations of students studying at universities of different types?
4. Is the type of university an independent factor determining differences in students' career orientations?

Methods

Characteristics of the study institutions

Kazan (Volga Region) Federal University (KFU) is the central university in the Volga Federal District, the largest federal university with more than forty eight thousand students from Russia and abroad. According to the international QS and World University Rankings, the University is among the top three Russian universities in Education. More than nine thousand students are are enrolled in *Education and Pedagogical Sciences*. The University offers different models of teacher education. Traditional model is developed by strengthening the personnel, laboratory and information base.

The distributed model is based on combining the capabilities of a classical university (fundamental training) and a pedagogical university (psychological, pedagogical and methodological training). Within the framework of the integrative model, variable educational trajectories are created for students and graduates entering the teaching profession from non-pedagogical training programs.

Smolensk State University (SmolSU) is the largest higher education institution in the region, offering a wide range of educational programs designed primarily for students from its own and neighboring regions. About five thousand students study at the university, 52% of them study on thirty five bachelor and master degree teacher training programs, implemented in eight faculties. The traditional model of teacher training prevails at the university, while elements of the integrative model are being developed.

In both universities offer budgetary and extra-budgetary places for admission to teacher education programs (bachelor's degree), with the same list of USE disciplines and minimum scores required for admission. The results of enrollment (see *Table 1*) suggest that teacher education at KFU is selective; the choice of this university among applicants with high scores indirectly indicates its high quality and established reputation t the national level. The average score for pedagogical programs at SmolSU slightly exceeds the average score for the country, indicating the university's stable position at the regional level.

Table 1

*Enrollment in teacher education programs in 2022**

	Budget admission, people	**Average score**	**Paid admission, people**	**Average score**
KFU	404	80.5	278	71.6
SmolSU	198	69.8	50	64.3

** According to the website "Monitoring the Quality of Admission to Higher Education Institutions" (https://ege.hse.ru/rating/2022/91645072/all/)*

Participants

The study was conducted among first-year undergraduate students at Kazan Federal University and Smolensk State University, majoring in *44.03.01 Teacher Training* and *44.03.05 Teacher Training* with two training profiles. At Kazan Federal University, students from all pedagogical programs of the Institute of Psychology and Education participated in the study: eighty three students from the programs, *Preschool Education*, *Primary Education and Foreign (English) Language*, and *Additional Education and Foreign (English) Language*. At Smolensk State University the study was conducted within the Faculty of Philology, where a total of eighty nine students from the programs, *Russian Language and Literature* and two foreign languages were surveyed. The number of girls: seventy five (90.4%) in KFU and eighty four (94.4%) in SmolSU. Average age of students: 18.6 years (SD - 0.695) in KFU and 18.5 years (SD — 0.692) in SmolSU.

All students were informed about the purpose of the study and participated on a voluntary basis. Anonymity and confidentiality were guaranteed to the participants.

Research Methods

To study students' career orientations, we chose the *Career Anchors* questionnaire by E. Schein (Chiker &Vinokurova, 2006), which is used to determine the main professional motives, value orientations, and social attitudes towards career and work. The methodology measures, on a 10-point scale, the level of eight career orientations: professional competence, management, autonomy, stability (place of work and place of residence), service, challenge, lifestyle integration of and entrepreneurship.

To determine the influence of various factors (socio-demographic and motivational-professional), a questionnaire was made, including the following variables: gender, form of education, economic status of the family, region of residence, place of residence, reasons for enrollment in this program, experience of pedagogical activity, professional plans.

Procedure

The collection of data was utilized the *Google Forms* service. The link to the survey was distributed to those first year students selected for the study. The instructions for the test indicated that participants should evaluate the statements in the context of the teaching profession. The study was conducted in May, 2023 at the end of the second academic semester.

Analysis

When analyzing the data, the sample was divided by universities according to the research design. The collected data were analyzed using IBM SPSS Statistics 23. First, the distribution of values of independent variables (construction of frequency distribution) was determined for comparison between the two groups. The method of hierarchical log-linear analysis was used to determine the relationships between nominal variables. Next, the mean values of nine career orientations were compared using the t-test for independent samples: (1) to compare the samples of two universities as a whole; (2) to determine significant differences for subgroups distinguished by socio-demographic and motivational-professional characteristics. To identify interrelationships in the structure of career orientations when comparing two samples, it was decided to abandon correlation analysis in favor of factor analysis (with varimax rotation) while preserving the calculated estimates as variables, allowed us to establish patterns of influence of independent variables on groups of career orientations.

Results

Socio-demographic and motivational-professional characteristics of students

Comparison of students by socio-demographic parameters (see Table 2) shows that among respondents in both groups, the majority are girls from middle-income families, with more than half residing in large cities. Among those studying at KFU, there

are significantly more students from other regions, which corresponds to the status of the university. This group is dominated by students from large cities or, regional centers. Smolensk State University also has a contingent of students from other regions, primarily those bordering the Smolensk region.

At SmolSU, more students are enrolled on an extra-budgetary basis, which accounts for the slightly higher percentage of well-off families and the smaller proportion of those living in rural areas. The distribution between the forms of education of students from their own and the other regions at SmolSU is approximately proportional across different forms of education. In contrast, at KFU, students enrolled in paid programs are predominantly from the other regions.

Table 2

Socio-demographic and motivational-professional characteristics of interviewees

Variable	Traits	Students KFU (n=83)		Students of SmolSU (n=89)	
		people	%	people	%
Gender:	female	75	90.4	84	94.4
	male	8	9.6	5	5.6
Form of education:	budgetary	70	84.3	57	64.0
	extra-budgetary	13	15.7	32	36.0
Family income:	affluent	10	11.1	13	14.6
	average income	64	77.1	63	70.8
	below average	7	8.4	10	11.2
	low-income	2	4.4	3	3.4
Place of residence:	city — regional center	48	57.8	52	58.4
	town/city — raion center	23	27.7	33	37.1
	rural area	12	14.5	4	4.5
University of enrollment:	own region	45	54.2	69	77.5
	other region	38	45.8	20	22.5
Motive for choosing of education/profession:	conscious	32	38.5	58	65.2
	random	51	61.5	31	34.8
Availability of teaching experience:	no experience	40	48.2	32	36.0
	experienced	43	51.8	57	64.0
Professional plans:	I'm going to work in my specialty	29	34.9	27	30.4
	more likely yes	24	28.9	34	38.2
	depending on circumstances	27	32.5	25	28.1
	no	3	3.6	3	3.4

There are a number of differences in motivational-professional characteristics. Among KFU students, almost two thirds of the respondents indicated the main rea-

son for choosing their direction of training was due to accidental circumstances, with the vast majority of these students enrolled on a budgetary basis. In contrast, only 35% of Smolensk State University students reported accidental circumstances as their main reason for choosing their direction of training 94% of the total number of admitted students randomly), while 65% of Smolensk State University students report chosing their field of study consciously. These indicators correspond to the responses regarding the presence of various forms of pedagogical experience before entering the university: 52% of KFU and 64% of SmolSU students reported having such experience. It is also important to note the less significant differences between the universities in terms of students' plans to work in their profession: 64% of respondents from KFU and 68% from SmolSU intend to work in the field of education. At SmolSU indicators generally correspond to the data on conscious enrollment motivation and the presence of pedagogical experience. The high percentage of KFU students may be explained by the fact that first year students undergo practical training. More than 60% of KFU respondents who entered for random reasons expressed an interest and desire to explore the teaching profession.

To identify patterns when comparing various variables, hierarchical log-linear analysis (see Table 3) was used. It was found that only a few socio-demographic variables are interrelated: in different types of universities, the number of students from other regions significantly differs depending on whether they are admitted to budget-funded or extra-budgetary placements.

In contrast, motivational-professional variables showed close connections both between pairs and in aggregate, indicating that conscious admission to a pedagogical program is associated with the presence of pre-university experience in this field and plans to work in the obtained specialty.

Additionally, connections between the type of university and motivation were recorded, confirming significant differences in conscious motivation for admission between students of federal and regional universities.

Table 3

Results of log-linear analysis

Effect	Chi squared test
University*Region	10.448*
Region*Form of education	6.287*
University*Place of residence*Motive	10.156*
Motive*University	11.769*
Motive*Experience*Professional plans	10.100*
Motive*Experience	5.644*
Motive*Professional plans	16.805**
Experience*Professional plans	18.024**

Note: $p<.05$; ** $p<.001$*

Career orientations of students

Comparison of mean scores of Schein's questionnaire shows values of 5.1 points and higher on all nine scales for students from both universities (see Table 4). This demonstrates the overall variability of career orientations among young people choosing teacher education.

Significant differences were recorded on the scales for *autonomy*, *entrepreneurship*, and *residential stability*, with the mean scores being higher among students from KFU. These differences can be attributed, firstly, to the larger number of non-local students who are forced to adapt to independent living and may face difficulties in doing so, hence the higher scores for *residential stability* and *autonomy*. Secondly, KFU students with high entrance scores and uncertain motivation may exhibit high aspirations, readiness to create new things, and overcome difficulties, which correlates to significantly higher scores for *entrepreneurship*.

Table 4

Descriptive statistics of the results of the Career Anchors questionnaire

Scale	KFU (n=83)		SmolSU (n=89)	
	Average	SD	Average	SD
Professional competence	6.1	1.36	6.2	1.76
Management	6.7	1.91	6.2	1.99
Autonomy	7.3*	1.43	6.7*	1.82
Job stability	7.9	1.55	8.1	1.64
Stability of place of residence	5.7*	2.20	5.1*	1.94
Service	8.1	1.43	8.2	1.50
Challenge	6.1	1.59	5.9	1.92
Lifestyle integration	7.7	1.29	7.7	1.53
Entrepreneurship	6.7**	1.86	5.5**	2.06
Cronbach's Alpha	0,826		0,823	

*Note: * p<.05; ** p<.001*

No significant differences were found on the other scales. The heist scores (>7) in both groups are observed for career orientations *service*, *job stability*, *lifestyle integration*. This indicates that students receiving pedagogical education, regardless of the university, perceive the teaching profession as significant for societal development (as reflected in the *service* scale) and consider it in demand and supported by social guarantees (as reflected in the *job stability* scale). The high scores on the *lifestyle integration* scale are explained by the clear predominance of young girls (about 90%) who are oriented towards combining gender and professional roles.

Sufficiently high scores on the *autonomy* scale in both groups may be due to the age characteristics of the subjects, This can be considered in the context of general adolescent patterns such as the formation of their own subjective position, or as a

characteristic of this generation (*Generation Z*), which prefers work without rigid frameworks allowing for self-actualize and personal enjoyment (Lotkin & Slizhevskaya, 2019).

The influence of socio-demographic and motivational-professional characteristics on career orientations

It was important for us to determine whether different types of factors affect students' career orientations, and whether this influence is similar across different types of universities. Therefore, the next step in our analysis was to identify groups of universities from the overall samples for comparing career orientations based on each variable (see *Table 2*). The use of the t-test for independent samples revealed several differences in socio-demographic and especially motivational-professional factors across most of the Schein methodology scales. Variables that showed the influence of factors on career orientation are summarized in *Table 5*.

In both groups, no significant differences were found in variables gender and region of admission. Among KFU students, career orientations also do not significantly differ by variables such as family income, place of residence, and teaching experience. Similarly, among SmolGU students, there are no differences by the variable of the form of study.

Table 5

T-test for the scales of the Career Anchors methodology based on socio-demographic and motivational-professional variables across different universities

Scale	KFU (n=83)		SmolSU (n=89)	
	Variable	**Difference**	**Variable**	**Difference**
Professional competence	Motive (*conscious / random*)[1]	.71164*	Motive (*conscious / random*)	.88409*
			Experience (*yes/no*)	.89079*
	Plans (*going to work / depending on circumstances, no*)	1.20230*	Plans (*going to work / depending on circumstances, no*)	2.17169**
			Plans (*going to work / more likely yes*)	.86035*
	Plans (*going to work / more likely yes*)	.71667*	Plans (*more likely yes / depending on circumstances, no*)	1.31134*
Management	-	–	Family income (*low-income / average income*)	–1.26593*
			Experience (yes/no)	1.02007*
			Plans (*going to work / depending on circumstances, no*)	1.25344*
Autonomy	Motive (*conscious / random*)	–.63811*	–	–
Job stability	Form of education (*budgetary / extra-budgetary*)	–1.55897*	Place of residence (*regional center / raion center*)	–1.04235*

Stability of place of residence	Plans (*going to work / depending on circumstances, no*)	1.65172*	Plans (*more likely yes / depending on circumstances, no*)	1.11765*
Service	Plans (*going to work / depending on circumstances, no*)	.76598*	Motive (*conscious / random*) Plans (*going to work / depending on circumstances, no*) Plans (*more likely yes / depending on circumstances, no*)	1.03560* 1.49180** 1.20378*
Challenge	–	–	Plans (*more likely yes / depending on circumstances, no*)	1.12857*
Lifestyle integration	Motive (*conscious / random*)	–.60282*	Motive (*conscious / random*)	.69399*
Entrepreneurship	–	–	Family income (*low-income / average income*) Family income (*low-income / affluent*) Plans (*more likely yes / depending on circumstances, no*)	–1.58071* –2.13846* 1.38277*

*Note: * p<.05; ** p<.001*

[1] *In parentheses are discrete values of the factor variables determining differences in mean scores of career orientation scales*

Among Kazan Federal University students, only one variable from the group of socio-demographic factors, *the form of education*, shows a correlation with the *job stability* scale: students studying on a budgetary basis tend to prefer working in stable organizations. For Smolensk State University students, socio-demographic indicators differentiate the career orientations of *management*, *job stability* and *entrepreneurship*. Students from small localities or those studying on an extra-budget basis are focused on more stable employment. Students from low-income families are less likely to engage in management work or start their own business.

Compared to socio-demographic variables, motivational-professional variables are much more likely to distinguish career orientations, especially those related to teaching. Students from both universities who consciously choose the pedagogical direction of training show higher scores on the *professional competence* scale. Certainty in professional plans positively influences not only this orientation but also *service* and "job stability".

The following differences across universities were identified. KFU students who randomly entered the pedagogical program have higher scores on *autonomy* and *lifestyle integration*, which may indicate uncertainty in the choice of a future profession for this group. SmolSU students, on the contrary, have higher rates of *integration* among those who consciously chose their field of study. Students at a regional university with previous teaching experience show higher scores on the *professional competence* and *management* scales, indicating the positive impact of early inclusion in practical activities on their understanding of professional development and the importance of management skills and responsibility in the work of a teacher. Also, among students in this group, high scores on the *management*, *challenge* and *entre-*

preneurship scales are associated with the desire to work in their chosen specialty. These orientations are integrated into their perception of the teaching profession.

In general, students of the regional higher education institution, who chose the pedagogical sphere for themselves. They also realize the social usefulness and status of their chosen profession and are ready to overcome difficulties and solve complex problems. In turn, the students at federal university, who have not determined their professional future, consider the pedagogical profession only in the context of its external characteristics: social significance and stability.

Factor analysis

To further compress the data and identify patterns of influence of variables on career orientations, a factor analysis of the scales was carried out. A KMO (Kaiser–Meyer–Olkin criterion) value of 0.797 demonstrates acceptable sampling adequacy. Bartlett's test of sphericity shows a statistically significant result of 601.444 ($p < .001$). As a result of the varimax rotation procedure, two factors were identified that explained 58.992% of the variance (see Table 6).

Table 6

Results of factor analysis of the "Career Anchors" questionnaire for the entire sample

Factor no.	Dispersion, %	Scales and values	
1	30.311	entrepreneurship	.894
		management	.821
		autonomy	.778
		challenge	.604
2	28.681	service	.739
		professional competence	.734
		job stability	.656
		lifestyle integration	.600
		stability of place of residence	.587
		challenge	.551

The first factor included orientations related to the changeable and careerist quadrants (Wils et al., 2014), which are linked to with greater levels of activity, initiative, and independence. The second factor included mainly orientations from the social and bureaucratic quadrants. The highlighted factors demonstrate which orientations participants associate with teaching activities and which they consider unrelated to teaching. The inclusion of the *challenge* orientation in both factors can be interpreted as readiness to overcome difficulties and solve complex tasks, which is important for any professional activity, including teaching.

Highlighting computed scores into variables and using the t-test allowed us to identify clear differences between factors, determining the influence of socio-demographic and motivational-professional variables (see *Table 7*).

Table 7

Average difference across socio-demographic and motivational-professional variables for factors

Variables	Factor 1	Factor 2
Socio-demographic:		
Gender (male / female)	–.14307163	.09771115
Form of education (budgetary / extra-budgetary)	.11106988	–.04672372
Family income (low-income / average income)	–.58620889	.07699762
Family income (low-income / affluent)	–.54031498	.08065645
Place of residence (regional center / raion center)	.31210136	–.27509365
Place of residence (raion center / rural area)	–.63399434*	.12261016
University of enrollment (own region / other region)	–.07843196	–.11504025
University (KFU / SmolSU)	.44227828*	–.12548736
Motivational-professional:		
Motive (conscious / random)	–.15649652	.33618986*
Availability of teaching experience (yes/no)	.11916852	.21741136
Plans (going to work / depending on circumstances, no)	.00850186	.79936503**
Plans (more likely yes / depending on circumstances, no)	.07896609	.46462872*

*Note: * p<.05; ** p<.001*

Based on the data obtained, there is a clear trend where socio-demographic variables show more significant differences in Factor 1 while motivational-professional variables are grouped in Factor 2. The socio-economic status of the family, region, place of residence do not significantly influence attitudes towards the teaching profession and their readiness to work as a teacher. This suggests that contextual factors have a much smaller impact on career choice compared to personality factors.

Regarding socio-demographic characteristics, significant differences are associated with the variable of place of residence, indicating that students from rural areas are less likely to show initiative, and strive for independently organized activities. Significant differences were identified between universities, indicating that more students enter the federal university, which is selective and highly rated, with a focus on independent activity and aspiration for managerial worklit is obvious that among these students, there are more individuals who view the teaching profession as one of several potential career paths, with diverse options for their professional development.

The scales that make up the second factor are related to motivational-professional variables: students at both universities who consciously chose their specialty and plan to pursue a career in it have higher scores on the corresponding career orientations. The most significant differences are observed between those who plan to work in

the profession and those who are still uncertain in their career choice. The variable *teaching experience* does not significantly influence these career orientations. It is evident that prior engagement in teaching activities positively impacts the choice of the teaching profession, but its absence is compensated for by the educational process.

The analysis shows that career orientations related to teaching activities naturally interact with the motivational and professional characteristics of students, regardless of the university. However, the overall socio-demographic differences among students shows that more students at KFU are entering the teaching specialty with a focus on independence, leadership roles and a willingness to take initiative.

Discussion

RQ1. The study found similarities between the groups of students from federal and regional in terms of gender, economic status and place of residence of families, which confirms the high homogeneity of socio-demographic characteristics of students (Shibanova et al., 2023; Zamyatnina, 2021) entering teacher education programs (Quality of admission to Russian universities, 2021). The fact that the federal university enrolls a significant number of students from other regions is explained by its status and quality of education. Additionally, the large number of budget places gives the opportunity to enroll well-performing students from middle- and low-income families living not only in large cities, but also in rural areas. However, it can be assumed that the opportunity to get higher education at the expense of budget places becomes the leading motive to the detriment of an informed professional choice (Minina & Pavlenko, 2023), which is especially noticeable at a federal university. Many students choose the opportunity to study at a high-status university, and the choice of field of study is secondary and is determined by favorable admission conditions. On the other hand, the certainty in the choice of teaching profession among students of a regional university is consistent with the data of the study - students with lower USE scores more often indicate interest in the chosen profession, which is associated with the certainty of their career plans (Shibanova et al., 2023).

RQ2. The study revealed career orientations correlated with the teaching profession among students at both universities: service, workplace stability and lifestyle integration. Service and integration are included in the social quadrant of the career anchors structure, while stability refers to the bureaucratic quadrant (Wils et al., 2014). This indicates that the teaching profession is perceived as collective in nature, combining values of interpersonal relationships with attention to social norms. Similar results were obtained in an earlier study conducted by the authors with over 600 first-year undergraduate students, all future teachers, from 6 Russian universities of different types (Valeeva et al., 2022). High scores on these scales among first-year students at pedagogical universities have been revealed in the studies by Tsaritsentseva (2014), who found high scores in stability and service; and Solovyova & Zausenko (2015), who reported high scores in stability of residence and lifestyle integration. We can assume the existence of a stable *career profile* of a teacher. However, this idea requires further research with the accumulation of data not only on career orientations of students at different stages of education, but also the study of teachers with different lengths of service. It is also advisable to compare career

orientations of students and teachers of different specializations in order to clarify whether there are invariant career orientations of pedagogical activity in general and their subject variations.

RQ3. One of the objectives of the research was to identify the factors, both personal and contextual, that influence the career orientations of students who are future teachers. The results show that individual socio-demographic factors influence career orientations, such as management, entrepreneurship, and job stability which are not predominant in the chosen field of activity:.

Personal factors, such as conscious motivation in choosing education and plans for future professional activities, on the contrary, demonstrate an influence not only on the aforementioned orientations career orientations of service and stability, but also on the orientations of professional competence, management and challenge. These factors contribute to professional development and the formation of important qualities for a teacher. However, analysis of the data from the combined sample did not reveal any differences by university. Our findings are consistent with the results of Sheveleva (2019), who found that the career orientation variables concerning *service*, *challenge*, and *professional competence* are the most significant motivational factors. An important aspect in the further study of students' career orientations is their degree of awareness. It is reasonable to study this in the dynamics from freshmen to graduates as suggested by Tsaritsentseva (2014).

Discussing the findings in the context of the FIT-Choice model (Watt & Richardson, 2007), it is possible to correlate *service* orientation with social utility values, *lifestyle integration* and "job stability" with personal utility values, *professional competence* and possibly *challenge* with intrinsic values. Accordingly, more conscious career motivation to the teaching profession includes not only social and extrinsic motives, but also intrinsic motives.

RQ4. Our study revealed differences in career orientations among students attending universities of different types. The university factor is a stronger differentiating factor than individual socio-demographic characteristics; it explains higher scores on the entrepreneurship, management, and autonomy scales among students at federal universities compared to regional ones. These confirmed differences stem from the fact that many students entering federal universities are clearly motivated by the intention to obtain education at a prestigious institution, and their choice of specific study fields may be driven by external motivation. In contrast, two-thirds of students at regional universities, enter their studies with an established preference for pedagogical fields of study. At the same time, the type of university does not have a significant impact on the career orientations of students motivated towards teaching professions.

Taking into account the influence of the type of university on the career orientations of students destined to be future teachers appears to be productive, as it allows for a comprehensive analysis of various factors, ranging from socio-demographic aspects, which reflect objective parameters and set the social context of the study, to motivational-professional factors, which determin its substantive aspect. Further research of career orientations should include as variables learning profiles, as well as features of the organization of theoretical and practical training in universities of various types.

Conclusion

In general, according to the results of the study, the career orientations of students from both universities can be considered positive prerequisites for the formation of stable career preferences and conscious plans to work as a teacher. However, federal university students showed a wider variability of career trajectories and uncertainty in professional choice.

These results are further supported by the grouping the career scales into two distinct factors. The first, *managerial-entrepreneurial* level, is influenced by socio-demographic variables, primarily the university. The orientations of the *professional-pedagogical* factor showed a connection with motivational and professional characteristics. Students who consciously choose the pedagogical profession, demonstrate not only beliefs in its high social significance, but also greater readiness for professional development, the overcoming of difficulties, the development of organizational skills, and initiative.

In the context of the anchor model, diagnosing the characteristics of students' career orientations already at the initial stage of professional training plays an important prognostic function. These characteristics should be taken into account when constructing individual educational trajectories of students, combining theoretical and practical training to stimulate the development of professional values and attitudes, and the formation of interest in the teaching profession. Within the framework of the social-cognitive approach, it has been established that personal and contextual factors have an unequal impact on the professional development of an individual. Also, the university itself, from the standpoint of its status and quality of education, is the most important environmental factor that creates conditions for professional development.

The ability to link the location of vocational education with employment prospects and career retention is essential at the initial stage of vocational training (Jackson & Wilton, 2017). This linkage has a positive impact on subjective career success (Chang et al., 2023).

The results and materials from the study can be useful for researchers examining the problem of personal and professional development of a teacher during their initial professional education. Additionally, education management, engaged in the design and organization of professional and pre-professional training of teachers, as well as teachers, developing programs for the development of professional career of pre-service teachers may also find the materials useful.

Limitations

The following limitations should be kept in mind when interpreting the study data. First, although the HEIs described are typical for their categories, using one HEI for each category may include additional unique characteristics not accounted for in the study but influencing the results. For example, the national factor in KFU or the proximity of the capital region for SmolSU. Using data from several universities for each category would reduce this influence. Secondly, the sample of respondents is limited, which may affect the reliability of the results. Thirdly, the compared groups of students have different specializations, which can also influence the differences in career orientations.

Ethics Statement

The study procedures conformed to the ethical standards adopted at Kazan (Volga Region) Federal University and Smolensk State University. The participants were informed about the study objectives before the study and took part in the study voluntarily.

Author Contributions

R.V. and S.K. proposed the idea for the study. R.V. conceptualized the study. F.K. and G.P. developed the research design. G.P. and S.K. collected the data and formed the database. F.K. performed statistical analysis of the data and prepared the initial draft. S.K. and F.K. drafted the manuscript. R.V. performed the review and editing of the manuscript. All authors discussed the results of the study and contributed to the final version of the manuscript.

Conflict of Interest

The authors declared that there are no conflicts of interest.

Acknowledgments

This paper has been supported by the Kazan Federal University Strategic Academic Leadership Program (PRIORITY-2030)

References

Al Tamimi, N.N.M., Al Mashrafi, O.M.S., & Thottoli, M.M. (2023). Exploring the Factors that Influence University Selection: Insights from College Students. *Journal of Business and Management Review*, *4*(6), 439–454. https://doi.org/10.47153/jbmr46.7142023

Ayoobzadeh, M., Lyons, S. & Schweitzer, L. (2021). Career expectations of international and domestic students in Canada. *International Journal for Educational and Vocational Guidance*, *23*(1), 77– 96.. https://doi.org/10.1007/s10775-021-09504-0

Bandura, A., & National Inst of Mental Health. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall, Inc.

Bogdanov, M.B., & Malik, V.M. (2020). Kak sochetaiutsia sotsial'noe, territorial'noe i gendernoe neravenstva v obrazovatel'nykh traektoriiakh molodezhi Rossii? [Social, territorial and gender inequalities in educational trajectories of the Russian youth]. *Monitoring obshchestvennogo mneniia: ekonomicheskie i sotsial'nye peremeny* [Monitoring of Public Opinion: Economic and Social Changes Journal]*, 3*(157), 392–421. https://doi.org/10.14515/monitoring.2020.3.1603

Bugakova, P.O., & Prakhov, I.A. (2021). Obzor modelei priema abiturientov v VUZy i ikh vliianie na dostupnost' vysshego obrazovaniia [The Characteristics of the University Admission System and Their Influence on the Accessibility of Higher Education]. *Universitetskoe upravlenie: praktika i analiz* [University Management: Practice and Analysis], *25*(4), 37–54. https://doi.org/10.15826/umpa.2021.04.035

Bukova, Ya.S., & Chiker, V.A. (2022). Kar'ernye orientatsii studentov Rossiiskikh VUZov [Career orientations of students of Russian universities]. *Mir pedagogiki i psikhologii* [The World of Pedagogy and Psychology], *12*(77), 49–60.

Cappellen, T., & Janssens, M. (2010). The career reality of global managers: An examination of career triggers. *The International Journal of Human Resource Management*, *21*(11), 1884–1910. https://doi.org/10.1080/09585192.2010.505090

Chang, C.L. & Wu, S. (2022). The Circumplex Model for Structuring Career Anchors of the IT/IS Personnel. *Journal of Global Information Management (JGIM), 30*(1), 1–27. http://doi.org/10.4018/JGIM.307118

Chang, P.-C., Guo, Y., Cai, Q., & Guo, H. (2023). Proactive Career Orientation and Subjective Career Success: A Perspective of Career Construction Theory. *Behavioral Sciences*, *13*(6), 503. https://doi.org/10.3390/bs13060503

Coleman, C.E., Lenz, J.G., & Osborn, D.S. (2023). The relationships among the big 5 personality factors and negative career thoughts. *The Career Development Quarterly*, *71*, 30–40. https://doi.org/10.1002/cdq.12313

Dalla Rosa, A., Vianello, M., & Anselmi, P. (2019). Longitudinal predictors of the development of a calling: New evidence for the a posteriori hypothesis. *Journal of Vocational Behavior*, *114*, 44-56. https://doi.org/10.1016/jjvb.2019.02.007

Duffy, R.D., Autin, K.L., England, J.W., Douglass, R. P., & Gensmer, N. P. (2018). Examining the effects of contextual variables on living a calling overtime. *Journal of Vocational Behavior, 107*, 141–152. https://doi.org/10.1016/j.jvb.2018.04. 003

Egorova, U.G. (2017). Kar'ernye orientatsii v studencheskom vozraste [Career orientations in student age]. *Izvestiya Samarskogo nauchnogo tsentra Rossiiskoi akademii nauk. Sotsial'nye, gumanitarnye, mediko-biologicheskie nauki* [News of the Samara Science Centre of the Russian Academy of Sciences. Social, humanitarian, medicobiological sciences], *19*(6), 26–30.

Eldegwy, A., Elsharnouby, T.H., & Kortam, W. (2022) Like father like son: the role of similar-education parents in their children's university choice. *Journal of Marketing for Higher Education,* 1–20. https://doi.org/10.1080/08841241.2021.2018087

Fearon, C., Nachmias, S., McLaughlin, H., & Jackson, S. (2018). Personal values, social capital, and higher education student career decidedness: a new 'protean'-informed model. *Studies in Higher Education, 43*(2), 269–291. https://doi.org/10.1080/03075079.2016.1162781

Fray, L., & Gore, J. (2018). Why people choose teaching: A scoping review of empirical studies, 2007–2016. *Teaching and Teacher Education, 75*, 153–163. https://doi.org/10.1016/j.tate.2018.06.009

Ginevra, M.C., Nota, L., & Ferrari, L. (2015). Parental support in adolescents' career development: parents' and children's perceptions. *The Career Development Quarterly, 63*(1), 2–15. https://doi.org/10.1002/j.2161-0045.2015.00091.x

Guan, Y., Liu, S., Guo, M.J., Li, M., Wu, M., Chen, S.X., Xu, … & Tian, L. (2018). Acculturation orientations and Chinese student sojourners' career adaptability: The role of career exploration and cultural distance. *Journal of Vocational Behavior, 104*, 228–239. https://doi.org/10.1016/j.jvb.2017.11.008

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments*. Psychological Assessment Resources. Psychological Assessment Resources.

Igbaria, M., Baroudi, J.J. (1993). A short-form measure of career orientations: A psychometric evaluation. *Journal of Management Information Systems, 10*(2), 131–154. https://doi.org/10.1080/07421222.1993.11518003

Iskhakova, M., & Kosheleva, S. (2023). Global vs local career intentions and career trajectories in the student's domain. *International Journal of Employment Studies, 31*(1), 5–37. https://search.informit.org/doi/10.3316/informit.259154643476487

Jackson, D., & Tomlinson, M. (2019). Career values and proactive career behaviour among contemporary higher education students. *Journal of Education and Work*, *32*(5), 449–464. https://doi.org/10.1080/13639080.2019.1679730

Jackson, D., & Wilton, N. (2017) Perceived Employability among Undergraduates and the Importance of Career Self-Management, Work Experience and Individual Characteristics. *Higher Education Research and Development*, *36*, 747–762. https://doi.org/10.1080/07294360.2016.1229270

Kachestvo priema v rossiiskie vuzy: 2021 (rezul'taty 11-go monitoringa) [Quality of admission to Russian universities: 2021 (results of the 11th monitoring)] (2021). Natsional'nyi issledovatel'skii universitet "Vysshaya shkola ekonomiki" *[National Research University Higher School of Economics]*. https://www.hse.ru/ege2021/

Kachestvo priema v rossiiskie vuzy: 2022 Vypusk 2 [Quality of admission to Russian universities: 2022 Issue 2]. Ukrupnennye predmetnye gruppy (napravleniya i spetsial'nosti) [Aggregated subject groups (directions and specialties)] (2022). Natsional'nyi issledovatel'skii universitet "Vysshaya shkola ekonomiki" *[National Research University Higher School of Economics]*. https://www.hse.ru/ege2022-2/

Kenny, M., & Medvide, M.B. (2013). Relational influences on career development. In S.D. Brown & R.W. Lent (Eds.), *Career development and counseling: Putting theory and research to work* (pp. 329–356). Wiley.

Khavenson, T.E., & Chirkina, T.A. (2019). Obrazovatel'nyi vybor uchashchikhsia posle 9-go i 11-go klassov: sravnenie pervichnykh i vtorichnykh effektov sotsial'no-ekonomicheskogo polozheniia sem'i [Student Educational Choice after the 9th and 11th Grades: Comparing the Primary and Secondary Effects of Family Socioeconomic Status]. *Zhurnal issledovaniia sotsial'noi politiki* [The Journal of Social Policy Studies], *17*(4), 539–554. https://doi.org/ 10.17323/727-0634-2019-17-4-539-554

Kremen, F., & Kremen, S. (2021). The influence of gender leadership styles of teachers on the professional choice. *The European Proceedings of Social & Behavioural Sciences EpSBS*, EdCW2020, 94–103. https://doi.org/10.15405/epsbs.2021.07.02.12

Kuzmina, Yu.V. (2013) Vybor spetsial'nosti obucheniia: priamoi i nepriamoi effekt semeinykh faktorov [The choice of fields of study: the direct and indirect effects of family background]. *Vysshee obrazovanie v Rossii* [Higher Education in Russia], 10, 133–140.

Lee, S.D., Aquino, A., Kuncel, N.R., & Hansen, J.-I.C. (2023). Personality predictors of career exploration: A meta-analysis. *The Career Development Quarterly, 71*(1), 41–55. https://doi.org/10.1002/cdq.12315

Lent R.W., Brown S.D., & Hackett G. (1994). Toward a Unifying Social Cognitive Theory of Career and Academic Interest, Choice, and Performance. *Journal of Vocational Behavior, 45*(1), 79–122. https://doi.org/10.1006/jvbe.1994.1027

Lent, R.W., Morris, T.R., Penn, L.T., & Ireland, G.W. (2019). Social–cognitive predictors of career exploration and decision-making: Longitudinal test of the career self-management model. *Journal of Counseling Psychology, 66*(2), 184–194. https://doi.org/10.1037/cou0000307

Li, H., Ngo, H.-y., & Cheung, F. (2019). Linking protean career orientation and career decidedness: The mediating role of career decision self-efficacy. *Journal of Vocational Behavior,* 115, Article 103322. https://doi.org/10.1016/j.jvb.2019.103322

Lotkin, I.V., & Slizhevskaya, A.N. (2019). Pokolenie Z: psikhologicheskie osobennosti i tsennosti (na primere Omskogo gosudarstvennogo universiteta putei soobshcheniia) [Psychological Features and Values of Generation Z (through the example Omsk State Transport University (OSTU)]. *Nauka o cheloveke: gumanitarnye issledovaniia* [Russian Journal of Social Sciences and Humanities], *4*(38), 163–167. https://doi.org/10.17238/issn1998-5320.2019.38.163

Lounsbury, J.W., Hutchens, T., & Loveland, J.M. (2005). An Investigation of Big Five Personality Traits and Career Decidedness Among Early and Middle Adolescents. *Journal of Career Assessment, 13*(1), 25–39. https://doi.org/10.1177/1069072704270272

Malinovskii, S.S., & Shibanova, E.Yu. (2023). Bar'ery dostupnosti vysshego obrazovaniia i sotsial'nye faktory differentsiatsii obrazovatel'nykh traektorii: Informatsionnyi biulleten' [Barriers to Access to Higher Education and Social Differentiation of Educational Pathways: Information Bulletin]. *Monitoring ekonomiki obrazovaniia* [Monitoring of Education Markets and Organizations.], *8*(50). Natsional'nyi issledovatel'skii universitet "Vysshaia shkola ekonomiki" [National Research University "Higher School of Economics"].

Marks, L.R., Harrell-Williams, L.M., Tate, K.A., Coleman, M.L., & Moore, K. (2018). Family influence, critical consciousness, and career calling in women of color. *The Career Development Quarterly, 66*(4), 329–343. https://doi.org/10.1002/cdq.12154

Minina, E., & Pavlenko, E. (2023) 'Choosing the lesser of evils': cultural narrative and career decision-making in post-Soviet Russia. *Journal of Youth Studies, 26*(9), 1109–1129. https://doi.org/10.1080/13676261.2022.2071123

Minina, E.V., Pavlenko, E.S., Kiryushina, M.A., & Yakubovskaya, A.A. (2021). Kar'ernoe konsul'tirovanie v sovremennom mire: teorii i praktiki v Rossii i za rubezhom [Career Counselling in today's World: Theory and Practices in Russia and Abroad]. Sovremennaia analitika obrazovaniia[Modern education analytics.], *2*(51). Natsional'nyi issledovatel'skii universitet "Vysshaia shkola ekonomiki" [National Research University "Higher School of Economics"].

Nauta, M.M. (2010). The development, evolution, and status of Holland's theory of vocational personalities: Reflections and future directions for counseling psychology. *Journal of Counseling Psychology, 57*(1), 11–22. https://doi.org/10.1037/a0018213

Nazarov, M., & Soboleva, E. (2020). *Pedagogicheskie VUZy – "novyi povorot"?* [Pedagogical universities - a "new twist"?]. https://www.dvfu.ru/expertise/news/education/teaching_a_new_twist/

Nye, C.D., Su, R., Rounds, J., & Drasgow, F. (2017). Interest congruence and performance: Revisiting recent meta-analytic findings. *Journal of Vocational Behavior*, *98*, 138–151. https://doi.org/10.1016/j.jvb.2016.11.002

Polyanskaya, E.N. & Ernazarova D. D. (2019). Sravnitel'nyi analiz kar'ernykh orientatsii rossiiskikh i kitaiskikh studentov [Comparative analysis of career orientations of Russian and Chinese students]. *Kazanskii pedagogicheskii zhurnal* [Kazan Pedagogical Journal], *5*(136), 189–196.

Quinlan, K.M., & Renninger, K.A. (2022). Rethinking employability: how students build on interest in a subject to plan a career. *Higher Education, 84*(4), 863–883. https://doi.org/10.1007/s10734-021-00804-6

Ramakrishna, H.V., & Potosky, D. (2003). Conceptualisation and exploration of composite career anchors: An analysis of Information Systems Personnel. *Human Resource Development Quarterly*, *14*(2), 199–214. https://doi.org/10.1002/hrdq.1060

Schein, E.H. (1990). *Career Anchors: Discovering Your Real Values*. Pfeiffer & Company.

Schein, E.H. (1996). Career anchors revisited: Implications for career development in the 21st century. *Academy of Management Executive*, *10*(4), 80-88.

Sheveleva, A.M. (2019). Kar'ernye orientatsii studentov-psikhologov v sochetanii s uchebno-trudovymi motivami[Career orientations of psychology students in combination with educational and labor motives]. *Mir nauki. Pedagogika i psikhologiia* [The world of science. Pedagogy and psychology], *5*. https://mir-nauki.com/PDF/74PSMN519.pdf

Shibanova, E.Yu., Malinovskii, S.S., Abalmasova, E.S., & Maslova, E.A. (2023). *Kuda podat'sia: tsennosti, faktory i posledstviia vybora vysshego obrazovaniia v Rossii* [Where to go: Values, factors and consequences of choosing higher education in Russia]. Ekspertno-analiticheskii doklad NIU VShE; Yandeks obrazovanie [Expert analytical report. National Research University Higher School of Economics; Yandex education]. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://yastatic.net/s3/academy/research/Values_factors_and_consequences_of_choosing_higher_education_Yandex.pdf

Solovyova, E. M., & Zausenko, I. V. (2015). Tsennosti i kar'ernye orientatsii studentov pedagogicheskogo VUZa [Values and career orientations of pedagogical university students]. *Sovremennye problemy nauki i obrazovaniia* [Modern problems of science and education], 3. https://science-education.ru/ru/article/view?id=20248

Sortheix, F.M., Dietrich, J., Chow, A., & Salmela-Aro, K. (2013). The role of career values for work engagement during the transition to working life. *Journal of Vocational Behavior, 83*(3), 466–475. https://doi.org/10.1016/j.jvb.2013.07.003

Super, D.E. (1990). A life span, life-space approach to career development. In D. Brown & L. Brooks, & associates (Eds.), *Career choice and development* (pp. 197–261). San Francisco: Jossey-Bass.

Thomson, M.M., & Palermo, C. (2014). Preservice teachers' understanding of their professional goals: Case studies from three different typologies. *Teaching and Teacher Education, 44*, 56-68. https://doi.org/10.1016/j.tate.2014.08.002

Tsaritsentseva, O.P. (2014). Kar'ernye orientatsii v starshem shkol'nom i studencheskom vozraste [Career orientations in high school and student age]. *Obrazovatel'nye tekhnologii* [Educational technologies], *3*, 58-68.

Valeeva, R.A., Parfilova G.G., Demakova, I.D. [et al.]. (2022). Motivation of the professional career of future teachers. *Education and Self Development, 17*(3), 169-186. https://doi.org/ 10.26907/esd.17.3.14

Vulperhorst, J.P., van der Rijst, R.M., & Akkerman, S.F. (2020). Dynamics in higher education choice: weighing one's multiple interests in light of available programmes. *Higher Educatio*n, *79*, 1001–1021. https://doi.org/10.1007/s10734-019-00452-x

Vuzoteka (2023) *Pedagogical universities of Russia* [Website]. https://vuzoteka.ru/вузы/педагогические

Watt, H.M.G., & Richardson, P.W. (2007). Motivational factors influencing teaching as a career choice: Development and validation of the FIT-Choice Scale. *Journal of Experimental Education*, *75*(3), 167–202. https://doi.org/10.3200/JEXE.75.3.167-202

Watt, H.M.G., & Richardson, P.W. (2023). Supportive School Workplaces for Beginning Teachers' Motivations and Career Satisfaction. In Urdan, T. and Gonida, E.N. (Eds.) *Remembering the Life, Work, and Influence of Stuart A. Karabenick (Advances in Motivation and Achievement*, Vol. 22) (pp. 115–138). Emerald Publishing Limited, Leeds,. https://doi.org/10.1108/S0749-742320230000022009

Wils, T., Bélanger, J., & Gosselin, E. (2016). Rival Structures for Career Anchors: An Empirical Test of the Circumplex. *Canadian Journal of Career Development*, *15*(2), 17–29. https://cjcd-rcdc.ceric.ca/index.php/cjcd/article/view/150

Wils, T., Wils, L., & Tremblay, M. (2014). Revisiting the career anchor model: A proposition and an empirical investigation of a new model of career value structure. *Industrial Relations, 69*(4), 813–839. https://doi.org/10.7202/1028113ar

Yurtaeva, N.I. (2012). Upravlenie kar'ernymi orientatsiiami v professional'nom razvitii studentov inzhenernogo VUZa [Management of career orientations in the professional development of engineering university students]. *Vestnik Kazanskogo tekhnologicheskogo universiteta* [Bulletin of Kazan Technological University], *15*(1), 300–306.

Zhdanovich, A.A. (2008). *Kar'ernye orientatsii v strukture professional'noi Ia-kontseptsii studentov* [Career orientations in the structure of students' professional Self-Concept]. Dissertatsiia kandidata psikhologicheskikh nauk [Candidate of psychological sciences dissertation]. Natsional'nyi issledovatel'skii universitet "Vysshaya shkola ekonomiki" [National Research University "Higher School of Economics"]. http://www.hse.ru/data/681/929/1235/avt%5fZdanovich.pdf

Original manuscript received March 26, 2024
Revised manuscript accepted June 25, 2024
First published online June 30, 2024

To cite this article: Valeeva, R.A., Parfilova, G.G., Kremen, F.M., Kremen, S.A. (2024). Career Orientations of Pre-Service Teachers: Exploring the Influence of Different Types of Universities, *Psychology in Russia: State of the Art*, *17*(2), 114–137. DOI: 10.11621/pir.2024.0208