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Russian Psychological Journal

Russian Psychological Journal is a peer-reviewed open access journal that publishes original research papers on all aspects of psychology.

It was founded by the Russian Psychological Society in 2004.

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The journal adheres to international standards of publishing ethics in accordance with the recommendations of the Committee on Publication Ethics (COPE).

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Research article

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Using the Internet User's Self-report Diagnostic Tool to Study Specific Characteristics of Internet-based Socialization Among Adolescents and Young Adults with Intellectual Disabilities

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Abstract

Introduction. The study of specific characteristics of online socialization among adolescents and young adults with disabilities, especially intellectual disabilities, is a new and promising direction in special education that requires the development of methodological approaches and foundations for conducting research of this kind.

Methods. The study of specifics characteristics of online socialization in individuals with intellectual disabilities is associated with a description of their socialization and online-based formation, in comparison with typically developing peers. Researchers should understand online interaction as a form of alternative communication, a way of adaptation and a potential source of online risks individuals face. The Internet User's Self-report diagnostic tool was tested using the samples of typically developing adolescents and young adults (n = 181) and respondents of the same age with intellectual disabilities (n = 119).

Results. Testing the Internet User's Self-report using samples of adolescents and young adults with mental retardation and their typically developing adolescents showed that this diagnostic tool is easily understood by respondents from both groups and can identify qualitative and quantitative differences between the samples. The respondents with mental retardation show less online activity related to search for information and a low awareness of online phenomena and the phenomena of online interaction; they use the Internet as an additional field for realizing the need for communication and more aggressively protect their online interaction space from parental control.

Discussion. The presented data open up promising directions of research in the field of online socialization of students with developmental disabilities, including (a) primary screening within the framework of the primary disease in comparison with typically developing peers, (b) in-depth study of age ranges within nosologies and identification of age differences within nosological groups, and (c) differentiated study comparing different nosological categories and identifying intergroup differences.

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Keywords
mental retardation, online socialization, Internet, personality, adolescents, young adults, Internet users, online risks, communication, online interaction

Highlights
- The development of tools for studying online socialization is associated with understanding online interaction as an alternative communication, a way of adaptation, and a potential source of online risks individuals face.
- Adolescents and young adults with mental retardation and typical development have common characteristics of online socialization, including high motivation to use the Internet for individual purposes (for example, viewing photos and videos, searching for various information, online games, communication, and entertainment using interesting multimodal content).
- Adolescents and young adults with mental retardation have an insufficiently realized need for communication in an online context and a tendency towards online hypersociality.

Acknowledgments
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Introduction
For individuals with disabilities, in particular students with intellectual disabilities, social realization on the Internet may be characterized as an alternative form of social adaptation, expanding the habilitation prerequisites for the integration of such individuals into society and activating the compensation potential in adolescents or young adults with special needs. The online adaptation may require a teacher and psychologist to assess the necessity of creating additional special conditions for the successful online socialization of students with developmental disabilities. The qualitative uniqueness and potential possibilities of online socialization among individuals with disabilities, in particular intellectual disabilities, still remain understudied.

This study *aims* to develop and test the Internet user's Self-report diagnostic tool in the context of studying certain aspects of online socialization of adolescents and young adults with disabilities, in particular mental retardation, in comparison with their typically developing peers. A number of preliminary considerations provided a conceptual framework for the approach to studying specific characteristics of online socialization of adolescents and young adults with intellectual disabilities and methodological tools developed in this study.

We believe that in this case online socialization should be understood not only as a process of personality development and assimilation of online experience, but also as a polycontextual

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integrative modus of personal realization, demonstrating an individual's ability to his/her own formation in the existing diverse and changing online conditions.

The Internet, which becomes the most important socialization institution for individuals, has a decisive influence in the context of new technologies of informatization and globalization in today's society (Arnoux et al., 2017; Danilov, 2012). The Internet transmits such characteristics of space that describe it as something filled with social meaning and content, bearing both potentials and risks, as the emergence of virtual social reality is both a cause and a result of online interactions (Beck, 1992; Golbeck, Robles, & Turner, 2011; Danilov, 2012). The Internet, in turn, becomes an alternative field which offers young individuals expanded possibilities for finding themselves and realizing their interests (Yartsev, 1999; Karpukhin, 2000).

The modern educational and communication environment is increasingly 'digitalized'. Networked interaction becomes the main media mechanism of socialization, initiating large-scale changes in the content and forms of relationships between individuals of various ages in the online space (Boyd & Pennebaker, 2017; Celli, Bruni, & Lepri, 2014; McLuhan, 2007).

Online communication appears to be a specific environment for social interactions (Farnadi et al., 2016). It has the following characteristics: (a) presence of an audience of online resources with common value orientations; (b) social importance of online information for the emergence and development of interpersonal interactions; (c) technical environment that ensures the process of online interaction; (d) heterogeneity of the social environment/audience of online resources; (e) illusory nature of freedom of behavior and action; (f) anonymity that enables individuals to overcome communication barriers; (g) reduction of non-verbal communication, which is partially replaced by the use of smiles, emoji, and audio messages; (h) need to 'complete' the image of a online interlocutor unknown in real life using social stereotypes; (i) decrease in the pace of communication; and (g) intensification and concentration of information in verbal/written communication (Dibble & Levine, 2013; Kalimeri, Beiró, Delfino, Raleigh, & Cattuto, 2019; Kolokol'tseva & Lutovinova, 2012; Chuiko, 2012; Danilov, 2012).

Individuals' participation in online communities is one of the socio-integrative forms of individual realization in online interaction, which has the following attributes: (a) all the participants in communication interaction can build relationships with everyone; online openness to each other is considered as an alternative to real manifestations of social space, where social interaction is determined by a number of factors, including territory, time, and functional potential of the participants; (b) anonymity as a factor of an unlimited personal resource for transforming individual image, constructing models of behavior, ways of implementing individual actions, acting both in a constructive and destructive way; (c) freedom of entry/exit as the main value of online Internet communities, which determines actions of subjects in this space; and (d) concrete character of interests, leading to the emergence of various virtual integrations, communication groups, and communities (Danilov, 2012).

Individuals can realize the possibilities of online socialization in the following directions: (a) when they interiorize online norms, values, and behavior models and becomes a member of Internet communities, acquiring online literacy and networking skills; (b) when they are socialized in the real world using the resources of the virtual dimension; and (c) when they construct their online images with their presentation potential, because the success of social inclusion and individual online security depend on the quality of the presentation of personal information.

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Maintaining netiquette, distinguishing between ethical and unethical online behavior, and adopting moral and ethical standards of cyberspace contribute to ensuring the online security of individuals (Maner, 1980; Moor, 2017; Kovaleva & Serdyukova, 2015). Personal online security is directly related to the problems of cybersecurity, prevention of extremism and terrorism, violence and aggression, fraud and crimes against the person in the online field (Voiskunskii, 2000, 2010; Gorshenin & Dubenskii, 2018), compliance with ethical standards of control over information flows during data transmission (Ovchinnikov & Grishin, 2012; Danilenkov, 2014; Kuchin, 2010).

There is also a relationship between the level of moral development of individuals and their perception of online content. For example, there is a complex relationship between various parameters of the moral development of adolescents and the productivity of cognitive methods of processing social information on the Internet. For adolescents with a low level of moral development, the central task is to understand the moral content of social information and the identification of moral conflict; for adolescents with a high level of moral development, the main task is the choice of the optimal solution to the moral dilemma based on ideas about moral norms of regulation of social relations (Molchanov, Voiskunskii, Markina, & Borodina, 2019).

The analysis of individual online images that subjects create may help determine the specific characteristics of their communication skills, value orientations, and potential opportunities and weaknesses of personal development (Ferwerda & Tkalcic, 2018; Celli et al., 2014; Guntuku, Qiu, Roy, Lin, & Jakhetiya, 2015; Guntuku, Lin, et al., 2017). Information on an individual online profile demonstrates: (a) the Big Five personality traits – extraversion, openness to experience, conscientiousness, neuroticism, and agreeableness (Azucar, Marengo, & Settanni, 2018); (b) a variety of emotional states (joy, sadness, loss, etc.); (c) interests, hobbies, and values; (d) features of behavior in online contacts; and (e) disabilities, physical and mental problems (e.g., physical and mental disabilities, depressive disorders, mania, etc.) (Benton, Mitchell, & Hovy, 2017; Bijl, Ravelli, & van Zessen, 1998; Reece et al., 2017; Guntuku, Yaden, Kern, Ungar, & Eichstaedt, 2017).

The phenomenology of individual abnormal states can be found both in the verbal content produced by the Internet users and in the specific characteristic of their online contacts, social circle, photo and video material that they represent. For example, the profile photographs of an individual with depressive disorders do not show pronounced emotional manifestations, such as laughing or crying, overt joy or sadness, smiling or tears. Such images are emotionally neutral, individualized, and minimally expressive, which is associated with the weakening of polar opposite emotions emotional experiences in depression and subdepression (Andalibi, Ozturk, & Forte, 2015; De Choudhury, Counts, & Horvitz, 2013; Reece et al., 2017; Guntuku, Yaden et al., 2017).

Thus, online interaction is not only a form of alternative communication and a way of adaptation in the context of habilitation prospects but also a potential source of personal online risks for an Internet user. This idea represents an important prerequisite for studying the possibilities of online socialization of individuals with disabilities, in particular intellectual disabilities, in comparison with their typically developing peers. However, within this research area, there is a methodological and methodological vacuum, which overcoming is associated, first of all, with the development and testing of new approaches which may help conduct comparative studies on the online aspects of socialization of persons with disabilities and with typical development. Individuals with developmental deficits (e.g., impaired vision or hearing) may be examined using diagnostic tools developed for persons with typical development, taking into account the modification of presentation. However, it is difficult and uninformative to examine individuals

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with intellectual disability with the use of verbal diagnostic tools developed for those with typical development, because of their specific perception and processing of cognitive information in combination with systemic speech underdevelopment that is not overcome with age. Difficulties in understanding the instructions, specific perception and comprehension of the verbal content of questionnaires and inventories used for individuals with typical development, leads to an unconscious, random choice of answers by individuals with intellectual disabilities, which significantly complicates the diagnostics. Therefore, a diagnostic tool should be a kind of unified version of self-report, available for independent implementation by individuals with intellectual disabilities, requiring minimal organizing assistance from the experimenter and assuming its minimal impact on the diagnostic results.

Methods

To study specific characteristics of online socialization among adolescents and young adults with disabilities, including those with mental retardation, and their typically developing peers, the original Internet User's Self-report diagnostic tool was developed, which considers the fundamental principles of special education – the principle of qualitative analysis, the principle of complexity, and the principles of determinism and structural dynamic study. This diagnostic tool is based on a unified version of thematic standardized self-reports, implemented in relation to the areas of online socialization, which is important for adolescents and young adults with typical and impaired intellectual development. Within these areas self-reports of respondents provide a variety of information about the possibilities of their online socialization: (a) the information block – information on gender and age characteristics; (b) the organizational block – data on how respondents arrange their time and activities on the Web, how they observe online rules of behavior, and what online resources they prefer; (c) the 'e-mail and browser' block – formal data on the availability of e-mail, the frequency of its use, the methods and purposes of using mail and search engines); (d) the 'social networks and trading platforms' block (information about the preferred use of social networks and awareness of online trading platforms); (e) the 'friends on the Internet' block (information related to specific characteristics with respondents' relationships with online contacts); (f) the linguistic block (information about the specific characteristics of respondents' verbal communication on the Web); (g) the 'parental control' block (information about the attitude of parents towards respondents' online activity and ways of its control).

The Internet User's Self-report contains 34 items formulated as simple extended sentence. The Internet User's Self-report items involve mainly standardized answer options (the wording is understandable for individuals with intellectual disabilities, since they were previously obtained using the method of content analysis from interviews with Internet users of different ages and different nosological groups, including those with mental retardation). The respondents also may choose the non-standardized answer ('Another') in case of difficulties in choosing from the proposed options or if they wish to expand the range of answers and provide important information. The linguistic material of the Internet User's Self-report is maximally simplified to minimize misunderstanding and misinterpretation of its semantic variability by the respondents and to realize their ability to independently fill in this diagnostic tool. The Internet User's Self-report indirectly contains markers of potential encountering online risks (high and average levels).

To test the Internet User's Self-report diagnostic tool, we conducted a study involving adolescents and young adults with typical development (n = 181) and with mental retardation (MR, n = 119),

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males and females. For this study, we used a wide age range, because already in early adolescence (in some cases even earlier), the Internet space becomes widely available for students. They have their own gadgets (phone, tablet, computer) and, accordingly, gain the advantages of online interaction, and face various internet-related risks as well. In addition to age and nosological compliance, the main selection criteria for the experimental groups, were the presence of their own gadgets (for example, a phone) and/or (access to a stationary home computer with Internet access (both under the control of parents and without it), which in our understanding, a priori meant a respondent's exposure to online risks. This research did not aim to identify dynamic intragroup age and gender differences. Therefore, the participants of different ages and genders were combined into two experimental groups – (a) a group of adolescents and young adults with mental retardation and (b) a group of adolescents and young adults with typical development (Table 1). Comparison of the characteristics of the samples was carried out using the φ-test, Fisher's angular transformation (Fisher's criterion).

Table 1

Nosological characteristics of the subjects

Nosology	Early adolescents (11–12 years)	Late adolescents (13–15 years)	Young adults (16–18 years)	Males	Females	Total
Typical development	57	102	22	123	58	181
Mental retardation	18	50	51	74	45	119

Results

Testing the Internet User's Self-report provided the following empirical results.

The organizational block. Compared to their typically developing peers, adolescents and young adults with MR are less active in using the Internet for their own purposes. Some of them spend more than five hours on the Internet (16.4 %); the number of those who spend less than an hour on the Internet (31.9 %) is higher. The respondents of both groups have different experiences as Internet users – from 'less than a year' to 'more than three years', which does not always correspond to their age (for example, younger adolescents from both study groups indicate the user experience of 'more than three years').

The online vocabulary of adolescents and young adults with MR is much more modest than that of their typically developing peers. Despite the fact that of 22 online terms proposed for recognition, they marked all of them as familiar, most of these words were in the passive vocabulary of adolescents and young adults with MR and were available only for recognition without subsequent reproduction in spontaneous speech. Recognition of popular web terms showed the advantage of respondents

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with typical development. The most popular terms were as follows: 'site', 'password', 'account', 'chat', 'login', 'browser', and 'link'. Similarly to typically developing peers (65.1 %), the respondents with MR have an idea of online rules (60.5 %), but they often neglect reading user agreements (38.5 %) and cannot verbalize the rules they are familiar with. Respondents with intellectual disabilities, as a rule, do not face the facts of account blocking due to violation of the rules (68.1 %). However, they note that at least once they were blocked for violation of the rules (15.1 %) or warned about impending blocking (7.1 %). Only several adolescents and young adults with mental retardation noted regular blocking of their accounts (8 %).

Representatives of both groups use the Internet for viewing photos and videos, communicating with others, reading news, playing online games, doing online shopping, searching for information, studying, and gambling. The most visited sites are those with games, sites for self-development, internet libraries, hobby sites, dating sites, and sites for adults (Fig. 1).

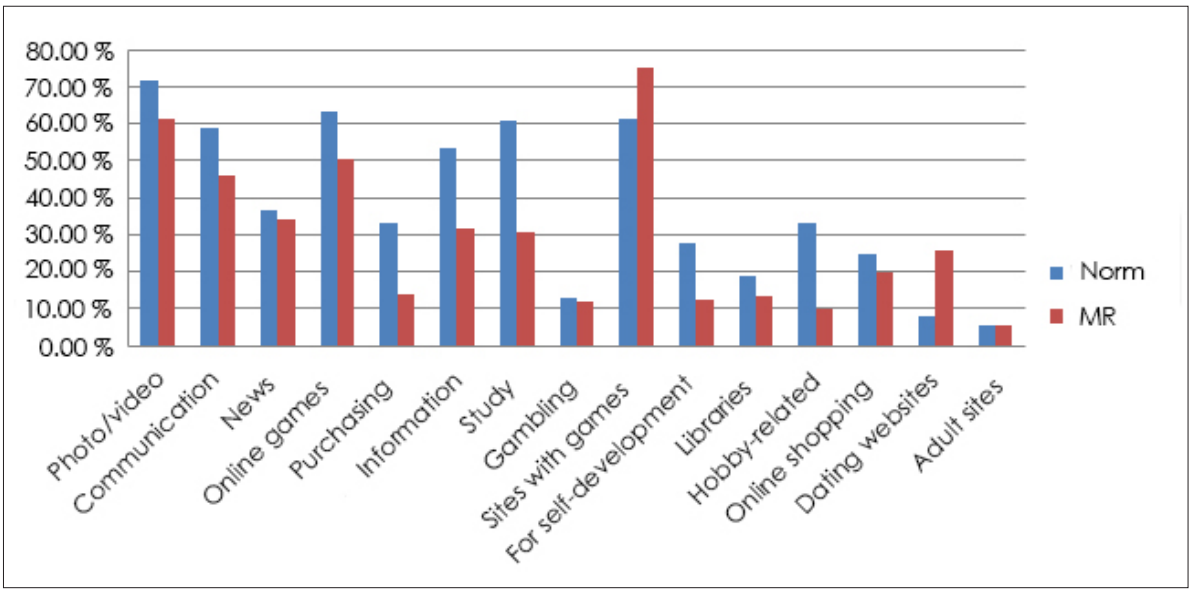

Figure 1. Purposes of the respondents' visits to the Internet space

The 'e-mail and browser' block. The percentage of those who use personal e-mail was 70 % among those with typical development and 49.1 % among the respondents with MR. Respondents with MR actively used e-mails of their friends and acquaintances (16.4 %), while typically developing respondents did it less often (6.7 %). The percentage of those who did not have e-mail is higher among adolescents and boys with MR (34.5 %). The respondents with typical development more often used e-mail for study (43.8 %) and for sharing information (40.2 %); the respondents with MR more often used e-mail for communication (46.9 %). The respondents from both groups used e-mail to make online orders at online stores. All the respondents were well informed about browsers. Google, Yandex, Yahoo!, and Rambler were the most famous. Compared to typically developing peers (61.5 %), respondents with MR less often used them to search for educational information (37.5 %); they preferred to search for entertainment (60.7 %), news (33.9 %), and goods in online stores (19.6 %).

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The block of social networks and trading platforms. The respondents of both groups are focused on communication in social networks and create their accounts. The Vkontakte is the leader in terms of use. The respondents with typical development (71.9 %) and with mental retardation (71 %) are most often registered on this platform. In the social network, respondents, having an interest in the very content of online communication and knowing that many of their acquaintances have accounts there, use them to find interesting people. Among the attractive characteristics of social networks the respondents of both groups noted the following ones: to buy and sell things, to make money, to have an opportunity to find a couple, to communicate with a large number of individuals, to be 'in touch', to express an opinion, to block an unwanted interlocutor, to get acquainted online, to argue and quarrel, and to be rude to someone without consequences for themselves. The identification of online trading sites was not difficult for the respondents. However, in both groups, some respondents indicated the Gosuslugi site among the traditional online trading sites such as Avito and Yula. Also, 6.5 % of respondents with typical development mentioned the Hydra online trading platform for drug-containing products (website banned in Russia), while among respondents with mental retardation, only one person indicated this resource (Fig. 2).

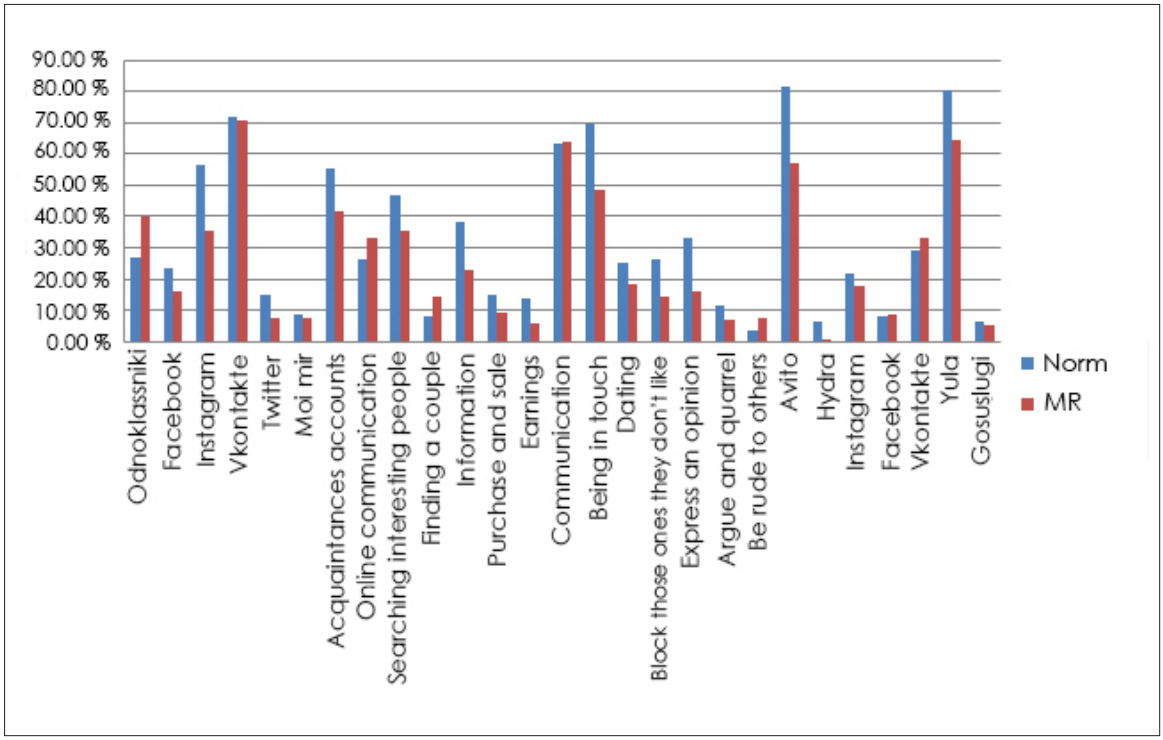

Figure 2. Distribution of responses from the block of social networks and trading platforms

The linguistic block. The respondents of both groups used emojis and emoticons in online interaction. In writing, they tried not to make mistakes, but sometimes they used obscene vocabulary to describe their emotional state (Fig. 3).

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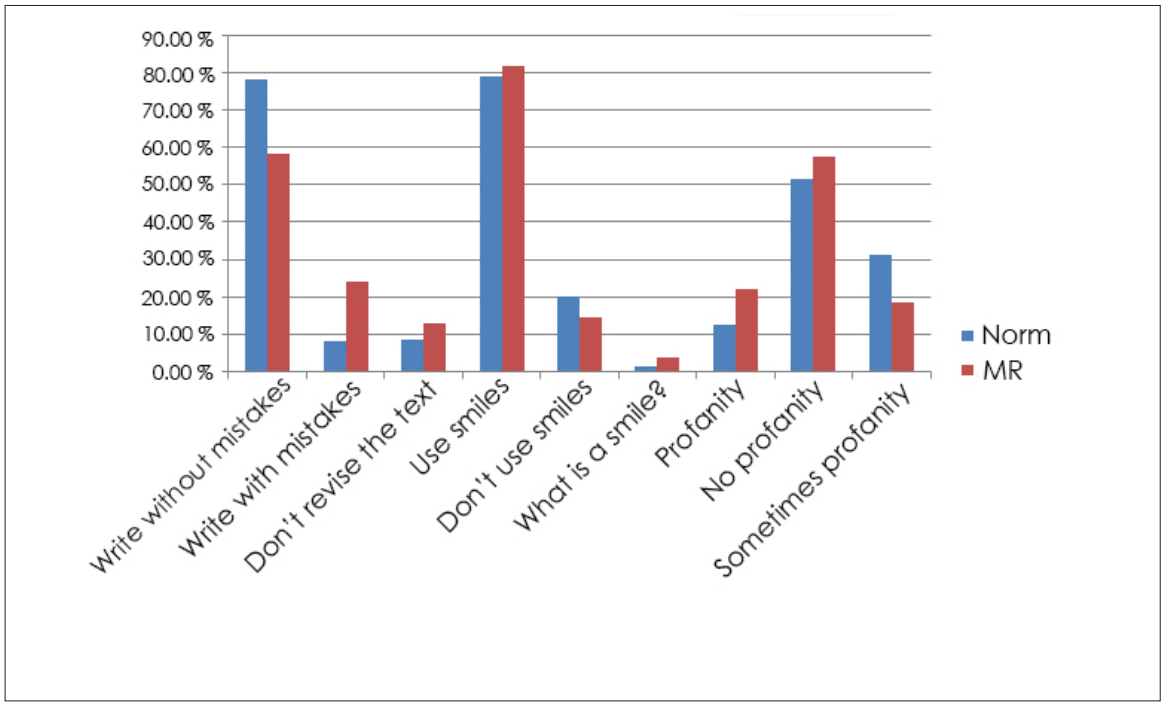

Figure 3. Distribution of responses from the linguistic block

The block of parental control. According to self-report, compared to parents of typically developing respondents, those of their peers with MR were more interested in the content and had more control over the time they spent on the Internet. Meanwhile, the respondents with MR argue that their parents had no idea about the content they used or produced. However, in both groups, respondents pointed to the presence of parents who were aware of specific sites they visited and their online movements. Parents could limit their time online, but some of them allowed their children to be there for as long as they wanted. Some respondents from both groups were ready to agree with parental restrictions; others actively resisted their influence. The respondents with MR demonstrated willingness to aggressively protect their online space from parental interference and were willing to prevent the blocking of the content that was valuable to them. Parental control of the time spent on the Internet was also variable – from less than 1 hour a day to more than 5 hours a day (Fig. 4).

Statistically confirmed data on specific characteristics of the process of online socialization of adolescents and young adults with mental retardation, in comparison with their typically developing peers, may be significant differences indicating that the following parameters are more pronounced in the group of adolescents and young adults with MR: visits to sites with games (GS) and dating sites (DS), use of others' e-mails for their own purposes (OE), respondents do not have e-mail (NE), use of e-mail for communication (EO), use of the Odnoklassniki online (O), presence of more than 100 friends on the internet (FI), aggressive defense of their online interaction space from parental control (A), lack of effort to write without mistakes when communicating in the online (CO) (Table 2).

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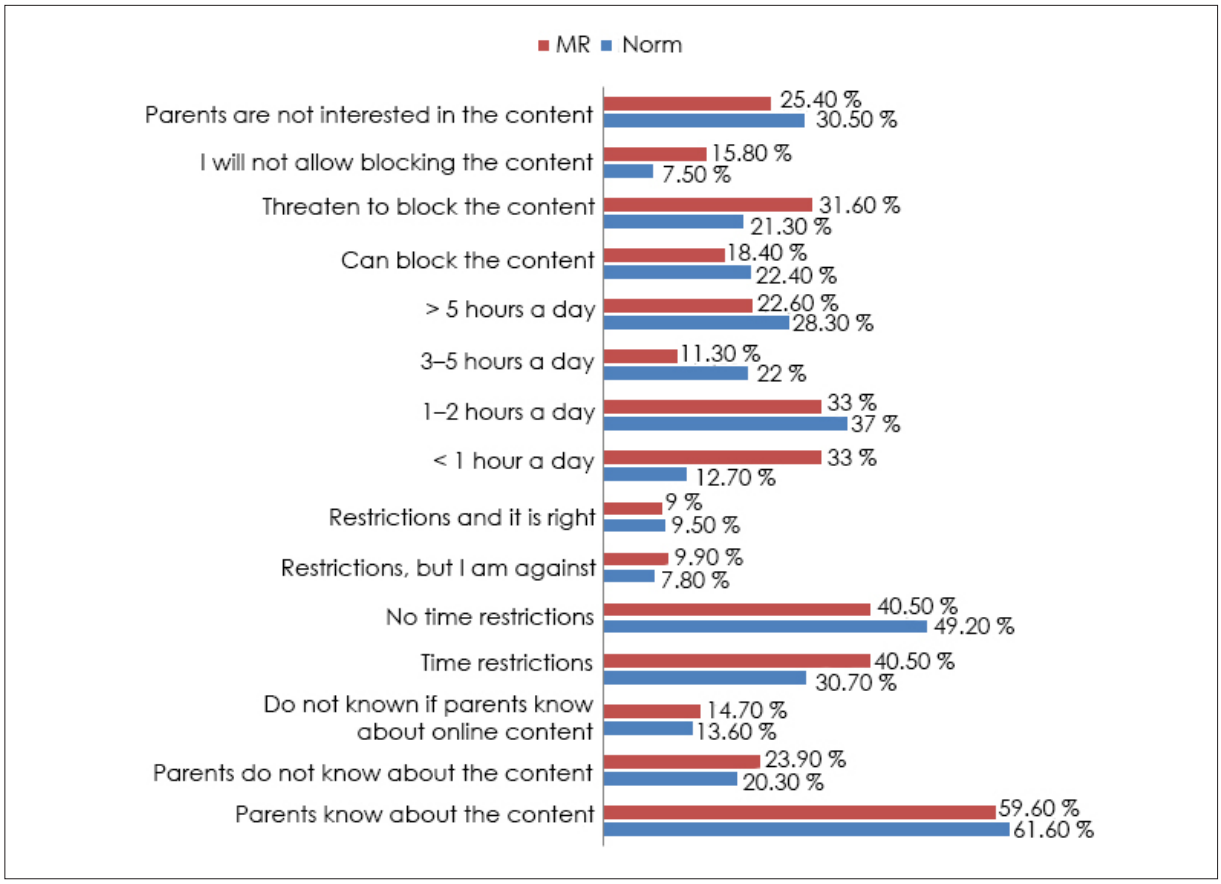

Figure 4. Performance characteristics of the block of parental control

Table 2

Fisher's criterion (φ-test) when comparing samples by the parameters

	GS	DS	OE	NE	EO	O	FI	A	CO
P	0.05	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.01
φ^*_{emp}	1.94	3.991*	2.567*	3.127*	2.212	2.067	1.737	2.161	3.474*

Note: * values with high statistical significance.

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Online risk markers. Respondents with MR demonstrated less frequent encounters with both high and medium levels of online risk, in comparison with typically developing peers. This may be determined by reduced cognitive activity of adolescents and young adults with MR on the Internet, which in online interaction is normally expressed in an intensive online search for content, sites, specific communities, as well as their lower awareness of the characteristics of online realization. For the sample of normatively developing adolescents and young adults, the total percentage of the possibility of encountering online risks of an average level is 23.6 %; for the sample of adolescents and young adults with MR it is 16.9 %. For high-level online risks it is 18.2 % in the norm and 12.8 % for those with intellectual disabilities.

In the context of studying markers of potential encounter with online risks of a high degree of danger, we identified the following diagnostic positions: the respondent is familiar with the Tor Browser concept (1); the respondent is familiar with the 'darknet' concept (2); the respondent is familiar with the Hydra online trading platform (website banned in Russia) (3); the respondent plays online gambling (4); the respondent visits websites for adults (5); on the Internet the respondent communicates with much older individuals (the same age as his/her parents) (6); for the respondent, communication on the Internet is attractive as an opportunity to be rude to others without consequences (7); parents do not limit the time spent by the respondent on the Internet (8); parents are not interested in the respondent's online activity (9); the respondent receives requests to "move money" from online acquaintances (10); the respondent mentions the possibility of aggressively protecting their online space from parental control, using phrases such as "my parents want to restrict my online presence, but I will not let them!" (11) (Fig. 5).

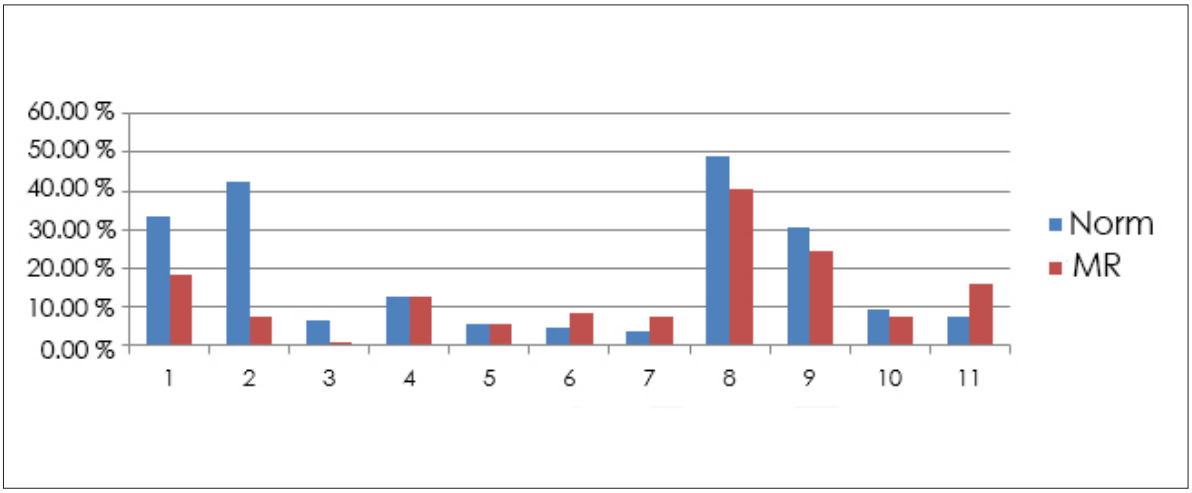

Figure 5. Distribution of responses in relation to markers of high-level online risks

The markers of a potential encounter with medium-level online risks represent the following diagnostic positions: the respondent is familiar with the concept of 'cryptocurrency' (1); the respondent considers online interaction as a way of earning money (2); for the respondent, online communication is attractive because of the opportunity to argue and quarrel without problems (3); on the Internet the respondent communicates with much older individuals (4);

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the respondent receives requests for help, and he/she responds to them (5); the respondent receives requests to convey something to someone (6); the respondent receives requests to help deceive or play a prank on someone (7); the respondent has more than 100 online friends (8); the respondent knows nothing about the activities of his online friends (9); parents do not know which sites the respondent visits (10); and the respondent spends on the Internet more than 5 hours a day (11) (Fig. 6).

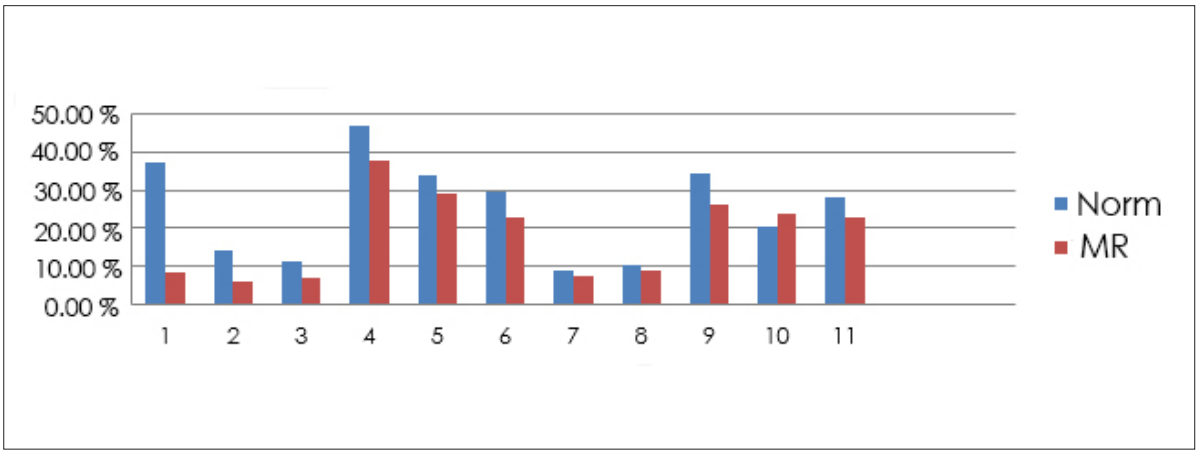

Figure 6. Distribution of responses in relation to markers of average-level online risks

By itself, the presence of online risk markers in respondents' answers does not directly indicate that they have faced a real online risk. This, first of all, indicates the broad online awareness of the respondents. However, it needs in-depth verification and study in confidential communication to minimize online risks.

The awareness of adolescents and young adults in areas that under certain conditions can produce online risks indicates that teenagers or young adults (a) observed potentially harmful factors occurring with others, (b) communicate with those who are already exposed to these risk factors, (c) themselves create such risks to other participants in online interaction, (d) were directly exposed to an online risk (consciousness/unconsciousness), (e) got into a risky online situation and stay in this situation, and (f) are aware of the dark sides of online interaction and this help them to avoid risks.

Online risk markers in adolescents or young adults should be studied individually and comprehensively. Close attention should be paid to both the facts of facing with a potential online threat, and the facts when respondents do not know what factors of online interaction are potentially dangerous. Low intensity of online interaction, limited experience of online contacts, low awareness of online 'dark' phenomena may be a risk factor for the occurrence of potentially dangerous online behavior in the future. And then a teenager or young man with MR or normative development may be uncritical about the incoming online information or the negative online intentions of others due to the lack of elementary knowledge in this area.

Discussion

The data obtained in the testing study indicate that the Internet User's Self-report is available for understanding and independent implementation by respondents with mental retardation.

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It has potential for use in comparative studies among respondents from different nosological groups. This diagnostic helped identify general manifestations of the online interaction among adolescents and young adults with typical development and impaired intelligence. These include the widespread use of the potential of the Internet; high motivation to use the Web for their own purposes; relatively successful attempts to implement such use for viewing photos and videos, searching for various information (e.g., educational) online games, entertainment with the use of interesting multimodal content. The presence of a wide range of online terms in the passive vocabulary; partial acquaintance with netiquette was also noted. In most cases, the experience of using the Internet is from one to three years by adolescence, and over three years by young adulthood.

The respondents of both groups are characterized by attempts to establish online communication with individuals of different ages, the desire to express themselves and their emotions using a variety of verbal and visual-emotive means, including using emojis, smiles, profanity, the desire to get acquainted with the dark side of online life, visiting dating sites and adult sites. Some respondents are ready to engage in polemics on the Internet. Some respondents are ready to quarrel and swear with online interlocutor, but preferably without consequences for themselves.

The data obtained in this study partly correspond to the results of a study (Sobkin & Fedotova, 2019) involving school students from grades 5 to 11, which considers the Online as a socialization space for modern adolescents and indicates the hierarchy of the importance of the Online functions in their understanding such as enabling communication with friends and relatives, finding new acquaintances, expanding the circle of friends, having fun and finding the information you need, usefulness of using social networks in learning, for self-education, and self-development, searching for romantic acquaintances or professional contacts.

Testing the Internet User's Self-report diagnostic tool helped establish, that compared to their normatively developing peers, adolescents and young adults with MR had the following specific characteristics of the Internet socialization: lower online awareness (including the dark side of the Internet); lower online mobility and switchability; preferable use of the Interned for communication, games, dating and searching for a couple, rather than for studying, making money, buying and selling, and self-development. Respondents with MR more often visit dating sites, have a high, but often insufficiently realized need for communication in an online context. The phenomenon of 'online hypersocialization' is noted, when the quality of interpersonal online interaction decreases due to attempts to communicate with as many individuals as possible (for example, a subject may have more than 100 online friends). The respondents with MR have a lower intensity of verbal online communication, the difficulty of perceiving the interlocutor. This may be explained by the fact that the process of communication on the Internet mainly involves verbal means, which use is difficult when the intellect is impaired (due to systemic speech underdevelopment). Also, in online communication it is difficult/impossible to perceive facial expressions and direct emotional manifestations of the interlocutor (which is partly compensated by the use of emojis and smiles in correspondence or with the help of audio messages and video communication). Compared to peers with a developmental norm, the respondents of this group more often mention the possibility to aggressively protect their online space from parental control.

Thus, the Internet User's Self-report can be used to analyze respondents' online interactions, collect data within a single class, one parallel, one nosological group of respondents, and as a screening for respondents' encounter with potential online risks. In addition to its informative component, the approach to studying specific characteristics of the online interaction among adolescents and young adults with normative and impaired development with the help of the Internet user's Self-report encourages respondents to self-analysis, activates the reflexive mechanism of self-consciousness, which is in its sensitive phase in adolescence and young adulthood, and open up areas of psychological and pedagogical support.

It is necessary to expand this direction of research not only for the primary disease, but also for the age ranges within the same nosological category, and also create samples that include various categories of students with disabilities in the framework of comparative studies, examine the levels of online socialization, and etc.

Future work should involve (a) the development of methods for a more in-depth study of respondents' adherence to online risks based on comparing their declared facts of online interaction with their real behavior on the Internet and analyzing their digital footprints and (b) the elaboration of educational materials to increase the digital awareness among students with typical and impaired development, their parents and teachers, as well as to create methods of psychological and pedagogical support for the online socialization of adolescents and young adults with special educational needs.

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The Relationship Between Self-attitude and Oculomotor Patterns in Self-face Perception in Women

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Abstract

Introduction. The analysis of oculomotor activity makes it possible to better understand the perceptual strategies of self-face perception and to examine their associations with the mechanisms of self-attitude. Therefore, the study of the relationship between self-attitude and oculomotor activity in self-face perception is important. This study represents the first attempt to investigate self-face perception using eye-tracking in a mentally healthy sample of women and to compare the findings with women's self-attitudes. In young women the components of self-attitude that contain the assessment of others determine the perception of their own attractive and unattractive features. A mechanism focused on the internal processes is more characteristic of mature women.

Methods. The study used a psychodiagnostic method (Self-attitude Questionnaire by V. V. Stolin & S. R. Pantileev), structured interview, and a psychophysiological method (eye-tracking). The study sample comprised 31 women aged 20 to 48 years.

Results. In young women significant correlations were found between the following parameters: (a) index of attention to attractive facial features and such components of self-attitude as autosympathy (r = 0.581), self-blaming (r = –0.589), self-interest (r = 0.543), and self-understanding (r = 0.509); (b) percentage of time spent on viewing attractive facial features and the integral scale of self-attitude (r = 0.513); and (c) percentage of time spent on viewing unattractive facial features and the attitude of others (r = 0.616) and self-blaming (r = 0.522). In mature women, significant correlations were found between the following parameters: (a) index of attention to attractive facial features and self-esteem (r = 0.610); (b) total time spent on viewing

self-face and self-interest (r = 0.524); and (c) percentage of time spent on viewing attractive facial features and self-esteem (r = –0.548).
Discussion. This paper considers two mechanisms of self-face perception, depending on the age group of the respondents. The external mechanism of self-perception is characteristic of young women; the internal one is characteristic of mature women. The findings may be of great help to cosmetologists, plastic surgeons, and psychologists.

Keywords
face perception, eye movements, oculography, self-attitude, autosympathy, self-blaming, self-interest, self-understanding, self-esteem, attitude of others

Highlights
- Appearance is a key characteristic of self-identification that affects self-attitude. In turn, self-attitude is associated with self-face perception and manifests itself in increased attention to any facial traits or features.
- In young women self-face perception is associated with the following components of self-attitude: autosympathy, self-blaming, self-interest, self-understanding, integral scale of self-attitude, and attitude of others.
- In mature women self-face perception is associated with such components of self-attitude as self-esteem and self-interest.

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Introduction
Perceptual processing of human faces is a fast and exact cognitive process, which components are well understood by psychophysiologists. Numerous empirical studies have suggested various theoretical concepts of visual processing of faces. The functional model is the most famous. This model suggests that when perceiving faces individuals receive several types of information, including graphic, structural, and semantic ones, and also information related to the expressive component of facial expressions (Bruce & Young, 1986; Russell, Duchaine, & Nakayama, 2009). The ability to recognize faces depends on many psychological and psychophysiological characteristics and can be impaired in prosopagnosia (Garrido, Duchaine, & Nakayama, 2008).

Despite the large amount of research on the process of recognizing faces of others, few

studies provide insights into self-face perception. Most of the studies examine the relationship between various psychiatric diagnoses and organic disorders and the characteristics of perceptual processing of self-face images. Unlike other faces, the mental image of a subject's own face was formed through his/her repeated observations (Tong & Nakayama, 1999). Self-face perceptual processing can be impaired in many neuropsychological disorders. For example, compared to healthy individuals those with damage to the hippocampus and parahippocampal gyrus are more likely to recognize their own face as unfamiliar. In contrast, patients with lesions of the superior frontal gyrus and superior temporal sulcus are more likely to recognize faces of others as their own ones (Sui, Chechlacz, Rotshtein, & Humphreys, 2015). Mental disorders also affect self-face processing. For example, nearly 10 % of patients with schizophrenia cannot recognize themselves in photographs, although they do relatively well at recognizing familiar and unfamiliar faces (Irani et al., 2006; Heinisch, Wiens, Gründl, Juckel, & Brüne, 2013).

Visible facial skin lesions result in severe loss of the sense of self, for example, after facial disfigurement (Callahan, 2005). Despite this, self-face mental representations are rather plastic than static, influenced by multisensory stimuli. This plasticity is an adaptive specific characteristic for maintaining a holistic sense of self, despite the physical changes occurring over time (Felisberti & Musholt, 2014; Walton & Hills, 2012).

Self-face perceptual processing is associated with neural processes different to those associated with processing other faces, even when comparing one's own face with familiar faces (Alzueta, Melcón, Poch, & Capilla, 2019). Self-face perception differs from the perception of other faces and external body parts in that we can only see our faces indirectly (for example, in a photograph or reflected in a mirror). Self-identification requires self-orientation from a decentralized position and indicates a high value of self-related stimuli (Heinisch, Dinse, Tegenthoff, Juckel, & Brüne, 2011).

Self-consciousness is one of the most complex manifestations of human cognition and is a requirement for the feeling of Self and Others (Gallup, 1970; Keenan et al., 1999). Self-consciousness exists in various areas, including the physical sphere (body image) and the mental one (a complex of specific personal traits and qualities) (James, 1890).

Self-face recognition is of critical importance for the sense of identity and maintaining a holistic sense of self. The images that we see are the same images that others can see. A certain level of self-awareness is characteristic of children aged 1.5 to 2 when they recognize their own face in the mirror (Suddendorf, Simcock, & Nielsen, 2007). This ability is a prerequisite for reflexive self-consciousness (Gallup, 1970; Lewis, 2003) because it facilitates the construction and recognition of a perceptual facial image (Young & Brédart, 2004; Gallup, 1998). Thus, self-face recognition is often defined as a characteristic of reflexive self-consciousness, which should be distinguished from other more basic forms of self-consciousness (Zahavi & Roepstorff, 2011).

The attention mechanisms involved in processing self-related information represent an important aspect of the self that requires empirical research (Sui & Gu, 2017).

Current studies on the issues of self-face perception have certain specific characteristics. First, they focus on the body image perception, which is rather the body build than the face (Thaler et al., 2018). Second, they involve individuals with mental disorders, including body dysmorphic disorder (Ritter et al., 2020), eating disorders (Esposito, Cieri, di Giannantonio, & Tartaro, 2018), depression (Aftanas et al., 2019), and schizophrenia (Caputo et al., 2012). Third, they often focus on faces with visible abnormalities in result of injuries and tumors of the maxillofacial region (Callahan, 2005) or cleft palate (Meyer-Marcotty, Gerdes, Stellzig-Eisenhauer, & Alpers, 2011).

In Russian psychology studies on the perception of appearance were carried out within the framework of the social-perceptual approach. Physical appearance was studied as a component of the communication process. According to A. A. Bodalev, human face is the most important communication tool (Bodalev, 1982). Physical appearance is perceived by the reflected Others.

According to Russian researchers, personal characteristics, including perfectionism (Varlashkina & Dementii, 2010), self-attitude to a physical self-image (Cherkashina, 2012), and the attachment pattern (Tsurkin & Razuvaeva, 2013) determine satisfaction with self-appearance. For example, the degree of physical self-acceptance is higher in women with a high level of general perfectionism and a low level of socially prescribed perfectionism (Varlashkina & Dementii, 2010).

The research methods used play a significant role. The study of oculomotor activity in self-face recognizing makes it possible to obtain objective data on self-perception, and also to better understand the perceptual strategies that underlie the fundamental component of both physical and reflexive self-consciousness.

Methods

A sample of 31 women aged 20 to 48 years took part in the study (mean age 35.5 ± 7.3 years), 16 being included in the group of 'young women' (mean age 29.5 ± 4.3 years) and 15 being included in the group of 'mature women' (mean age 41.9 ± 3.3 years).

Study progress

Color portrait photographs of the respondents taken in a photographic studio before the experiment started were used as stimulus material. No makeup or post-processing were used to create these photos. Further, we showed each respondent her photograph on a computer monitor; the gaze was registered using an eye tracker. The structured interview and filling out the questionnaire were carried out after viewing the photograph.

The study used the following *methods:*

A *survey method* represented a structured interview, during which we obtained biographical data of the respondents and self-reports of attractive and unattractive features of their own appearance (examples of questions, "Which face region do you find especially attractive?", "What don't you like about your appearance (face region)?", "What do you think is your most attractive face angle (in relation to yourself) – right or left"?). The structured interview was conducted by an interviewer, who recorded responses. Further, we transferred these data into an electronic format in an Excel spreadsheet. Thus, for each woman we obtained a unique complex of features (for example, eyes, lips, nose were attractive features; shape of the face, wrinkles were unattractive ones) that they consider as their attractive or unattractive features. indicators as an area of interest in further data processing.

The Self-attitude Questionnaire (Gurevich & Borisova, 1997; Stolin & Pantileev, 1988) was used as a *psychodiagnostic method*. The questionnaire contains 57 statements that constitute the following scales: the integral scale of self-attitude, self-esteem, autosympathy, expected attitude from others, and self-interest. The questionnaire also contains seven scales measuring the severity of the attitude towards certain self-related internal actions, including self-confidence, attitude of others, self-acceptance, self-guidance, self-blaming, self-interest, and self-understanding.

Oculography using the Neurobureau software and hardware complex, including the GP3HD eye tracker at the sampling rate of 150 Hz (Shelepin, Shelepin, & Skuratova, 2019) was used as a *psychophysiological method*.

The oculography was performed by an eye tracking specialist. For the study, a place was organized taking into account the requirements for eye-tracking research (no illumination of the eye-tracker; a place where respondents sit still during the experiment). The respondent was in front of the computer where the image was later presented. The specialist gave the following instructions, "First, you will need to monitor the red dot for the eye tracker calibration. Further, your photo will be presented. Please look at your photo and say whether you like everything. You are not limited in time. When viewing is finished, please press the space bar". Thus, respondents could view their own images for an unlimited amount of time and complete the experiment by pressing the space bar.

For the statistical analysis of oculomotor activity, we identified areas of interest based on the data obtained from respondents in the process of the structured interview (a unique complex of attractive and unattractive facial features for each woman). Thus, the further analysis involved both attractive and unattractive facial features. For these areas, we analyzed the following indicators of oculomotor activity: (1) the total time of self-face viewing; (2) the percentage of time spent on viewing attractive features; (3) the percentage of time spent on viewing unattractive features; (4) the time until the first fixation on attractive features; (5) the time until the first fixation on unattractive features; (6) the number of returns to viewing attractive features; (7) the number of returns to viewing unattractive features; and (8) the index of attention to attractive features.

Statistical processing of the data was carried out using the statistical software R (version 3.5.1) using Spearman's correlation coefficient.

Results

The results of the structured interview indicated the following characteristics of self-perception of attractive and unattractive facial features. Young women most often considered eyes (34 %), lips (22 %), and nose (11 %) as attractive facial features and chin (23 %), nose (19 %), skin condition, dermatitis (15 %) as unattractive ones. Mature women most often considered lips (32 %), eyes (26 %), and nose (11 %) as attractive facial features and wrinkles, nasolabial folds (18 %), facial contours (14 %), and eyelids (14 %) as unattractive ones.

Therefore, we observed differences in the mechanisms of self-face perception in young and mature women, depending on the dominant characteristics of self-attitude.

Such characteristics of self-attitude as 'attitude of others' ($r = 0.616$; $p = 0.010$) and 'self-blaming' ($r = 0.522$; $p = 0.038$) determine the perception of unattractive facial features in young women. The importance of opinions and attitudes of others and the tendency to self-blaming and denial of self-related emotions contribute to a longer fixation on self-face unattractive features.

We also observed this pattern in the relationship between the index of oculomotor activity ('index of attention to attractive facial features') and characteristics of self-attitude. Thus, 'self-blaming' ($r = –0.589$; $p = 0.016$) has a negative correlation coefficient. This means that low levels of attention paid to attractive features are associated with high levels of openness to the perception of self-related negative emotions and a tendency to self-blame. 'Autosympathy' ($r = 0.581$; $p = 0.018$), 'self-interest' ($r = 0.543$; $p = 0.029$), and 'self-understanding' ($r = 0.509$; $p = 0.043$)

has positive correlations with the 'index of attention to attractive features of appearance'. This means that young women who are in harmony with themselves and show interest in their own thoughts and feelings are ready to communicate with themselves on equal terms and are sure that they are interesting for others; they are more fixated on their attractive features, rather than unattractive ones, which, in turn, reinforces their self-esteem and self-attitude ($r = 0.513$; $p = 0.014$).

Table 1 shows Spearman correlation coefficients between indices of oculomotor activity and self-attitude in young women.

Table 1

Indices of oculomotor activity during self-face viewing and self-attitude in young women (n = 16)

Oculomotor activity indices	Self-attitude	Spearman correlation coefficient	Significance level
Index of attention to attractive facial features	Autosympathy	0.581	0.018
	Self-blaming	–0.589	0.016
	Self-interest	0.543	0.029
	Self-understanding	0.509	0.043
Percentage of time spent on viewing attractive facial features	Integral self-attitude scale	0.513	0.041
	Attitude of others	0.616	0.010
Percentage of time spent on viewing unattractive facial features	Self-blaming	0.522	0.038

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In mature women the perception of attractive facial features is associated with such a component of self-attitude as 'self-esteem' ($r = –0.548$; $p = 0.034$); it concerns internal consistency, self-understanding, and self-confidence. We can assume that in mature women low self-confidence is associated with high rates of fixation on unattractive facial features.

This assumption is also confirmed by positive correlations between the 'index of attention to attractive features' and 'self-esteem' ($r = 0.610$; $p = 0.015$).

We also found a positive relationship between the total time of viewing self-face images and self-interest in mature women ($r = 0.524$; $p = 0.045$). This may be explained by the fact that with age self-face images undergo changes and may not coincide with women's mental self-face images. Thus, women with high rates of self-interest are more interested in changes in their appearance, which determines a longer viewing of their own faces.

Table 2 shows Spearman correlation coefficients between indices of oculomotor activity and self-attitude in mature women.

Table 2

Indices of oculomotor activity during self-face viewing and self-attitude in mature women (n = 15)

Oculomotor activity indices	Self-attitude	Spearman correlation coefficient	Significance level
Index of attention to attractive facial features	Self-esteem	0.610	0.015
Total time of self-face viewing	Self-interest	0.524	0.045
Percentage of time spent on viewing unattractive facial features	Self-esteem	–0.548	0.034

Therefore, we can conclude that the components of self-attitude and the perceptual strategy of viewing self-face differ depending on the age of women, which suggests the existence of different mechanisms of self-perception.

Discussion

Attitude towards self-face represents an important component of self-appraisal. Researchers argue that human face plays a decisive role in interpersonal interaction, because it is the most visible part of the body for the others (Inoue et al., 2015).

The findings of our study indicate that there is a relationship between eye movements during self-face perceiving and the components of self-attitude. We also observed differences in these components depending on the women's age, which suggests the existence of different mechanisms for perceiving attractive and unattractive facial features. Thus, young women's perception of facial imperfections is characterized by greater externalization, that is, orientation towards others; internalized mechanisms that are focused on internal self-related processes are more characteristic of mature women. Young women have numerous associations in their perception of attractive features. Mature women's perception of attractive facial features is associated only with 'self-esteem'. This observation may indicate that at a young age a more dynamic self-attitude contains more variables that depend both on the assessments of others and on internal attitudes, which may also be reflected in the dynamic attention to positive traits. In turn, mature women's perception of attractive facial features is mediated by a single component of self-attitude, which makes the recognition of all the pluses and minuses in their appearance more stable.

Delving deeper into the differences in self-perception, we may assume that young women are more involved in the processes of socialization, which entails risks in objectification.

According to L. Festinger's theory of objectification (Festinger, 1954), the process of female socialization involves a critical assessment of self-value, based on social standards (primarily, standards of appearance). In an objectifying culture socialization is mediated by interpersonal relationships and the media, which entails the process of self-objectification, when women start to evaluate themselves according to their appearance. B. L. Fredrickson defines self-objectification as the process by which a woman starts to "treat herself as an object to be looked at and evaluated" (Fredrickson & Roberts, 1997, p. 177). Self-objectification leads to negative consequences, including mental health disorders such as depression, dysmorphomania, and eating disorders (Moradi & Huang, 2008). Despite the fact that similar processes are to some extent characteristic of male socialization, women experience greater social pressure related to their appearance (Fox & Vendemia, 2016). Some researchers found that compared to mature women young women demonstrate higher self-objectification (Tiggemann & Lynch, 2001), which does not contradict our results.

Russian psychologists consider the issues of physical appearance within the framework of the 'I-for-Another' construct. According to Labunskaya & Pogontseva (2016), categorizing a person as beautiful or, conversely, ugly leads to a special form of discrimination – lookism.

The results obtained in this study may be useful to cosmetologists and plastic surgeons to understand the psychological reasons for patients' applying and to form a general understanding of problems (correcting unattractive features or, conversely, outlining attractive ones) and, as a result, to increase the level of client satisfaction.

Also, the results can be used in the practice of psychological counseling to change the strategy of perception of the body image and to shift the focus from unattractive features to attractive ones when working through internal mechanisms of self-attitude.

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Author Contributions

N. P. Yarovaya conducted a clinical interview, wrote a literature overview, and interpreted empirical results.
E. R. Araviiskaia provided a critical revision of the content.
V. S. Zueva carried out the eye-tracking study.
K. A. Skuratova carried out statistical data processing.
E. Yu. Shelepin designed the study.

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Characteristics of Lifeworlds in Male and Female Youths at Different Age Periods

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Abstract
Introduction. The transition from adolescence to young adulthood is an important stage in personality development, which changes the perception of the surrounding reality and lifeworld. Yet, little is known about this issue. This paper is the first report on the characteristics of lifeworld in male and female youths of different age groups. This study is based on the concept of F. Ye. Vasilyuk, who distinguished external and internal perspectives of lifeworld and their main characteristics (easiness/difficulty of the external world; simplicity/complexity of the internal world).
Methods. The study used the technique for graphic representation of the vital psychological space (by G. V. Shukova) to assess the multi-component nature of the world as a criterion of its simplicity/complexity. To assess lifeworld easiness/difficulty the following diagnostic tools were used: (a) a modified version of the inventory for assessing the subjective distance of need-related objects by A. B. Kupreichenko; (b) the Questionnaire on the Value-Accessibility Ratio in Various Life Areas developed by E. B. Fantalova to determine the subjective difficulty of achieving meaningful objects; and (c) the questionnaire for assessing global life satisfaction and subjective level of happiness for an overall assessment of the subjective difficulty of the world.
Results. The findings indicated that males and females aged 16–17 have similar lifeworlds in terms of the internal world simplicity/complexity and the external world easiness/difficulty. At the age of 18–22, females have a more complex and differentiated internal world. In males the space of lifeworld is simplified by this age. At this age differences manifest themselves in the fact females are less happy and satisfied with life, which is associated with an increase in the subjective difficulty of lifeworld.
Discussion. Male and female youths' lifeworld restructuring is associated with different ways in which they transform subjective reality.

Keywords
lifeworld, internal world simplicity/complexity, external world easiness/difficulty, male youths, female youths, adolescence, young adulthood, distance of social groups, subjective well-being, meaningful objects

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Highlights

- Lifeworlds of male and female youths are almost the same at the age of 16–17; at the age of 18–22 their lifeworlds are characterized by certain differences both in terms of simplicity/complexity and easiness/difficulty.
- Differences in lifeworlds of females aged 16–17 and 18–22 manifest themselves in the fact that 18–22-year-olds perceive the world as more difficult.
- Compared to males aged 16–17, those aged 18–22 are characterized by a simpler internal world.

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Introduction

Socio-economic changes in the post-industrial world are characterized as a situation of uncertainty. Thus, there are no clear value-meaning guidelines; the collectivist type of consciousness is supplanted by the individualistic and utilitarian one; the traditional forms of socialization and intergenerational continuity are destroyed; there is a rapid dissemination of information via the Internet, etc. The speed and scale of transformational changes in modern society require sufficiently developed individual abilities of social adaptation. This means a qualitatively different way of self-organization and self-regulation of individuals in modern society, which enables them to coordinate external and internal conditions for the implementation of activities in time, to coordinate all mental states, traits, abilities, possibilities, and limitations (A. V. Brushlinskii, D. A. Leont'ev, and E. A. Sergienko).

In this context the periods of transition from one age stage to another, which are crises and accompanied by the processes of restructuring and transformation of the human psyche are of particular interest. Traditionally, psychological studies examine changes in mental processes, self-consciousness, the system of relations between the individual and the world during a crisis period, and the problems that individuals solve at each age. Researchers generally focus on the age period between birth and adolescence. However, the transition from adolescence to young adulthood, which corresponds to the beginning of an autonomous life in the modern world, becomes an important starting point which changes an individual's perception of the surrounding reality constituting his/her lifeworld. Some researchers note that the issues of personality development in the period of young adulthood are insufficiently elaborated (N. R. Bityanova, V. A. Nepomnyashchaya).

According to most psychologists (L. I. Bozhovich, A. V. Petrovskii, I. S. Kon, E. I. Isaev, V. I. Slobodchikov, E. Erikson, G. Craig, G. Marcia, J. Cote, etc.), during this period individuals solve the problems of professional development, life self-determination associated with values, planning for the future, finding an ideal, searching for the meaning of their own existence and realize the opportunities for self-development and self-actualization as well. At the same time, the requirements of society for young men and women are quite different. Professional development is the main requirement for men. Meanwhile, along with professional development and knowledge acquisition, women are supposed to create family and give birth to children (Soldatova, 2007).

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The transition from adolescence to young adulthood is a period of active construction of personal lifeworld, transformations that may be both constructive and destructive. Therefore, it is necessary to understand the processes taking place in order to prevent possible negative trends and support young people in this age period.

At the same time, the category of lifeworld is a rather new phenomenon in psychology associated with a shift in scientific focus on studying 'self-determination' and 'world-transformative activity' of the individual (V. A. Belyaev, V. A. Barabanshchikov, A. L. Zhuravlev, A. B. Kupreichenko, T. V. Levkova, etc.). This tendency is found in numerous psychological studies which indicate the need to use a phenomenological approach in psychological research. Thus, Bengtsson (2013) believes that an approach based on the phenomenology of lifeworld is important for empirical research in the field of education. Gorichanaz, Latham, & Wood (2018) emphasize the importance of studying lifeworld as a unit of analysis of human information behavior.

Siriwardane-de Zoysa & Hornidge (2016) note that the concept of 'lifeworld' is ambiguous and has no single definition. Kraus (2015) emphasizes that there is a confusion of concepts in scholarly works. From a phenomenological point of view, lifeworld should be considered as a result of the subject's appropriation of the world and individual construction of reality, his/her subjective view of living conditions. However, lifeworld is often described as external conditions of life (life conditions).

Vasilyuk (2003) described the essential characteristics of the 'human lifeworld'. He believed that the world objectively exists independently of us, and we exist within it. The world differs from the environment and is not reduced to it; it is integral, but not unique. All our worlds, even the external world, which we identify as reality, are constructed by ourselves. Any opportunity to influence the external world is determined by the presence of the internal world. In other words, an individual's lifeworld goes beyond the actual (given situation); it exists in the past and in the future and may be desirable or undesirable. An individual's internal world creates a basis for relative independence from the external world.

When studying human lifeworlds, researchers focus their attention on their typology, highlighting different criteria. Thus, Leont'ev (2019) suggested his own typology of lifeworlds, which is based on the following criteria: (a) the ratio of the past, the present, and the future; (b) the ratio of the individual and society; and (c) the ratio of the values of the existing, the required, and the possible. This typology is applicable to both an individual and a social group. He distinguished three lifeworlds, placing them in a sociogenetic sequence. These were traditionalist, hedonistic, and progressive lifeworlds.

Sapogova (2019) distinguishes the types of lifeworlds proceeding from ultimate ontologemes that individuals use as supporting structures for self-understanding and building a life story (autobiography) – ontologemes of fate, chance or free will. They stimulate the predominance in self-interpretation of one of the mental processes (faith, thinking, and intuition) and set three possible frameworks for interpreting the path of life – 'fate–fulfillment–faith'; 'chance–incident–intuition'; 'free will–deed–thinking'.

Vasilyuk (1984) was the first who identified the characteristics of lifeworlds. In his opinion, 'lifeworld' has external and internal perspectives, which he defined, respectively, as external and internal worlds. Easiness and difficulty are the main characteristics of the external world. Easiness of the lifeworld external perspective provides security to all life processes; difficulty is associated with the presence of obstacles to their achievement. The internal world (the internal structure of life, the interconnection and association of its internal world units, as understood by F. E. Vasilyuk)

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may be simple or complex, where simplicity is considered as its single-composition nature, the absence of structuredness and association of individual moments of life.

In our study, we assumed that individuals' external and internal lifeworlds are not static. They undergo considerable changes in the process of personal development; they also depend on the events that occur with a particular individual during his/her life. As he/she grows up, his/her external world becomes more difficult. Meanwhile, as he/she psychically develops, his/her external world becomes more complicated because of the expansion of social space and the inclusion of various objects in the field of consciousness.

In the concept of F. E. Vasilyuk, the internally complex and externally difficult lifeworld is characterized by a basic life principle – life creativity, active self-construction, conscious self-creation, and realization of individual plans under conditions of complex existence. With this type of lifeworld, the goal-achievement process is impeded both by external obstacles and internal hesitation, which requires volitional self-regulation. We believe that this direction of changes is constructive in transforming lifeworld. However, transformations occurring in lifeworld during the transition from adolescence to young adulthood still remain an open question in psychology.

Specific characteristics of lifeworlds in male and female youths are still poorly studied in psychology. Some studies focus to the characteristics of the living space of young people (Arendachuk, 2018; Lodkin & Chetverikova, 2018; Osipchukova & Popova, 2020; Stefanova & Krugova, 2019) and the prevalence of different types of lifeworld in this age group (Gryazeva-Dobshinskaya & Mal'tseva, 2016; Men'shikova & Levchenko, 2015). Demidova (2012) studied youth people's lifeworld from a dynamic perspective. She noted that as individuals get older, their type of lifeworld becomes more pronounced. Instrumental values are changed in the value and creative types of lifeworld. The hedonistic and realistic types become stabilized.

Meanwhile, the distinctive features of lifeworlds in male and female youths are understudied. We admit that they have their own specific characteristics that manifest themselves especially intensively during periods of crisis, because the strategies of coping with difficult life situations differ between male and female youths.

For example, compared to female youths, males are more likely to use avoidant coping strategies. Numerous studies confirm this assumption (Roecker, Dubow, & Donaldson, 1996; Hampel & Petermann, 2005; Eschenbeck, Kohlmann, & Lohaus, 2007). In young adulthood, this pattern persists. Thus, Gentry et al. (2007) found that compared female youths, males more often use the avoidant strategy.

Vasyura & Korobeinikova (2014) found that when young male students have doubts about their own abilities, they tend to underestimate the importance and seriousness of the events taking place and to suppress their emotions. Male youths cannot experience stress and internal discomfort for a long time; they start to protest and feel exasperated by difficulties.

Kolomenskaya, Sklyar, & Koskina (2015) found that male youths are more likely to have high self-esteem and are more confident in themselves and their strengths than girls. Uncompromising following their destiny and faith in its implementation are more characteristic of male youths. Female youths are no longer confident in themselves, tend to have low self-esteem, and do not believe in themselves.

Such characteristics of coping, which become more active during the crisis period, can lead to differences in the processes of restructuring lifeworld during the transition from adolescence to young adulthood in male and female youths.

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This study *aims* to examine easiness/difficulty and simplicity/complexity of lifeworlds in male and female youths at different age periods.

Methods

The empirical study was conducted in Komsomolsk-on-Amur. The sample consisted of 260 youths aged 16–22 years (mean age 18.6 years), 176 of whom were females and 84 of whom were males.

We divided all the respondents into two groups. The first group comprised high school students aged 16–17; the second group consisted of youths aged 18–22 aged. In different countries, the age range for youths are defined differently. In most European countries, the USA, and Japan, youths are those aged from 13–14 to 29–30. In England and the Netherlands youths are not attributed to a special group. In Russia, this group consists of 14–24-year-old young people. Our study involved respondents aged 16–24 years, which corresponds to the age range for youths defined by the UN declaration. According to sociologists, this age range is associated with a so-called age stratification, that is, vertical age differentiation (Boryaz, 1973). In our study, we used the following age gradation for youths: adolescence (high school students at the age from 13–14 to 16–17 age) and young adulthood (individuals of the first young civilian age from 18 to 20–25 years) (Pavlovskii, 2001).

The multi-composition nature of the internal world was measured using the technique for graphical representation of the psychological life space by G. V. Shukova (Shukova, 2014); this was a criterion for assessing its *simplicity/complexity*. The respondents were offered two circles – 'my real life' and 'my ideal life', which they had fill with circles indicating people, relationships, processes, phenomena, etc. that they considered meaningful. In our work, we took into account the number of meaningful objects depicted in images of real and ideal lives.

To assess *easiness/difficulty* of the external world, we used the following two criteria: 1) subjective distance of need-related objects; 2) subjective difficulty in reaching meaningful objects.

To assess *the subjective distance of need-related objects*, we used the modified version of the inventory measuring the psychological distance in social contacts by A. B. Kupreichenko (Zhuravlev & Kupreichenko, 2012). Using a five-point scale we assessed the rate of psychological distance between the group and the respondent for 17 social groups (from family and friends to the country's population as a whole, including professional and non-professional spheres). The rates of psychological distance distributed as follows: the closest (5 points); close (4); neither close nor distant (3); distant (2); the most distant (1).

We assessed *the subjective difficulty in achieving meaningful objects* using the Questionnaire on the Value-Accessibility Ratio in Various Life Areas developed by E. B. Fantalova (2011), which determined the gap between the significance of a particular personal sphere and its subjective availability in 12 spheres of life. When processing, we applied the integral (total) mismatch index (the total amount of mismatch between values and their availability).

In addition, we used the following two indicators of subjective well-being as an overall assessment measure for *the subjective difficulty of the world:* (a) the rate of global life satisfaction and (b) the subjective level of happiness (Yaremtchuk & Novgorodova, 2015). These indicators determine the gap between individual desires and possibilities (Michalos, 2017). Subjective well-being and the extent of experiencing positive emotions decrease if the real world does not correspond to the ideal one (Carver & Scheier, 1990). Thus, a decrease in subjective well-being may indicate 'difficulty' of the external world, problems in realizing individual needs, goals and values.

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Differences between different age groups, as well as between males and females, were calculated with the Mann–Whitney U test. The STATISTICA, a statistical package software version 10.0, was used for data processing.

Results

Table 1 presents results of the study of the living space among youths of various age groups.

Table 1

Characteristics of lifeworlds in male and female youths at different age periods

Indicators of the life world assessment	Females				Males			
	16–17 years	18–22 years	U	p	16–17 years	18–22 years	U	p
1. Assessment of lifeworld simplicity/complexity								
Number of circles in the image of the real world	5.0	5.4	2832.5	0.470	***5.1***	***4.2***	***413.5***	***0.042***
The number of circles in the image of the ideal world	5.8	5.5	2725.0	0.275	***5.1***	***4.4***	***353.0***	***0.029***
2. Assessment of lifeworld easiness/difficulty								
2.1. Subjective distance of social groups								
Family	4.4	4.6	3030.5	0.167	4.4	4.6	544.0	0.075
Parents	4.7	4.5	3059.0	0.437	4.6	4.6	670.0	0.846
Children	2.9	2.4	1152.5	0.302	2.6	2.7	357.0	0.899
Peers	2.9	3.0	3347.5	0.981	3.0	3.1	610.5	0.367
Class-mates (group-mates)	3.1	3.0	3037.5	0.547	3.1	3.2	538.0	0.368
Friends	4.1	3.9	2884.0	0.140	4.0	4.0	662.5	0.795

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Table 1

Characteristics of lifeworlds in male and female youths at different age periods

Indicators of the life world assessment	Females				Males			
	16–17 years	18–22 years	U	p	16–17 years	18–22 years	U	p
Compatriots	2.2	2.1	3043.5	0.790	2.2	2.2	636.5	0.894
Citizens / fellow villagers	2.1	2.2	3057.5	0.304	2.2	2.6	530.0	0.106
Ethnos	2.1	2.3	2870.0	0.253	2.4	2.2	594.0	0.412
Coreligionists	2.1	2.3	2608.5	0.182	***1.6***	***2.4***	***316.0***	***0.003***
Teacher-mentors	2.8	3.0	3073.0	0.325	3.0	2.9	582.0	0.569
Colleagues	2.5	2.4	2072.0	0.850	2.1	2.2	483.0	0.853
Authorities	2.3	2.2	2697.0	0.778	2.4	2.1	546.0	0.320
Successful individuals	2.7	2.5	2933.5	0.224	2.7	2.7	634.5	0.867
Careerists	2.6	2.5	3046.0	0.716	2.6	2.6	553.0	0.753
Individuals believing in the future	***3.0***	***2.6***	***2592.0***	***0.016***	2.9	2.6	480.5	0.236
Individuals living "like others"	2.4	2.5	3041.0	0.214	***2.2***	***2.7***	***445.0***	***0.033***
Individuals making their own destiny	3.3	3.1	3017.0	0.242	3.3	3.1	581.0	0.327
Average distance	2.9	2.9	3104.0	0.345	2.9	3.0	647.0	0.689

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Table 1

Characteristics of lifeworlds in male and female youths at different age periods

Indicators of the life world assessment	Females				Males			
	16–17 years	18–22 years	U	p	16–17 years	18–22 years	U	p
2.2. Subjective difficulty in reaching meaningful objects								
Total mismatch between values and their availability	***23.5***	***29.4***	***2594.0***	***0.012***	24.5	27.0	632.5	0.577
2.3. Subjective well-being								
Global life satisfaction	***7.4***	***6.5***	***2638.5***	***0.009***	7.6	7.6	678.5	0.800
Subjective level of happiness	***7.5***	***6.6***	***2764.5***	***0.028***	7.8	7.9	697.0	0.957

Note: significant differences are indicated in bold italic type.

Table 1 shows that 16- to17-year-olds perceive living conditions almost equally. No significant differences were found in the degree of differentiation of the perception of meaningful objects (neither in creating a real image of life, nor in constructing an ideal one). However, females of this age attributed a larger number of meaningful objects to the circle of an ideal life; the average number of objects was identical in both cases among male respondents.

We also observed no differences in the perception of lifeworld as easy/difficult between female and male respondents aged 16–17. Their assessments of the subjective difficulty of achieving meaningful objects and subjective well-being were similar.

The assessment of the subjective distance to social groups also does not differ in most cases. Significant differences are found in the assessment of distance only in relation to fellow believers. Female respondents rate representatives of their religion as closer ones ($U = 1079.5$; $p = 0.043$).

Thus, at the age of 16–17 the world in which male and female respondents live appears to be similar, both in terms of the internal world simplicity/complexity and the external world easiness/difficulty. At the same time, a comparison of different age groups enabled us to identify characteristics of lifeworlds in male and female respondents.

Lifeworld simplicity/complexity does not differ significantly between females aged 16–17 and 18–22. The number of meaningful objects does not differ significantly in their ideas about real

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and ideal life. Despite this, there is a tendency towards greater coordination of objects in real and ideal living spaces. Females aged 18–22 attribute a greater number of meaningful objects to the image of real life, and a smaller number of meaningful objects to the image of ideal life.

We found the following differences in characteristics of perception of the external lifeworld in female respondents. First, achieving meaningful objects is subjectively more difficult for females aged 18–22 years ($U = 2594.0$; $p = 0.012$), which determines an increase in a mismatch. Secondly, they are characterized by a lower level of subjective well-being, both in terms of global life satisfaction ($U = 2638.5$; $p = 0.009$) and subjective level of happiness ($U = 2764.5$; $p = 0.028$). Third, compared to those aged 16–17 years, they are more distant in relation to individuals who have not lost faith in the future ($U = 1079.5$; $p = 0.043$).

Thus, we observed differences in the characteristics of lifeworld in female respondents aged 16–17 and 18–22 years. Females aged 18–22 years perceived the external world as more difficult for realizing their own life values, satisfying their individual needs, which determined a lower level of subjective well-being and distancing from people who believed in the future. Moreover, their internal world did not differ from lifeworld of 16–17-year-old females in terms of the number of meaningful life spheres and is characterized by a similar complexity. Females aged 18–22 years were more realistic and pessimistic; in their consciousness they moved meaningful objects to a greater distance, which impeded their achievement.

As for male respondents from different age groups, their lifeworlds were characterized by phenomena that were completely opposite to those found in females. In contrast to female respondents, the main differences in the living space of males relate to the processes of simplifying the complexity of the internal world. Males aged 18–22 years attributed a smaller number of meaningful objects both to the image of real life ($U = 413.5$; $p = 0.042$) and the image of the ideal life ($U = 353$; significant for $p = 0.029$). The internal lifeworld of males aged 18–22 years is simpler, with fewer meaningful objects and meaningful needs.

At the same time, the external lifeworld has no specific characteristics. For male respondents, age differences in life easiness/difficulty are mostly related to distance in relation to social groups. Males aged 18–22 years showed a reduction in the distance towards fellow believers ($U = 316$; $p = 0.003$) and those living "like others" ($U = 445$; $p = 0.033$).

The study showed that at the age of 16–17 lifeworlds of male and female youths were almost identical in their characteristics; at the age of 18–22 their differences relate to both the internal and external components of the living space.

Therefore, we may conclude that 18–22-year-old females differ from males in terms of a more complex and differentiated internal world ($U = 980$; $p = 0.033$), where they distinguish which more meaningful objects. At the same time, females are significantly less satisfied with life ($U = 1119$; $p = 0.012$) and are less happy ($U = 1074$; $p = 0.006$) than their male peers.

Discussion

As Kon (1989) points out, adolescence (15–17 years) is a period of forming life prospects, which are experienced as a passionate desire to start something and an unshakable confidence that everything will work out. In other words, the external perspective of the psychological world develops into a certain space-time perspective. High school students discover the psychological 'extension' ('there' and 'then') of life, which enriches the structure of their psychological world and grasps the previously unreachable future and present. In adolescence the idea of an ideal

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future is especially vague and unrealistic, as it often does not correspond to an individual's real capabilities and the conditions of his/her life. Youthful dreams, where everything is possible and ideal gradually give way to a more realistic image of the future, which is focused on reality.

The transition from adolescence to young adulthood is associated with the emergence of contradictions between the ideal and reality, with a reflection of the objective difficulties of the external world. Slobodchikov & Isaev (2000) describe this period as a 'crisis of young adulthood', which is characterized by a 'meeting' of ideal life plans and social reality, by entering into an independent life in society and gaining financial independence from parents. At this age, there are often disappointments in professional and life choices, a discrepancy between expectations and ideas about the profession and the reality of its mastering, the real nature of its development.

Having found themselves in a situation of life and age crisis, male and female youths structure their lifeworlds differently. The results of our study indicate that female youths perceive difficulties and the world as difficult, hindering the realization of their needs, which is associated with the emergence of a more pessimistic internal stand and a decrease in life satisfaction. In contrast to females, male youths overcome the crisis by reducing the subjective complexity of life, reducing the number of meaningful objects and strengthening the tendency to 'be like others', and a partial rejection of their own individuality.

Thus, for female adolescents and youths, differences in lifeworlds are only related to the external world; for male adolescents and youths these differences occur in the internal world. Meanwhile, a comparison of females and males in these age periods indicates negative processes.

For female youths, lifeworld, while maintaining a rather simple structure, becomes subjectively more difficult, approaching to the "externally difficult and internally simple lifeworld" (according to F. Ye. Vasilyuk's typology). The simplicity of the internal world frees an individual from internal limitations, leaving the focus on external obstacles. Therefore, in such a world, activity is characterized by an aspiration to a need-related object without distractions, hesitations, and doubts.

As for male youths, a comparison of their lifeworlds in adolescence and young adulthood indicates a simpler structure of lifeworld at young adulthood, their focus on a narrowed sphere of meaningful objects, which also determines an externally difficult and internally simple lifeworld. These trends enable us to think about the direction of support of these life periods for both male and female youths, which should increase the complexity of their internal world, expand the scope of their meaningful objects and values, and their awareness of the associations between meaningful objects and phenomena. This provide a basis for possible creative transformation of the individual life and world, which is especially important during periods of crisis.

The findings of this study enabled us to draw the following *conclusions:*

1. At the age of 16–17, lifeworlds of males and females do not differ in their characteristics. At the age of 18–22, the differences relate to both the internal and external components of the living space.

2. Differences in lifeworlds of females aged 16–17 and 18–22 relate to the perception of the world as more difficult in young adulthood. This determines a lower level of subjective well-being experienced and distancing from people who believe in the future.

3. Differences in lifeworlds of males aged 16–17 and 18–22 years manifest themselves in the fact that the internal world is simpler in 18–22-year-olds. At the same time, the external lifeworlds do not differ considerably.

The limitations of the conclusions are that the study sample comprised youths living in the urban environment of a region remote from the center of Russia, which determines the prospects for further research – testing the results obtained in this study in other regions and settlements of different types.

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Author Contributions

S. V. Yaremtchuk conducted the study, analyzed and interpreted empirical results, worked with sources, wrote the literature overview, and carried out a critical revision of the content.

A. V. Bakina conducted the study, analyzed and interpreted empirical results, worked with sources, wrote the literature overview, and carried out a critical revision of the content.

S. M. Sityaeva conducted the study, analyzed and interpreted empirical results, worked with sources, wrote the literature overview, and carried out a critical revision of the content.

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Developing a Diagnostic Tool for a Prognostic Assessment of Resistance to Professional Information Stress in Flight Personnel

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Abstract

Introduction. Stress resistance is a professionally important quality for flight personnel. However, the methods for determining stress resistance (neuropsychic resistance) recommended by the regulatory documents for applicants to military flight schools are rather subjective. This paper presents a novel diagnostic tool as an objective instrument for assessing resistance to the effects of experimental information stress.

Methods. The authors developed the diagnostic tool for assessing resistance to the influence of informational experimental stress intended for use in occupational psychological selection of flight personnel. A stressor represented a complex of stressful stimuli, including a competitive exam, complicated arithmetic tasks, and interferences having both noise and distraction effects. The level of stress resistance was determined by the dynamics of mental activity during testing, the physiological 'cost' of activity (heart rate at different stages of the experimental stress examination), and external behavior manifestations (speech, movements, posture, and facial expressions). The standardization procedure for a representative sample (n = 3191) used the Descriptive Statistics statistical software package, Microsoft Excel 2007. The author's script of the diagnostic tool was incorporated into the software of the Reacor multifunctional psychophysiological complex.

Results and Discussion. The study examined the applicability of the novel diagnostic tool for diagnosing applicants to military flight schools. The study sample comprised 1135 male candidates aged 18–27 years. The findings indicated the presence of a significant correlation between psychological, physiological, behavioral indicators of subjective stress resistance and the success of flight training (according to expert assessments of simulator training and flight practice). Therefore, the developed diagnostic tool for assessing resistance to experimental information stress is a sensitive test for diagnosing stress resistance and can be recommended for use in occupational psychological selection of flight personnel.

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LABOR PSYCHOLOGY

Keywords
flight personnel, professional stress, information stress, experimental stress, stress resistance, stressor, occupational psychological selection, professionally important qualities, psychometric indicators, prognostic assessment

Highlights
- Experimental information stress is created by a complex of stressful stimuli (complicated arithmetic tasks, unexpectedness when presenting stimuli, time deficit, and sound interferences with noise and distraction effects).
- Resistance to stress is determined by psychometric indicators of stress manifestations, including the dynamics of mental activity during testing, the physiological 'cost' of activity (heart rate at different stages of the examination), and external behavior manifestations (speech, movements, posture, and facial expressions).
- The indicators of stress manifestations in candidates for admission to the flight school had significant correlations with the indicators of the success of their flight training.

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Introduction

The profession of aviation pilot is an extreme and dangerous profession; stressful situations are a constant factor in such a professional activity. As introduced by G. Selye in 1936 (Selye, 1936), the concept of stress as a nonspecific adaptive reaction of the body to various influences of excessive intensity continues to attract attention of researchers in various scientific fields (Berebin & Pashkov, 2017; Bitutskaya, Lebedeva, & Tsalikova, 2020; Karayani & Syromyatnikov, 2016; Kulikova, 2019; Ponomarenko, 2006; Rabenu, Yaniv, & Elizur, 2017). Studies have shown that both the qualitative uniqueness of stress factors and the individual characteristics of the organism contribute to stress reactions (Solov'eva, Nikolaev, Denisenko, & Denisenko, 2012; Carver, Sutton, & Scheier, 2000; Fink, 2016; Vine et al., 2015). According to the qualitative characteristics of stressful stimuli stresses are conventionally divided into physiological and psychological ones. Physiological stress represents a response to damage to the integrity of the body; it is characterized by impaired homeostasis. The stereotypical nature of reactions under physiological stress reflects the mechanisms of restoring homeostatic balance. Psychological stress is understood as a state of mental stress, combined with physiological symptoms of stress, which occurs under the influence of an intense socio-psychological stimulus and is characterized by a large variability in manifestations.

According to the qualitative characteristics of stress factors, researchers distinguish informational and emotional types of psychological stress (Bodrov, 2000, 2006; Yuzhakov, Avdeeva, & Nguyen, 2015). Information stress arises in situations when it is necessary to process large amounts of

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information within a short space of time. This entails information overloads, when subjects do not cope with solving emerging problems and do not have time to make right decisions under conditions of high responsibility for the consequences of their decisions (Gander, Vorona, Ponomarenko, & Alekseenko, 2016; Kovtunovich & Markachev, 2008; Samotrueva et al., 2015; Sobol'nikov & Irgit, 2018). Emotional stress arises when there is a threat of danger to the psychological, social or physical integrity of the human body and personality (Solov'eva et al., 2012; Stamova, Gulin, & Nazirova, 2017; Yuzhakov et al., 2015; Yumatov, 2020; Carver et al., 2000). However, such a differentiation of stresses, based on the distinction between stressful stimuli (informational or emotional), is rather relative because it is often difficult to determine which of the identified stressors is the leading one. In flying in a stressful situation, it is difficult to distinguish informational stressors from emotional ones, as emotions appear on the basis of previous cognitive processing of information; even a purely physical stimulus is addressed to the pilot's psyche and is subjected to information analysis. Previous studies (Bodrov, 2006; Gander et al., 2016; Ponomarenko, 2006) demonstrated that pilots often experience information overloads, because they need to process large amounts of information in a short space of time, which has varying degrees of uncertainty, and also great responsibility for the consequences of their decision. The described circumstances of information overload usually determine the development of professional stress of flight personnel, which is defined as information stress (Ponomarenko, 2006).

Therefore, any aviation stress (primarily informational) that pilots experience during flights is both emotional and physiological, since emotional stress causes the same changes in the body as physiological stress (Ponomarenko, 2006).

The importance of occupational selection of stress-resistant individuals in aviation is obvious. Few individuals can maintain full working capacity or even increase it in critical situations. In others the same conditions may arise a feeling of fear, cold perspiration, slowed thoughts, and inadequate chaotic activity (Kitaev-Smyk, 2013). In this case an individual's behavior turns out to be non-adaptive; it is not aimed at rational control of the situation, which is inadmissible in aviation (Krasilnikov, Krachko, & Malchinsky, 2014). It is difficult to predict human behavior under stressful conditions, because the individuals who had good performance indicators in normal conditions often turn out to be non-productive (Kitaev-Smyk, 2013). As recommended in regulatory documents, psychological tests should be used to examine stress resistance (neuropsychic resistance) during occupational psychological selection (OPS) in military aviation schools. However, such tests and questionnaires are based on self-assessment and are influenced by subjective factors (Nikiforov, Vorona, Bogomolov, & Kukushkin, 2015; Pokrovskii, Mingalev, Pukhnyak, & Abushkevich, 2011; Yuzhakov et al., 2015).

Prediction of the behavior of the subjects in stressful situations of real professional activity is argued by their resistance to the effects of experimental stress. Under normal conditions, it is difficult to form such a 'laboratory' situation, which may correspond to a real professional stressful environment. The difficulty lies in the creation of a subjective reality of the extremeness of acting

factors. In addition to the objective importance of stressors, an individual attitude towards stimuli, their assessment and comparison with personal resources are of great importance in the process of the development of a stressful state. According to R. Lazarus (Lazarus, 1993), the development of stress depends on how an individual evaluates the relationship between external environmental requirements (intensity and quality of stimulus) and his/her own coping resources. Stress-triggering emotions appear only in the case of a negative balance of this relationship. According to the concept of stress by Selye (1982), stress is determined by a pluricausal (multi-causal) adaptation syndrome arising under the influence of a complex of factors that are necessary for its development. Consequently, either a single intense stimulus with extreme impact or a complex of acting factors represent an experimental stressor. Taking into account the purpose of the diagnostic tool for assessing professional suitability for flight training and work, its developers should focus on real technical and organizational capabilities of its application. The OPS specialists do not have such devices as a centrifuge that can be used as a dosed physiological stress stimulus. In the OPS process the assessment of stress resistance of each candidate for admission to the flight school takes no more than 20 minutes. However, the real number of candidates for admission is often up to 1000 or more.

This study presents the novel diagnostic tool developed by authors for a prognostic assessment of resistance to professional information stress in flight personnel. This diagnostic tool examines resistance to the effects of experimental information stress and can be used in the process of occupational psychological selection of applicants to flight schools. Since in today's fifth-generation military aircraft navigation devices have been converted to digital indicators of information display, the novel diagnostic tool is especially important. When developing the program of this diagnostic tool, the authors used the fundamental works of Selye (1982), Lomov (1984), Bodrov (2006), Kitaev-Smyk (2013), and Ponomarenko (2006).

This study *aims* to develop a diagnostic tool for an objective assessment of resistance to the effects of experimental information stress using psychometric indicators, which can predict the behavior of subjects in stressful situations of real professional activity.

Methods

Development of a stress stimulus for the creation of experimental information stress

Initially, a stressful stimulus was presented by a complex of emotionally saturated factors, including tragic video and audio stimuli (slide show of car and plane crashes, photographs of people with severe injuries and simultaneous exposure to negative sounds of a siren, machine gun fire, broken glass, dramatic screams of men, women, and children), the very situation of competitive testing, and intense emotiogenic instruction upon presentation of test items (Krasilnikov, Krachko, & Malchinsky, 2013). However, it turned out that this stress stimulus caused not a stressful, but an orienting response, because at the stage of stressful exposure the pulse rate did not increase but decreased in the majority of subjects; they entered the study room asking a question, "Are

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they showing a scary movie here?" This was explained by their acquaintance with horror images from thrillers. Therefore, after the analysis of the relevant literature (Bodrov, 2006; Gazieva, 2018; Gander et al., 2016; Kitaev-Smyk, 2013; Ponomarenko, 2006; Samotrueva et al., 2015; Yuzhakov et al., 2015; Yumatov, 2020; Bernardi et al., 2000) and empirical testing of various methods for experimental stressing (Krasilnikov et al., 2013, 2014; Krasilnikov, Krachko, & Malchinsky, 2015; Krachko, Krasilnikov, & Malchinsky, 2017; Krachko, Krasilnikov, Malchinsky, & Khvostova , 2018), the authors developed the following complex of effective stressful stimuli:

(a) Complicated mathematical tasks, which solution causes an activation of more substantial areas of the brain, compared with verbal tests (Aidarkin & Fomina, 2012; Pavlygina, Karamysheva, Tutushkina, Sakharov, & Davydov, 2012; Roik & Ivanitskii, 2011; Neubauer & Fink, 2009; Wagner, Sebastian, Lieb, Tüscher, & Tadić, 2014; Zago et al., 2008). The tasks consist of 100 examples, presented in the form of three modified arithmetic tests (Arithmetic Counting 1 (AC1), Arithmetic Counting 2 (AC2) and Addition of Numbers (AN)), where operations with integers are performed according to complicated rules.

(b) Screen presentation of test arithmetic tasks in random order, one at a time, at intervals of 3–4 s, which creates emotional stress from unpredictability of expectation, and also excludes the effect of memorization and 'habituation' (Alyushin, 2015).

(c) The impact of informational interference through headphones when performing tasks, which had both noise (the beat of the metronome) and distractor (a dramatic radio exchange of an air traffic controller with a pilot about an emergency in an airplane) effects (Utochkin, 2010).

(d) High motivation for competitive participation in competitive exams, which is obligatory, because without motivation to get a high score in this test, its stress-generating effect is minimized.

Psychometric indicators of stress manifestations

The authors assessed resistance to experimental information stress according to the following criteria.

The psychological criterion included indicators of performance, dynamics, stability of mental performance. Mental performance is measured by the number of correctly solved arithmetic tasks when performing three tests (AC1, AC2, and AN) and their sum. The dynamics is determined by the ratio of correct answers in the AC1 and AC2 tests. Stability is assessed by the results of the Addition of Numbers test, divided into six equal parts (by the number of zero solutions in each part of the test).

The physiological criterion is determined by heart rate (HR) values at different stages of the examination. The choice of heart rate is determined by the fact that according to many studies (Baevskii, Kirillov, & Kletskin, 1984; Bakhchina, Demidovskii, & Aleksandrov, 2018; Kitaev-Smyk, 2013), the heart rate dynamics is an integrative indicator of changes in the physiological state of the body, characterized by a moderate interindividual variation. This provides the optimal standardization of indicators and their assessment; the reliability and simplicity of heart rate

measurement facilitate its use in OPS. The authors refused to use galvanic skin response (GSR) as a pattern of physiological response accompanying mental activity, because of large interindividual differences in indicators, dependence on environmental conditions, which made it difficult to carry out standardization for the sample and criterial assessment of GSR values.

The physiological criterion includes heart rate values at the stages of performing arithmetic tests (AC1, AC2, and AN), heart rate values at the background stage and the final stage of rest, stress index (the ratio between heart rate values at the background stage and those at the stage of performing the AC1 test) and recovery index (the ratio between heart rate values at the background stage and those at the final stage of rest).

The behavioral criterion included changes in the behavior of the subjects that reflect the level of emotional stress during the study (speech and motor retardation or hyperactivity, stuttering, tremors, and changes in facial expressions and vegetation). Behavioral indicators were divided into the following ones: pronounced (impairing the performance of test tasks), moderate (impeding the performance of tasks), episodic moderate or mild forms of manifestation, absence of behavioral manifestations.

The psychological, physiological, and behavioral criteria (psychometric indicators of stress manifestations) are combined into an integral assessment of stress resistance (Bodrov, 2001; Krachko, Krasilnikov, & Malchinsky, 2019; Yuzhakov et al., 2015).

Development of the study program

The authors developed a scenario with the specification of procedures and textual content of activities at each stage of the experimental stress study, and also a complex of psychometric indicators of stress manifestations and methods of their registration. The tool was implemented on the basis of the Reacor multifunctional psychophysiological complex which contained an original script for conducting the study according to the following stages: (a) the background stage, (b) the stages of performing arithmetic tasks (AC1, AC2, and AN), alternating with the stages of instructions for each task, and (c) the rest stage.

Standardization of the diagnostic tool indicators

The authors examined psychometric indicators of stress manifestations for the samples of candidates who entered the flight school over a three-year period. Quantitative indicators (indicators of psychological and physiological criteria) were checked for compliance with the normal distribution. Therefore, the authors calculated the following: (a) characteristics of the sample position and (b) characteristics of the sample dispersion.

For the calculations, the authors used the Descriptive Statistics statistical software package, Microsoft Excel 2007, and obtained statistical characteristics of the indicators included into the integral value of stress resistance that were measured in quantitative indicators (for the general sample of applicants, n = 3191). The authors presented the results of these calculations in their previous publications (Krachko et al., 2018, 2019).

The findings suggest that the quantitative indicators of the integral value of stress resistance correspond to the normal distribution according to the distribution of test scores on representative samples, which is confirmed by the representative data obtained from empirical tests (n = 3191) (Krachko et al., 2019).

Results and Discussion

According to normative assessment scales the primary quantitative indicators of stress tolerance were converted into partial estimates (a five-point scale) as follows:

– a primary indicator that is in the $<\bar{X}-\sigma$ interval scored two points.
– a primary indicator that is in the interval between $\geq\bar{X}-\sigma$ и $<\bar{X}$ scored three points.
– a primary indicator that is in the interval between $\geq\bar{X}$ и $<\bar{X}+\sigma$ scored four points.
– a primary indicator that is in the interval between $\geq\bar{X}+\sigma$ scored five points.

Using the normative assessment scale of the distribution of quantitative indicators of stress resistance, the authors used partial estimates (a five-point scale) for each indicator. In terms of the level of manifestation the points distributed as follows: two points indicated a low level of manifestation, three points – a satisfactory level, four points – a good level, and five points – a high level.

Indicators of the dynamics of mental performance and qualitative indicators of behavioral manifestations were immediately converted into partial estimates using a five-point scale (Krachko et al., 2019).

Table 1 presents the standards for psychometric indicators of stress manifestations, that were developed in accordance with the normative assessment scales of the distribution of primary indicators using a five-point scale.

Table 1
Standards for assessing psychometric indicators of stress manifestations

	Points (partial estimates)			
	2	3	4	5
Psychological criterion				
Indicators of mental performance (MP)				
AC1	2 and <	3–6	7–10	11 and >
AN	6 and <	7–15	16–23	24 and >
AC2	5 and <	6–10	11–13	14 and >

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Table 1
Standards for assessing psychometric indicators of stress manifestations

	Points (partial estimates)			
	2	3	4	5
Psychological criterion				
Sum of tests (AC1 + AN + AC2)	14 and <	15–29	30–45	46 and >
Stability of MP	2 and > zero solutions	1 zero solution	Absence of zero solutions	Absence of zero solutions
Dynamics of MP	Stable low estimates for AC2 and AC1	Stable satisfactory estimates for AC2 and AC1	Stable good estimates for AC2 and AC1	Stable high estimates for AC2 and AC1
Physiological criterion				
Heart rate at the background stage	100 and >	86–99	72–85	71 and <
Heart rate at the AC1 stage	127 and >	108–126	90–107	89 and <
Heart rate at the AN stage	119 and >	102–118	84–101	83 and <
Heart rate at the index AC2 stage	113 and >	97–112	81–96	80 and <
Tension index	1.43 and >	1.26–1.42	1.12–1.25	1.11 and <
Recovery index	1.07 and >	0.96–1.06	0.89–0.95	0.88 and <
Behavioral criterion				
Indicators of behavioral manifestations	Severe manifestations	Moderate manifestations	Episodic manifestations	Absence of behavioral manifestations

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The integral value of stress resistance was calculated using the expert analytical method of multidimensional scaling, which was developed in the field of aviation psychology as the most acceptable for the practical assessment of the professionally important qualities of a military pilot. In accordance with the method of multidimensional scaling, certain coefficients of significance were assigned to each measurement indicator (Krachko et al., 2019).

The psychological criterion indicators (AN, stability and dynamics of MP) are indicators of primary importance, the other three indicators (AC1, AC2, sum of tests) are of secondary importance.

The indicators of the physiological criterion (heart rate at the background stage, heart rate when performing the AN test, and the recovery index) are of primary importance. Heart rate values when performing AC1 and AC2 tests and the tension index are of secondary importance.

For the indicators of the behavioral criterion, the first coefficient of importance was assigned to pronounced manifestations; moderate and mild manifestations referred to the indicators of secondary importance.

The calculation of the integral value of stress resistance (SR) was carried out in an electronic database in the Excel format according to the formulas presented in previous publications (Krachko et al., 2018, 2019). According to the degree of stress resistance, the individuals are divided into four groups: (a) *individuals with a low integral value of SR*, who are characterized by a high probability of disorganization of activity in stressful situations; (b) *individuals with a satisfactory integral value of SR*, who are characterized by a high probability of a decrease in the reliability of activities in stressful situations; (c) *individuals with a good integral value of SR*, who are characterized by the preservation of the reliability of activities in stressful situations; and (d) *individuals with a high integral value of SR*, who are characterized by the preservation of high reliability of activities in stressful situations.

To assess the relationship between the psychometric indicators of stress manifestations, combined into an integral value of subjects' resistance to experimental information stress and the results of expert assessments for simulator training ($n = 562$), the authors carried out a correlation analysis, which showed good reliability coefficients of relationships among these variables ($p < 0.05$). The indices of the integral value of stress resistance, obtained during the examination of applicants in the process of occupational psychological selection, were compared to the estimates of emotional tension during flight simulator operation among the same subjects (who became cadets). When comparing, it turned out that cadets with high scores of the integral assessment of stress resistance had low scores of tension and better acted in special (emergency) situations during flight simulator operation. The presence of the relationships among the studied estimates indicates the criterial (prognostic) validity of the developed diagnostic tool, based on a significant coefficient ($p < 0.05$) of the correlation between the integral value of stress resistance and values of the external criterion (marks for simulator training).

Significant differences (at $p < 0.05$) were also observed when comparing the indicators of resistance to experimental information stress and the results of flight practice in the sample of cadets ($n = 562$), divided into polar groups of the 'best' and the 'worst' (according to rating assessments of experts). Cadets with excellent ratings for the performance of flight missions using training aircraft had high stress resistance values. Cadets from the group of the 'worst' (according to expert assessments for flying practice) had higher stress manifestations and a low integral value of stress resistance during the experimental stress study.

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Conclusion

The data on the existence of a significant correlation and significant differences (at $p < 0.05$) between the integral value of cadets' stress resistance and success of their flight training (according to expert assessments of simulator training and flight practice), give us a reason to believe in possible practical application of the developed diagnostic tool.

The criterion validity based on two approaches (prognostic and by dividing into polar groups according to the success of flight practice) provides grounds for using the novel diagnostic tool in order to predict resistance to professional information stress based on the resistance of subjects to experimental stress caused by a complex of information stress-generating stimuli.

Thus, this diagnostic tool is a sensitive test for identifying resistance to information stress in individuals undergoing examination, which makes it possible to recommend it for use in the procedures of occupational psychological selection of candidates for admission to flight schools.

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Psychological Characteristics of Psychologists' Adaptation to Online Counseling During the COVID-19 Pandemic

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Abstract

Introduction. Practicing psychologists need to adapt to new conditions of a forced transition to the online counseling. Until now, however, no data are available about adaptation to online counseling among Russian practicing psychologists during the COVID-19 pandemic; innovativeness among psychologists has been scarcely investigated. This study aims to identify the factors of adaptation to online counseling among psychologists during the COVID-19 pandemic. The main hypothesis is that psychologists' innovative qualities are associated with their successful adaptation to online counseling during the COVID-19 pandemic. The additional hypotheses were that psychologists' successful adaptation to online counseling is associated with work experience, region of residence, modality of counseling, and a positive attitude towards working from home. This study represents the first attempt to examine the factors of psychologists' adaptation to online counseling during the COVID-19 pandemic.

Methods. The study sample comprised 312 counseling psychologists from Russia. To examine adaptation and innovative qualities the authors used the original questionnaire for Studying Individual Attitudes Towards Innovation (N. M. Lebedeva, A. N. Tatarko). Descriptive statistics procedures, Chi-square test, and Cramer's V test were used.

Results. Psychologists scored high on innovative qualities and had an average level of willingness to take risks for success. Psychologists' innovative qualities are associated with successful adaptation to online counseling. No associations were found between adaptation and both work experience, and psychologists' region of residence. Gestalt therapists scored highest on adaptation to the online format; cognitive-behavioral psychologists scored lowest. The assumption that there is an association between the modality of counseling and adaptation was confirmed. Positive attitudes towards working from home were generally associated with successful adaptation among psychologists. Counseling psychologists who had no problem with blurring the work/home boundaries enjoyed working from home.

Discussion. Well-developed innovative qualities, possibilities for comfortable working at home, and the modality of work contributed to successful adaptation to online counseling for most

psychologists during the COVID-19 pandemic. Major recommendations for future research, as well as study limitations are discussed.

Keywords
Internet counseling, online counseling, psychological counseling, psychologist, adaptation, innovative qualities, personality innovativeness, COVID-19, self-isolation, working at home

Highlights
- Well-developed innovative qualities are characteristic of psychologists. They are highly creative, future-oriented, with average levels of willingness to take risks for success.
- Innovative qualities are associated with psychologists' successful adaptation to the online format of counseling.
- Work experience and region of residence are not associated with adaptation to online counseling.
- The modality of counseling, the desire and ability to work from home, the ability to manage work/home boundaries are associated with counseling psychologists' adaptation to remote working.

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Introduction
The COVID-19 coronavirus pandemic has become a global challenge for all the areas of social life. An increased need for psychological help (Krakhmaleva, Kuz'mina, & Ermolova, 2020) and impossibility of working in a face-to-face format have affected practicing psychologists and determined the rapid transformation of the format of work. Uncertain prospects of returning to the usual offline format required new forms of work.

Practicing psychologists' inability to adapt to such an unstable environment may lead to a decrease in the number of clients, and sometimes even finish their career. During the pandemic, online counseling has become one of the main challenges for psychologists. Many academic and practicing psychologists generally had negative or suspicious attitudes towards it (Glueckauf et al., 2018; Topooco et al., 2017).

The ability to change individual behavior in a situation of uncertainty, to be creative in solving new problems is of particular importance for a counseling psychologist, as it helps to successfully

adapt to changes in the environment. 'Innovative qualities' and an 'innovative potential' are complex terms combining the qualities of creativity, openness to new experience, flexibility, and proactive personality. We believe that these qualities should be examined among practicing psychologists in the context of adaptation to online counseling.

Problem formulation

An individual's inclination towards innovation is a psychological characteristic that determines his/her willingness to perceive new experience and to adapt to the changing environment. For a long time many authors examined innovative personality traits and recognized them as central for predicting individuals' attitudes towards innovation, and also their ability to innovation activity (Zhuravlev, 1993; Klochko & Galazhinskii, 2009; Klochko & Krasnoryadtseva, 2010; Lebedeva & Tatarko, 2009; Sovetova, 2000; Terekhova & Popov, 2015; Shemelina & Bykova, 2019; Aldahdouh, Korhonen, & Nokelainen, 2019; Aldahdouh, Nokelainen, & Korhonen, 2018; Ali, 2019; Nisula & Kianto, 2016; Wisdom, Chor, Hoagwood, & Horwitz, 2014). Some authors distinguished structural components of this complex phenomenon, including 'willingness to innovation', 'innovative activity', and 'innovative potential' (Zagashev, 2010; Klochko & Krasnoryadtseva, 2010; Nesterov, 2007).

The study of innovative qualities among practicing psychologists appears to be one of the important areas of research, as psychological practice itself is a process of creativity (Makhlova, 2012), which is characterized by uncertainty, creativity, ability and desire to make decisions under conditions of insufficient information. As with any modernization process, the client consultation process includes an initial creative understanding and understanding of the problem, the discovery of resources and problem-solving strategies, and further development of new solutions and possible transformation of these strategies. To successfully complete these steps, the consultant needs to have certain personal characteristics. Thus, a previous review of more than a hundred empirical studies has shown that the success of a counselor's psychological assistance is associated with his/her individual adaptation and creativity in solving problems (Beutler et al., 2004).

An overview of relevant literature demonstrated that counselling psychologists have a high level of creativity (Kostrigin, 2014) and are open to new experience (Aver'yanov, 2018). However, there is a lack of data (e.g., Ikiz & Asici, 2017) on innovativeness and innovative potential of counselling specialists as an individual integrative characteristic (attitude towards innovations, ability and willingness to introduce and develop innovations) (Terekhova & Popov, 2015).

Under changing conditions of life counseling psychologists should develop the ability to change and transform the environment and to adapt to new conditions, as they are among the first to encounter actual mental phenomena in society. Today, the main needs of clients are primarily associated with overcoming anxiety during the pandemic, building new meanings, forms, and strategies of behavior in the context of a changed world (Efremova, 2020). Therefore, the innovative qualities of a psychologist, his/her adaptation to the transforming conditions of life are of key importance.

Thus, this study aims to identify the factors of adaptation to the online format of work among counseling psychologists during the COVID-19 pandemic.

Innovative qualities are associated with openness to new experience (Klochko & Galazhinskii, 2009; Terekhova & Popov, 2015). Our main hypothesis (1) suggests that counseling psychologists' innovative qualities determine their successful adaptation to online counseling during self-isolation.

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Based on data from recent studies on forced online counseling during the pandemic (Békés & Aafjes-van Doorn, 2020), our additional hypothesis (2) suggests that psychologists' adaptation to the online format is associated with the region of their residence and work experience.

There is an evidence that representatives of different modalities of psychotherapy adapt and relate differently to online counseling (Békés & Aafjes-van Doorn, 2020; Perle et al., 2013). Therefore, another additional hypothesis (3) suggests that self-assessment of the success of adaptation to the online work is associated with counseling modality that psychologists adhere to.

Finally, the fact that 'passion' for home-based work was one of the most reliable predictors of a positive attitude to the distance learning process among higher education teachers (Rogozin, 2020) enabled us to formulate another additional hypothesis (4) suggesting that a positive attitude towards working at home is associated with adaptation to online counseling among practicing psychologists.

Methods

The study comprised 312 psychologists practicing in Russia and representing the following communities: Professional Psychotherapeutic League (PPL), Zigmund.Online service providing online trainings with psychologists, BrainBild online service providing psychological services and distance trainings, International Professional Association of Psychologists (IPAP). Informational support of the survey was provided by the Psychological Book store.

The main stage of data collection was preceded by a pilot survey of practicing psychologists of the IPAP (n = 23) in May 2020. The results of this survey enabled us to change the structure of the questionnaire and reformulate several questions. The main phase of the study was conducted via Google Forms in the summer of 2020; it was anonymous and voluntary. No compensation was offered to the survey participants.

Due to the current coronavirus restrictions during the study, and technical difficulties and complications associated with remote measuring innovative potential and adaptability to online counseling among psychologists, we decided to use online self-assessment inventories. To examine innovative dispositions among specialists, we used the diagnostic tool for Studying Individual Attitudes Towards Innovation (Lebedeva & Tatarko, 2009). We chose this diagnostic tool because of its reliability and internal consistency. Besides, it has a small number of items, which is critical for Internet surveys. The scale of self-assessment of innovative personality traits consisted of 12 statements characterizing an individual with whom respondents needed to compare themselves by choosing the following answers: 'he is not like me at all', 'he is not much like me, 'he is a little like me', 'he is like me', and 'he is very similar to me'. Each statement refers to one of three scales – 'creativity', 'risk for success', and 'focus on the future'. Then we calculated the arithmetic mean for each scale and the general index of individual innovativeness (the arithmetic mean for the three scales). The values obtained varied from 1 to 5.

Additionally, we developed an original questionnaire, which contained questions about respondents' place of residence, their experience of work, specialization, experience of online counseling before and during self-isolation, attitudes towards this form of work, difficulties they faced, the way they adapted to the online format of working, and the specific characteristics of counseling during the pandemic (competition among psychologists, clients' desire for being consulted online). This paper presents some empirical results of this study.

Results

The respondents' places of residence distributed as follows: 42 % of respondents (n = 131) lived in Moscow or the Moscow Region, 39.4 % of respondents (n = 123) lived in other regions of the Russian Federation, and 18.6 % of respondents (n = 58) lived in St. Petersburg and the Leningrad Region. We did not collect any other socio-demographic information about the respondents.

Most of the counselling psychologists had private practice (67.3%; n = 210) and were specialized in face-to-face counseling (41.35 %; n = 129). At the time of the study, psychologists had from 6 to 15 years (39.7 %; n = 124) or up to 5 years of working experience (39.1 %; n = 122).

A third of psychologists (32 %; n = 99) noted that they applied an integrative or eclectic approach; 16 % of respondents practiced cognitive behavioral therapy (CBT) or gestalt psychotherapy.

Most of the specialists interviewed in our study had some experience of online counseling before the pandemic (82.4 %; n = 257) and started to work more often in this format during self-isolation (75.6 %; n = 236). At the same time, half of the respondents had a positive attitude towards online counseling before the pandemic (49.7 %; n = 155). As the pandemic started, they either did not change their opinion (53.5 %; n = 167) or began to relate to online counseling even better (39.4 %; n = 123). If psychologists experienced difficulties in the process of online counseling, they asked their colleagues to help them (72.4 %; n = 226).

A considerable part of practicing psychologists believed that they had adapted to the online format of work (80.8 %; n = 252); 14.1 % (n = 44) of respondents found it difficult to answer. Several respondents (5.1 %; n = 16) did not adapt. More than half of the specialists (57 %; n = 178) did not feel 'more exhausted' after online consultation, 30.5 % (n = 95) noted this feature for themselves. Some psychologists (12.5 %, n = 39) found it difficult to answer. During the pandemic, most respondents did not have problems with time management. Thus, 79 % (n = 246) of practicing psychologists did not notice any problems in structuring their time after the transition to online work.

Interestingly, the psychologists had different opinions about blurring the work/home boundaries in the context of home-based online counseling. Thus, 59 % of respondents (n = 184) noted that they did not face such a difficulty. However, 35 % of (n = 109) of psychologists noted that they had such a problem; 6 % (n = 19) found it difficult to answer. When asked whether they generally like to work from home; 69.2 % of psychologists (n = 216) answered in the affirmative.

On average, all the psychologists showed a high level of the development of innovative qualities (M = 3.74). More than half of the respondents (54.2 %; n = 169) had a high level of innovativeness, 44.5 % of the respondents (n = 139) had an average level of innovativeness, and 1.3 % of the respondents (n = 4) had a low level of innovativeness. The respondents also showed a high level of creativity (M = 3.95) and focus on the future (M = 3.85) and had an average level of willingness to take risks for success (M = 3.4).

To test the hypothesis that the innovative qualities of psychologists are associated with their adaptation to online counseling, we compiled a contingency table and applied the Chi-squared test with Yates continuity correction. We used Cramer's V test to determine the strength of correlations. Hereinafter, we considered the group of psychologists who found it difficult to answer the question about their adaptation as a group of 'unadapted' psychologists. We believe that such an uncertainty means that these specialists did not fully adapt. These groups of respondents were further combined for the convenience of statistical processing.

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The results obtained in the sample of counseling psychologists (df = 1; χ^2 = 6.732; p < 0.01; Cramer's V test = 0.155) indicated the presence of a correlation (Akoglu, 2018) between the level of the development of innovative qualities and the sense of adaptation to the online format of work (Table 1).

Table 1
Relationship between innovative qualities and adaptation to working online

Adaptation	Level of development of innovative qualities		Significance	
	High	Average/low	χ^2	Cramer's V test
Adapted	146 / 86.4 %	106 / 74.1 %	6.732	0.155
Did not adapt	23 / 13.6 %	37 / 25.9 %		
Overall	169 / 100 %	143 / 100 %		

We also analyzed the relationship between the specialists' successful adaptation and the region of their residence (df = 2; χ^2 = 2.512), their experience of work (df = 2; χ^2 = 0.564), and the presence of discussions of online consultation problems with colleagues (df = 1; χ^2 = 0.221). In all these cases, we found no significant relationship among the variables.

As Table 2 shows, we found a significant relationship between the psychologists' adaptation and the modality of counseling (df = 5; χ^2 = 11.171; p < 0.05; Cramer's V test = 0.189). Most often, Gestalt therapists scored highest on adaptation to the online format; cognitive-behavioral psychologists scored lowest.

Table 2
Relationship between adaptation to online counseling and the modality of counseling

Modality	Adaptation		Overall
	Adapted	Did not adapt	
Gestalt	46 / 90.2 %	5 / 9.8 %	51 / 100 %
CBT	33 / 66 %	17 / 34 %	50 / 100 %

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Table 2
Relationship between adaptation to online counseling and the modality of counseling

Modality	Adaptation		Overall
	Adapted	Did not adapt	
Systemic	27 / 87.1 %	4 / 12.9 %	31 / 100 %
Eclectic/integrative	79 / 79.8 %	20 / 20.2 %	99 / 100 %
Other	34 / 81 %	8 / 19 %	42 / 100 %
Psychoanalysis	33 / 84.6%	6 / 15.4 %	39 / 100 %
χ^2	11.171		

Table 3 shows the relationship between the specialists' adaptation and their general attitude towards working from home. We obtained a significant result (df = 2; χ^2 = 70.538; p < 0.01; Cramer's V test = 0.475).

Table 3
Relationship between adaptation to online counseling and attitude towards working from home

Positive attitude towards working from home	Adaptation		Overall
	Adapted	Did not adapt	
Yes	200 / 92.6 %	16 / 7.4 %	216 / 100 %
No	28 / 45.9 %	33 / 54.1 %	61 / 100 %
Do not know	24 / 68.6 %	11 / 31.4 %	35 / 100 %
χ^2	70.538		

Further, we found (Table 4) that adaptation to working online is also associated with the experience of blurring or preserving the work/home boundaries related to the transition to online counseling from home (df = 2; χ^2 = 28.819; p < 0.01; Cramer's V test = 0.304).

Table 4
Relationship between adaptation to online counseling and the experience of blurring the work/home boundaries

Blurring the work/home boundaries	Adaptation		Overall
	Adapted	Did not adapt	
Yes	76 / 69.7 %	33 / 30.3 %	109 / 100 %
No	166 / 90.2 %	18 / 9.8 %	184 / 100 %
Do not know	10 / 52.6 %	9 / 47.4 %	19 / 100 %
χ^2	28.819		

We should note that psychologists who did not experienced the blurring of the work/home boundaries related to remote working often had a positive attitude towards working from home (Table 5). Statistical verification of this observation revealed a significant relationship between the above parameters (df = 4; χ^2 = 47.539; p < 0.01; Cramer's V test = 0.276).

Table 5
Relationship between a positive attitude towards working from home and the experience of blurring the work/home boundaries

Positive attitude towards working from home	Blurring the work/home boundaries			Significance	
	Yes	No	Find it difficult to answer	χ^2	Cramer's V test
Yes	55 / 50.5 %	154 / 83.7 %	7 / 36.8 %	47.539	0.276
No	19 / 8.4 %	10 / 5.4 %	6 / 31.6 %		
Find it difficult to answer	35 / 32.1 %	20 / 10.9 %	6 / 31.6 %		
Overall	109 / 100 %	184 / 100 %	19 / 100 %		

Discussion

Most psychologists who were interviewed had already some experience of online counseling before the pandemic and, of course, started working more often in this format during self-isolation. We should note that about half of the respondents were generally positive about this format of counseling before the pandemic and did not change their opinion. These results contradict some previous reports (Glueckauf et al., 2018; Stoll, Müller, & Trachsel, 2020; Topooco et al., 2017). Our results require further testing in a larger and more diverse sample of practicing psychologists.

Specific characteristics of our sample could also determine the fact that most specialists believed that they had adapted to the online format; if there were any difficulties with the online format, they asked their colleagues to help them. A considerable part of the psychologists were members of professional communities with a developed system of supervision, intervision and group professional training, which formed reliable professional connections with colleagues and could help practitioners in adaptation. At the same time, we found no significant relationship between these factors.

Despite the existing evidence regarding the phenomena of increased fatigue and stress resulting from working online among psychologists (Stoll et al., 2020), only one third of counseling psychologists recognized the presence of stress in our study. Also, most of the respondents had no problem with structuring their time while working from home, which may be explained by the fact that a considerable part of the psychologists interviewed in our study had previous experience of online counseling. Therefore, they avoided some of the difficulties related to the pandemic and working online. Types and forms of online counseling, which are widely represented in the psychological services market today, could also affect the results obtained in our study (Cooper & Neal, 2015). We may assume that compared, for example, with counseling via correspondence on online portals or on social network or messenger sites, video and audio conferencing cause greater fatigue. This factor requires further clarification in future studies.

The hypothesis suggested that a positive attitude towards working from home is associated with better adaptation to online counseling has been confirmed. Moreover, we found that a positive attitude toward working from home is negatively correlated with an experience of blurring the home/work boundaries. In other words, practicing psychologists who successfully manage work/home boundaries do not experience difficulties when conducting online consultations at home. The way they manage these boundaries is of interest for further research. Thus, we may assume that unfavorable conditions for working from home or the lack of self-organization to manage the boundaries of professional roles prevents some psychologists from adapting to the online format, which, in turn, leads to the fact that specialists generally do not want to work in this way. Also, the relationships obtained in this study enable us to conclude that specialists who need to change the environment for changing roles experience difficulties when they are forced to work from home.

Interestingly, despite the fact that most of the counselling psychologists did not face the problem of blurring the work/home boundaries in the context of the transition to online work, still more than a third of respondents felt difficulties related to this format of working. Such results may be explained by different family and living conditions of the respondents. Thus, compared to specialists who have a workroom at home and/or does not have younger children and elderly relatives living together, those living with preschool children or with elderly relatives in cramped

conditions, having objective difficulties with a separate workroom and maintaining silence during consultations, experience much more inconvenience in terms of maintaining the setting, ensuring the safety of the consultative process, respecting boundaries, and being a professional during the working day. The gender of the respondents could also affect a positive attitude towards work from home and the management of the home/family boundaries. In our country women bear a considerably greater parental and home load (Makarentseva, Biryukova, & Tret'yakova, 2017). This could increase pressure on female psychologists during self-isolation and reduce their desire and ability to work from home.

Hypotheses suggested that there is a relationship between the region of residence and experience of work and adaptation to online counseling have not been confirmed. The results differ from the data from a previous study (Békés & Aafjes-van Doorn, 2020). The researchers found that the experience of work and region of residence influence the attitude towards online counseling and its acceptance. Such differences may be explained by the fact that the authors of the study interviewed psychologists from North America and Europe, where socio-cultural and economic conditions were different. We, in turn, conducted a study among specialists living and practicing exclusively on the territory of Russia, which, of course, provided a more homogeneous pattern of psychologists' living conditions and practice.

The relationship between the approach that counseling psychologists adhere to and their successful adaptation to the online format of work is interesting. Previous study on the adaptation of counselling psychologists to the online format during the pandemic has shown a similar result (Békés & Aafjes-van Doorn, 2020). However, in our study, Gestalt therapists scored highest on adaptation to the online format; cognitive-behavioral psychologists scored lowest. This differs from previous results of some authors (Perle et al., 2013). In addition to the fact that representatives of the Gestalt approach more often considered themselves adapted to the online format, they were less likely to find it difficult to answer, which can be explained by the characteristics of this approach. Thus, increased attention to emotional and bodily reactions, holistic perception of personality, the practice of concentrating on the present (Perls, 2004) with constant practice could lead, on the one hand, to better adaptation in the changed conditions, and on the other, to a better awareness of their emotional state and sensations.

Practicing psychologists have shown high innovative potential, characterized by a high level of creativity and orientation towards the future, and an average level of willingness to take risks for success, which correlates with the results of other authors (Ikiz & Asici, 2017). Our hypothesis that the innovative qualities of psychologists are associated with successful adaptation to the online format of work was confirmed. We should note that such results may be explained by self-selection of respondents. Initially more open and active respondents could have a desire to take part in the study of the attitude towards online counseling during the pandemic without material reward.

Conclusion

Thus, Russian psychologists painlessly survived the forced transition of work to the online format, showing a high level of the development of innovative qualities. Their ability to adapt to changed working conditions was mainly associated with innovative personality dispositions, the ability to organize a remote working process, the desire to work from home, and the modality of psychological counseling.

The data we have obtained can be used to develop recommendations for arranging psychologists' work in an online format, as well as in trainings for the development of creativity, flexibility, and innovativeness in the community of practicing psychologists.

The limitations of our work are primarily related to the small sample size, the use of a self-report survey form, and the lack of sociodemographic information about the psychologists interviewed in the study.

Further research can focus on studying the innovative potential, the ability of psychologists to adapt in the rapidly changing conditions of the modern digital world in the context of online counseling and other means and methods of work using a larger and more diverse sample of specialists.

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Author Contributions

S. I. Skipor designed and conducted the study, interpreted the results, analyzed the sources, and wrote a literature overview.

A. E. Vorobieva designed the study, interpreted the results, wrote the Discussion section, and carried out a critical revision of the content.

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Functional States of the Magnocellular and Parvocellular Neural Systems and Cognitive Impairments in Schizophrenia at Different Stages of the Disease

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Abstract

Introduction. This paper discusses possibilities for using an integrated (psychophysiological and experimental psychological) approach to diagnosing cognitive processes to objectify disorders in patients with schizophrenia. This study represents the first attempt to apply psychophysiological methods to diagnose impairments in perception and thinking in schizophrenia. It is important to clarify the relationship between cognitive functioning and functional states of magnocellular and parvocellular neural visual networks and their dynamics during the development and progression of schizophrenia. The authors' intention is to provide convincing evidence that the imbalance between these neural systems leads to impairments in the integrity of visual perception and, subsequently, to impairments in selective thinking, which makes it difficult to assess and recognize meaningful, essential information when forming judgments, and impedes the construction of a full and adequate world picture.

Methods. The study used the methods of visocontrastometry; contrast sensitivity and immunity to interference were assessed. To diagnose cognitive functions, the study used an experimental psychological method combined with the following neuro- and pathopsychological diagnostic tools: Exclusion of the 4th Superfluous, Comparison of Concepts, Poppelreuter Test, and Incomplete Images.

Results and Discussion. The authors examined functional states of the magnocellular and parvocellular visual systems, characteristics of their interaction, and cognitive functions at different stages of the disease. Psychophysiological characteristics of perception are associated with the processes of perception, memory, attention, and thinking. The findings indicate that magnocellular system is associated with the characteristics of perception, working memory, and characteristics of attention. Hyperactivation of the magnocellular system is accompanied by impairments in selective attention. Magno- and parvocellular systems (mechanisms of global and local analysis) contribute to the realization of thinking processes. Hypoactivation of the parvocellular system leads to a decrease

in selective thinking. Progression of schizophrenia is accompanied by a decrease in the activity of both neural systems.

Keywords
visual perception, visual perception in schizophrenia, cognitive processes, cognitive impairments in schizophrenia, neural systems, magnocellular system, parvocellular system, contrast sensitivity, thinking, thinking disorders

Highlights
- In schizophrenia, there is an imbalance between the magnocellular and parvocellular neural systems, which provide the mechanisms of global and local analysis in perceiving information.
- The first episode of schizophrenia is accompanied by a hyperactivation of the magnocellular neural network and a decrease in the activity of the parvocellular neural network. However, long-term treatment with antipsychotic drugs leads to a decrease in the activity of both neural systems.
- Magnocellular and parvocellular systems are associated with thinking processes. The magnocellular system provides the processes of abstraction and categorization; the parvocellular system provides the processes of recognition and assessment of meaningful characteristics.

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Introduction
Cognitive disorders in schizophrenia (disorders of attention, perception, thinking, and regulatory functions), described in the works by E. Kraepelin and E. Bleuler, constitute a separate cluster of pathological disorders along with positive and negative symptoms. These disorders are defined as components of a schizophrenic defect that lead to severe maladjustment of patients, deterioration of social functioning, and disability (Gurovich, Shmukler, & Magomedova, 2001; Ivanov & Neznanov, 2008; Neznanov, Shmukler, Kostyuk, & Sofronov, 2018; Mukhitova, 2013; Yanushko, Ivanov, & Sorokina, 2014; Lebedeva & Isaeva, 2017; Nuechterlein et al., 1992; Addington, Addington, & Gasbarre, 2001; Savla, Moore, & Palmer, 2008; Green & Harvey, 2014).

Current studies demonstrate a variety of cognitive impairments in schizophrenia, describing different components of the cognitive defect. Cognitive impairments in schizophrenia occur at all the levels, starting from direct sensory reflection of reality, affecting the processes of attention, memory, learning, and up to complex processes of thinking, planning, control and regulation of cognitive activity (Tkachenko & Bocharov, 1991; Zaitseva, Sarkisyan, Sarkisyan, & Storozhakova, 2011; Cherednikova, 2011; Mukhitova, 2013; Lebedeva, Isaeva, & Stepanova, 2013; Harvey & Keefe, 2009; Kalkstein, Hurford, & Gur, 2010; Schaub, Neubauer, Mueser, Engel, & Möller, 2013; Moustafa et al.,

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2016; Penadés, Franck, González-Vallespí, & Dekerle, 2019; Peskin, Koren, & Gabay, 2020); depending on drug therapy, form and duration of the disease (Gurovich et al., 2001; Mosolov & Kabanov, 2005; Lebedeva & Isaeva, 2017; Addington et al., 2001; Mesholam-Gately, Giuliano, Goff, Faraone, & Seidman, 2009; Green & Harvey, 2014; Isaeva, Lebedeva, & Simon, 2018).

Studies of the perception process in patients with schizophrenic spectrum disorders are traditionally considered within the framework of emotional and social cognition (Rychkova, Fedorova, & Priimak, 2011; Addington et al., 2001; Green & Leitman, 2008; Kurylo, Pasternak, Silipo, Javitt, & Butler, 2007; Savla et al., 2008). Moreover, perception is studied within cognitive processes in patients with cognitive deficits (Bleikher, Kruk, & Bokov, 2002; Bologov, Kritskaya, & Meleshko, 2009; Zaitseva et al., 2011; Mukhitova, 2013; Shoshina & Shelepin, 2016; Shoshina et al., 2020). It is no coincidence that many authors consider schizophrenia as a 'cognitive-perceptual dysfunction' or a disorder with dysfunction of thinking and perception (Sartorius et al., 2014).

In current psychological studies perception is understood as a complex mental process that is associated with universal processes (memory, attention), and with thinking as well. The process of perception involves both underlying (physiological) and overlying (mental, cognitive) processes and associated with perceptual hypotheses and expectations (Arbib, 2004; Velichkovskii, 1999; Glezer, 1993; Falikman & Pechenkova, 2004). This study takes into account the interpenetration of the processes of processing cognitive information and attempts to describe associations between psychophysiological indicators of visual perception and the characteristics of 'through' processes (memory, attention) and thinking.

The studies combining traditional psychodiagnostic and psychophysical and psychophysiological methods of studying cognitive processes are the most promising today. Examining functional states of the magnocellular and parvocellular visual systems was proposed as the basis for the psychophysiological approach to the assessment of perception. Magnocellular and parvocellular neural systems differ in their sensitivity to the spatial frequency of the visual information. The magnocellular system is most sensitive to low spatial frequencies; the parvocellular system is most sensitive to high spatial frequencies. Recording the contrast sensitivity of the visual system in various spatial frequency ranges is a generally accepted method for assessing their condition (Shoshina, Shelepin, Vershinina, & Novikova, 2015).

Therefore, there is a need for complex studies of the mechanisms of impairments of visual perception and thinking in their association with functional states of the magnocellular and parvocellular neural systems in schizophrenic patients to objectify the data in identifying early signs of the disease and their dynamics during treatment.

This study *aims* to determine the mechanisms of sensory-cognitive impairments in schizophrenia and their relationship with changes in the functioning of the magnocellular and parvocellular neural systems at different stages of the disease.

Methods

The study was carried out on the basis of the departments of the Psychiatric Hospital no. 1 named after P. P. Kashchenko, St. Petersburg. The study involved patients with paranoid schizophrenia (F20), established in accordance with the ICD-10 diagnostic criteria, without a pronounced intellectual decline. The patients participated in the study in the absence of a pronounced psychotic state, in a state of drug remission; all the patients received neuroleptic therapy as prescribed by the attending physician. The research conditions met the requirements of the Declaration of Helsinki

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of the World Medical Association and were approved by the Ethics Committee of Pavlov First Saint Petersburg State Medical University. The study sample comprised 68 patients (mean age 34 ± 12 years, 51 (75 %) males and 17 (25 %) females). The sample was divided into 2 subgroups: (a) patients with the first psychotic episode (disease duration up to 1 year), n = 30; (b) patients with chronic schizophrenia (disease duration from 3 to 15 years), n = 38.

We used the method of visocontrastometry, based on the assessment of the contrast sensitivity of the visual system (Shelepin, Kolesnikova, & Levkovich, 1985), and the method for assessing immunity to interference of the visual system, based on recording the probability of a correct answer in distinguishing the location of gaps in Landolt rings presented under conditions of the imposition of noise of different amounts and qualities, which indicates the level of internal noise of the visual system. These methods helped us assess functional states of magno- and parvocellular neural networks that provide mechanisms for global and local analysis of information and its transmission within the dorsal and ventral streams to the frontal cerebral cortex for image building, decision-making, and action programming.

Visocontrastometry was performed using a computer program developed by S. V. Pronin, Pavlov Institute of Physiology of the Russian Academy of Sciences, which made it possible to form test images of any type without preliminary calibration. To transmit the brightness profile of the test images, it uses density variations of white dots randomly located on a black background. The adaptive staircase procedure was used to measure the threshold contrast. The stimuli were presented on a 15.4" TFT, WXGA screen, with an active matrix of increased brightness (Toshiba TruBrite), a resolution of 1024*600 pixels, a refresh rate of 60 Hz. Gabor elements were displayed randomly to the left or right of the center of the screen (Fig. 1) with spatial frequencies of 0.4, 0.6, 0.8, 1.0, 4.0 and 10.0 c/deg. When analyzing the obtained data, spatial frequencies of 0.4, 0.6, 0.8 c/deg were attributed to low ones, spatial frequencies of 1.0 and 4.0 c/deg were attributed to average ones, and spatial frequencies of 10 c/deg were attributed to high ones.

The subject's task was to click on the right mouse button if he/she saw the image on the right, and the left button if the image was on the left.

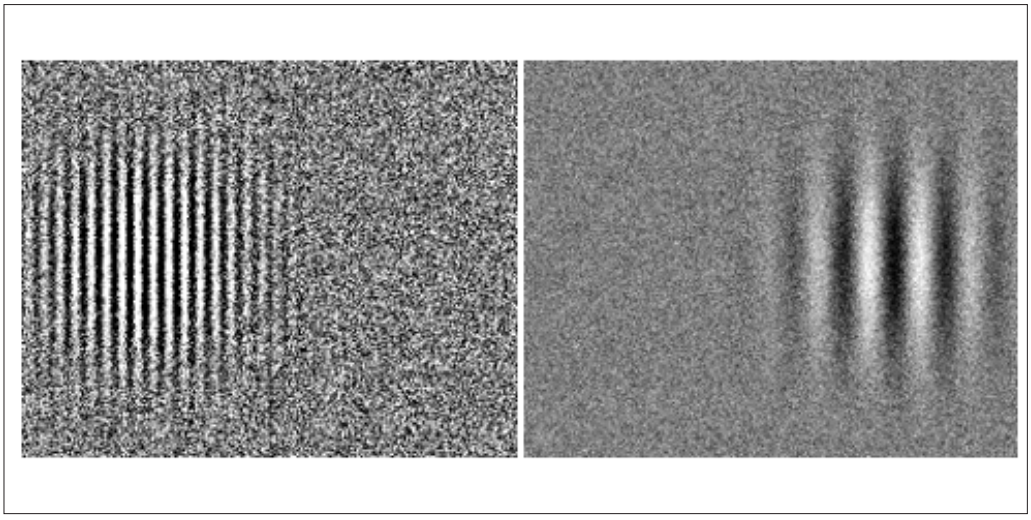

Figure 1. Examples of images of Gabor elements presented in the study

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We asked to make a choice, even when the subject was not sure that there was a test image on the screen. Measurements were started with a contrast of 0.5 and decreased to a threshold level at which the tester made at least one error with a probability of 0.5, after which the contrast began to fluctuate around this level. The contrast change step was 20 %.

The number of repetitions for each spatial frequency was eight.

The monitor was located at 1.5 meters; the level of the subject's eyes corresponded to the middle of the screen. The position of the head was fixed using a frontal-chin support. The observation was carried out binocularly. In our experiment, the visual acuity of the subjects participating in the study had to correspond to the norm or be corrected to the norm using glasses. The measurements were carried out in the dark; the monitor screen was the only source of illumination.

The assessment of immunity to interference was carried out using a computer program developed by S. V. Pronin and Yu. E. Shelepin in the laboratory of physiology of vision, Pavlov Institute of Physiology, Russian Academy of Sciences (Shoshina, Shelepin, Vershinina, & Novikova, 2014; Shoshina et al., 2020). On a black background the monitor screen displayed white stylized images of Landolt rings of different sizes with ring gaps of 4, 8, 12, 16, 20, 28, 36, 60, and 100 pixels with and without noise (Fig. 2).

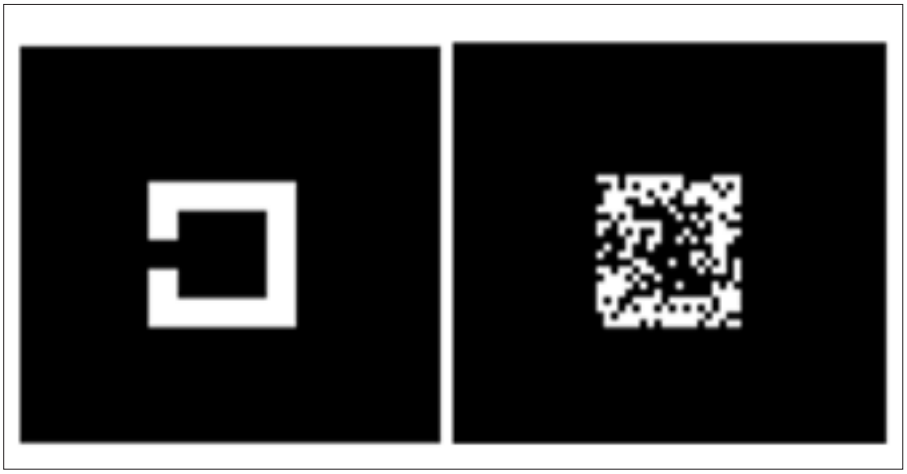

Figure 2. Stylized images of Landolt rings without (a) and (b) with noise

We used noise at which the size of the elementary interference was equal to 25 % of the size of the ring gap. In each case the amount of noise was 30 %. The subject's task was to distinguish the location of the ring gap (right, left, top or bottom). The probability of a correct answer was recorded (in portions of 1.0, when 1.0 was the maximum) for the images with and without noise. The number of repetitions of presentation of images of Landolt rings of different sizes was 5. The time for viewing the images was not limited. High probability of a correct answer was associated with high immunity to interference.

We also used the following experimental psychological diagnostic tools to examine cognitive processes: (a) Exclusion of the 4th Superfluous, Comparison of Concepts, and Similarities to diagnose the ability to carry out the operations of analysis and synthesis, generalization, abstraction, ability to distinguish the main, essential features of objects or concepts at the figurative level (Bleikher et al.,

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2002); (b) Stroop Color-Word Interference Test to assess the degree of flexibility/rigidity of cognitive control, selectivity of voluntary attention and selectivity of thinking (Zotov, 2012); (c) TMT (Trail Making Test), subtests A and B, to examine the characteristics of attention (concentration, switching, level of distribution) and the rate of mental activity (Mosolov & Kabanov, 2005); (d) Poppelreuter Test to evaluate visual gnosis, the ability to distinguish a figure from the background; and (e) the Underpainting Images technique to assess the constancy of perception, the preservation of the visual image of an object, and the presence of fragmented perception (Rubinstein, 2004). The calculation of mathematical and statistical data was carried out using the STATISTICA 10 software package combined the following methods of statistical data analysis: comparative analysis (the Mann–Whitney test), Spearman correlation analysis. Considering the small size and unevenness across the group size, which implies some heteroscedasticity of the data and the possibility of outliers, we chose nonparametric methods of statistical processing (comparative analysis using the Mann–Whitney test). The selected methods are robust and do not require data distribution. The correlation analysis was carried out using the Spearman's correlation coefficient calculation algorithm, which includes the stage of converting all the presented data into a single scale, where the calculation itself according to the coefficient formula occurs after the transformation and is impossible without it. Since this transformation was included in the calculation itself and was done automatically, we do not describe the algorithm itself in the article (it is standard for the statistical method that we used). In the correlation analysis the following physiological indicators were used: (a) contrast sensitivity in the range of low, medium and high spatial frequencies (c/deg) and (b) accuracy in identifying the location of the Landolt ring gap under conditions of external interference (immunity to interference, portion of 1.0).

Results and Discussion

The results of a psychophysiological study of functional states of magnocellular and parvocellular neural networks indicate that patients have imbalance in the mechanisms of global and local information analysis, which substrate is mainly represented by these neural networks. Compared to mentally healthy subjects, patients with the first episode of schizophrenia who did not receive long-term antipsychotic treatment, showed an increase in the activity of the magnocellular neural system (mechanism of global analysis), while the activity of the parvocellular system (mechanism of local analysis) was reduced. Patients with long-term course of schizophrenia (chronic patients) who perceived long-term antipsychotic treatment showed a decrease in the sensitivity (activity) of both neural systems ($p < 0.05$).

Patients with the first episode of schizophrenia and chronically ill patients as well ($p < 0.05$) showed a decrease (compared to normal values) in contrast sensitivity in the range of medium spatial frequencies. As a result of recording the efficiency of distinguishing noisy images, a significant decrease in the number of correct answers about the location of the gap of the Landolt ring for noisy images was observed in chronic schizophrenic patients, compared to the patients with the first episode of schizophrenia. At the same time, patients with the first episode of schizophrenia (without long-term pharmacotherapy) demonstrated the same performance of recognizing noisy images in comparison with chronically ill patients receiving long-term therapy. The data obtained indicate an increase in the level of internal noise of the visual perception system as the disease progresses.

Schizophrenic patients with the first psychotic episode cope worse with figure/ground discrimination compared to chronically ill patients (Poppelreuter Test). Table 1 presents the results.

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Table 1
Comparative analysis of perception in patients with different duration of the disease

Indicator	Chronic patients	First episode	U-criterion	Z-transformed	Significance level, p
		Perception (Poppelreuter Test)			
Number of recognized images	9.44 ± 0.70	8.73 ± 0.93	332.00	2.07	0.04

Deterioration in the performance of this technique in schizophrenic patients is associated with a decrease in contrast sensitivity in the range of low spatial frequencies to which the magnocellular system is specific. In the psychophysical experiment, the results of which are presented above, we found that during the first psychotic episode, the magnocellular neuronal system is hyperactivated. This fact explains impairments in figure/ground discrimination in persons with the first episode of schizophrenia, which is a consequence of a shift in the balance of concentration and distribution of attention towards distribution.

Table 2 presents psychological diagnostics of memory and attention characteristics.

Table 2
Comparative analysis of memory and attention indicators in patients with different duration of the disease

Indicator	Chronic patients	First episode	U-criterion	Z-transformed	Significance level, p
		10 Words test			
Growth rate of memorization of words	0.55 ± 0.45	0.76 ± 0.30	96.00	–2.08	0.04

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Table 2
Comparative analysis of memory and attention indicators in patients with different duration of the disease

Indicator	Chronic patients	First episode	U-criterion	Z-transformed	Significance level, p
		TMT (attention)			
Time sec., A	54.62 ± 25.47	50.39 ± 25.41	463.00	0.84	
Time sec., B	163.58 ± 92.68	125.48 ± 70.29	335.50	2.04	0.04

In patients in the early stages of the disease (first episode), the growth rate of memorization of words is significantly higher (with each presentation, patients reproduce more words) than in chronically ill patients. Figure 3 shows the averaged profile over five samples.

Patients with a chronic form of the disease are characterized by unequal reproduction of memorized material. Compared to chronic schizophrenic patients, the process of attention switching and the speed of information processing (TMT, part B, execution time) is significantly higher in patients with the first episode.

Thus, the data obtained in this study indicate that patients with the first episode of schizophrenia demonstrate greater memorization performance, a higher speed of information processing and mobility of nervous processes (flexibility of cognitive control), and higher scores of attention switching and distribution, compared to chronic patients with schizophrenia. However, the patients of the first group gave more false identifications in the perception of visual images and false reproductions in the memorization of words. This indicates the severity of the mental state and can be explained by hyperactivation of the magnocellular neural system, changes in the characteristics of interaction between the magnocellular and parvocellular neural systems, and, accordingly, an imbalance in the interaction between the processes of concentration and distribution of attention.

Further, we carried out a correlation analysis of physiological indicators and psychological parameters of the processes of memory, perception, attention and thinking. Further, we constructed the correlation pleiades (Fig. 4–5).

We found that all the memory indicators (Fig. 4), including delayed reproduction, have a direct correlation with contrast sensitivity in the range of low spatial frequencies, to which the magnocellular neural system is specific, providing a global mechanism for analyzing the visual field (Shoshina et al., 2014; Shoshina & Shelepin, 2016). Processes of neurons in the magnocellular system form the dorsal pathway of information transmission from the caudal regions to the frontal cortex, which are responsible for control, decision-making, and programming of actions (Merigan & Maunsell, 1993).

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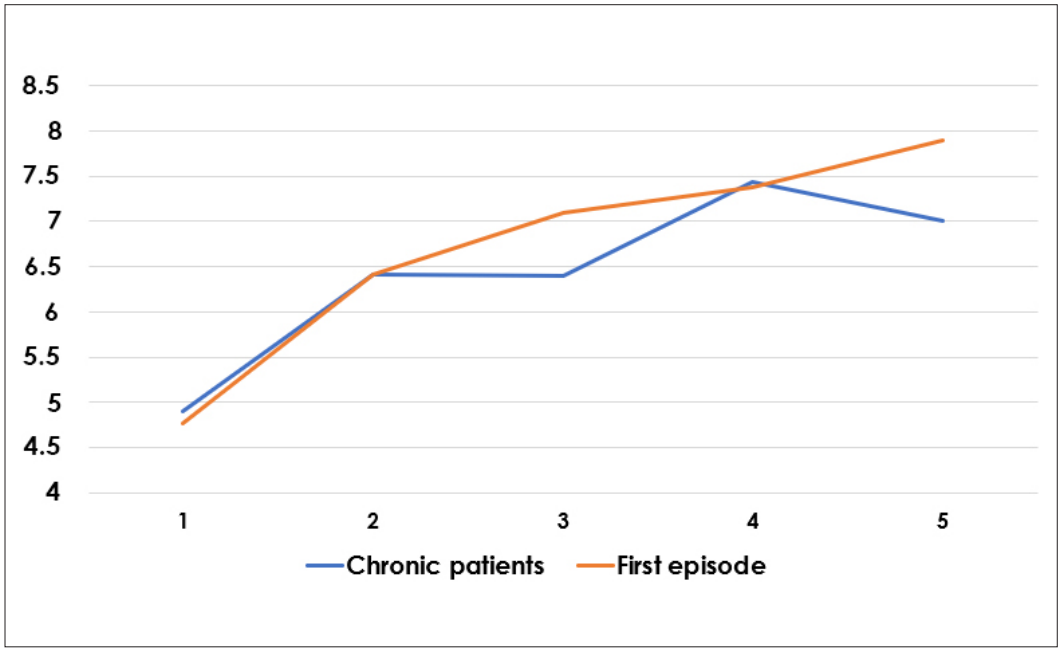

Figure 3. Averaged profile for the 10 Words tests in patients with different duration of the disease

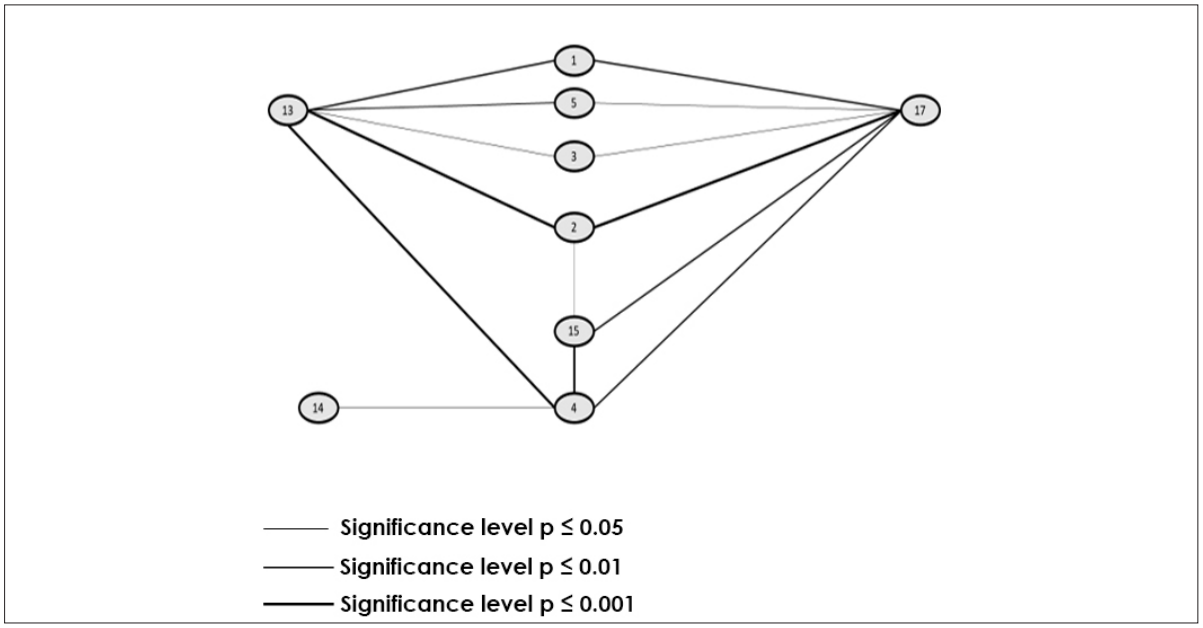

Figure 4. Correlation pleiad for physiological indicators and memory characteristics

Legend: 1) 1 presentation; 2) 4 presentation; 3) 5 presentation; 4) retention; 5) mean for memory tests; 13) contrast sensitivity in the range of low spatial frequencies; 14) contrast sensitivity in the range of medium spatial frequencies; 15) contrast sensitivity in the range of high spatial frequencies; 17) immunity to interference.

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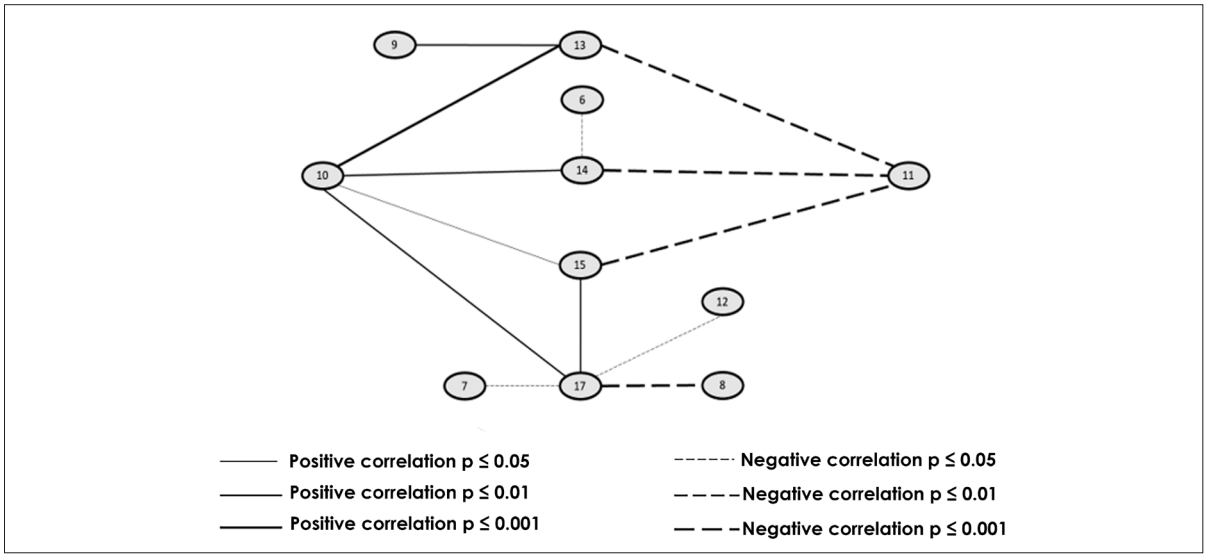

Figure 5. Correlation pleiad for physiological indicators and characteristics of perception and attention

Legend: 6) rigidity coefficient (Stroop Test); 7) time, sec (TMT, attention); 8) number of errors (TMT, attention); 9) number of recognized images (Poppelreuter Test); 10) number of recognized images (Incomplete Images); 11) number of unrecognized images (Incomplete Images); 12) distortions in perception (Incomplete Images); 13) contrast sensitivity in the range of low spatial frequencies; 14) contrast sensitivity in the range of medium spatial frequencies; 15) contrast sensitivity in the range of high spatial frequencies; 17) immunity to interference.

The findings indicated that delayed reproduction correlates with contrast sensitivity in the range of high spatial frequencies, to which the parvocellular neural system is specific, which provides a *local* analysis of the visual field (Shoshina et al., 2014; Shoshina & Shelepin, 2016). Processes of neurons in the parvocellular system form the ventral pathway of information transmission from the caudal regions to the frontal cortex (Merigan & Maunsell, 1993). Thus, the data obtained in our study provide direct evidence that the magnocellular neural system is involved in memory processes and provides *procedural* memorization, because neurons of the magnocellular system are specific to the assessment of movements and, accordingly, are associated with motor learning. Procedural memorization is based on memorizing a sequence of actions without referring to the content and capturing the essence, and determines the automatization of actions that underlie the formation of habits and skills. The fact that the delayed reproduction indicator is associated with contrast sensitivity in the range of high spatial frequencies indicates the involvement of the parvocellular neural network in memory processes, probably due to the establishment of semantic connections. Thus, we demonstrated the characteristics of interaction between the magnocellular and parvocellular neural networks in the processes of memorization. The results of the regression analysis indicate a high coefficient of determination of memory indicators by contrast sensitivity in the range of low and high spatial frequencies and immunity to interference as well as (the efficiency of identifying the location of the Landolt ring gap under noise conditions).

Contrast sensitivity in the range of high spatial frequencies associated with the operation of the parvocellular system makes the greatest contribution to the efficiency of delayed reproduction.

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Let us examine associations of the parvo- and magno-systems and the characteristics of perception and attention (see Fig. 5). We found a direct correlation between contrast sensitivity in the range of low, medium and high spatial frequencies and the number of correctly completed images in the Incomplete Images test; accordingly, there was an inverse correlation with the number of incorrectly completed images. Moreover, we found a pronounced direct relationship between contrast sensitivity in the low spatial frequency range and the number of recognized images in the Poppelreuter Test.

Our findings indicate the role of the mechanisms of global and local analysis in figure/ground discrimination, the role of each of the neural systems, and their interaction in completing the image and ensuring holistic perception. Thus, the importance of interaction between magnocellular and parvocellular neural systems, and, respectively, the mechanisms of global and local analysis in providing perception regardless of the task has been demonstrated once again.

At the final stage, we examined the relationship between physiological indicators and the characteristics of thinking (Fig. 6).

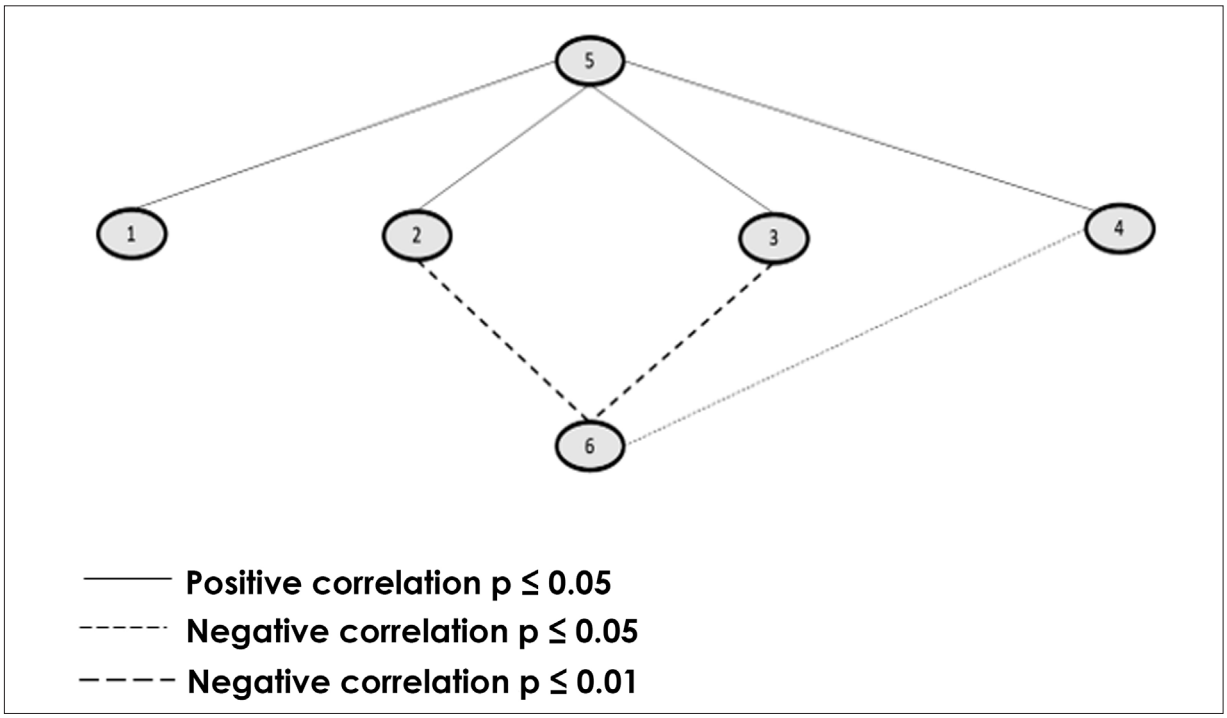

Figure 6. Correlation pleiad for physiological indicators and the characteristics of thinking

Legend: 1) contrast sensitivity in the range of low spatial frequencies; 2) contrast sensitivity in the range of medium spatial frequencies; 3) contrast sensitivity in the range of high spatial frequencies; 4) immunity to interference; 5) level of generalization; 6) distortions in the generalization process.

The correlation analysis of the results of psychophysiological diagnostics and examination of thinking indicated that contrast sensitivity in the range of medium spatial frequencies had a positive correlation with the level of generalization (abstraction and categorization) and a negative one

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with the parameter of distortions in the generalization process (discrimination of essential, relevant features of objects and phenomena when forming judgments) the Exclusion of the 4th Superfluous test. Thus, both magno- and parvocellular systems (mechanisms of global and local analysis) contribute to thinking processes (abstraction and categorization, assessment and selection of essential information), which is fundamental for constructing a complete and realistic picture of the world, planning and regulating social behavior and choice of adequate strategies of behavior in social interaction.

Findings

1. Patients with first-episode schizophrenia, not receiving long-term antipsychotic treatment, showed an increase in the activity of the magnocellular neural system and a decrease in the activity of the parvocellular system. Patients with long-term schizophrenia and long-term use of antipsychotic drugs showed a decrease in the activity of both neural systems. As the disease progressed, a decrease in the immunity to interference of the visual perception system was observed.

2. In comparison with chronically ill patients, those with the first psychotic episode cope worse with figure/ground discrimination, give more false identifications in the perception of visual images, which indicates the severity of their mental states and is determined by hyperactivation of the magnocellular neural system at the first stage of the disease.

3. Compared to chronic patients, those with first-episode schizophrenia have a higher speed of information processing and flexibility of cognitive control, higher levels of attention switching and distribution, and higher productivity of memorization, which is associated with a general decrease in the activity of the magno- and parvocellular neural systems as the disease progresses and the treatment lasts.

4. In thinking, the level of generalization (abstraction and categorization) is closely associated with the level of activity of the magnocellular system, and also with the consistency and balance in the interaction of both neural systems that provide the processes of global and local analysis of information.

5. The parameter of distortion of the generalization process, which reflects the process of analysis and recognition of essential (relevant) features when forming judgments, is mainly associated with the activity of parvocellular system (the mechanism of local analysis): a decrease in its activity and imbalance with the magnocellular system leads to an increase in the number of responses to 'latent' signs and deterioration in selective thinking.

Conclusion

We obtained a pool of data for the development of a method for objective diagnostics of thinking and perception disorders in mental illness that may help monitor functional states of the brain in neuropsychiatric disorders, assessing the effectiveness of pharmacological therapy and its effect on sensory-cognitive functions, thereby ensuring the implementation of a personalized approach to the therapy of the mentally ill.

The combination of psychophysiological, psychophysical, and psychodiagnostic methods that we used in this study made it possible to examine the relationship between perception and thinking in schizophrenia. As a result of the implementation of this stage of our project, we obtained new data on the relationship between the mechanisms of global and local analysis of visual information and cognitive impairments in schizophrenic patients at different stages

of illness. Our findings suggest that early sensory deficits are closely interrelated with the level and nature of functioning of higher-level cognitive processes (perception, attention, memory, and thinking).

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E. R. Isaeva carried out research planning and management, conducted experimental psychological research, analyzed and interpreted experimental data, and prepared and edited the manuscript.

I. A. Tregubenko carried out research planning and statistical processing of research data, analyzed and described mathematical and statistical data for the manuscript, worked with sources, and prepared the manuscript.

Yu. V. Mukhitova carried out research planning, conducted experimental psychological research, filled out research protocols, worked with sources, and prepared the manuscript.

I. I. Shoshina carried out research planning, performed consulting work on the organization of the study, conducted psychophysical studies of visual functions using the method of visocontrastometry, assessed the immunity to interference in schizophrenic patients, and prepared the manuscript.

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Implicit Racial Identity of Russian Schoolchildren at the Commitment Stage

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Abstract
Introduction. The conditions of the transitivity in today's social space, the interpenetration of different cultures, and the value of racial identity in racially heterogeneous societies such as Russian society, which historically represents two races (Caucasian and Mongoloid), explain the importance of studying racial identity. This study represents the first contribution to issues of implicit racial identity in Russian children. The authors introduce the concept of the commitment stage as a manifestation of interest in other groups, regardless of the consciousness or implicitness of individual identity. The theory of social identity and social categorization by G. Tajfel, J. Turner and the commitment approach in the models of the formation of racial identity by Yu. V. Stavropol'skii and J. Marcia provided a conceptual basis for this study.
Methods. The research is based on an experiment with preferences. The respondents were offered photographs of faces of Caucasian, Mongoloid, and Equatorial races of different genders. They had to choose a partner for interaction in personal or social spheres. The number of choices and the number of categories used by the subjects during the experiment were calculated. Statistical tests and a one-way ANOVA were used.
Results. This section contains data from the experimental study. The sample comprised of 290 individual participants (four age subgroups) aged 7–11 years. There were no significant differences among age subgroups (grades 1, 2, 3, and 4) in terms of racial preferences. Gender effects racial preferences. The leading factor influencing preferences when choosing a partner for interaction by photographic images is his/her gender (same- vs. opposite-gender individuals).
Discussion. The authors interpret the results of choosing a partner for interaction as an indication of implicit identity and note that the criterion of 'racial identity' has an insignificant impact on the process of social categorization by Russian primary schoolchildren. Russian schoolchildren are interested in interacting with children of all races, that is, their implicit racial identity is at the commitment stage.

Keywords
identity, racial identity, implicit identity, in-group, commitment, social categorization, primary schoolchild, group favoritism, identity dynamics, gender differences

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Highlights

- Racial implicit identity does not undergo pronounced age-related changes in Russian children at 7–11 years of age.
- The structure of Russian children's implicit identity does not contain the criterion of 'racial identity' as the basis for social categorization.
- Russian children aged 7–11 are at the commitment stage. They are actively interested in interacting with their peers – representatives of different races.
- The gender factor is important for racial implicit identity in 7–11-year-old children, which determines their preferences of partners of different races for various types of interaction (by photographic images).

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Introduction

In this study, we are based on the theory of social identity and social categorization, developed by G. Tajfel, who generalized the study of the processes of in-group and out-group categorization (Tajfel, 1970; Turner, 2010). Social identity is defined as a part of an individual's self-esteem that results from his/her awareness of belonging to one (or more) social group, as well as an emotional attitude towards this belonging (Tajfel, 1982). Studies of in-group categorization have identified the phenomena of in-group favoritism and out-group discrimination (Tajfel, 1970), which manifest themselves in preferences of in-group representatives and rejection of out-group ones for joint activities.

The construction of social identity involves both conscious social representations and unconscious implicit foundations of identity, which manifest themselves in behavior (Dasgupta, 2013). The explicitness/implicitness of identity is determined by the degree of an individual's awareness of his/her own uniqueness, autonomy, differentiation of emotional and cognitive components of identity and manifest itself in active and to varying degrees conscious participation in activities of in-groups. The personal and social levels of the spaces of explicit and implicit identity are distinguished (Stavropol'skii, 2009).

The issues of social identity, based on the 'race' construct, are among the most relevant in the dynamics of today's processes of globalization of life. Race is a category created or socially constructed to distinguish a group of people on the basis of physical characteristics. Despite scientific evidence to the contrary, humans have got into the habit of considering races as natural and separate constructs. In fact, variations in human are not important for life activities, except for the social sphere (Hud-Aleem & Countryman, 2008). Being the basic anthropological parameter of identity, race is often not in the zone of consciousness, because this parameter is closely associated with socio- and ethno-cultural implicit manifestations of identity, which ensures its place in the 'blind' zone of social categorization, especially where society is racially reconcilable and conflict-free due to the historical features of its development.

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The request for a theoretical understanding of the phenomenon of racial identity is stimulated by the processes of transitivity of the today's social space, the commonality of information resources, leading to the escalation of social successes and social problems as well. In the English-language psychological literature racial identity is often considered in terms of discrimination, stereotyping, and the degree of an individual's closeness to a minority culture (Neville, Heppner, & Wang, 1997; Dutton, Singer, & Devlin, 1998; Taylor, 2014; Umaña-Taylor et al., 2014; Hindley & Edwards, 2017).

Cognitive social psychology conducts experimental research on the effects of dual or multiple identities on emotional well-being (Coard, Breland, & Raskin, 2001), stress tolerance (Neville et al., 1997; Hindley & Edwards, 2017; Williams, Duque, Wetterneck, Chapman, & DeLapp, 2018), adaptation when changing the country of residence (Berry, 2005), intragroup and intergroup relationships (Tajfel, 1982), and academic success in the case of schoolchildren or students (Hoffman & Lowitzki, 2005).

Numerous empirical studies have suggested various models for the development of racial identity. These models are applied in psychotherapy, education, family, and organization to understand how individuals function in a community. In a review article Hud-Aleem & Countryman (2008) present the following most important models: (a) the models associated with the dynamics and stages of dual (biracial) identity (Carlos Poston, 1990); (b) the model of conscious choice by Rockquemore & Laszloffy (2003); (c) the model of cultural assimilation/acculturation by Nadal (2011) and Helms (2019); (d) the model related to the stages of the universal and unique nature of identity formation (Hoffman & Lowitzki, 2005), etc.

The presented models interpret racial identity as a dynamic construct based on socio- and ethnocultural foundations with a universal formation algorithm based on the mechanism of interiorization (Vygotskii, 1982), assimilation of the meanings of the reference group and culture, followed by their acceptance/rejection and the search for new groups and cultures as sources of identification categories. The formation of racial identity is carried out in the process of everyday interactions and challenges that individuals face.

Using the example of the formation of racial identity based on the completeness of an individual's assimilation of the culture of a racial minority, Cross (1991) distinguishes the stages of acceptance/binding, awakening/immersion, collision, and indifference. In a modified version of this model by W. E. Cross, Jr., the process of formation of racial identity contains the following three stages: pre-encounter, immersion-emersion, and internalization (Cross, 1991). In the models of racial identity by D. R. Atkinson, G. Morten, S. Sue and racial and cultural identity, the development process includes the following stages: 'coherence', 'dissonance', 'resistance', 'introspection', 'integrative awareness' (Sue, 1998; Okazaki & Sue, 2016). The result is the acceptance of individual cultural uniqueness in the system of values in a multicultural society.

The key construct for the substantiation of the process of the formation of racial identity is the concept of 'commitment' (derived from the English term 'commitment' – duty, obligation, contract, decision, choice, and intention). In the socio-psychological approach to the analysis of the phenomenon of racial identity, commitment is considered as involvement, which indicates willingness for identification choice at the level of motivational and meaning intentions and behavior. This willingness is based on an internal obligation to the reference social group and the courage of decision-making. J. Marcia considers commitment to be a differentiating characteristic of the presence/absence of identification with a social group (Marcia, Waterman, Matteson, Archer, & Orlofsky, 1993). At the commitment stage, interest and sensitivity to other cultures and races appear as a result of accepting individual racial and ethnic identity as positive. English-language

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scientific publications present a methodology for studying racial identity and empirical data. Meanwhile, this issue is insufficiently developed in Russian-language psychological publications. Therefore, in our theoretical analysis, we mainly focus on English-language studies.

In a racially diverse society, the process of commitment entails the processes of involvement in the culture of racial majority and the formation of racial implicit identity. Under today's civilizational challenges, accompanied by the interpenetration of cultures, meeting with representatives of other races leads to an alternative choice of the value of racial diversity vs. racist attitudes, if it causes anxiety and concern. Our *aim* is to examine the racial implicit identity of Russian schoolchildren at the commitment stage.

Methods

The research method was an experiment on the social categorization of racial preferences determined by implicit racial identity. The stimulus material consisted of color photographs of faces of boys and girls aged 7–11 years (up to the shoulder girdle, full face) of the Caucasian (CR), Mongoloid (MR) and Equatorial (ER) types. The set contained 18 photos, 6 for each race (3 girls and 3 boys). The respondents could view all the photos simultaneously. They were asked to choose a partner for interaction by answering the questions of personal and social blocks (PB, SB) with 8 questions in each block. The number of elections was unlimited. The number of categories that a child could use in the experiment ranged from 1 (if he/she chose, for example, only MR girls) to 6 (if he/she chose girls and boys of all three races).

The number of questions was determined by the time a subject spent in searching for answers, in accordance with the age norms of perception and thinking. The examination procedure took 9–11 minutes. To reduce the effect of focusing on a specific topic, questions were asked from personal and social blocks by turn. The content of the questions was evaluated by a group of professional psychologists. Therefore, the subjects could carry out social categorization on the basis of 'types of activity' (play, work, study, and communication).

The PB questions relate to interaction with Another in personal space, in the sphere of direct bodily contact, providing Another with an object that has a deep personal meaning for the subject. Examples of the PB questions: "Who would you like to live with in a two-person tent on a camping trip? Who would you like to play the guide with?" The SB questions relate to the sphere of distant interaction with Another in play, entertainment, and study. Examples of the SB questions: "Who would you like to go to play on the court with? Who would you like to invite for your birthday?"

The experiment was carried out in a separate room (familiar to children) in an individual mode. The presentation of the stimulus materials was preceded by several indirect questions aimed at obtaining a subject's primary idea about the experience of direct perception or communication with representatives of another race and ethnic culture (e.g., "Do you like to travel?" and "Have you been abroad?"). All the answers, as well as emotional and verbal manifestations during the examination, were recorded in individual protocols.

To assess the differentiation of social categorization, we calculated the following indices of the number of choices of photographic images by race and gender: (a) the total number, (b) the number of choices for the PB and the SB, (c) number of choices of the same-gender and the opposite-gender partners, and (d) the number of choices for groups of boys and girls.

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Results

The study involved schoolchildren in grades 1–4 (7–11-years old) of a comprehensive school, where they studied several subjects in English. All respondents were Russian-speaking representatives of Caucasian race. The table presents the distribution of respondents by grades and genders (Table 1).

Table 1
Sample composition

Subgroup	1st grade	2nd grade	3rd grade	4th grade	Total
Boys	42	24	34	20	124
Girls	46	34	46	40	166
Total	88	58	80	60	290

We proceeded on the assumption that the dynamics of racial preferences will be observed in children during between 7–8 and 10–11 years of age.

In total, the participants in the experiment made 1415 choices. Half of the choices were in favor of CR representatives. The remaining choices were almost evenly distributed between MR and ER representatives (Table 2).

Table 2
Frequency of choices for representatives of different races (% of the total number of choices in an age group), χ^2 (emp)

Group	Race			Total	Children, n	χ^2 (emp)	Significance level, p
	CR	MR	ER				
1st grade	55.1	24.5	20.4	100.0	92	305.8	$p \leq 0.0001$
2nd grade	49.4	25.1	25.5	100.0	58	105.3	$p \leq 0.0001$
3rd grade	49.8	25.8	25.2	100.0	80	148.6	$p \leq 0.0001$
4th grade	50.8	25.2	24.0	100.0	60	128.6	$p \leq 0.0001$
Total	55.1	24.5	20.4	100.0	290	672.2	$p \leq 0.0001$

The χ^2 criterion was used to assess the significance of the statistical 'shift' of preferences towards CR. Comparison of the obtained empirical distribution of racial preference frequencies with theoretical frequencies showed significant differences from a uniform distribution.

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Table 2 shows the values of the empirical χ^2 criterion and significance levels (for our calculation method $\chi^2_{cr} = 13.8$, $p < 0.001$).

We obtained similar results in our study for personal and social preferences. The assessment of the influence of the age factor on racial preferences was carried out additionally using a one-way ANOVA, developed by R. Fisher. We tested the working hypotheses about the influence of age on the preferences of boys (a) when boys choose boys or girls in the PB and the SB and (b) when girls choose boys or girls in the PB and the SB. In each case, there was hypothesis H_0 about the absence of the effect of age on racial preferences.

The next stage in the study was to test the hypothesis about the influence of the gender factor on racial preferences. A one-way ANOVA was carried for the number of choices of photographic images of the CR, MR, and ER faces. We found no effect of the gender factor on the preferences of the CR and MR photographs ($F_{CR} = 2.4$ and $F_{MR} = 5.25 < F_{cr} = 5.99$). A one-way ANOVA revealed the difference in the racial preferences of girls and boys in only one case – in relation to Equatorial race (Fig. 1). Compared to boys, girls are much more favourably disposed towards ER ($F_{emp} = 11.4 > F_{cr} = 5.99$; $p = 0.015$).

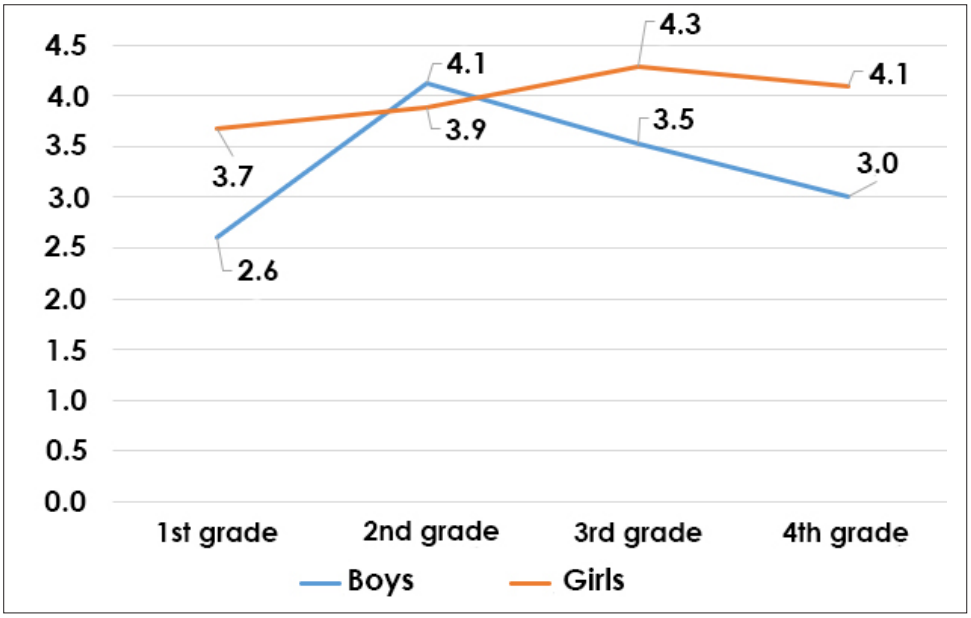

Figure 1. The average number of choices of photographic images representing individuals of Equatorial race (ER) by boys and girls of different ages

We analyzed the influence of gender on social categorization for each age group, considering the preferences of partners of the same and opposite gender. Significant differences were found between boys and girls in the frequency of choices of photographic images of the opposite-gender individuals of different races (two-way ANOVA; $p = 0.004$). Girls are significantly less likely to choose photographs of boys than vice versa. This trend is observed in both personal and social blocks of interaction. Descending number of choices was as follows: CR, MR, and ER. This trend was observed in each age group. Figure 2 shows the preferences for photographic images of partners of the same and opposite gender among the 1st grade children.

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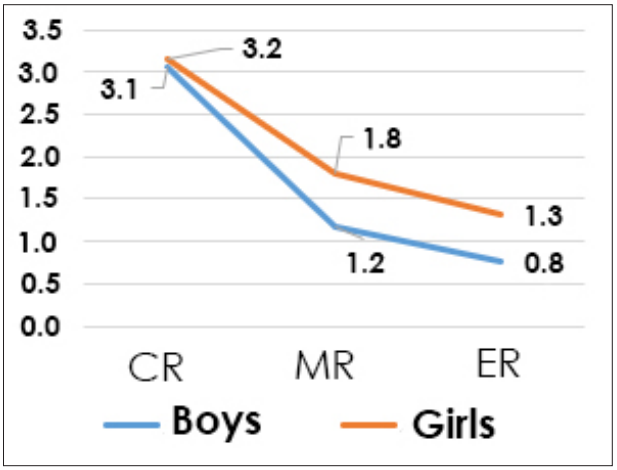
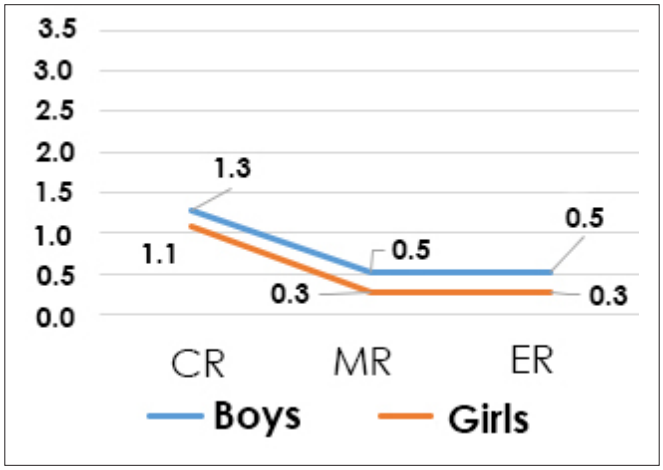
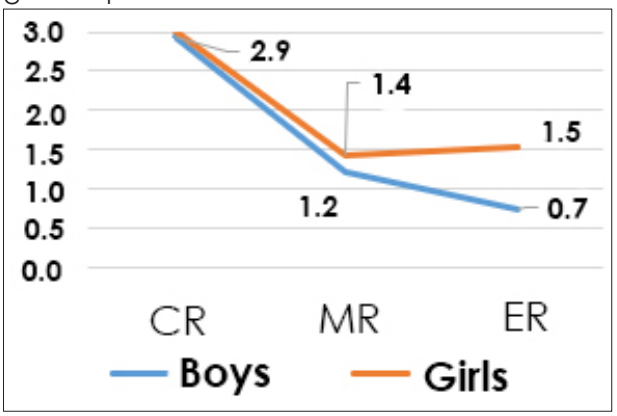


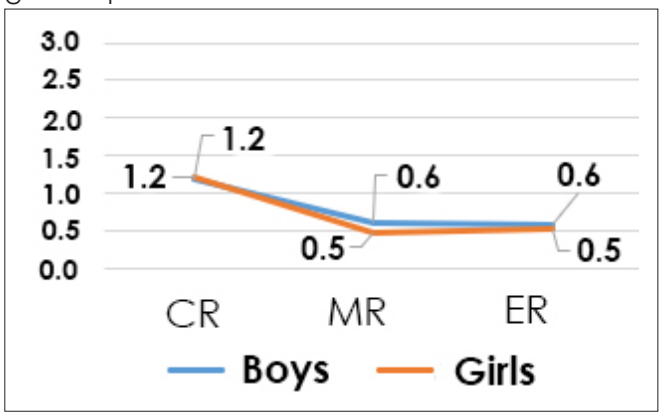
(a) PB (personal block). Choice of the same-gender partner



(b) PB (personal block). Choice of the opposite-gender partner



(c) SB (social block). Choice of the same-gender partner



(d) PB (social block). Choice of the opposite-gender partner

Figure 2. Choices of photographic images of partners of the same and opposite gender among the 1st grade children

Legend: the graphs show the average number of choices of photographic images of individuals of Caucasian (CR), Mongoloid (MR), and Equatorial (ER) races. Personal block and social block represent 12 different interaction situations.

The next stage in the study was to analyze the differentiation of social categorization by race and gender in the groups of boys. The respondents differed in their tendency to choose the same photographic image when answering different questions (only girls, only boys, only one race, or all the races).

The number of categories of photographic images that a child chose characterizes his/her cognitive simplicity/complexity, i.e., the tendency to perceive and interpret the world around him in a simplified form or in a complex one, striving for diversity (Kholodnaya, 2000). The preference of three or more categories indicates the subjects' intention of social activity, flexibility of thinking in the process of social categorization when choosing an in-group. Choosing from 1–2 categories

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of photographic images is an indicator of rigidity, cognitive simplicity, or tendencies for intra-group favoritism and out-group hostility (Turner, Brown, & Tajfel, 1979).

The results indicated that, on average, 4.0 % of the subjects chose 1–2 categories out of 6 possible. Figures 3 and 4 show the diversity/narrowness of social categorization in choosing a partner for interaction in groups of boys and girls.

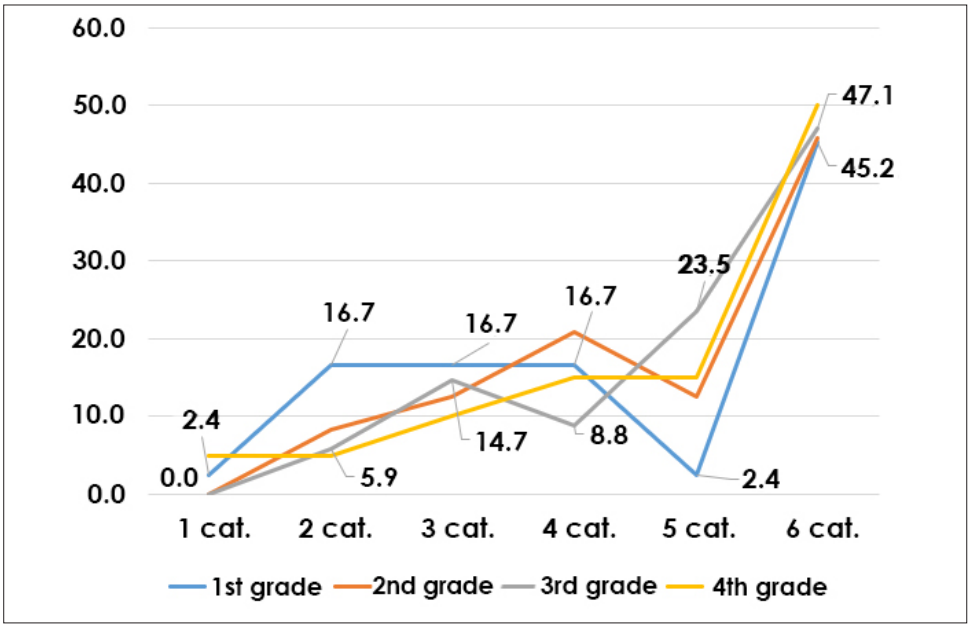

Figure 3. Choices of photographic images of different categories by boys in grades 1–4 (% of the number of boys in each grade)

Legend: on the graph, the number of categories of all the choices made is designated as '1 cat.', i.e., a respondent preferred a partner of the same gender and race for all the interactions; '6 cat.' a respondent preferred partners of both genders and all three races. Grades 1 and 3 are numbered for easy orientation.

The way the boys chose the categories of the photographic images was typical for all the examined grades. The use of categories distributed as follows: rare choice of one category – 2.4–5.0 %; choice of two categories – from 5.0–5.09 to 16.7 %; choice of three categories – 10.0–16.7 %; choice of four categories – 8.8–20.8 %; choice of five categories – 2.4–23.5 %. About half of all boys (45.2–50.0 %) chose six categories of photographic images. Only 1.8 % of boys demonstrated the tendency to group favoritism, i.e., a rigid choice of representatives of their gender and their race.

The way girls chose the partners of different categories of gender and race was also quite typical for all the examined grades. In each grade, an approximately equal number of girls preferred two (from 2.2–5.0 to 6.5 %) or three categories (14.7–17.5 %). Two girls in the 2nd grade (1.5 % of all girls) chose only CR girls for different types of interaction.

Most girls in each grade chose their partners from four or more categorical groups. The use of categories distributed as follows: choice of four categories – from 20.6 to 42.5 %; choice of five categories – from 8.8 to 23.9 %; and choice of six categories – from 20.0 to 50.0 %. In the

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4th grade, there was a distribution of choices of partners from different categories. The maximum number of girls (42.5 %) chose representatives of only four categories; these were always girls (CR, MR, and ER), and rare choices of boys of CR (1–5 choices) and MR (0–2 choices) out of six possible ones (1–3 choices). The 2nd-grade girls showed interest in partners of all six categories.

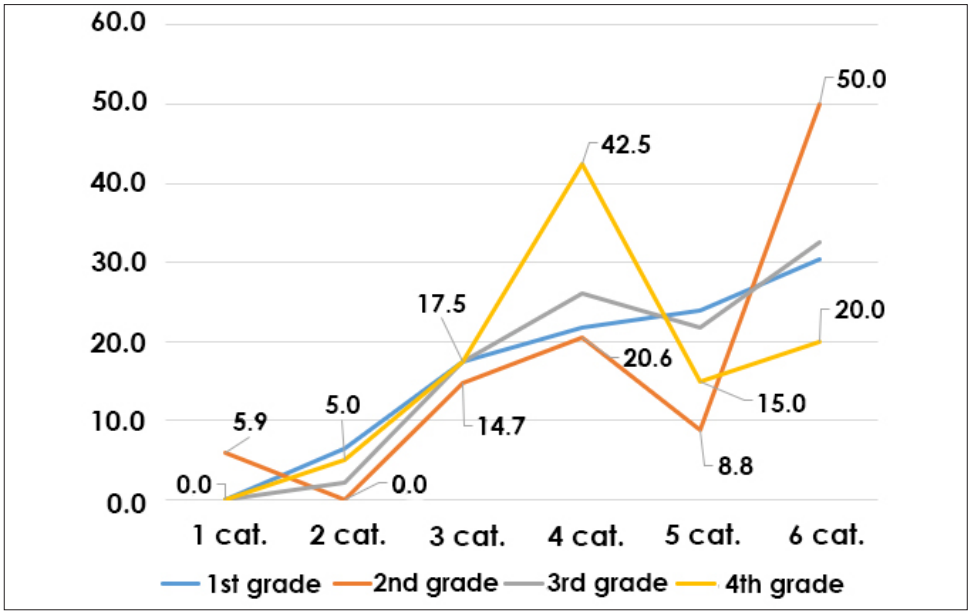

Figure 4. Choices of photographic images of different categories by girls in grades 1–4 (% of the number of girls in each grade)

Legend: on the graph, the number of categories of all the choices made is designated as '1 cat.', i.e., a respondent preferred a partner of the same gender and race for all the interactions; '6 cat.' a respondent preferred partners of both genders and all three races. Grades 2 and 4 are numbered for easy orientation.

Comparison of the obtained data on the choices of boys and girls clearly indicate that starting from the 1st grade boys demonstrate the persistent desire to be included in the in-group of persons differing in their gender and race. Girls show restraint and are oriented towards a limited number of individuals. In each grade there are several girls and boys who are wary of those of the opposite gender or race.

Discussion

The analysis of racial implicit identity in Russian schoolchildren at the commitment stage showed several patterns of social categorization. We defined implicit identity by the subjects' inclination to possible in-group relationships with individuals of the same or opposite gender and race. According to the concept of social categorization by G. Tajfel and J. Turner, in most cases of joint activities in the personal and social spheres, individuals prefer the 'same' representative of the in-group, with whom they built relationships at the stage of commitment (Turner, Brown, & Tajfel, 1979). This tendency enables us to interpret the choices in the conducted experiment as an indication of the implicitly inherent identity of the study participants.

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In fact, about half of the respondents choose representatives of Caucasian race for various spheres of interaction. The other half of choices was almost evenly distributed between Mongoloid and Equatorial races. Does this result indicate a tendency towards alienation of representatives of other races and their attribution to an out-group? We have come to a paradoxical conclusion. The experimental conditions of choice can be understood differently – a child chooses either MR or not MR. In general, of all the offered categories the subjects made a 50/50 choice of the "same" and "not the same" races, making an almost equal choice of a partner of the same (CR) and other (MR, ER) races. This indicates the absence of the criterion of 'racial identity' in the structure of implicit identity in children of the studied age. Numerous studies of racial and ethnic identity conducted by Anan'eva & Tovuu (2019) in Russian samples, show that the race and ethnicity of the perceived individuals did not significantly affect the correctness of their understanding, in contrast to the gender of both the subjects and the persons depicted. Various studies of Russian primary school students' identity indicate the absence of the category of 'race' in self-categorization (Shakurova, 2007; Andreeva, 2011; Gudzovskaya & Shpuntova, 2016; Kuzmin, 2017). Gender and family are the most typical components in the configuration of their social identity (Kuzmin, 2017). The mention of racial and ethnic identity is much more common in schools and groups mixed on these grounds (Dutton et al., 1998).

The almost equal distribution of partner choices (25 % for each) between MR and ER demonstrates that, the desire to interact with peers of other races in various activities in personal and social spheres of communication is equally important to Russian children aged 7–11 years. This may be a result of children's assimilation of the positive racial implicit identity of their parents. The racial preferences of children, based on implicit identity, implicitly contain information about 'default' attitudes in the surrounding world of adults. This is consistent with findings of Huguley, Wang, Vasquez, & Guo (2019), Kickett-Tucker (2009) on the impact of positive racial parental identity on children's identity and with data from Dasgupta (2013), indicating that implicit attitudes, stereotypes, and preferences are the result of passive involvement.

Our results may also indicate the prevalence of a collectivist cognitive orientation in Russian society, which determines a holistic thinking, when the main attention is paid to the integral field of ethnic and racial groups, based on similarities, the search and identification of unifying elements (Nisbett, Peng, Choi, & Norenzayan, 2001). The predominant cognitive orientation is an implicit condition for passive involvement in the system of social values and their uncritical assimilation. Thus, children assimilate that the surrounding adults 'bear' in themselves. Similar data were obtained in the study of students' ethnic identity (Myshkina, 2014). An increase in ethnic self-esteem in an experiment leads to an increase in the frequency of using positive assessments of representatives of another ethnic group (Wu, Outley, & Matarrita-Cascante, 2019).

We did not find the age dynamics of racial implicit identity in the period of active socialization of children from 7–8 to 10–11 years old. This is consistent with the research of G. Tajfel, who wrote that numerous evidences show that children learn the hierarchy of assessments of various groups prevailing in their society early enough; this order remains rather stable. This relates not only to the assessment of groups that they contact in everyday life, such as racial groups in a mixed environment, but also to racial groups from other countries (Tajfel, 1982). The longitudinal study by Gudzovskaya & Shpuntova (2016), conducted in a sample of subjects aged from 7 to 25, also empirically established that the configuration of identity in its cognitive representation is rather stable in terms of the structure of the main social components.

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The analysis of the influence of the gender factor on racial preferences, and, consequently, on implicit racial identity, showed the following patterns. Girls and boys do not differ in their choices of photographic images representing individuals of Caucasian and Mongoloid races. At the same time, there was a difference in the frequency of categorization of representatives of Equatorial race as members of their own in-group. Girls are significantly more likely to choose the ER representatives than boys. In most cases girls and boys choose representatives of the same gender. Representatives of the opposite gender are chosen much less frequently (on average, in one third of cases). Compared to girls aged 7–11 years, boys of the same age tend to include individuals of the opposite gender (regardless of race) in the in-group. This is consistent with the findings of Kuzmin (2017) indicating compared to girls, boys are characterized by more pronounced ethnic component.

Among girls and boys, there are 1–2 % of those who choose only one category of partners – individuals of the same gender and race. Such a choice may indicate the disturbed relationships of these children in their class and can be used as a prognostic methodological tool for detecting children in need of increased psychological and pedagogical attention. This idea requires further research.

Some outliers and the identified characteristics of the distribution of gender and racial preferences for each grade and gender group may be explained by the factor of influence of the teacher and the educational environment. The identified intra-group differences between children of the same age represent another direction for further research. In addition, future studies may consider the factors of the language of communication and subjective physical attractiveness of the children represented in the photographs.

The findings of the experimental work enable us to draw the following conclusions.

The experiment carried out in a sample of children aged 7–11 years from four age groups revealed the characteristics of social categorization when they referred photographs of peers of different races and different genders in different hypothetical situations of interaction.

In the process of active socialization of children aged 7–11 years, the age dynamics of racial implicit identity does not undergo pronounced changes. In half of the experimental situations, Russian children choose representatives of the same race, in another half – representatives of other races. The choices between representatives of Mongoloid and Equatorial races are distributed almost evenly.

The structure of implicit identity of Russian children aged 7–11 years does not contain the criterion of 'racial identity' as the basis for social categorization. Children of this age are at the commitment stage. They are actively interested in interacting with their peers, regardless of their race.

For Russian children aged 7–11 years, the desire to interact with peers of other races in various activities in the personal and social spheres of communication is equally important.

The gender factor influences racial preferences and, consequently, the implicit racial identity of children aged 7–11 years. Girls are significantly more likely to include representatives of Equatorial race in the ingroup. Boys are more likely to include a wider range of categories, differing in gender and race, in the in-group.

The transitivity of today's socio-cultural space may determine future dynamic changes in the manifestations of racial implicit identity.

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Author Contributions

A. A. Gudzovskaya wrote the literature overview, worked with English-language sources, analyzed and interpreted empirical results, designed graphic illustrations, and discussed the methodology and conclusions of the study.

M. S. Myshkina suggested the research idea, designed the experiment, collected the data, analyzed the empirical results, carried out a critical revision of the content, and wrote the literature overview.

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