

PSYCHOLOGY IN RUSSIA: STATE OF THE ART

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Editorial

This special issue of “Psychology in Russia: State of the Art” — “Contemporary childhood research” — is devoted to the VI International Conference “Early Childhood Care and Education” (ECCE 2017) that was held on May, 10–13 2017, in Moscow, Russia. It includes conference participants’ articles as well as regular submissions.

Silvia H. Koller generously shared her reflections of collaboration and personal communication with Uri Bronfenbrenner in the tribute to his centennial, “Making human beings human”. Dr. Koller’s piece also gives some insights into the origins of Ecological Theory of Human Development.

The “Educational psychology” section includes a wide range of articles on education and cognitive development at various stages of childhood and emerging adulthood. Four articles deal with language development that is rapidly changing in contemporary world with its multiculturalism, mobility and proliferation of digital media. Elena N. Bicherova investigated dependence of success in foreign language acquisition at primary school age on reaction type and cognitive control. Hristo Kyuchukov, Milan Samko, and Dagmar Kopcanova developed culturally appropriate materials to assess knowledge of Romani language grammar. Focusing on thinking and speech, Nadezda N. Eliseeva, Elena N. Guts, and Andrea Marini described age dynamics of comprehension of idiomatic expressions by Russian speaking typically developing children. Liv Gjems applied Vygotskian approach to investigation of learning about concepts through everyday language interactions in preschools.

Three more articles are devoted to first-year students, who fall in-between adolescence and emerging adulthood, and sometimes require much support. Anna A. Gladkova investigated the role of communication skills in the process of psychological and socio-cultural adaptation of international journalism students in Russia. Svetlana N. Kostromina, Nadezhda A. Mkrtychian, Diana M. Kurmaeva, and Daria S. Gnedykh performed an interdisciplinary study of the interrelationship between cognitive control and academic success of first-year students. Irina A. Novikova and Alexandra A. Vorobyeva outlined the relationships between Big Five Factors and academic achievement in Russian students.

Finally, Liudmila Liutsko, Alexandr N. Veraksa, and Vera A. Yakupova studied cultural and psychophysiological aspects of early numeracy, namely, embodied finger counting in children.

The “Social psychology” provides two highly topical articles. Ksenia Yu. Eritsyana and Olga I. Kolpakova performed a qualitative study of runaway behavior among children in residential care in St. Petersburg — though state care in Russia is going through major reforming, children are challenged by residential placements. Maria A. Dzherelievskaya and Anna V. Vizgina investigated the issues of identity of youths in the ex-USSR countries — socio-cultural differences in the self-descriptions of two groups of Azerbaijani students learning in the Russian and Azerbaijani languages.

The “Virtual reality” section is expected in a journal issue, devoted to contemporary childhood. Elena B. Puchkova, Yulia V. Sukhovershina, and Larisa V. Temnova provided a study of Generation Z’s — who are now adolescents — involvement in virtual reality. Alexander E. Voiskounsky, Tatiana D. Yermolova, Sergey R. Yagolkovskiy, and Valeria M. Khromova investigated creativity in online gaming at the example of individual and dyadic performance in young Minecraft gamers.

The “Clinical psychology” section deals with both health and developmental distortions. Elena I. Nikolaeva and Vera S. Merenkova outlined an inner picture of health as a factor in changing a child’s behavior to health-promoting behavior. Yulia Solovieva and Luis Quintanar Rojas provided an interesting case study of syndromic analysis in child neuropsychology based on the works by A. Luria.

There is also an additional section — “Well-being in adults”. Elena B. PereLygina, Alexander M. Rikel, and Alexander I. Dontsov analysed the concept of subjective well-being of a person as a prism of personal and socio-psychological characteristics. Varvara I. Morosanova, Igor V. Gaidamashko, Svetlana N. Chistyakova, Nailia G. Kondratyuk, and Angelika V. Burmistrova-Savenkova shared the results of research of regulatory and personality predictors of the reliability of professional actions.

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Making human beings human: A tribute to Bronfenbrenner's centennial

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I was given the honor of making a tribute to Bronfenbrenner during the VI International Conference “Early Childhood Care and Education” (ECCE 2017) held on May 10-13th, 2017, in Moscow, Russia. I opened countless files on my computer, started texts, and wrote a paragraph or two, but no more. It was a very challenging invitation for many reasons. First, Bronfenbrenner is one of the most well-known psychologists of our time. Bronfenbrenner was a pioneer of translational and positive Psychology and inspired many environmental intervention programs around the world related to family support services, home visits, and education for parenthood, especially for low-income families and communities. Second, he is a very important figure in my professional and personal life, as a mentor and a wonderful and kind friend. In the beginning, my pages to accomplish this challenging task stayed blank, but not my heart and mind. I had so many ideas and feelings taking root in me that I could hardly decide which were the most relevant. I used to tell my students that when they could not write the first line, they should write the second one. Easier said than done. I looked out at the universe, looking for inspiration. I imagined so many beautiful and true words, but actually, when they appeared on the screen, they did not seem to do justice to the honorable task I had been assigned. Sometimes it seemed sentimental, sometimes distant. It should be so easy to write about Bronfenbrenner, so why could not I? After all, it would be reverencing the one who best defined human development among the theorists of our time. Development is more than change, it is constancy, he used to state. This has a tremendous intrinsic value. In addition, I, who am not given to praying but to expressing gratitude, caught myself repeatedly constrained in search of a light. In addition, this fact was itself constancy!

Bronfenbrenner was not in those theoretical, biographical, empty, and distant paragraphs I had been writing. I knew they would be authentic only if they expressed him. I knew that he was here, within me. It is in human companionship

where he remains, which turned me more human. His ideas still vibrate intensely in memories and texts. It feels like he is near whenever I start to tell the stories of our brief and intense companionship. When I tell these stories, I see, in the vibrant eyes of my students, the same inquietude that I felt when I was a student of Psychology. When I talked with him and read his texts, my ardent doubts, questions, and retorts made more sense. What I admired most in his works was the lack of certainties, the capacity of self-criticism, and the eternal possibilities that could present themselves. After all, to be human is not to be trivial. There must always be the potential to discover something new about him.

I also reread what I had already written about him in other works and was not satisfied. Other texts about him brought back wonderful memories about his life and our companionship (Koller, 2004) and the profound pain from his loss (Koller, 2005). These texts were mentioned countless times by students and co-workers, who told me how much they came to admire him through my writing. He certainly would have liked to read them. With these recollections and remarks, I started to ask myself what I could do differently now. More than writing about his theories, ideas, or biography, I wanted, again, to write about who he had been to me. More than that, I wanted to write about how human he had been and how similar we all are in our immense diversity. To write about this would also certainly be to learn about and contribute to teaching his theory. I also wanted to write about the Ecological Engagement Methodology that we created in Brazil to apply his theory, and luckily, we had time enough to discuss with him and hear his compliments on our methodological ideas (Koller, Morais, & Paludo, 2016).

The opportunity of being in Moscow, where he was born, is very significant to me. Certainly, Russian psychologists and students are aware of his importance to the Psychology field, and they should be very proud of his work and legacy to the world and to the studies of child development. Many Psychology students also would like (and perhaps need) to know how similar they are to Bronfenbrenner. His accounts about needing to seek, during youth, works in Psychology to better understand himself seemed so unoriginal and contemporary. But, similar to so many Psychology students, Bronfenbrenner also thought that some subjects taught in university were tedious and absurd (Bronfenbrenner, 1995).

Even having learned, throughout his school years, that Psychology was a science similar to any other that measured, observed, and performed experiments, he was sometimes suspicious of this. He wanted more. He was studying human beings and could not accept the reduction of such a complex psychological reality. Scholarly books showed that there was not just one Psychology but dozens and that the chapters separating psychological fields fragmented something or someone that seemed to him so whole and natural that it, therefore, could not be simple. Facing such a fragmented vision of human beings, Bronfenbrenner continued asking where could be found this man or woman, child or adolescent that they were trying to understand.

With the advance of his studies and an increased worry about these questions, Bronfenbrenner became increasingly convinced that a new way of conceiving and analyzing human development was needed. In his studies about individual differences, he noticed that the Psychology of human beings integrated itself in sequential chapters with environmental influences and genetic factors through-

out development. However, once again doubts overtook him, which seems to me, brought him closer, in one more way, to so many students discovering the different psychologies during their years in university. Bronfenbrenner, in part, was fascinated by new knowledge but feared that some of the ideas were not properly and experimentally tested. Maybe they had been thoroughly tested but were distant from the ecology of human beings. The use of measuring in the field originated from the idea that Psychology was, after all, a real science, but some measurements seemed alien to him. However, his persistence and knowledge, accumulated as far back as when he lived with his scientist father, showed him that it should be possible to unite such ideas. Maybe more than this, Bronfenbrenner accepted the challenge of creating a Psychology that was definitely a science, with an innovative attitude that is so expected contemporarily. Psychological reality does not occur just in controlled experiments. Bronfenbrenner emphasized the natural experiments that human nature itself experienced during development, saying that these should receive priority. The naturalistic observation of real human beings, in their real environments, interacting with other human beings, objects, and symbols that were also real, even if only to themselves, became the central nucleus to his theory. Science, after all, as Bronfenbrenner emphasized, was “not to verify hypotheses, but to discover new ones, by proving yourself wrong” (1995, p. 606). More than this, he realized that the integration and advance of the science of Psychology only occurs because “psychologists not only did experiments, they also thought — rigorously and systematically — both before and after each experiment” (1995, p. 606). How many Psychology students throughout their school years vigorously shout in favor of this? How many are actually heard by their mentors? How many are silenced? And how silenced they are!

Making human beings more human seems to be a challenging proposal with a touch of pretension and utopia. Who knows? Only a few scholars in Psychology could give such boldness. Only a few scholars would also have the sensibility and commitment to perceive that many human beings live in conditions that do not correspond to their status as a human or that, at the very least, subjugate the humanity (in the greatest sense possible) they should be experiencing. Bronfenbrenner is certainly one of them and, because of this, deserves our greatest respect and admiration.

Bronfenbrenner lived a life of diversities, challenges, and adversities. He was born in 1917 during the Russian Revolution and immigrated with his parents to the United States after an uncle died from hunger. He lived there as the son of a neuropathologist and a Russian mother, who did not allow him to forget and value his Russian language and heritage. In search of a better position, his family survived marginality and poverty, as foreigners did at the time. He received a scholarship at Cornell University, after his father's illness, and graduated with a degree in Music and Psychology. After studying at Harvard University and the University of Michigan, he debuted as a doctor during the Second World War. He then returned to Cornell as a professor and stayed there until the end of his life. He had a long-lasting marriage with a woman of German descent, six children, thirteen grandchildren, and one great-granddaughter by the time of his death in 2005, in Ithaca, New York. His life was marked by concurrent risk and protective factors that showed, in his own experience, just how much being human costs and is worth.

For Bronfenbrenner, the worlds of human beings were not just the ones he himself had lived in. His legacy is immortal and is an example of how even living through so many battles, someone can be happy and look around with hope and confidence in better worlds. His bioecological theory of human development expresses this. Bronfenbrenner had the conviction that the world was immense and filled with opportunities and that human beings could be in it to improve their own lives and those with them in that journey. Of the experience he achieved through Psychology and the knowledge he passed on, perhaps these have been the most fertile. Studying human beings, making a science about them, let us believe there are always possibilities. One theory – his theory – should be able to find a reason for being and be applied to improve the quality of life of all human beings. Why would it be, then, pretentious to propose turning human beings into beings even more human?

Bronfenbrenner was a boy immigrant running from war into a strange country. He accompanied his father in daily journeys to an institution for the “mentally deficient” in which was his house. No barbed wire passed from his house’s door and surrounded the entire institution. In this setting, he heard every day about how to perform science and how the truths it could present should be doubted. He learned in every detail how to see widely. Starting his studies in a school for boys of different ethnicities and ages, where he learned English and much about North American culture, made him transit ecologically through many roles and contexts. It was up to him, in his family, to come back home to “Americanize” his parents.

Bronfenbrenner performed an active role in the conception of intervention programs in human development, such as Head Start. His ideas and ability to transform ideas into possibilities for understanding and perfecting natural environments for human development inspired efficient and successful social policies to detain the poverty cycle and exclusion of many human beings. Comprehensive education, health, nutrition, and the involvement of families in several participation and discussion contexts showed his visionary attitude of a truly healthy ecology for human development.

I was privileged to know Bronfenbrenner during his life. Therefore, I could share with him my book about his work, published in Portuguese, in Brazil (Koller, 2004) and discuss the ideas and all the intriguing questions (as he used to say) of my research team about his theory. In 2003, during my last visit with him in Ithaca, I had a chance to discuss the ecological engagement methodology proposal. He was really open to it and even said: “I wish I have enough time to see your methodology being applied and the results you are going to get through the use of it!” In 2003, Cecconello and I published a paper about the ecological engagement as a scientific method based on the Bronfenbrenner’s ecological theory of human development. Our main idea was that through naturalistic data collection with scientific rigor data could be considered ecologically valid. The researchers could be sure that the analysis done by them on naturalistic data is definitely well based in the perception and daily experience of the participants. Eventually, more than enabling the accomplishment of research in a natural environment with ecological validity, the ecological engagement provided researchers social interaction with participants, acting also as an intervention. Later, Eschiletti-Prati et al. (2008) proposed a review of Ecological Engagement in greater detail, revisiting the con-

cepts of bioecological approach (process, person, context and time) and the contributions previously offered by Cecconello and Koller (2003). However, they went further, bringing examples of research that used the methodology in order to propose its operationalization. Some of these studies can be seen in Koller, Morais, and Paludo's book chapters (2016). Some steps should be taken to consider the use of Ecological Engagement Methodology, as Bronfenbrenner advised: 1) A profound knowledge about the Ecological Theory of Human Development, and a rigorous training about methodology, ethics, and data analysis; 2) The construction of the field diary by each member of the research team in order to analyze the participants' proximal processes, as well as of the members of the research team; 3) the participation of the researchers in several activities with the participants in formal and informal moments of the data collection; 4) a period of developing bonds with participants and institutions; and 5) a combination and integration of several strategies of data collection (interviews, tests, scales, etc.). The use of quantitative and qualitative strategies is strongly recommended. The researchers' act of being close to the context being researched, as well as to the knowledge they have about the particularities of the individuals' life and history, allows a much more complex and pertinent discussion and analysis of the collected data. This approach assures the quality of the collected data. The act of being close to the participants' context, as well as the knowledge of their personal characteristics and of their developmental processes during their lifespan, also allows the possibility of a much richer discussion and analysis of data. It may be said, this way, that the "data gain life" through engagement. In addition, even when the results are shown in numbers, percentiles and the results of statistical tests, one will know the "kind" of person and reality he/she is working with. The data gain, if one can say that, sense. As previously noted, especially in the systematization proposed by Cecconello and Koller (2003), the methodological proposal of Ecological Engagement implies the direct and indirect use of intervention strategies and the transformation of contexts and realities (objective and subjective) that researchers face. The situations are the most diverse ones, evolving from moments in which guidance is given by the research team to the participants (rights, sexuality, etc.), in addition to the denouncement/report of abuse cases and sexual exploitation, the creation of a favorable atmosphere to the expression of feelings and personal sufferings and/or the use of findings to subsidize several programs of intervention, through the dialogue of studies' data with the professionals of different institutions.

Throughout his life and career, Bronfenbrenner pursued three reinforcing themes. First, he always required a good theory for human development. Second, this theory should be implicated in and applied to social policies and strategies for improving the life quality of human beings in their environments. For him, "there is nothing as practical as a good theory" (Bronfenbrenner, 1978, p.48). Third, that to disseminate knowledge, researchers had to always communicate their findings to various audiences through publications, lectures, and debates. His goal was to teach, disseminate, and transform. University students, research co-workers, social policy makers, families, the public in general, and politicians were his permanent target in his inquietude to pass on what he had learned by being human. Bronfenbrenner emphasized the use of naturalistic methods, of observing the real life of human beings. The most sophisticated argument in defense of the superiority of

these methods compared to experimental studies on humans denounced the practical and ethical impossibility of manipulating and controlling the most significant variables for psychological development.

The preservation of the good species of dear “uncle Bronfy”, as we call him in our Study Center, is guaranteed. Being human, noun or predicate, is a rich expression difficult to define. Bronfenbrenner lived a long life and had the ability to look within and try to understand himself. This was his reason for seeking the study of Psychology. It does not seem very original; actually, it seems trivial and common, as it has been repeated many times to us as students of Psychology. Bronfenbrenner's humanity is what fascinates throughout his history and work, and having finished this writing, perhaps I now only have to look through the window and give thanks.

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EDUCATIONAL PSYCHOLOGY

Dependence of success in foreign language acquisition at primary school age on reaction type and cognitive control

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Background. This article reveals the importance of studying the problem of success in foreign language acquisition during the first stage of study in the modern educational environment. Particular attention is paid to factors of successful foreign language acquisition during the primary-school ages, which depends on cognitive style features, such as reaction type and cognitive control. The content and characteristics of cognitive styles as individual styles of foreign language acquisition are analyzed in the context of a leading activity of primary school students.

Objective. A hypothesis of this research was that success in foreign language acquisition depends on reaction type and cognitive control, particularly the extent of the cognitive styles of impulsivity, reflexivity, rigidity and flexibility in primary-school students.

Design. To implement the proposed empirical tasks, the author organized and conducted research using a combination of methods intended to study the correlation between success in foreign language acquisition by primary-school students and reaction type as well as the features of cognitive control. A total of 74 elementary-school pupils aged 8-11 years were studied. A direct connection between success in foreign language acquisition and the indicators of the cognitive style “impulsivity — reflexivity” was identified using mathematical statistics methods.

Results. This study found no statistically significant correlation between success in foreign language acquisition and the indicators of the cognitive style “rigidity — flexibility”. Therefore, the results confirm that success in foreign language acquisition at primary-school ages is determined more by reaction type (impulsive or reflexive) than by the features of cognitive control (rigidity or flexibility).

Conclusion: The practical significance of the study is that the obtained results can be used in the work of teachers and psychologists to improve the educational process in primary school and to promote the effective study of foreign language by students.

Keywords: cognitive style, reaction type, cognitive control, impulsivity, reflexivity, rigidity, flexibility, success in foreign language acquisition, primary-school age

Introduction

Increasing attention is being paid to foreign language teaching in primary school, which is important for state educational policy. Earlier foreign language acquisition has a positive effect on the formation of personality and the overall development of the child in support of such mental and physiological characteristics as curiosity, the need for communication, the ability to mimic, and the ability to articulate, thereby promoting the development of a personal emotional relationship of the child with the foreign language.

According to I. Zimnyaya and Z. Klychnikova, early foreign language teaching gives the child an opportunity to study the language intensively during a long period of time and, in general, positively influences the activity of learning (Zimnyaya, 1991, 2008; Klychnikova, 1973). The activity of learning, which is diverse in content and complex, leads to the production of different styles of intellectual activity (Kulyutkin & Sukhobskaya, 1971).

The study of the features of the activity of learning and the processes of conceptualization at primary-school age shows that cognitive styles, as factors of individual regulation, play a significant regulative role in the formation of intellectual strategies (Klaus, 1987).

The concept of “cognitive styles” includes a variety of individual characteristics of cognitive activity during personality development (Kagan, 1966; Witkin & Goodenough, 1981). Klaus examines the cognitive component of the activity of learning and analyzes the individual characteristics of information perception, processing, storage and utilization. Klaus also emphasizes differences in pupils’ personal characteristics, such as gender, age, features of cognitive style and achievement motivation. “The cognitive styles appear as soon as the person addresses the situation, in which he has not adopted the way of behavior yet, or where a personal ‘contribution’ is needed to solve the problem: the personal activity” (Klaus, 1987, p. 56). According to Klaus, the most important feature of cognitive styles is the fact that they result in the learning process, and it is necessary to take them into account in the individualization of the pupil’s learning (Klaus, 1987, pp. 41-78).

A review of the works of the Russian researchers who address the problem of cognitive styles and linguistic competence in the activity of learning (e.g., E.V. Artsishevskaya, S.V. Boldyreva, E.P. Gustova, M.K. Kabardov, Ya.A. Tunkun, I.L. Zhirnova et.al) as well as an analysis of psychological theories and concepts (A. Adler, J. Bruner, J. Kagan, R. Solso, H.A. Witkin, V.A. Kolga, A.A. Leontiev, I.S. Yakimanskaya, V.N. Druzhinin, V.P. Zinchenko, I.A. Zimnyaya, M.A. Luria, M.A. Kholodnaya) demonstrates the timeliness of the question under discussion.

The relevance of this study is primarily based on the presence of vexing questions concerning the study of cognitive styles in conjunction with the individual ways a person uses the acquisition of new information and the handling of obtained data (Averin, Kireeva, & Kotova, 2014; Barabanshnikov, Nosulenko, & Samojlenko, 2011, etc.). This issue becomes especially significant for the subject-subject approach to foreign language teaching in primary school (Ilyin, 2011; Protasova, 2011, Nikitenko, 2011; Shchukin, 2010, etc.).

Since the individual style of foreign language acquisition can be considered the success factor for foreign language acquisition (Boldyreva, 2004; Kabardov, 1983, 2001), one may state that the formation of cognitive style contributes to effective

foreign language teaching. Therefore, it becomes necessary to study the correlation between success in foreign language acquisition and the features of cognitive styles. This research also has great importance because foreign language teaching is one of the most promising endeavors in the modernization of elementary education. The scientific novelty of the present work lies in the study of the orientation of correlations 1) between success in foreign language acquisition by primary-school students and reaction type (the cognitive styles of impulsivity and reflexivity) and 2) between success in foreign language acquisition by primary-school students and the features of cognitive control (rigidity and flexibility).

Before presenting the empirical part of this work, it is necessary to review the key concepts of the problem.

In both Russian and foreign psychology, there are a great number of works dedicated to the study of cognitive styles (Witkin, Moore, Goodenough, & Cox, 1977; Kolga, 1976; Holodnaja, 2004). Some researchers use concepts that form a semantic field with the concept of the cognitive style, such as “lifestyle” (Adler, 2002), “rigidity” (Cattell, 1971), “control rigidity” (Stroop, 1935), and the concept of balance between the first and second signal systems (Pavlov, 1951).

A. Adler used the concept of cognitive style to define such personal characteristics as the individual features of the cognitive processes that predetermine the utilization of different research strategies. In his scheme of individual psychology, the cognitive style is the peculiarity of the personal way of living, structured by goal-setting and achievement (Bunduls, 1982).

Cognitive styles are relevant to operating style because all of them characterize the typical features of intellectual activity, including perception, thought and action, which are connected to the solution of cognitive tasks, particularly in situations of uncertainty (Klaus, 1987).

At the present time, there is no consensus concerning the content and the meaning of the concept of cognitive style. However, this concept may turn out to be very useful in pedagogical psychology, where cognitive style can be considered to be educational style (Kolga, 1976).

In his book, G. Klaus describes the regulative functions of two the most popular and well-known cognitive styles that occur in the process of teaching: “field dependence — field independence” and “impulsivity — reflectivity”. The intensity of each of these bipolar styles influences the strategy of pupils’ perceptions, their conceptual sphere and the development of reasoning. “Like other cognitive styles, they are: 1) stable towards the age group the individual belongs to; 2) relatively independent of the person’s motivation and goal intentions. They demonstrate another personal characteristic of cognition” (Klaus, 1987, p.78).

According to Klaus, “the intensity of the cognitive styles changes during the ontogenetic development but stays the same in...each particular person, if we compare his characteristics with those of the age group he belongs to” (Klaus, 1987, p. 91).

The idea of the existence of stable differences in ways of perception and thinking was suggested by G. Klein (1970), and the concept of “cognitive style” was proposed by the American psychologist R. Gardner (1953). Cognitive style as a stable individual characteristic of personal interconnection with the information field, connected to different aspects of cognitive-sphere functioning, was studied by H.

Witkin (Witkin et al., 1977). The analysis of the sources showed that the most frequently explored parameters of cognitive styles are 1) the type of perception: field dependence — field independence (Witkin, 1949); 2) the type of reaction: impulsivity — reflexivity (Kagan, 1966); 3) the type of thinking: analyticity — syntheticity (Gardner, Holzman, Klein, Linton, & Spence, 1959); 4) the equivalence range: narrowness — largeness of the categorization (Pettigrew, 1958); and 5) the degree of complexity: cognitive complexity — simplicity (Bieri, 1955). “However, the first results have already shown that the researchers deal with the psychological reality, analysis of which can not be limited by the understanding of the style only as the cognitive variable” (Libin, 1999, p.163).

There are other cognitive styles described in native and foreign sources, such as 1) the features of cognitive control: rigidity — flexibility; 2) the predominant method of information processing: figurative — verbal; and 3) the locus of control: external — internal (Holodnaja, 2004, p.122).

The mental activity of learning varies in content and complexity and leads to the emergence of different styles of intellectual activity. The study of the intellectual activity involved in decision-making in situations of uncertainty distinguishes the styles according to the reaction type (reflexivity and impulsivity) when it is necessary to make the right choice from several alternatives. Impulsive people tend to respond to a problem quickly, making decisions without thorough thinking. In contrast, reflexive people can be characterized by delayed reaction in such situations, making a decision only after thorough consideration of all pros and cons. They collect more information before the answer, use more effective ways of problem-solving, and utilize strategies acquired in the learning process more successfully (Kagan, 1966).

According to the data of S. Messick (1984), response rate does not depend on intelligence level, unlike the number of incorrect decisions.

In terms of the type of cognitive control, psychologists emphasize such cognitive styles as rigidity and flexibility. These styles are connected with the simplicity or complexity of changing work methods or changing from one information alphabet to another. The complexity of the change leads to the narrowness and inflexibility of the cognitive control (R. Kettell, J. Stroop).

The cognitive styles discussed above become especially important in the situation of foreign language study, when mental flexibility and a rapid rate of response to the new stimuli are needed. Therefore, to learn a foreign language successfully, it is necessary to have characteristics such as communicative activity, a focus on the language behavior and language system, and fluency in solving linguistic tasks. In view of this understanding, there are two styles (types) of language acquisition: communicative (typical of people with high nervous system lability) and linguistic (typical of inactive people) (Kabardov, 1983).

Method

The main goal of this research is to define the correlation between success in foreign language acquisition by primary-school students and cognitive styles that vary by the type of reaction and the features of the cognitive control. For this purpose, an empirical study was organized and conducted.

Participants. A total of 74 elementary school pupils aged 8–11 years were studied. The sample group included 24 second-form pupils aged 8–9, 25 third-form pupils aged 9–10 and 25 fourth-form pupils aged 10–11 years.

Measures and procedure. To examine the problem, the author used the following diagnostic test instruments: “A comparison of similar pictures” (J. Kagan), “Stroop interference” (J. Stroop), and “evaluation of the level of the foreign language acquisition” (E. Bicherova, N. Volchkova).

The “comparison of similar pictures” method is used to diagnose the cognitive style of the reaction type “impulsivity — reflexivity”. According to a tentative assumption by J. Kagan, this cognitive style characterizes individual differences by the tendency to make decisions quickly or slowly. This style becomes especially significant in conditions of uncertainty, when it is necessary to make the right choice from several alternatives (Kagan, 1966).

The procedure. The subject is shown 2 training and 12 main papers with an image of a known object (a reference figure) on the top and 8 almost identical images of the same object in two rows at the bottom, where only one image is identical to the reference figure. The subject’s instruction is to find and point to the image that is identical to the reference figure.

People with the impulsive style make assumptions in the situation of alternative choice promptly but make many errors. A slow rate of decision-making is typical of people with the reflexive style; they make few mistakes due to their thorough preliminary analysis.

To determine the type of cognitive control (flexibility — rigidity), the “Stroop interference” method was used. A predominant cognitive style characterizes the degree of psychological difficulty in changing the ways that information is processed in situations of cognitive conflict. Rigid control indicates difficulties in moving from verbal functions to perceptive functions because of their low automation degree, whereas flexible control indicates relative ease with such a transition because of their high automation degree (Stroop, 1935).

To analyze success in foreign language acquisition by primary-school children, we have developed a method, “evaluation of the level of foreign language acquisition”. This method is based on the approach of structured control. The pupils’ activity was observed directly during English lessons, and five main levels of educational material acquisition were determined.

The zero level (Understanding) is the level at which a pupil is able to understand, i.e., to acquire new information consciously. Strictly speaking, this level cannot be called the level of “educational material acquisition” because this concerns the student’s background, which allows him to understand the new educational material.

The first level (Identification) is the recognition of the objects and processes in the study during the re-experience of information about them or actions with them that were acquired earlier (for example, the separation of the studied object from the variety of proposed different objects).

The second level (Reproduction) is the representation of the knowledge acquired earlier from imitation to implementation in typical situations (for example,

information reproduction off the top of the head or solving standard problems using the sample acquired earlier).

The third level (Application) is the level at which a pupil is able to reproduce and transform acquired information by himself for discussion of known objects and the application of the information in unusual situations. In this case, the pupil can generate new information about studied objects and processes (for example, the solution of nonstandard problems or the choice of a proper algorithm from a variety of algorithms studied earlier for the solution of the particular task).

The fourth level (Creative activity) is the level at which a pupil is able to produce new information that is previously unknown to everyone (for example, the development of a new algorithm to solve a problem).

Results

In the beginning of the study, the pupils were presented with the “comparison of similar pictures” task (J. Kagan). This task was used to diagnose cognitive style with the reaction type “impulsivity — reflexivity”. The analysis of the obtained results showed that most of the primary-school pupils aged 8–11 (44 students, or 58.5% of the participants) demonstrated impulsivity in cognitive activity rather than reflexivity (30 students, or 41.5%). This finding might be due to the intensive expression of the cognitive style “impulsivity” when the learning situation is accompanied by difficulties in the study of the subject.

The results of the study of the cognitive style “reflexivity — impulsivity” of the pupils as a function of forms are shown in Fig. 1.

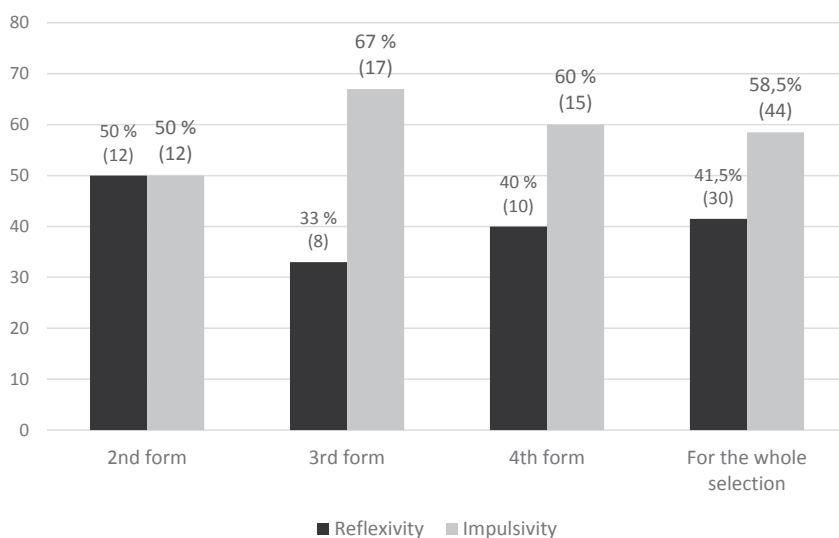


Figure 1. The results of the study of the reaction type “reflexivity — impulsivity” in the primary-school students

It can be seen in Fig. 1 that in the second form, half of the participants (12 pupils aged 8–9) demonstrate the styles “reflexivity” and “impulsivity” on the same

level. This finding can be explained by the assumption that these cognitive style features are connected not to the method of new material acquisition (at ages 8–9, an approximate basis of learning activity has only begun to form, whereas the acquisition of new methods of activity is in the process of forming and occurs at ages 9–11) but with the individual typological features of the pupils appearing in accordance with the extent of their mental activity. Quickness and ease of new material acquisition depend on the strength of the nervous system, the predominance of excitation over extinction, a dynamic of the ability to work and fatigability.

However, we can detect the tendency that, during the study of a foreign language, most participants demonstrate the cognitive style “impulsivity” (17 pupils of the third form, aged 9–10 (67%), and 15 pupils of the fourth form, aged 10–11 (60%)). These results illustrate the cognitive style features of foreign language acquisition by primary-school students as a new work method: a tendency toward rapid reactions in new situations (the new educational material) and in situations of multiple choice without the analysis of possible solutions. The tested pupils with the impulsive cognitive style can be characterized by word fluency, a high rate of fulfilling separate linguistic tasks, the presence of recurrent errors and stereotypical answers. The children with the reflexive cognitive style differ: they have a slow rate of foreign language acquisition but a higher quality of cognitive activity. Erroneous answers are almost absent, there is no repetition, and solutions are nonstandard.

At the next stage of our study, the students were presented with the “Stroop interference” task, intended to diagnose the ratio of flexibility to rigidity of cognitive control as well as mental flexibility. Fig. 2 presents the results.

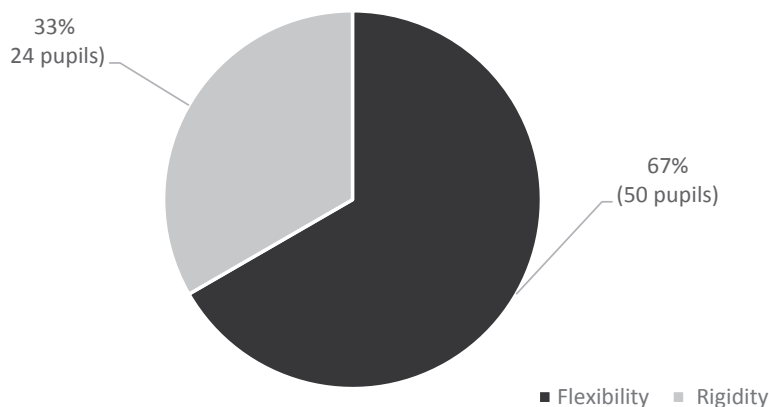


Figure 2. The results of the study of the ratio “flexibility — rigidity” of the schoolchildren’s cognitive control

Most of the participants (50, or 67%) exhibited a flexible style of cognitive control. In this case, a strong automation of the cognitive processes is typical of children with predominant flexible control. However, 33% of the tested pupils (24 children) had a rigid style of thinking with weak automation of cognitive processes.

To study the success of foreign language acquisition, the “evaluation of the level of foreign language acquisition” task was used to establish the degree of educational material acquisition, with consideration of the following factors: vocabulary, speaking, grammar, and listening comprehension. Using these factors, a general level of foreign language acquisition was determined.

Analysis of the results shows that level zero (understanding) was found for 25% of pupils (18 pupils), the first level (identification) was found for most of the participants (50%, or 37 pupils), the second level (reproduction) was found for 8% of children (6 pupils), and the third level (application) was found for 17% (13 pupils). Hence, we can conclude that the level of identification, which is characterized by recognition of the studied objects in the process of re-experiencing information about them that was acquired earlier, is predominant among the primary-school students.

The fourth level (creative activity) was not found at all (0%). The summarized results of the evaluation of the level of foreign language acquisition are shown in Fig. 3.

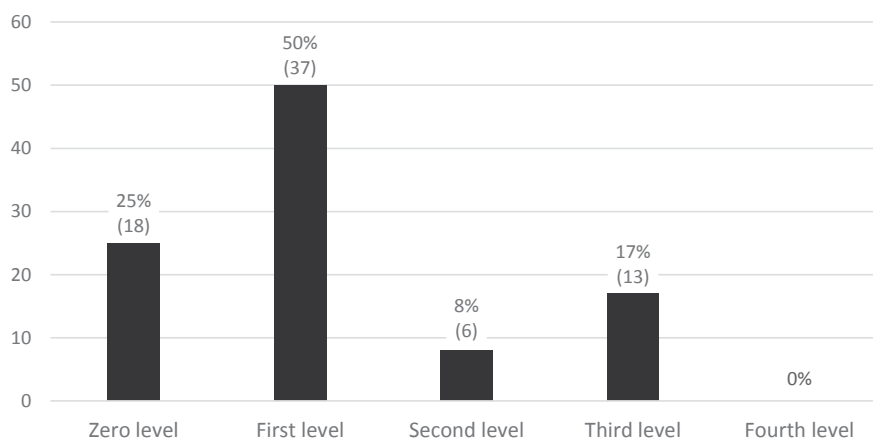


Figure 3. The results of the evaluation of the level of foreign language acquisition

Summary

A benchmark qualitative study of the obtained results allows us to generalize and to state the following. Impulsive pupils are more successful in foreign language acquisition because they have a flexible style of thinking. Reflexive pupils are less successful because of their individual features and because they are characterized by a rigid style of thinking. These pupils learn the material at the minimal standard level.

To confirm the reliability of the results obtained in the empirical study, we have applied a combination of mathematical methods with the help of the statistical package SPSS 19.0. In particular, to find the connection between success in foreign language acquisition and the individual cognitive styles of the pupils, such as impulsivity — reflexivity and rigidity — flexibility, Pearson’s correlation coefficient was used. The results are shown in Table 1.

Table 1. The correlation of cognitive styles and success in foreign language acquisition by primary school students

		Reflexivity Impulsivity	Flexibility Rigidity
Vocabulary	Pearson's correlation	0.718**	-0.473
	Value (2-sides)	0.009	0.121
	N	74	74
Speaking	Pearson's correlation	0.705*	-0.273
	Value (2-sides)	0.010	0.390
	N	74	74
Grammar	Pearson's correlation	0.761**	-0.127
	Value (2-sides)	0.004	0.695
	N	74	74
Listening comprehension	Pearson's correlation	0.779**	-0.224
	Value (2-sides)	0.003	0.485
	N	74	74
General level of foreign language acquisition	Pearson's correlation	0.799**	-0.317
	Value (2-sides)	0.002	0.315
	N	74	74

Note: ** — correlation is significant at the 0.01 level; * — correlation is insignificant at the 0.05 level. The levels of critical significance for the Pearson correlation coefficient are $p_{0.05} = 0.576$ and $p_{0.01} = 0.708$ (Nasledov, 2012).

The results of the correlation analysis allow us to make the following conclusions.

There is a statistically significant correlation between success in foreign language acquisition and the cognitive style “impulsivity — reflexivity” index at the 0.01 level. This correlation indicates that the more impulsive primary-school pupils are, the more successful they are in foreign language acquisition.

Moreover, there is a significant correlation between the cognitive style “impulsivity — reflexivity” index and the all factors of success in foreign language acquisition. For instance, a significant correlation was found at the 0.05 level between the cognitive style “impulsivity - reflexivity” index and the success factor “speaking”. This connection indicates that the more impulsive pupils are, the higher their “speaking” factor is.

A statistically significant correlation was also found at the 0.01 level between the cognitive style “impulsivity — reflexivity” index and success factors of foreign language acquisition such as “vocabulary”, “grammar” and “listening comprehension”. This correlation implies that the more impulsive pupils are, the larger their vocabulary is and the better they are in grammar and listening comprehension.

A statistically significant correlation between success in foreign language acquisition and the cognitive style “rigidity — flexibility” was not found.

Discussion

In this work, we proposed that the important factors of success in primary-school foreign language acquisition are individual styles of acquisition such as cognitive style and the cognitive control that is used in the training process. The results of the present empirical research are similar to those obtained by M. Kabardov (Kabardov, 1983), according to which there are interconnections between the success — failure parameter in foreign language teaching and individual stable characteristics of pupils such as the mental process reaction rate (lability — passivity of mental and language processes). In our research, we study the lability — rigidity parameter. The results of the analysis imply that pupils with a labile nervous system are more successful in knowledge updating and in new information processing, whereas pupils with the passive (or rigid) cognitive type have more advantages in determining logical and grammatical rules in the unknown language.

The comparison of Kabardov's results with our results reveals some discrepancies. According to Kabardov, children with both the labile and passive cognitive types could be successful in foreign language acquisition, but with different parameters. For instance, children with the labile cognitive type are more successful in the acquisition of the communicative components of language, and children with the rigid type are more efficient in language analysis and foreign speech perception. In our research, we have shown that pupils with the rigid cognitive style, in general, are less successful in foreign language acquisition.

We also note a congruence of our results with the claim proposed by I. Zimnyaya (Zimnyaya, 1991) that success in foreign language acquisition by primary-school pupils depends on “the self-reflection of the language behavior”. This claim reflects the statistically significant connections found in this work between the cognitive style “impulsivity — reflexivity” parameter and such success criteria in foreign language acquisition as “speaking” and “listening comprehension”.

Conclusion

The data obtained in this benchmark analysis allows us to make conclusions and generalizations about the connection between success in foreign language acquisition by primary-school students and their reaction type (cognitive styles: impulsivity and reflexivity) and between successful assimilation of the foreign language by pupils and the features of their cognitive control (rigidity and flexibility).

The study has shown that impulsive students are more successful in foreign language acquisition than reflexive students are. For the majority of students, a flexible way of thinking is more typical, and they are successful in the assimilation of the program material in the foreign language. The rest of the students are characterized by the rigid style of thinking. Generally, these are students who learn the material at the minimum standard level.

The statistical analysis of the results allow us to determine a reliable significant correlation between success in foreign language acquisition and the cognitive style factors of the “impulsivity — reflexivity” reaction type. Statistically significant correlations between success in foreign language acquisition and the cognitive control “rigidity — flexibility” index were not discovered.

On the basis of the foregoing, we can say that at primary-school age, success in foreign language acquisition is greatly dependent on the reaction type (impulsivity — reflexivity) rather than on the type of cognitive control (rigidity — flexibility).

This study has allowed us to consider theoretical and practical problems of success in foreign language acquisition at primary-school age. A consideration of the cognitive style characteristics of pupils, such as the reaction type, allows for the actualization of the personal and communicative abilities of the pupils, to implement the person-centered approach in the learning process, to optimize the learning process and to create favorable conditions for the cognitive development of the pupils.

Prospects for further study may be related to empirical tests of the importance of other cognitive styles during the process of foreign language acquisition by children of primary-school age in modern school conditions.

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Comprehension of idiomatic expressions by Russian speaking typically developing children

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Background. The ability to understand idiomatic expressions begins to develop at an early age. However, such skill is not achieved within the same age and at the same pace in children speaking different languages.

Objective. This study assesses comprehension of idiomatic expressions by Russian-speaking monolingual children aged 4 to 12 and monitoring the age dynamics of figurative language understanding.

Design. 80 children were split in 4 age groups balanced for gender and level of formal education. The participants were asked to identify the correct non-literal meaning of 10 idioms. For each idiomatic expression, children heard three potential interpretations (one correct, and two incorrect ones of which one was literal while the other was overtly wrong).

Results. Age-related differences were analysed by performing a series of univariate ANOVAs. These analyses showed that already at preschool age children begin to understand some kinds of idiomatic expressions and that such ability slowly develops throughout childhood. Interestingly, until the age of 6 children predominantly interpreted idioms literally. By the age of 7 their ability to correctly understand the non-literal meanings of idiomatic expressions enhanced significantly until it reached a plateau around the age of 12.

Conclusion. The results of the study are in line with those found for children speaking other languages. The findings are interpreted in light of recent theories of language and cognitive development. Potential limitations of the study are also discussed.

Keywords: Russian language, children, language acquisition, idioms

Introduction

According to Teliya (1996), Idiomatic expressions (IEs), just like individual words, have a nominative function and share with them features like semantic integrity and reproducibility. IEs are socially anchored and emotionally connoted (Voynova & Molotkov, 1994). The ability to use and understand IEs likely rests on a complex array of cognitive skills, including the ability to process the semantic meaning of the single words that form the IE, the ability to inhibit the literal interpretation of the idiomatic sequence, and use of linguistic and contextual cues to select its correct indirect meaning (Coulson, 2005). It is not surprising, then, if the acquisition of this complex skill proceeds gradually during childhood and might continue until adulthood (e.g., Nippold, 2006). It has been suggested that English-speaking children with typical development begin to understand and use IEs by the age of 6 or 7 (Simms, 2007). A recent experimental study showed that the vast majority (> 90%) of a cohort of 285 Ukrainian preschoolers (5-6 years old) who were asked to describe the figurative meaning of a list of IEs could only explain the literal meanings of the individual words that formed them (Mysan, 2016).

Unfortunately, the comprehension and production of IEs by Russian speaking children has not been systematically studied yet in developmental linguistics (Gridina, 2006). The few available studies have mostly focused on error analyses (e.g., Tseytlin, 2000) rather than on investigating how these skills develop throughout childhood and beyond. These investigations have shown that some IEs might appear far earlier than suggested by Simms (2007). For example, Piterkina (2010) and Ratajczyk (2005) showed that some highly frequent IEs might be available as early as 2 years of age. However, in these studies these indirect expressions appear quite accidentally and are not used with a figurative meaning but just as a mechanical repetition of previously heard sequences of words. This is supported by Ratajczyk (2005), who remarks that at 4-7 years old children usually understand only the literal meanings of the words that form IEs and might replace one word with another with a similar meaning.

Studies focusing on children and adolescents with developmental disorders confirm that the ability to process IEs rests on a set of cognitive skills that can be impaired. As a result, comprehension and production of IEs can often be impaired as well. For example, children older than 7 with a diagnosis of pragmatic language disorder might experience difficulties in dealing with a conversation and discourse and in the correct use of IEs (Rinaldi, 2000). These children might understand them literally, failing to interpret their indirect meanings even if they might still understand and use short phrases and words (Simms, 2007).

Some indirect evidence of the complexity of idiomatic comprehension and production comes from neuropsychological studies focusing on children with mental retardation or language impairments. For example, in Lacroix and colleagues (2010) a group of French-speaking children and adolescents with Williams' syndrome had significant difficulties in the comprehension and interpretation of IEs. This is not surprising, as these individuals often have difficulties in dealing with non-literal meanings (e.g., Karmiloff-Smith et al., 1995; Sullivan et al., 2003). Also, some children with Language Impairments (LIs) might have difficulties dealing with IEs as shown by their diminished ability to use context to understand their

non-literal meanings on a task of Idiom comprehension (e.g., Norbury, 2004). Similarly, Spanish-speaking children with LIs aged 5 to 12 scored lower than their peers on a task aimed to assess their comprehension of figurative language (Navarrete et al., 2004). Interestingly, however, children with LIs who do not have a pragmatic disorder and have resolved their linguistic comprehension difficulties might perform like their peers with typical development on such tasks (e.g., van der Merwe and Adendorff, 2012).

The current paper aims to report the preliminary results of a larger study aimed at developing an Idiom Comprehension Task for Russian-speaking children that involves both children with Typical Development and children with Language Impairments. Namely, we present here the preliminary results obtained by administering this task to a sample of 80 monolingual children aged 4 through 11. This study aims to determine whether the comprehension of IEs is already available at preschool-age, and to trace the development of such ability through childhood.

Method

Participants

Eighty Russian speaking children with typical development were recruited for this experiment. They formed four age groups of 20 subjects each. The groups were balanced for gender. Two of these groups consisted of 40 preschoolers aged 4 to 7 years old, whereas the remaining two groups were formed by 40 children aged 8 to 11 years old and attending primary school (see Table 1). None of the participants had any known history of speech and/or language development, mental retardation, hearing loss or pervasive developmental disorders. All participants were attending regular public schools in four different cities across Russia.

Table 1. Age, level of formal education and gender of the four groups of participants

Age-Group (N=20 per Group)	Age	Education	Sex
1	4;61 (.49) – Range: 4;04-5;11	Preschoolers	F=10
2	6;28 (.43) – Range: 6;00-7;02	Preschoolers	F=10
3	8;29 (.43) – Range: 8;01-9;04	Primary School	F=13
4	10;56 (.52) – Range: 10;01-11;11	Primary School	F=10

Materials

A list of 40 idiomatic expressions with high frequency of occurrence in Russian was selected from the dictionary of Russian idiomatic expressions (Fedorov, 2008). Their frequency was first calculated automatically and then controlled with a survey. First, we controlled for the presence/absence of the selected IEs in the General Internet-Corpus of Russian language (GICR¹), a database which includes text data

¹ <http://www.webcorpora.ru/en/#sthash.n1hjGkYI.dpuf>

from Russian Internet resources. Only resources containing data from a Russian social network (VKontakte) and a blog (LiveJournal) were considered in order to check whether the selected items reflected the state-of-the-art of Russian language. News sites and Journal's Magazine Halls were not included as databases for our check due to their stylistic peculiarities. We sorted the results according to their frequency of occurrence in written texts. As a second step, we launched an online survey asking adult Russian native speakers to assess how frequently they used the selected idiomatic expressions in their daily speech or heard their friends/relatives using them. A total of 420 Russian-speaking adults aged 20 through 60 participated to this survey. They were controlled for their formal education (school / college / university / scientific degree) and profession. They assessed each IE on a three-score scale according to their daily usage (0: never; 1: sometimes; 2: often). Then, we compared the results of the survey with those obtained with the GICR database. As a result, the 10 idioms with the highest frequency rate were selected for the experiment. There were IEs having equivalents across several European languages with clear internal lexical meaning, such as, for example, 'похожи как две капли воды', literally translated — / like two drops of water/, which conveys the same non-literal meaning in English — 'like two peas in a pod'. The figurative meaning of such idioms might be easier for children to interpret, unlike those IEs with obscure origin, such as 'ни пуха, ни пера', literally — /not a bit of down, nor a single feather/, corresponding to an ironic wish of good luck — 'break a leg'.

Procedures

Children were tested individually in a quiet room at their schools. Participants were asked to identify the correct non-literal meaning of a list of 10 IEs that were uttered with a flat tone and a normal speech rate by the examiner. For each item children heard three potential interpretations (one correct, one literal, and one overtly wrong) and were asked to choose the one that they thought to be correct. In case of missing (after 10 seconds) or a wrong response (i.e., literal or completely wrong) they scored 0. If they provided the right answer they scored 1, for a maximum total score of 10.

Results

Potential age-related differences in the ability to identify the correct indirect meaning of the provided IEs were explored, running one univariate ANOVA, with the age-group (4 to 11) as independent variable, and the total score obtained by each age-group at this task as dependent variable. Alpha level was set at $p < .05$ (see Table 2).

The ANOVA showed the presence of a significant age effect on the ability of the four groups to produce correct answers on the task ($[F(3,79)=26.076; p < .001]$). Specific group-related relations were further explored by performing post-hoc Tukey's tests. The post-hoc analyses showed the absence of group-related differences among preschoolers (Group 1 vs Group 2, $p = .135$) and also among school-aged children (Group 3 vs Group 4, $p = .997$). However, preschoolers performed significantly worse than older children: Groups 1 and 2 vs. Groups 3 and 4: all $ps < .001$).

Table 2. Performance of the four groups of participants on the Comprehension of Idiomatic Expressions' Task. Data are expressed as means (and standard deviations)

Age-Group	Correct Answers	Literal Answers	Wrong Answers
1	2.6 (2.30)	3.45 (1.57)	2.85 (1.79)
2	4.2 (2.21)	3 (2.49)	1.9 (1.12)
3	7.75 (1.94)	0.9 (1.17)	1.3 (1.45)
4	7.9 (2.71)	0.9 (1.17)	0.6 (.82)

The Levene's test for homogeneity of variance was significant for literal and wrong answers ($p < .001$). For this reason, non-parametric analyses (i.e., Kruskal-Wallis test for independent samples) were run to explore group-related differences on these two variables. As for the production of literal answers, a group-related difference was found: ($X^2(3) = 29.676$; $p < .001$). The pairwise comparisons showed that no significant differences were found between the two preschool-age groups ($p = .999$) nor among the two groups of children attending primary school ($p = .999$). However, kindergarten children and primary school students did differ among each other (Group 1 vs Group 3: $p < .001$; Group 1 vs Group 4: $p < .001$; and Group 2 vs Group 3: $p < .014$; Group 2 vs Group 4: $p < .012$).

A group-related difference was found also for the production of wrong answers ($X^2(3) = 23.957$; $p < .001$). Again, the pairwise comparisons showed that no significant differences were found between the two preschool-age groups ($p = .999$) nor among the two groups of children attending primary school ($p = .719$). However, kindergarten children and primary school students did differ among each other (Group 1 vs Group 3: $p < .016$; Group 1 vs Group 4: $p < .001$; Group 2 vs Group 4: $p < .005$) with the only notable exception of the performance of children in Groups 2 and 3 that was no different on this variable ($p = .462$).

Overall, these results suggest that the ability to process the non-literal meaning of IEs is still not mature until the age of 6, begins to be functional around the age of 7, and continues maturing until the age of 9. After this age, it remains somehow stable at least until the age of 11.

Discussion

The acquisition of IEs occurs gradually and develops across childhood and adolescence. Some IEs might be acquired intuitively, relying on context, while others are acquired during a process of formal learning. The current literature shows that the performance on tasks assessing comprehension and production of IEs in children improves as a function of increasing age (e.g., Nippold, Taylor & Baker, 1996; Hsieh & Hsu, 2010). The results of studies using different procedures for the assessment of IE comprehension in participants speaking different languages suggest that by the age of 7 years old children are able to process IEs by focusing on the literal meaning of the words they are made of. Indeed, it has been suggested that until 6 years of age, children might predominantly use a word-by-word analysis strategy while processing figurative language (e.g. Levorato and Cacciari, 1995).

The results from the current study suggest that monolingual children with typical development can process some IEs already at pre-school age, but tend to split them into individual words and interpret them literally: up to age 7 they were able to produce approximately 40% of correct responses, with 30% of literal responses. On the other hand, these data also suggest that the first key age when children significantly improve their comprehension of figurative language is around 7-8 years. By the age of 12 children were able to provide a correct response, on average, in 8 out of 10 cases, therefore almost reaching ceiling level. A similar trend had been previously noted by Levorato and Cacciari (1995) for Italian-speaking children. Considering that some recent studies failed to find any age-related difference in adults older than 20 years in understanding idioms (e.g., Hung and Nippold, 2014), it is likely that the process of acquisition of IEs further develops slowly from 12 to late adolescence before reaching full maturation.

A relevant question that still needs to be answered concerns the potential reasons for the age-related differences in the ability to process IEs found in this and previous studies. A potential explanation might stem from the types of IEs children were required to understand. IEs differ on several dimensions, and the degree of difficulty of their understanding might vary accordingly (Titone & Connine, 1994; Libben & Titone, 2008). As to this issue, the available evidence is quite controversial. For example, Nippold and colleagues suggest that decompositional idioms might be easier to understand than those with low decompositional ratings (Nippold & Duthie, 2003; Nippold & Rudzinski, 1993). In contrast, a more recent study by Whyte and colleagues (2014) highlights the role of social contextual cues. In our study, we controlled for the familiarity of the selected IEs. However, because of the absence of descriptive norms of compositionability, predictability and literability for Russian IEs, we could not control also for these potentially confounding variables. Nonetheless, a literature review suggests that some environmental (i.e., academic skills), cognitive and even biological factors might allow us to interpret our findings. For example, it has been shown that academic learning might significantly affect the ability to understand and correctly use IEs. In order to examine the relationship between academic competence and IEs comprehension, Caillies and Le Sourn-Bissaoui's (2006) assessed the performance of a large cohort of 116 French-speaking children with TLD aged 4 to 9 on an IE comprehension task. They found a significant correlation between reading level and the ability to correctly interpret the figurative meaning of idioms. Similar findings have also been reported in other investigations focusing on children with different languages (e.g., Levorato, Nesi & Cacciari, 2004; Cain & Towse, 2008). However, reading skills alone might not fully explain why older children perform better on such tasks. It is likely that the overall linguistic maturation enhanced by scholarization exerts a positive effect on this complex ability. For example, several studies found significant correlations between the ability to correctly process IEs and the maturation of metalinguistic skills in children aged 6 to 10 (e.g., Bernicot, Laval and Chaminaud, 2007), the development of their grammatical skills and lexical repertoire (e.g., Norbury, 2004), as well as their ability to use semantic analysis and contextual cues to understand them (e.g., Cain, Towse & Knight, 2009).

Apparently, not only environmental factors but also cognitive and biological factors might play a key role in enhancing the children's ability to process IEs.

As figurative language is supposedly more demanding than understanding literal meanings (e.g. Proverbio et al., 2009; Coulson & Van Petten, 2007), some cognitive skills might play a key role in such a process, and this might determine the difficulty to properly understand IEs until the cognitive system has reached an adequate level of maturation (likely by the age of 6 to 8 years, as proposed by Caillies and Le Sourn-Bissaoui, 2013). This hypothesis is apparently also supported by the available functional neuroimaging evidence which suggests that idiom comprehension is implemented in an extensive neural network, including bilateral inferior frontal and middle temporal gyri, left cerebellum, right insula and left lingual gyrus in the posterior temporal areas (e.g., Oliveri, Romero & Papagno, 2004; Huber-Okraienec, Blaser & Dennis, 2005; Zempleni et al., 2007; but see also Bohrn, Altmann & Jacobs [2012] for a review). It is therefore likely that idiom comprehension involves several cognitive processes, such as executive functions (i.e., inhibition) and working memory skills (e.g., Gernsbacher & Robertson, 1999; Qualls & Harris, 2003; Fogliata et al., 2007; Caillies & Le Sourn-Bissaoui, 2013) that mature slowly during childhood. This biological constraint is likely at the origin of the slow development of idiom comprehension in children and the direct relation between cognitive development, and idiomatic comprehension skills on large samples of children should be the target of future research.

Conclusion

The findings of the current study contribute to our understanding of how the ability to correctly comprehend IEs develops through childhood and which factors might affect idiom understanding. First, we showed that already by the age of 4 Russian-speaking children can understand some IEs but still have problems in correctly interpreting the nonliteral meanings of the majority of the items. Second, the results of the current experiment are in line with those from studies with children of the same age speaking other languages, and support the hypothesis of a great developmental change which takes place around 7–8 years old and can be explained by a complex effect of cognitive (internal) and environmental (external) factors. Unfortunately, one limitation of this study is that we did not control for these variables. Future studies should take these aspects into account in order to determine the exact role of such factors on idiom comprehension. Third, our study documented a ceiling effect in children at around 11 years of age. Such effect might be explained in part by the rapid development of their academic competence. In order to determine at what age the process of idiom comprehension reaches full maturation, future studies should investigate whether these skills further develop into adolescence in large longitudinal cohorts of participants.

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Appendix

A list of idiomatic expressions used in the study

1. V jedno uho vletelo, v drugoe — vyletelo (Russian — В одно ухо влетело, в другое — вылетело);
2. Ni puha ni pera (Russian — Ни пуха, ни пера);
3. Bezhat' slomya golovu (Russian — Бежать сломя голову);
4. Schitat' voron (Russian — Считать ворон);
5. Glaza razbezhalis' (Russian — Глаза разбежались);
6. Hodit' po pyatam (Russian — Ходить по пятам);
7. Ushi razvesit' (Russian — Уши развесить);
8. Muhi ne obidit (Russian — Мухи не обидит);
9. Dusha v pyatki ushla (Russian — Душа в пятки ушла);
10. Kak dve kapli vody (Russian — Как две капли воды).

Learning about concepts through everyday language interactions in preschools

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Background. In several Nordic countries, the pedagogy in preschools has a social pedagogical ideal. The focus is on development of social competence, aiming to empower children. There is only minimal focus on teaching and academic learning. The aim of this study is to investigate what kind of support children's concept formation can receive when children are engaged in everyday language interactions with preschool teachers in Norway. Theoretically, the article is based on theories developed from Vygotsky's (1987) perspectives on language as a mediating tool.

Design. Two classrooms with two preschool teachers and 18 children in each class participated in the study. The preschool was chosen because it especially focused on children's language learning.

Method. This study is a qualitative study based on video-taped observations in one preschool, and the data are video-taped observations of language interactions between two preschool teachers and children in two preschool classrooms. Most language interactions in Norway occur in everyday conversations such as play, art activities and meals.

Results. The teachers interacted with the children around topics that engage the children and topics they took initiative to talk about. The teachers invited the children in warm ways to use language to make meaning of the shared topic. However, they seldom presented supplementary concepts or expanded the children's concept understanding with their own knowledge.

Conclusion. The social pedagogical ideal may have made them associate such sharing of knowledge with teaching.

Keywords: everyday language interactions, learning words and concepts, cognition, preschool

Introduction

The aim of this study is to investigate talk in everyday language interactions and examine what they can represent as arenas for concept formation. Vygotsky (1987) used the term scientific concepts to refer to academic concepts as opposed to intuitive tacit concepts and the names of concrete objects embedded in everyday con-

texts. He argued that there is a complex relationship between everyday concepts that children hear in everyday language interactions with parents, teachers and peers, and scientific and more abstract concepts.

The Nordic early childhood education is described by Bennett (2010) as a social pedagogical approach in opposition to a pre-primary approach. Such a social pedagogical approach focuses on the development of social competence, aiming to empower children as active participants who can influence their own lives by strengthening their identity and self-esteem. Language interactions occur mainly spontaneously in daily activities, initiated by the children or the teachers, without any planned intentions or aims. Usually, approximately 20-30 minutes a day can be used for teacher-led planned activities. Accordingly, the most frequent situations for language interactions occur in everyday activities, and everyday activities represent important language learning situations in preschools in Norway as well as in the other Nordic countries.

Learning everyday concepts and scientific concepts in daily activities

From a socio-cultural perspective, learning is regarded as situated, and experiences such as joint activities that promote talk are seen as important means for both conveying meaning and generating new meaning (Nelson, 1995; Rogoff, 1998). Sociocultural theories claim that language represents our most important mental function (Fleer, 2009), and Vygotsky (1981) described human thinking as linguistic thinking, and concepts as the meaning of words. He stressed especially the meaning of words, because in thinking, we use the meaning of words. Vygotsky (1981) suggested that higher mental functioning has its origins in social processes mediated by tools and signs, and particularly by language. Vygotsky had a different perspective on conceptual learning than Piaget who believed that children's learning about concepts and their surroundings were results of inner thought processes through assimilation and accommodation (Rogoff, 1998).

In the early years, language interactions between preschool teachers and children in different everyday activities represent the most meaningful places for hearing and using words and concepts (Rogoff, Paradise, Arauz, Correa-Chávez, & Angelillo, 2012). Everyday language interactions are frequently occurring situations and can be used as a primary tool for language development and concept formation in Norwegian preschools. According to August, Carlo, Dressler and Snow (2005) and Dickinson, McCabe, Anastasopolulos, Peisner-Feinberg and Poe (2003), opportunities for children to talk with teachers and receive feedback is of great importance for their language learning and concept formation. Siraj-Blatchford (2007) found that qualified staff that did take an active role as language participants supported children's search for understanding coherence and continuity between experiences and language.

This study is built on theories developed from Vygotsky's perspectives (1987) on language as a mediating tool. He asserted that scientific concepts or theoretical concepts are primarily learned through language, while spontaneous concepts are acquired in everyday contexts and systematically built up only to a small degree. His theory suggests that preschool teachers should use language to support the creation and extension of children's word knowledge and that teachers' talk should

be geared to the needs of the child (Hasan, 2005). Vygotsky (1987) claimed that everyday concepts include knowledge of everyday situations, such as knowing that we call almost all creatures with four legs and fur animals, though children may not know what elements are necessary to draw this conclusion. In this study, abstract concepts are given equal status as scientific concepts as they are both abstract concepts and can be used across contexts, and they do not exist in everyday practice.

Moving from everyday concepts to abstract, scientific concepts

Vygotsky (1987) claimed that everyday concepts develop from below to above, while scientific concepts develop from above to below, and that they are strongly connected to each other. Everyday concepts are grounded in everyday language and life experiences, while scientific concepts constitute the structural formation necessary for the strengthening of everyday concepts. Children's language learning constitutes an important part of cognitive development and concept formation (Borovsky & Elman, 2006; Wells, 1994). To include a word into a system of a concept, children have to understand that for an object to be categorized as a member, they have to have some traits in common with the other members of the system (Fleer, 2009). For instance, animals have mainly four legs, a tail, a snout and some kind of fur. At the same time, they must accept that the members in a category also have some differences, as in size, color, appearance and behavior. To identify an object as a member of a system or concept, a child must master looking away from differences between the members of the system, and instead look for relevant similarities (Wells, 2008).

Nelson (2007) claims that the greatest challenge for children is learning abstract and scientific concepts higher up in the conceptual hierarchy than learning concrete ones, since these concepts do not exist in the physical world. Children must learn abstract concepts through definitions or by getting several experiences with hearing a concrete concept named together with the corresponding abstract concept (Kontos, 1999). Understanding that a word, representing a concept, symbolizes a trait that is shared by all objects in a category, transferable from context to context, will support a child in understanding some aspect of new situations. Vygotsky (1987) claimed that such generalization of word meaning is related to thinking, and he noted that the meaning of a word is connected to the domain of thought as well as the domain of speech. A word without meaning is not a word, but an empty sound. A word's meaning is both speech and thoughts, and Vygotsky used the expression *verbal thinking* for such cognitive processes. Vygotsky (1987) meant that it is fruitless to directly teach or instruct preschool children about scientific concepts: "under these conditions children learn not the concept, but the word, and this word is taken over by the child through memory rather than thought" (Vygotsky, 1987; p. 170). When children learn scientific concepts away from the context in which they are used, scientific ideas and thinking becomes separated from everyday practice. Preschool teachers can support children's learning about abstract concepts when they grasp an opportunity to prolong a language interaction in situations when the children are engaged in activities (Wilcox-Herzog & Kontos, 1998), when they participate in play and reading aloud settings, and when the children invite the teacher to talk about something (Dickinson, 2011).

Research question

This study aimed to examine how preschool teachers, through everyday talk, can support children's understanding of the connection between everyday concepts and abstract, scientific concepts. In Norwegian preschools, the topics of everyday talk address all types of subject areas in which either the children or teachers are engaged. The research question in this study is: *How can preschool teachers support children's early experiences with abstract and scientific concept formation in everyday activities?*

Method

Background

This study employs video-taped observations of everyday talks to investigate how two preschool teachers promoted children's language learning and concept formation in two classrooms in a small-town public preschool. All parents and staff signed a written, informed consent accepting the research and use of video filming. Spontaneous and informal everyday language interactions were chosen as situations for observation because they are the most frequent arena for language interactions in Norwegian preschools. Everyday language interactions occur in many activities such as meals, play, in the cloakroom, and in arts and craft activities, and they can be initiated by either the teachers or the children (Weizman & Snow, 2001). The focus was on the *content* of the interactions. A previous incident, an association or a prolonging of the previous speakers topic could give grounds for talk initiation (Wasik, Bond, & Hindman, 2006).

Settings

The preschool consists of four classes. Two classes with children ranging from three to six years of age who agreed to participate. The classes comprise 18 children, with one preschool teacher and two teacher assistants. The children came from families with parents, mothers and/or fathers working in different areas, and none of the parents was particularly poor or particularly rich according to Norwegian standards.

The observations were conducted one day a week from 8 am to 11 am over a period of four months, for a total of 12 visits. The study was accomplished using video-taped observations over a period of four months, and a handheld video camera was used. I was sitting close to the teachers while they were interacting with small groups of children engaged in some type of everyday activity, and I attempted to interfere as little as possible in classroom activities during my visits.

Analysis

The talks were transcribed according to the Child Language Data Exchange system (MacWhinney, 1991), and the transcripts were marked for overlapping utterances, pauses, pace, emphatic stress and intonation (falling and rising intonation). Talks and language interactions are defined as a group of semantically contingent utterances between two or more speakers that comprises multiple turns on the same topic (i.e., each speaker talks at least one time) (Ninio & Snow, 1996). An utterance

is defined as the smallest unit of speech; it is primarily defined by intonations, and second, by the permanence of pauses. Utterance boundaries were based on intonation contour and pause duration, and the contextual information needed to understand the interaction and inaudible utterances was included in the transcripts. A turn was defined as what one speaker says about a particular topic and may include several consecutive utterances.

The analyses started by focusing on the teachers' engagement when talking with the children. Then, we examined whether and how preschool teachers supported the children's learning about the concepts by introducing a more abstract concept higher in the concept system from the subordinate concept the children used. Their language support, the words they used to support the children's formation of concepts, was examined, and bodily communication was studied to get an impression of the climate of and engagement in the relationship.

Results

The data comprised 12.5 hours of video-taped observations, and the data material consisted of 26 transcribed language interactions lasting from two to six minutes, for a total of 82 minutes. Fourteen of the talks were filmed in one classroom (Teacher 1) and 12 were filmed in the second classroom (Teacher 2). Only three of the conversations were about the meaning of words. The examples below are the only ones in the material where the two teachers and the children were engaged in spontaneous language interactions talking about the meaning of words.

Connecting experiences and abstract and scientific concepts

The first excerpt is from a conversation between a teacher (Teacher 1) and two children, Jan 4.2 years and Per 3.7 years, as they sit at a table eating breakfast. It is in the middle of November, and there has been some early snow covering the ground. The teacher and Per talk about a car he has placed on the table, and Jan is looking out of the window. Jan then introduces this topic:

- 1JAN: you know what I think -? [= engaged, talks loud, addressed to the teacher]
2TEA: [= smiles, shakes her head]
3JAN: it is too early for winter -! [= decisive tone]
4TEA: too early -? [= surprised, interested tone]
5TEA: why -? [= inviting, looks at Jan and smiles, waits for five sec]
6JAN: because there are – there are some leaves on a tree– [= talks slowly]
7JAN: and there should not be leaves -! [= indignant tone]
8TEA: no -? [= looks at Jan, waits for six seconds]
9TEA: and there are leaves -? [= confirming tone]
10JAN: yes -. [= smiles, nods, relieved?]
11PER: it doesn't matter -! [= comforting and explaining tone]
12TEA: leaves on the trees are typical autumn yes -! [= nods, smiles at Jan]
13TEA: and snow - [= interrupted of Jan]
14JAN: is winter -! [= jumps from his chair, and smiles at Per and the teacher] [= Per and Jan start talking about playing in the snow]

In line 3, Jan introduces the topic of winter, and shares his thoughts about what the autumn and the winter should be like. He seems to be disappointed about the snow on the ground and relates this snow to the winter coming too early. In line 5, the teacher challenges him to explain why he thinks winter has come too early. Jan explains his thoughts to her in lines 6 and 7. The teacher communicates in line 8 that his answer surprises her when she asks “no?” She then waits for six seconds for him to think about what to answer. When he does not continue, she repeats his utterance from line 6 and line 9, and Jan confirms her saying that leaves on the trees are wrong in his understanding of winter. The teacher communicates that she accepts his answers. Jan is introducing elements related to how we define winter and claims that the winters should be without leaves on trees. By making this statement, Jan reveals that he has some knowledge about winter as an abstract concept referring to seasons. He underlines that winter is different from autumn, and communicate that he has some understanding of the concept “season”, a concept that is even more abstract. In line 12, the teacher communicates that she agrees with Jan, that leaves on trees is typical in autumn, and she starts with confirming what is typical winter, when Jan fulfils her sentence and seems happy, introducing a talk with Per.

This spontaneous talk about what characterizes winter is introduced by Jan while he is looking out of the window. The teacher acknowledges and supports his utterances and communicates that she is engaged in Jan’s thoughts about the winter coming too early. She turns her attention towards him, asks him the open-ended question “why”, and she leans towards him and makes eye contact. She also provides him time to find answers to her questions. The teacher communicates that what he says engages and surprises her. Her supportive style may have inspired Jan to think through what winter is about, and his explanation is based on an element, leaves on the trees, we usually think of when we separate autumn from winter. He both introduces a scientific concept, winter, and argues for his points of view. His understanding about winter is probably related to a common, abstract and scientific understanding of winter as white all over, no leaves, no grass and no flowers. Jan categorizes his experiences by defining signs of autumn and winter. Talking about his observations with the teacher, and by getting acceptance for his explanation of an observed phenomena, Jan’s understanding of winter as a scientific concept is probably both confirmed and expanded. The teacher supported his thoughts, but she did not expand on his concept by presenting more differences between the two concepts.

The next example is from a conversation between a teacher (Teacher 2), Ari 3.2 years, Ole 5.3 years and Ida 3.5 years. The teacher, Ola and Ida are sitting around a small table and playing with building blocks when Ari arrives. He has with him a book his mother has read to him, and the excerpt is from the conversation following Ari’s talk about the book that he calls a naughty book:

1TEA: so is it about naughtiness -? [= engaged, smiles at Ari]

2ARI: yes -! [= aloud, looks proud]

3TEA: okay – but what do you do when you are naughty then -? [= interested tone, leans towards Ari]

4ARI: you hit when you get angry and such -. [= explaining tone]

- 5TEA: is that to be naughty -? [= she looks surprised at Ari and Ida]
6ARI: uhum – [= nods]
7TEA: what do you think Ida -? [= smiles at Ida, inviting, both Ida and Ole follow the interaction]
8IDA: being angry -? [= questioning, looks at the teacher, Ole and Ari]
9TEA: being angry -? [= inviting, looks at Ida]
10IDA: yes – [= nods, does not look up from the blocks]
11TEA: what do you do when you are angry then Ole -? [= inviting, smiles at Ole]
12OLE: hit -! [= quick and assertive, proud voice]
13TEA: hit – [= serious, nods, looks out of the window, it is quiet for six seconds]
14IDA: when I am a baby I kick and hit and scream -! [= creeps together and talk with a baby-like tone, Ari and Ola look resigned at the teacher]
15TEA: do you want me to read the book now -? [= the children nod]
16TEA: maybe we can hear what other children do when they are naughty -? [= the children gather around the teacher and look in the book]

The teacher invites Ari to tell her what he thinks we do when we are “naughty”. In line 4, Ari answers that it means that you hit “when you get angry and such”. Ari shows here that he knows what the abstract concept “naughty”, which is related to the even more abstract concept of behavior, may represent. The teacher then invites the two other children into the conversation. In line 7, she asks Ida what she thinks, and Ida answers, or asks, in line 8, that she think that “to be naughty” means to be angry. The teacher accepts her definition and uses her utterance “being angry” when she turns to Ole. She asks Ole what he is doing when he gets angry. In line 12, Ole answers that he hits when he is angry. Both Ida’s and Ole’s answers are based upon Ari’s saying that naughtiness is about being angry and to hit. Naughtiness is an abstract concept and they all seem to agree that the two suggestions, being angry and to hit, are part of the concept “naughty”.

The three children seemed engaged in the topic, and look at each other and the teacher while talking. They related their everyday experiences with doing something probably disobedient and using unacceptable behavior, such as being angry and hitting, with the abstract concept naughty. Both Ole and Ida answered in accordance with Ari’s saying in line 4, “you hit when you are angry”, and their associations with naughty are probably linked to these words. Their experiences from everyday practice are creating the potential for an abstract and scientific understanding of the word naughty and the environmental views of accepted and non-accepted behavior. This conversation may both have confirmed and expanded their understanding of the word naughty. Ida seemed uncertain when combining naughty with being angry, but the teacher confirmed her saying by sending it further to Ole. Ole connects “to be angry” with “to hit”, and seemed quite sure about this answer. The teacher communicates through her body language that she accepts their answers, though they seemed to surprise her. The children have experiences with relating concrete experiences such as being “angry and to hit” with the abstract concept “naughty”. The teacher seems to let the reading of the book represent any further expansion of the concept. She could also have expanded the meaning by presenting some of her own viewpoints. However, the teacher did not expand their ideas of being naughty by suggesting ruder behaviors.

The following excerpt is from a talk, in which the teacher dwells upon a superior and abstract concept used by one of the children. A teacher (Teacher 1) and two children, Eva 4.3 years and Mia, 3.1 years, are sitting together at a table and talking while they are drawing. They are alone in the room, and Eva has just told about a friend of hers who has been ill for two weeks. The teacher then invites the children to talk about the meaning of the word “ill”.

1TEA: to be ill -

2TEA: what is it actually, to be ill I mean -? [= no one replies, she waits for seven seconds]

3TEA: what happens when you get ill -? [= exploring tone, inviting]

4EVA: that you can get sick -! [= eager, loud]

5TEA: that you may get sick - uhuh -. [= nods, smiles at Eva, it is quiet for six seconds]

6TEA: have you ever been ill Mia -? [= inviting tone, Mia looks down at the table and shakes her head]

7TEA: you haven't -?

8TEA: eeh- have you ever been sick -? [= engaged tone, inviting, waits for 6 seconds]

9MIA: yes - sometimes - [= low voice, look quickly at the teacher, shy?]

10TEA: oh - what happens to you then -? [= engaged, loud, waits for eight seconds]

11MIA: I throw up- [= low voice]

12TEA: you throw up -! [= same low voice as Mia]

13MIA: yes -! [= louder]

14TEA: how did that feel -? [= smiles at Mia, inviting tone]

15MIA: I don't know -. [= looks at the teacher and Eva, shakes her head]

16TEA: but what is it to throw up then? -? [= exploring tone]

17MIA: I don't know - being ill -? [= looks quickly at the teacher]

18EVA: yes -! [= load, proud tone, smiles at Mia]

19TEA: yes -! [= confirming, smiles and nods to Eva. After four seconds, Eva introduces another topic]

In this excerpt, after Eva has spoken about her friend being ill, the teacher attempts to make the children formulate what it means to be ill. In lines 1 and 2, she asks what the word actually means, and she gives the children enough time, seven seconds, to think about the answer. When they do not answer, she concretizes the concept some more in line 3 by asking, “What happens” when we get ill. Eva demonstrates in line 4 that she has acquired an understanding of some of the core elements that characterize the knowledge related to the concept of “ill”. Eva shows that she understands that the abstract concept of being ill is related to the concept of physical health and has to do with bodily conditions. In this way, she displays an understanding of classification and that she is able to categorize sick as one way of being ill. In line 4, Eva suggests that what happens is that you can get sick when you are ill.

The teacher accepts Eva's utterance, and turns the topic to the children's experiences. In line 6, she asks Mia if she ever has been ill. When Mia claims that she has never been ill, the teacher takes up the word sick that Eva introduced in line 4, and ask in line 8 if she ever has been sick. In line 9, Mia confirms that she has been sick. Mia does not seem to have made the connection between being ill and being sick.

The teacher's question about what happens when you are sick in line 10 makes Mia talk about her experience with throwing up in line 11. The teacher's question about how it feels to throw up and what it is seems too difficult, may be too abstract, for Mia to answer. When the teacher asks what it is to throw up in line 16, Mia asks back if to throw up is to be ill in line 17. Mia relates her concrete experience with throwing up to the abstract and scientific concept "being ill", and ends up relating throwing up with being ill. She also seems to have some problem with understanding the phrase "what it is". Both Eva and the teacher confirm her conclusion in lines 18 and 19. Mia may perhaps only have got a limited understanding of the concept "ill". However, this experience will probably support her when she hears this concept in another context.

The preschool teacher elaborates on this topic, which was introduced by Eva, and through sharing experiences and giving each child time to think about what the concept "ill" can represent, the topic was explored. What the concept denotes was elaborated on through the children's talk about their experiences. The preschool teacher uses a warm tone and acknowledges the children by helping them to sort out what "ill" may mean in the light of their experiences. The children got an important experience through this conversation. This talk about "being ill" is about an abstract experience, a phenomenon, absent in the actual context, and both the children seemed interested and engaged in this conversation. They got an experience with talking about an abstract, non-present concept, as well as classifying being sick and throwing up as elements in the concept of "being ill". However, without disturbing the children's engagement, the teacher could have introduced some more well-known sub-ordinate concepts, such as sore throat and fever.

Discussion

According to Bronfenbrenner and Morris (2007), children's language learning in the early years is dependent upon a close and positive relation to responsive adults. Such a relation is expressed through warm and caring communication, with feedback given with both physical and emotional warmth. Everyday talks that children engage in represent important situations for them to learn about both abstract and scientific concepts (Hasan, 2002). The children in the three excerpts took spontaneous initiative to talk about a subject that engaged them, and the teachers supported them in warm and responsive ways. Dickinson (2011) underlined that engaging language experiences represent rich language learning situations for children. In all three excerpts, the two teachers communicated that they were listening and were interested in what the children uttered, and they prolonged the topics in which the children were engaged. They acknowledged what they said, and the children were invited to prolong their talk about the actual topic. To be attentive represents more than to smile and to nod (Neuman & Marulis, 2010). According to Dickinson (2011), preschool teachers must have knowledge about in what ways they can invite children to express an idea, prolong their engagement to talk about experiences, and support their talking as well as their thinking about experiences and concepts.

The two teachers asked questions that engaged the children to talk about their thoughts and experiences with abstract, scientific concepts such as the concept *winter*, as it related to the even more abstract concept season; *naughty*, as it related

to the more abstract concept of behavior; and *being ill*, as it related to the abstract concept of physical health. The teachers did not teach or talk with the children about the many elements that could have been added to the abstract and scientific concepts in focus here. Rather, they based their sayings on the children's own utterances and questions and their naming of elements. They prolonged their topics and invited them to express their experiences and thoughts about them. Through the language interactions, the children received some experience with classification, because the teachers helped them to link an abstract concept to a more concrete concept, or asked the child what he/ she was thinking of when using the concepts. The eldest children, Jan, Eva and Ari, presented examples of how one could classify winter by expecting no leaves on trees, being ill with being sick and classifying naughty with "being angry" and "to hit". The social pedagogical tradition may have hindered the teachers from presenting more examples and taking initiative to extend and prolong the talks about concepts.

According to Vygotsky (1987), classification is an important part of moving from everyday concepts to scientific concepts. When children have experiences with linking concrete subordinate concepts and abstract concepts higher in the system of the concept, this process will represent important experiences for their cognitive development. Acquiring scientific concepts presupposes that children acquire an understanding of the core or central elements that characterize the particular forms of knowledge the concept represents (Nelson, 2009). When a child understands classification, they have gained an understanding of comparison and categorization. The examples show how young children can engage in talk about abstract phenomena and connect their own everyday experiences to words not being physically present in the context. In the talk about winter for instance, Jan talks about winter as a season he has related some abstract and theoretical understanding about, and something is not right when there is snow on the ground at the same time as there are leaves on the trees. Ari associated naughty with doing bad things, and Eva related being ill with an unpleasant experience such as throwing up. All the experiences can be related to core elements in the system of abstract concepts.

Hasan (2002) underlined that most everyday talks occur with little reflection. How teachers talk, and what they talk about in everyday language interactions, represent frequent and accordingly important arenas for children's learning, and challenge preschool teachers to be attentive to that which different children are engaged. The teachers in this study talked with the children about the topics they introduced themselves and in which they were engaged. How teachers talk, and what they talk about in everyday language interactions, represent frequent and accordingly important arenas for children's language learning (Adger, Snow, & Christian, 2003; Dickinson, 2011). Through the language interactions, the children probably received some experience with classifying single incidences with abstract concepts, such as "throwing up" with "illness". To be attentive to what different children are engaged in represents challenges to preschool teachers. A question to ask is how attentive a preschool teacher can be to 18 different children's efforts to categorize experiences and thoughts and relate their experiences to language in informal, spontaneous language interactions. To manage this process, the teachers in most of their language interactions must direct their attention towards each child's language learning and concept formation.

Conclusion

The social pedagogical tradition seemed to dominate the pedagogy in this preschool. There were also relatively few talks where the teachers supported the children's concept formation and use of language. They did not introduce any new concrete or abstract concepts related to the concept system they used in these language interactions. In the social pedagogical tradition, cognition and concept formation received less focus and were of less importance than social competence, and this focus may have reduced the teachers' attention towards their language interactions with the children. Accordingly, there is a possibility that the ideal of not teaching in preschool may have prevented the teachers from sharing, informing and supporting the children learning, even though the children were engaged.

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Psychological and socio-cultural adaptation of international journalism students in Russia: The role of communication skills in the adaptation process

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Background. The study of both Russian and international publications issued in the last twenty years revealed a significant gap in the number of studies examining adaptation (general living, psychological, socio-cultural, etc.) in general, i.e., without regard to specific characteristics of the audience, and those describing adaptation of a particular group of people (specific age, ethnic, professional groups, etc.).

Objective. The current paper aims to overcome this gap by offering a closer look at the adaptation processes of international journalism students at Russian universities, in particular, their psychological and socio-cultural types of adaptation. The question that interests us the most is how psychological and socio-cultural adaptation of international journalists to-be can be made easier and whether communication-oriented techniques can somehow facilitate this process.

Design. In this paper, we provide an overview of current research analyzing adaptation from different angles, which is essential for creating a context for further narrower studies.

Results. We discuss adaptation of journalism students in Russia, suggesting ways to make their adaptation in a host country easier and arguing that the development of communication skills can be important for successful adaptation to new living and learning conditions.

Conclusion. We argue that there is a need for more detailed, narrow-focused research discussing the specifics of adaptation of different groups of people to a new environment (since we believe different people tend to adapt to new conditions in different ways) as well as research outlining the role of communication competences in their adaptation processes.

Keywords: psychological and socio-cultural adaptation, international students, journalism, communication skills, communication competence

Introduction

Today, Russia is seventh in the world in the total number of international students with 230 thousand international students or 3.8% of the total number of international students in the world (Arefyev & Sheregi, 2014). The most popular study programs among full-time international students in Russia are engineering (20.2% of the total number of international students), medicine (18.1%) and management (17.3%). The number of international students studying humanities in Russia — including journalism and mass communication studies — is lower but still relatively large at 11.5% (*ibid*). Among all international students in Russia, the biggest group of students currently come from Kazakhstan (28.8% of all international students), Belorussia (9.4%), Ukraine (8.5%), and Turkmenistan (8.4%). Countries like Azerbaijan, China, Tajikistan, Moldavia and India are also active in sending their students to Russia for higher education (Malykhin, 2015). Keeping this statistical data in mind, it seems clear that international students comprise an important group of the Russian student body and have their own specific needs. Coming to a new country to study or to conduct research makes international students face a number of challenges, including separation from their families and home environment, lack of Russian proficiency (most courses in Russia excluding short-term programs and dual degree programs with foreign universities are taught in Russian), and isolation from their cultural backgrounds. Scholars argue that these and other factors may cause psychological distress, which international students oftentimes experience in a new country. Berry (1997) and others noted that factors that may influence the amount of psychological distress and the way students cope with that stress can be grouped into three main categories: macrosocial (discrimination, degree of tolerance for diversity, academic pressure), factors related to an individual's background (worldview, cultural values) and individual factors (age, gender, foreign language proficiency) (Berry, 1997; Sümer, 2009). The importance of individual factors (age, gender, education, motivation, personal background, etc.) is also stressed by Stefanenko (2000), who argued that individual and group factors (the latter include, among others, cultural similarities and differences, specifics of home and host countries' cultures, etc.) can significantly influence the duration of the adaptation process.

The fact that many international students experience psychological distress when finding themselves in a new environment makes students' adaptation processes to new living and learning conditions an important issue for analysis in many respects — psychological, pedagogical, cultural and academic. Research showed that the state of psychological distress and culture shock — a sense of disorientation and confusion students may feel when experiencing an unfamiliar way of life — is significantly and negatively related to both the psychological and socio-cultural adaptation of newcomers (Presbitero, 2016). This fact brings up a question of how international students' adaptation can be made easier and more efficient. This paper aims at discussing one of the possible ways to lower psychological distress and to help international students adapt to the new conditions more easily, which is the development of their communication skills. In our opinion, the ability to communicate effectively with one's peers, teachers, colleagues, and a broader circle of people can make adaptation processes easier and stimulate students' integration into the new society through regular contact with the locals.

To put the discussion about communication skills as a possible way to ease international students' adaptation into a broader theoretical context, we attempted to classify the existing approaches to international students' adaptation, examining different types (general living, academic, socio-cultural, personal-psychological and others) with a particular emphasis on the psychological and socio-cultural adaptation of students. It should be noted that we understand *psychological adaptation* in this paper following Ward and colleagues "affective responses including a sense of well-being and self-esteem, as well as physical well-being" (Ward, Bochner, & Furnham, 2001), while *socio-cultural adaptation* hereinafter refers to "a set of appropriate socio-cultural skills that enable individuals to live successfully in an intercultural milieu" (ibid).

Let us note that in the current research, we will pay special attention to the adaptation processes of international *journalism* students in Russia — a group that has not been in the spotlight of academic research yet. The choice of this particular group was determined by the fact that journalism programs are to a large extent already aimed at developing students' communication skills through seminars, practical training, field work and internships in newsrooms. This background gives us an opportunity to see whether developed communication skills can make adaptation processes easier for international students and — consequently — whether any of the techniques used in journalism class can be implemented in work with students majoring in other subjects as well.

Finally, in this paper, we will hold to the definition of adaptation suggested by Castro (2003), who defined adaptation as "a development of cultural and social skills, sensibility to the beliefs, values and norms of the new culture and the acquisition of adequate communication skills for interacting effectively with the host culture". A small addition to this definition is that, in this paper, we will use terms the "communication skills" and "communication competence" interchangeably. Even though these notions are not identical, they both describe the ability to establish and support productive communication with other people.

Method

The primary method we used in this research into publications by both Russian and international scholars issued in the last twenty years centered around the following key problems: international students' adaptation processes in general, adaptation of particular groups of students, singled out by ethnic, cultural, gender, professional or any other factors, the role of communication skills in students' personal development and adaptation processes, and possible ways to ease adaptation processes for international students.

Although this paper has a relatively narrow focus, namely, the discussion of the role of communication skills in international journalism students' psychological and socio-cultural adaptation, we believe it is essential to create a theoretical model of what has already been covered in relation to international students' adaptation and to suggest our contribution to this discussion by offering a set of general and specific measures aimed at making adaptation for journalism students and students majoring in other disciplines easier, specifying the role of communication competences in this process.

Let us note that although in this paper we will focus primarily on psychological and socio-cultural adaptation of international students, we agree with Tseng (2002) that this group of students has to address different types of adaptation at the same time, including general living, academic, socio-cultural and personal-psychological types of adaptation. Therefore, we did not exclude these types of adaptation from our research scope either, arguing for a complex and multifaceted overview of this phenomenon.

Results

First, we determined that a significant cluster of research is devoted to the *international students' adaptation process in general* (Ward, 2001; Tseng, 2002; Castro, 2003; Berry, 1997, 2006; Sümer, 2009; Kulikova, 2007; Vitkovskaya & Trotsyk, 2005; Abdina et al, 2015; Hajara, 2014, etc.), treating it as a psychological and cultural phenomenon and oftentimes examining a particular type of this phenomenon. For instance, Ward (2001) outlined the specifics of psychological and socio-cultural adaptation, arguing that each of these two types of adaptation is influenced by a different set of variables: psychological adaptation is influenced by personality traits, coping strategies and available social support, whereas socio-cultural adaptation is influenced by length of residence in the new culture, cultural knowledge, language ability and acculturation strategy.

Tseng (2002) paid special attention to the general living adaptation of international students in a new country, which includes adaptation to the local food, living environment, transportation, climate, financial and health care systems. We cannot but agree that many of these everyday phenomena may cause confusion among international students when they face them for the first time. In this case, general orientation upon arrival and introducing students to the everyday reality in Russia by the locals (specifically assigned university officials and/or peer students) can be very helpful, in our opinion.

Sümer (2009) studied academic adaptation, which includes proficiency in the language of a new country, knowledge about the local educational system, and effective learning skills. Sometimes academic adaptation is perceived as the most crucial type of adaptation and becomes the focus of attention in scholarly works (Halamandaris & Power, 1999). Although studying factors contributing to successful academic performance is certainly an important task, we believe that this type of adaptation should not be considered a dominant one. One of international students' main goals is obviously to succeed in class. However, this goal can hardly be achieved without students' adaptation to the socio-cultural environment in which this class is conducted. Getting accustomed to a new system of values, beliefs, norms and regulations is what socio-cultural adaptation is about. Its role in achieving academic adaptation is significant. Without developed cultural and social competences, students will possibly experience difficulties in communication with their classmates, teachers and advisors and will not be able to comprehend what is going on in the class in the fullest sense. In regard to journalism students, for example, good knowledge of the values and norms of Russian society along with respecting (not necessarily sharing) these norms and values will help when covering stories in media outlets or working as a part of student groups on media products. Students

will learn about the culture they live in and will be able to speak about this culture and communicate with people raised in it with tolerance, respect and full understanding of its specifics.

Personal-psychological adaptation has been in the spotlight in a number of research studies (Vasyakin et al, 2015; Yang et al, 2015; Berestneva, Marukhina, & Shcherbakov, 2013; Kravtsov, 2008; Ivanova, 2001, etc.). Since many international students suffer from depression, isolation and homesickness when away from home and a familiar environment, their academic, socio-cultural, and general living adjustment can become even more complicated. Let us also note that all these types of adaptations, though rather general and typical to some extent for all international students, may differ in relation to a particular study major. International students coming abroad to study humanities or social sciences, for example, are expected to be involved into a whole range of communication activities. Starting from freshman year, journalism students, for instance, are taught how to conduct interviews, write reports about an event they have been to, visit presentations and round table discussions, use social media, and other skills. All these activities require constant communication with people, not necessarily the ones students already know. This fact can make adaptation processes more difficult and long-lasting, which raises a question about means of easing students' adaptation in Russia.

Research in the field of ethnopsychology, both domestic (Lebedeva, 1999; Stefanenko, 2000; Krysko & Sarakuev, 2001; Baronin, 2000; Platonov, 2012) and international (Shweder, 1991; Kirkpatrick & White, 1985; White, 1995; Despret, 2002; Turner, 2012), has emphasized the importance of successful psychological and socio-cultural adaptation for building harmonious relationships with representatives of cultures and ethnicities different from one's own. Scholars thus stressed that the role of psychological trainings, especially those aimed at revealing culture differences and showing ways to address them, can hardly be underestimated in regard to successful adaptation in a new country. Trainings may include, for example, cognitive (those providing information about host country and discussing difficulties in adaptation process in small groups) or attributive ones (those directed to learning how representatives of various nations and cultures interpret reasons for behavior and the results of activity) (Stefanenko, 2000; Wiseman et al, 2007; Kononova, 2012). Culture assimilators can be another efficient way to learn intercultural differences through introducing students to a variety of standpoints and opinions shared by people with different cultural backgrounds (Stefanenko, 2000; Kononova, 2012). As a result, students get to know the new culture better and learn how to communicate with the locals in a respectful and unbiased way.

Second, we examined research analyzing adaptation of *particular groups of students* in a new living and learning environment, specifically looking for information about journalism students. We revealed that many research studies aimed to study the specifics of international students' adaptation and focused primarily on general problems of adaptation and acculturation and/or covered experiences of particular universities in enhancing students' adaptation processes (see for example a paper by Vitkovskaya & Trotsyk (2005) about the case of Peoples' Friendship University of Russia or a paper by Krivtsova (2011) about the adaptation of international students at Voronezh State Medical University). A large-scale sociological research study was carried out in 2009 at Udmurt State University (Izhevsk, Rus-

sia). This research addressed academic and social adaptation of freshmen, without analyzing international students specifically. Interesting observations suggested in this research include signifying an important role of student academic groups, student organizations, scientific societies for students and students' academic advisors in helping students get accustomed to a new learning environment (Adaptatsiya studentov pervogo kursa..., 2009). The principal research method in this study was analyzing questionnaires filled out by students from different academic departments, including 17 journalism students. However, this study did not specify the difference in adaptation processes experienced by international and domestic journalism students. All in all, we found very few research studies focusing on a particular group of international students grouped together by majors, countries of origin or any other factors, unlike the number of those speaking about the adaptation of international students in general.

Third, we came across a substantial number of research studies discussing *the role of communication skills in one's personal development and in the society in general*. As Morreale et al (2000) articulate, developed communication competences are essential for a whole range of reasons, including an important role of communication in a person's development, career services, business enterprises, and, speaking more broadly, in the development of societal and political life and in inter-cultural understanding. The idea that communication competence and cultural competence are closely interrelated is supported by Wang (2011), who studied cultural codes and suggested that communication skills are indispensable for a culturally literate person, the one who "possesses both the language codes and contextual knowledge of a social environment" (Borden 1991). Dunas (2011) analyzed communication and communication competence through an anthropological approach. The development of students' communication skills in both theoretical and practical aspects were studied by Smirnova (2007) and Lyutova (2007), who also conducted one of the few research studies aimed at analyzing international journalism students' education process, though not focusing on their adaptation processes. Most of the researchers agree that communication competence can contribute to individuals' social adjustment and participation in satisfying interpersonal relationships. As Morreale et al (2000) note, youngsters with poor communication skills are sometimes viewed as less attractive by their peers and enjoy fewer friendships. In addition, the ability to communicate orally supports sound psychological development. In psychological terms, achieving self-actualization involves communication activities such as making contributions in groups, exerting influence over others, and using socially acceptable behavior (ibid).

In summary, we have to say, though, that despite the fact that the number of publications on communication skills in general is relatively large, we failed to find many research studies thoroughly outlining the role of communication skills in international students' adaptation processes, be it the group of international students in general or those who chose particular majors for their study abroad experience. One of the few publications on this topic is a research study by Westwood & Barker (1990), who underlined that the achievement rates of the international students who participated in a peer-pairing program with the local students are in most cases higher, and their social adjustment is in most cases easier compared to those who did not take part in that program. This fact proves that communication

practice plays an important role in both academic and psychological adaptation of international students in a new country.

Lastly, we tried to identify publications discussing *possible ways to ease adaptation process for international students*. Scholars more or less agree that communication with the locals (teachers, peers, advisers, employers, etc.) is an effective way to adapt to new living and learning conditions easier. Tran Ly Thi (2008) emphasized that there is a correlation between students' adaptation and the regularity of their interaction with the lecturers through face-to-face consultation, emails and discussions in class, which we admit to be important. Another way to help students adapt to a new environment is, according to Stefanenko (2000), Vasyakin et al (2015) and Nugmanova (2015), a series of psychological trainings aimed at developing students' adaptation skills, as well as their self-regulation resources, which also play an important role in adjustment to a new living environment or to a new group of people.

Keeping in mind a limited number of theoretical and empirical research studies on this topic, we decided to suggest a very rough *classification of measures to help students adjust to a new living and learning environment*. Since this research is aimed primarily at analyzing psychological and socio-cultural adaptation of international students, these measures are primarily focused on ways to overcome difficulties connected with these types of adaptation, although we believe that most of them can be used when dealing with other types of adaptation as well.

We argue that these measures can be divided into two big groups: general ones and specific ones. *General ones* can be used when dealing with all groups of international students no matter which major(s) they chose. This type of measures may include, but is not limited to, building contact between an international student and his/her academic advisor or/and student peers, including extracurricular activities and cultural events into students' schedule, providing psychological support and orientations to the students, organizing psychological trainings for students and much more. We believe that all these activities are extremely valuable and helpful for the international students' psychological and socio-cultural adaptation in a new country, especially when used together.

Talking more specifically, the role of academic advisors and student peers is clearly essential. Quite often, students do not know anyone when coming to a new country to live and study. Academic advisors, whose duties include providing educational guidance and assistance for students by planning schedules, recommending courses and determining appropriate education solutions, can be extremely helpful. Getting domestic students interested in contacting their international peers before or upon their arrival, and providing them informal support, orienting them in a new environment can be useful, too. International students become familiar with a new country and culture, and domestic students develop their cultural sensitivity and learn more about the culture from which their international peer comes.

Along with support from academic advisors and student peers, international students should be provided with general and special orientations. In this case, teaching students about the health care system, transport, climate, food in the new country, and other topics is the purpose of a general orientation upon and/or before arrival, while teaching students about values, beliefs, norms, and regulations in a new country and showing them how to behave in a professional environment

(journalists' ethics and an the vision of what is morally acceptable or not — like revealing confidential sources, for example, can vary in different countries) should be covered in a special orientation.

While orientations are usually organized a few times only, psychological support should be available to the international students on a permanent basis. Be it an academic advisor, whose list of responsibilities includes, besides academic work, psychological counseling, or a separate service at universities, this type of work is extremely important in regard to helping international students get accustomed to new life realities. Additionally, Ivanova (2001) notes that international students should be taught how to use self-regulation tools, especially at the very beginning of their study period, when they are in a “state of shock” (ibid) and not familiar with the learning and living environment. Last but not least are extracurricular activities aimed at bringing students together and encouraging them to learn from each other. Examples of such activities may be various joint projects, excursions, trips, celebrations, and others.

Now let us examine more closely the *specific measures* that can be used to make the adaptation processes of international students easier. This type of measure, in our opinion, is oriented towards a particular group of students, in our case journalism students. First, let us note that one of the prerequisites for applicants, both domestic and international, wishing to study journalism are developed communication skills, which are usually tested at an oral entrance examination. These skills seem to be indispensable, since journalist's work can hardly be imagined without communication with people, both oral and written, which is why the selection committee normally takes these skills into account when making admission decisions. However, international students coming to Russia to study journalism oftentimes have less developed communication skills than domestic students, first because of lack of language proficiency, and second because they do not feel comfortable in a new environment yet. We believe that developing their communication skills can be useful both for preparing them for their future profession and for easing their adaptation processes. Let us take a look at possible ways to strengthen international students' communication competence now, keeping in mind that first, we are focused on journalism students primarily, second, that many of these methods can be used in work with international students majoring in other subjects too, and third, that the purpose of communication skill development is a complex one (psychological and socio-cultural adaptation, academic adaptation, preparation for the professional career in journalism, self-actualization through communication, etc.).

To start, journalism programs at Russian universities, like in many international universities, are focused on developing an array of different skills and abilities: effective oral, written and visual communication abilities, effective research, interview and information gathering abilities, and others. Vartanova & Lukina (2014) examined different sets of skills that Russian journalists should possess in order to be in demand on the market today. They emphasized that communication skills are ranked rather highly today, meaning by communication skills an ability to interact with the audience, participate in planning social events (discussions, debates and others), get in touch with different sources when working on a story, and other aspects. (Vartanova & Lukina, 2014). It seems clear that communications skills are one of the most important sets of skills every good journalist should possess and a

prerequisite for future success in professional work. Since journalists primarily get their information from people, they should be able to conduct interviews and cover personal stories, ask relevant questions, listen carefully and simply have a pleasing personality so people would be willing to talk to them. In addition, journalists should have the ability to build contacts and have friends from different walks of life who can serve as a source when needed. All things considered, developed communication skills are essential for future journalists.

That is why an important component of journalism education along with theoretical courses are various practical assignments, such as work on joint projects, meeting with journalists and media practitioners, participation in seminars, workshops, trainings, internships in newsrooms, field trips to media outlets and hands-on experience of producing newspapers, TV and radio programs, and multimedia content for websites in class, among others. Communication with classmates, teachers, viewers, interviewees, journalists and media owners is an inseparable part of all these activities. Starting from freshman year, students learn to be open-minded, curious, disciplined, stress-resistant persons able to build effective communication with people belonging to different social, cultural, professional, and ethnic groups. However, while taking part in all those activities, students not only learn how to become good journalists but also begin to understand themselves better and get accustomed to their new professional environment.

For international students, practical assignments can be of extra value. While participating in seminars, trainings, role games in class and internships, students make new friends, learn about the new culture and society (what is appropriate and what is not, what roles men and women perform in the society, etc.), gradually get accustomed to a new reality, and find their own place in the society that is new to them. Joint projects, which require work in pairs or small groups (like producing an edition of a student newspaper or working on a TV show in a studio) are particularly helpful. Having found themselves in a completely new living and learning environment, struggling with academic and general living challenges, students need people they can talk to in case of problems or questions. Academic advisors and psychological counselors can be of much help, but they cannot replace classmates and people of the same age and interests. That is why practical assignments can play the role of “integrating factor”, bringing domestic and international students closer to each other and encouraging them to work together and learn from each other. Moreover, this “integrating factor” can later serve as a contribution to the general policy of integration (Gladkova, 2012, 2015), which is exceedingly vital in a multicultural, multiethnic and multilingual Russian society.

By participation in seminars, trainings and other types of practical learning activities, international students go beyond class routine and build contacts with different people, like visiting scholars from abroad or media practitioners. These contacts may follow up later in an internship, curriculum or optional practical training, or even a temporary job. Along with the professional development, students acquire knowledge of the media sphere, roles and mission of journalists in a given society, learn how to overcome challenges in professional work and establish effective communication with people. This process, in turn, contributes to further psychological and socio-cultural adaptation of students. They become more confident when outside the classroom and away from people they know well (classmates,

teachers, academic advisors, etc.), they learn the importance of productive communication (in order to acquire information, perform a task successfully, get accepted for an internship, etc.) and start feeling less lonely and depressed when away from home. Students also become familiar with the set of norms, moral and ethical issues, regulations and laws that exist in the country where they study, which contributes a lot to their socio-cultural adjustment. We believe that though theoretical preparation (reading books and instructions, participating in orientations, talking to academic advisors and international students who studied in Russia before) can be helpful, nothing can substitute real communication with the locals in regard to learning about the society.

We are also convinced that an effective tool for stimulating socio-cultural adaptation of international students and developing their communication competence is a course (both theoretical and practical ones) on intercultural communication. For journalism students, whose professional roles and responsibilities include communication with people from different cultural backgrounds, intercultural communication is an indispensable part of the learning process. In this case, we mean not only students majoring in foreign or international journalism but all other majors as well. In an era of globalization, which, as Vartanova (2005) mentions, is a complex phenomenon involving communication, media, business, culture spheres, and intercultural communication, competence is becoming more and more important. Having gained a better understanding of cultural differences and ways to establish efficient communication with people different from themselves, students develop professional competence to build relations easily when working on a media product in all journalism fields — broadcasting, print media, Internet, interviewing people, gathering opinions, and others. In addition, they start understanding that all cultures are equally important, and neither of them should be considered superior, which, in turn, has more to do with developing individual values and characteristics of the students (Gladkova, 2013).

In many Russian universities, including Lomonosov Moscow State University's Journalism Faculty, intercultural communication has been included in the list of required courses for both domestic and international students. This course focuses not only on teaching theories of intercultural communication, approaches to different cultures, their peculiarities and their differences. Its goal is to teach students how to establish productive communication with people belonging to diverse cultural, ethnic, linguistic, religious groups through numerous practice-oriented tasks and subsequently develop their communication skills and make them feel more comfortable when getting in touch with people around them.

The list of these tasks includes pair and team work on a project, usually related to students' specialization in one of the journalism fields — broadcasting, photo-journalism, media economics, fashion journalism, and others. An important part of this working-together scheme is that students are usually asked to work in pairs or small groups with people from different cultures. Team and/or pair work usually starts with a simple task, such as making a short dialogue, asking a team partner about his/her family, hobbies, recent travels or favorite movies and later develops to a larger task — spending a few hours together working on a project. Students choose topics and methods themselves after consultation with one of the teachers. Journalism projects may include, but are not limited to, conducting a series of in-

interviews on a topic of current interest, writing article for a student newspaper or for a blog, or shooting video, among others. An outcome of each project is presented to the rest of the class and openly discussed.

The tasks that include team and pair work have proved to be rather efficient in many senses. First, they help students get to know their classmates better. It is not a secret that quite often international students in Russia do not feel themselves part of the student community, be it due to their low language proficiency or lack of opportunities for integration or cultural specifics that prevent them from expressing their emotions and needs in public. Projects aimed at bringing people together, even for a short time, can play the role of such integration factors. Although sometimes cases of non-willingness to establish contacts with their classmates belonging to a different culture may appear, for both domestic and international students, the majority of them are usually satisfied with the results of their team work.

Another creative technique is asking students to produce short essays on a topic related to cultural differences. The topics of such essays are usually thought-provoking and meant to stimulate discussion about the way different cultures perceive the same things, like family relationships, marriage, the role of women in the society, and others. It is always very interesting to see how students perceive their own cultures through creative writing as well as discuss essays all together in class. Not surprisingly, many students have stereotypes regarding other cultures and people living abroad, so this task is aimed at both breaking stereotypes and providing students an opportunity to re-consider their own culture, its specifics and peculiarities.

What we consider even more important than successful completion of tasks in this course is that students start getting together with their international peers more often: greeting them in the corridor, asking informal questions, and sitting together in class. We may conclude thus that pair and team work as well as discussion of creative writings contribute to students' understanding of intercultural communication as an efficient tool to build contacts with people, something journalism cannot be imagined without. Moreover, it teaches them that all men are created equal, no culture should trump the others, and prejudices against other cultures are very often far from being true. Finally, international students become more comfortable in class, get used to the society, make new friends and gradually adapt to the new country both psychologically and culturally.

Conclusion

The research demonstrated a significant difference in the number of studies examining adaptation (general living, psychological, socio-cultural, etc.) in general, without regard to specific characteristics of the audience, and those describing adaptation of a particular group of people (in our case, international journalism students). A similar situation was observed when comparing a profound number of research studies emphasizing an important role of communication skills in general, and those speaking about communication skills in the adaptation processes of particular groups of people. In our view, there is certainly a need for more detailed, narrowly focused research discussing the specifics of adaptation of different groups of people to a new living and learning environment because we believe different

people tend to adapt to new conditions in different ways, and research outlining the role of communication competences in their adaptation process.

Having discussed the role of communication skills in psychological and socio-cultural adaptation of international journalism students, we may conclude that communication competence is certainly an important factor in both stimulating their adaptation process and familiarizing students with cultural codes and the realities of a new society. As we have noted, most adaptation measures can be used in work with all international students no matter which major(s) they chose (like academic advising, psychological counseling, peer counseling, orientations, extracurricular activities, psychological trainings, etc.). Communication skill development, which is attributed in this paper to a category of specific measures, can be basically considered a part of general measures, since all international students need to have communication competence to build relationships in a new society, make friends, understand the culture better and express themselves. We believe, though, that for journalism students, communication skills are particularly essential. Otherwise, their professional work, which presupposes communication with many different people every day, would be impossible.

The list of possible ways to develop communication skills is certainly broader than the one we presented in this research (including joint projects, essays, course of intercultural communication, team work, field trips, etc.) and deserves a separate large-scale study. In this paper, we were attempting to show that while these measures are widely used in journalism education, they can be successfully implemented in work with students majoring in other subjects too. The outcomes of this practice make it easier to adapt to the new society, its culture, everyday realities, living and learning standards, increase self-confidence in international students, including their ability and willingness to communicate with others, and finally improve their ability to address the challenges each international student faces in a new country.

Limitations

Since this research is purely theoretical and does not involve any empirical data analysis, the conclusions outlined earlier are generally based on the collection of academic works we had access to though various domestic and international databases. We are not ready to claim that the number of publications on adaptation in general, adaptation of particular groups of people, measures to ease adaptation process, or the role of communication skills in adaptation processes is limited to those included into this paper. The number of such publications by Russian and international authors is certainly much larger and deserves another large-scale study.

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The interrelationship between cognitive control and academic success of first-year students: An interdisciplinary study

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Background. Though many Russian and foreign studies have been devoted to the study of self-control in educational activity, most of the research has been limited to the use of questionnaires or psychodiagnostic methods. The neurophysiological mechanisms underlying the process of cognitive control in the context of learning have still not been sufficiently understood, despite the obvious significance of controlling action for academic success.

Objective. The purpose of this study is to identify the psychological and neurophysiological features of cognitive control in the process of learning activity, for students with different levels of academic success.

Design. This study investigates the control function in first-year students who have varying degrees of academic success. The research design is interdisciplinary and integrates three different approaches: the neurophysiological, psychological, and pedagogical. In the empirical part, 31 first-year students at Saint Petersburg State University (SPbSU) participated in the research. We measured the personal characteristics of the subjects (using the five-factor personality questionnaire as modified by A.B. Khromov), their self-management ability (Peysakhov's SMA test), characteristics of the event-related potentials of the brain in response to presentation of stimuli in the solving of problems that require searching for an error in a word (electroencephalographic method), response time, and number of errors and corrections. Four types of stimuli were used: the correct spelling of a word, the replacement of a letter with one that is written similarly or sounds similar, or by one that is not similar. The indicators used to measure academic success were the results of the Unified State Examination (USE) and the first (winter) term of the 2016–17 academic year. The data were analyzed by correlation analysis and analysis of variance.

Results. Comparison of groups of students with lower and higher levels of academic success showed significant differences in all the measured groups of variables — personality traits (Emotionality–Restraint factor), components of the system of self-management (Goal-Setting and Forecasting scales), behavioral data from the experiment (number of corrections), and neurophysiological indicators of cognitive control (the components P200, N200, P300, and N400). The results of the study revealed that students

with greater academic success are characterized by less emotionality, a higher capability for goal-setting, and a lower capability for forecasting, as well as greater attention and greater engagement in solving the task of finding mistakes. Such students flexibly distribute their efforts depending on the difficulty of the task and are less likely than the less successful students to change their initial answer to the experimental task.

Conclusion. A high level of development of the self-regulation and self-management system potentially improves the process of finding an error which is necessary for better academic success.

Keywords: cognitive control, self-control, event-related potentials, academic success

Introduction

Interdisciplinary research is becoming increasingly popular in modern human science, allowing the study of the object of interest from different vantage points and with different structural interrelationships with other objects and phenomena. Such an integrated approach makes possible a more holistic view of the person as the subject of cognition. A special place in the human sciences is occupied by neuroscience, which combines the most significant achievements in psychology, physiology, education, economics, and so forth. At the same time researchers who integrate knowledge from different domains face a number of difficulties associated in particular with confusion in terminology, lack of a common conceptual framework, and different paradigms for constructing empirical and experimental studies.

The study of control mechanisms is a subject of research in many scientific fields: physiology, psychology, pedagogy, etc. The importance of such research is mediated by the effectiveness of human activity. The function of control is to achieve goals, manage one's actions on the path from the goal to a result, correct in a timely way the deviations and disturbances of activity that arise. In psychology, the controlling function of the subject is mainly revealed through the concept of self-control; in pedagogy it is through self-control and control of educational activities; and for modern physiology, the closest term is "cognitive control." We will also use that term when describing the results of the experimental part of the study.

Control as a subject of study in education, psychology, and physiology

In Russian psychological research, self-control is usually defined as a regulatory function, the ability to restrain and suppress primitive urges and emotions and subordinate them to distant or higher goals (Rean, Ed., 2002).

In education, self-control is the most important link in the structure of learning activity. The self-regulation of any educational activities is acquired only through processes of control that perform the function of regulation (Elkonin, 1974; Davydov, 1986).

In Russian physiology, the mechanism of control over one's actions and their evaluation is described by P.K. Anokhin's functional system, in which any information about a process and the result of an action constitutes reverse afferentation or feedback, which controls, manages, and regulates of actions. The process of comparing the "image of the result of action" (Anokhin, 1975) or "model of the desired future" (Bernstein, 1990) with real information about an action takes place,

according to Anokhin, due to the “action result acceptor.” If these are consistent, there is a basis to continue the action, but if they diverge, the action has to be adjusted. In the structure of the controlling functions, implementation of activities is provided by three components (links): the image of the desired result of the action, its juxtaposition or comparison with real action, a decision on whether to continue or adjust the action. Each action of these links is controlled by multiple feedback paths. Self-control is a complex process, involved in all kinds of conscious activity, which makes it the most critical component of the human psyche, allowing us to consider the person as a self-regulating, self-improving, and self-educating system (Pavlov, 1973).

In foreign neuropsychological studies, cognitive control is described by executive functions. Executive functions are high-level cognitive functions, mediated primarily by the frontal lobes (Stuss & Knight, 2002). Executive functions include a range of cognitive processes and behavioral abilities required for control of attention, temporal organization of responses, planning to achieve goals, ability to assimilate and use the information in long-term memory, controlling and monitoring the current situation (Friedman & Miyake, 2017; Lesh et al., 2013; Diamond, 2013).

Many Russian and foreign studies have been devoted to the study of self-control in educational activity; however most of the research has been limited to the use of questionnaires or psychodiagnostic methods. The neurophysiological mechanisms underlying the process of cognitive control in the context of learning have still not been sufficiently understood, despite the obvious significance of controlling action for academic success.

This matter is partially solved by defining the role of inhibitory control in academic achievement (Espy et al., 2004; Cartwright, 2012; Gilmore & Cragg, 2014). Findings suggest that in primary school, inhibitory control and working memory contribute significantly to the performance of mathematical and reading assignments (Thorell, 2007; Welsh et al., 2010; Steele et al., 2012), and at the ages of 11 and 14, they determine the results of school tests in English, mathematics, and science (St Clair-Thompson & Gathercole, 2006; Nunes et al., 2012).

There is still insufficient data reported in the literature on the interrelationship between academic success and higher-order cognitive control associated not only with inhibition of undesired impulses in response to the presentation of artificial competing stimuli (inhibitory control), but also with control over the execution of tasks without the interruption of learning activity.

Study of the neuronal basis of cognitive control during learning activities will allow us to achieve a new level of understanding of the mechanisms that determine its successful application to solving learning tasks, and comparing the effects of performing tasks on cognitive control with the psychological characteristics of students and their objective academic performance will allow us to extrapolate the data thus obtained to psychological and pedagogical practice. The potential of interdisciplinary research to solve problems of education seems to be most promising (Kostromina et al., 2015).

Thus it is extremely important today to search for the interrelationships among the neurophysiological characteristics of cognitive control in educational activities, the psychological personality traits of students, and objective indicators of their academic success.

The purpose of this study is to identify the psychological and neurophysiological features of cognitive control in the process of learning activity, for students with different levels of academic success.

Method

Empirical methods were used for the comprehensive study of control processes, corresponding to different levels of controlling functions:

- 1) neurophysiological evaluation — electroencephalography (the method of event-related potentials, ERPs) and measurement of reaction time;
- 2) psychological evaluation — psychological diagnostics of personal qualities that are based on volitional and emotional regulation; the degree of development of the system of self-management, including self-control (the five-factor personality questionnaire — the Big Five as modified by A.B. Khromov and the methodology of Peysakhov's "Self-Management Ability" test, the SMA);
- 3) pedagogical evaluation — questionnaires (general information about respondents, including the results of entrance examinations and their first [winter] term at university) and analysis of activities performed (success in experimental problems of searching for spelling errors).

An electroencephalogram (EEG) was performed using an Mitsar-EEG-202 digital electroencephalograph (produced by OOO Mitsar, St. Petersburg), the MCSap electrode cap, and the WinEEG software package. We used 19 electrodes placed on the scalp according to the international 10-20 system, at leads Fp1, Fp2, F7, F3, Fz, F4, F8, T3, C3, Cz, C4, T4, T5, P3, Pz, P4, T6, O1, O2. Reference electrodes were placed on the earlobes, and a ground electrode on the forehead. A high-pass filter, on which the EEG registration is performed at 0.1 (1.6 Hz); a low pass-filter at 30 Hz. A monopolar method of registering the EEG was used; during the study, an oculogram (EOG) was recorded.

Registration of the EEG was performed during the task of searching for mistakes.

Stimuli

As stimulus material, we used 7-9-letter high-frequency Russian words, spelled correctly or with an error that substituted a letter with one that either sounds similar or looks similar, or with one that is not similar either in sound or appearance.

Russian words were chosen as stimulus words because checking the correctness of spelling is the most common learning activity; that is, it is naturally included in any learning situation for different subjects, starting from the first grade.

The type of controlling action was chosen taking into account that control always involves a process of checking against some model or standard — comparison of what is with what should be. In the case of checking the correct spelling of a word, a visual image of the word/letter, or a phonetic image (after all, when we check the text, we read it, that is, we say it to ourselves), or a rule of the Russian language can serve as a standard.

The types of stimuli were developed based on the understanding that the control process is less familiar and therefore less automatic for an adult than is reading, which, in fact, is of an opposite nature. When we read, we do not look at each letter, but ignore possible deviations from the standard so as not to lose the thread of the narrative and the meaning of the text. Therefore text verification skills require further development. To choose the appropriate methods for this, it is necessary to determine whether the process of comparison with the standard is the same for different types of standards (visual or auditory). To address this question, we chose 4 types of stimuli for our study:

- Type 1 — words that contain an error in which one of the letters is replaced with another that has a similar sound;
- Type 2 — words that contain an error in which one letter is replaced with another that is not similar either in appearance or sound;
- Type 3 — words that contain an error in which one letter is replaced with another that looks similar;
- Type 4 — words without mistakes or typographical errors.

Words with an error because a letter has been replaced with one that sounds similar have to pass phonetic but not visual control; if a letter is replaced by a visually similar one, the opposite is the case. Typographical errors should cause a mismatch signal on both channels of verification, and words written according to the rules of the Russian language have to pass both types of control.

Examples of stimulus material of each type are shown in Table 1.

Table 1. Examples of Stimulus Material

Type of stimulus	Type 1	Type 2	Type 3	Type 4
Example	<p>перкофь [tserkof']</p> <p>[correct word: церковь — tserkov' — church]</p>	<p>просткй [prostki]</p> <p>[correct word: простой — prostoi — simple]</p>	<p>инстигут [instigut]</p> <p>[correct word: институт — institut — institute]</p>	<p>поднять [podniat']</p> <p>[the spelling is correct — to raise]</p>

All four groups of stimuli were balanced according to the number of seven-, eight-, and nine-letter words. The total number of stimuli was 216 (18 in the pilot study and 198 in the main study), with an equal distribution of correctly spelled words (50%) and of each of the types of errors (16.67%).

Procedure for presentation

The stimulus words were presented in random order on a computer screen using the software PsychoPy2, version 1.82.01. The procedure for presentation of the stimuli is shown in Figure 1. Font — Times New Roman; color of letters — black; background — white. Each stimulus was presented for 1,500 ms, with an 800 ms pause between stimuli. During the pause, a sign in the shape of a cross was shown for 400 ms, to focus the gaze. The subject was instructed to press one of the two

keys, depending on whether the word was written correctly or not. The instruction was as follows: “Words will appear sequentially on the screen before you. If the word is spelled correctly, press -> (right arrow); if there is an error, press <- (left arrow). Before each word, a cross will appear on the screen. Please focus your gaze on it. If the instructions are clear, press the space bar and the study will begin immediately.”

The subjects could also, if necessary, correct their answer until the next task appeared, which made it possible to include the number of corrections as a variable in the study.

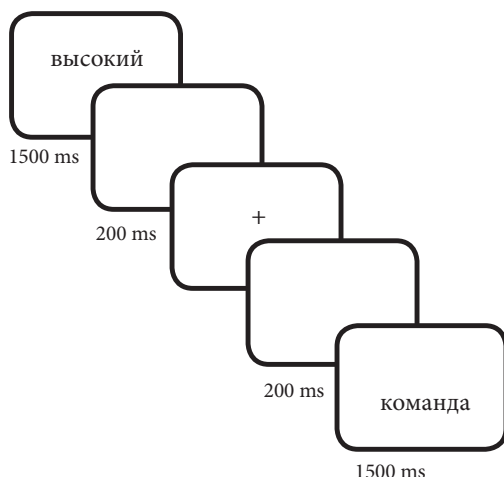


Figure 1. Procedure for presenting stimuli, specifying the duration of each stage

Note. вьсокий [vsokii] [correct word: высокий — vysokii — high]; команда [komanda] [spelling is correct — team]

Study participants

The study involved 31 first-year students from Saint Petersburg State University, all native speakers of Russian, of whom 21 were girls (67.74% of the total) and 10 were boys (32.26%). The average age was 18.99 years.

Data processing

Statistical data were processed in STATISTICA 8 in the paradigm of event-related potentials (General Linear Models) and IBM SPSS Statistics 22 (descriptive statistics [mean, standard deviation]; non-parametric methods for comparison of independent samples (U Mann-Whitney criterion); correlation analysis (Spearman's rank correlation coefficient).

Processing of ERP data included a filtration procedure: automatic removal of EOG in the WinEEG program and manual cleaning of artifacts. After preliminary processing of the EEG recordings, as well as exclusion of incorrect choices, the average number of tests for each subject used for averaging was 92 for stimulus words containing an error and 95 for those without an error.

The amplitude (in microvolts) of the components of the averaged ERPs was calculated from the baseline to the maximum of each component. The latent period component of the averaged ERPs for the presentation of each stimulus was calculated from the moment the stimulus was presented.

Results

The differentiation of the subjects based on academic success was based on three criteria: the results of the Russian-language USE, the average score on the USE, and the average grade for the winter term. Subjects whose criterion value exceeded ($M + 1/4 \sigma$) were placed in the more successful group, and those whose value was less than ($M - 1/4 \sigma$) were in the less successful group. All who were in the average zone were excluded from further analysis. It is important to point out that the sample generated from the SPbSU first-year students who had enrolled in 2016 is characterized by greater academic success than in the country as a whole and even in Saint Petersburg. The average score on the Russian-language USE was $90.67\sigma=7.35$; the USE score for two specialized subjects was $82.68 (\sigma=7.55)$. For comparison, the average score on the Russian-language USE in 2016 in St. Petersburg was 71.61 points, and in the Russian Federation as a whole it was 67.5; in mathematics for intended STEM majors — 47.83 points in St. Petersburg (according to the official portal of the state final certification of graduates of grades 9 and 11 in St. Petersburg for 2017) and 46.3 points in Russia as a whole (according to the official USE portal).

The number of groups obtained and their gender composition are presented in Table 2.

Table 2. Number of groups with different levels of academic success

Differentiating criterion	Less successful			More successful		
	Boys	Girls	Total	Boys	Girls	Total
USE average	3	10	13	4	9	13
Russian-language USE	6	6	12	2	13	15
Academic term	5	8	13	4	11	15

Analysis of success in finding errors and speed of response

Analysis of pair correlations using Spearman's criterion revealed a weak negative correlation ($r=-0.373$, $p=0.039$) between the results of the Russian-language USE and the number of errors made when solving the experimental problems. However, comparison of the groups of students with different levels of academic success did not reveal any significant differences in their ability to find errors.

As Table 3 shows, subjects made the most errors (41.2% of the total number of errors) when the task contained stimuli of the third type (replacement of a letter with one similar in appearance) and the least errors (12.32%) in the second type (words containing a typo — replacement of a letter with one that is dissimilar both in appearance and in sound). Problems with spelling mistakes because of the

replacement of a letter with one that sounds similar proved to be quite difficult — 30.42% of the mistakes were made in this type of problem.

Table 3. Distribution of incorrectly solved problems, depending on the type of stimulus

Type of stimulus	Number of incorrectly solved problems	Number of correctly solved problems	Total	% with errors out of all the problems of the same type	% of all errors
1	79	944	1.023	7.72	30.42
2	32	991	1.023	3.13	12.32
3	107	916	1.023	10.46	41.21
4	125	2.944	3.069	4.07	16.05
Total	343	5.795	6.138	5.59	100

Analysis of the speed of motor response given the correct solution to the experimental task showed that the response time for tasks of the first type (a spelling error in which a letter has been replaced with another that sounds similar) significantly exceeded the response time for the other tasks ($p=0.013$ between stimulus types 1 and 2, $p=0.044$ between types 1 and 3, and $p=0.001$ between types 1 and 4). No differences were found in the speed of solving problems of the second, third, and fourth types.

Comparative analysis of psychological features of students with different levels of academic success

Comparative analysis of the groups of students with different levels of academic success using the nonparametric U Mann-Whitney criterion revealed significant differences in the development of the components of the system of self-management, in the indicators “Goal-Setting” and “Forecasting,” as expressed by the personality trait “Emotionality” (Big Five), and in the number of corrections made to answers given for the experimental problems. Table 4 shows that students with a higher average USE score have, on average, a more developed ability to create a subjective model of what is desired or correct, than students with lower results. The students who were more successful in the Russian-language USE were more relaxed, confident, emotionally mature, and more often stopped at their first choice of answer than those who are less successful. Subjects who received higher grades during the academic term were less likely to change their answers to the experimental problems and were less able to speculate on possible further developments based on analysis of the past and present.

Differences in the statistical trend when comparing groups of students with different levels of academic success were identified by the variables “Planning” to differentiate the results of the academic term ($p=0.065$) and “Goal-Setting” to differentiate the Russian-language USE scores ($p=0.093$). The less successful students showed a lower level of development of both of these stages of the self-management system, compared to the more successful ones.

Table 4. Intergroup psychological differences between students with more and less academic success

Criterion of success	Variable	Average value		U Mann-Whitney criterion
		Less successful	More successful	
USE average	Goal-Setting	2.231	3.692	0.009
Russian-language USE	Emotionality — Restraint	55.000	44.267	0.004
	Number of corrections	7.000	3.933	0.032
Academic term	Forecasting	4.615	3.933	0.037
	Number of corrections	6.846	4.000	0.029

Note. Average value — points on a scale. On Peysakhov's SMA, the range is from 0 to 6; on the Big Five-factor scale, it is from 15 to 75.

Neurophysiological indicators for solving experimental problems: Searching for errors

To study the differences in neurophysiological cognitive control in students with different levels of academic success, using STATISTICA 8 with the General Linear Models method, we analyzed the data obtained for problems correctly solved by the subjects with stimulus types 1 to 3 (words with errors) and type 4 (correctly spelled words). The answers for types 1, 2, and 3 were averaged, as there were no significant differences among them.

The following were allocated as components related to cognitive control (Kropotov, 2010): a component of motor response suppression and conflict monitoring N2 (N200), a component involving the P3b (part of the P300 complex), an N400 component for monitoring of activity. These, as some sources note (Kutas & Federmeier, 2011; Deacon et al., 2004), have a maximum intensity in the centro-parietal leads (Pz). The data obtained from the Pz lead in the range from 120 to 440 ms was most significant for the further processing.

Figure 2 shows the ERPs for the correctly and incorrectly spelled words (average for all types of errors). The graph shows the differences between the curves for ERP at one of the sections of interest to us — from 320 to 440 ms (that is, in the N400 region) — the amplitude of the potentials caused by incorrectly written words was significantly greater ($p < 0.001$) than for those spelled correctly. These data are consistent with the hypothesis that N400 is generated by orthographic / phonological analysis and is attenuated by top-down processes of feeding semantic information to the orthographic / phonological level (Deacon, et al., 2004).

The curves of event-related potentials of the less successful (Group 1) and more successful subjects (Group 2), obtained in lead Pz, are presented in Figure 3 (grouped according to the average USE score), Figure 4 (grouped according to the results of the Russian-language USE), and Figure 5 (grouped by success — the result of the academic term). The figures on the left show dynamics of electrical brain activity in response to words containing an error, and on the right, to correctly written words.

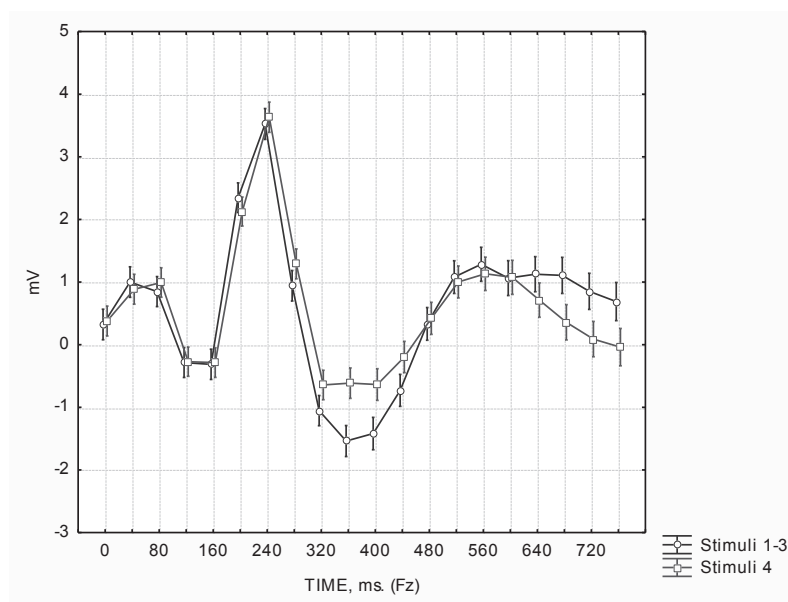


Figure 2. ERPs in response to stimuli containing an error (blue line) / not containing an error (red line)

Students with lower academic success, measured by their average result on the USE, were found to have a greater amplitude of the positive wave in the region of around 160 ms ($p < 0.01$) and a smaller one in the region of 280–320 ms ($p < 0.001$); those less successful on the Russian-language USE had smaller amplitudes of the N200 components (240 ms) ($p < 0.01$) and P3b (280–320 ms) ($p < 0.001$) and greater latency of the N400 component ($p < 0.001$); for those less successful in the term, there were larger amplitudes of the positive wave in the region around 160 ms in response to correctly spelled words ($p = 0.026$) and a negative wave in the region of 240 ms ($p < 0.01$) in response to stimuli of any kind, compared to the more successful subjects.

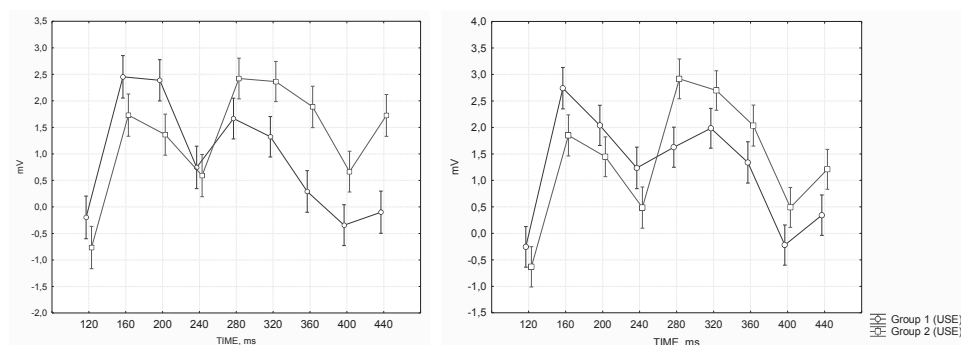


Figure 3. ERPs in response to the presentation of stimuli with an error (left) and without an error (right) obtained in lead Pz in groups of students with lower (blue line) and higher (red line) results on the USE

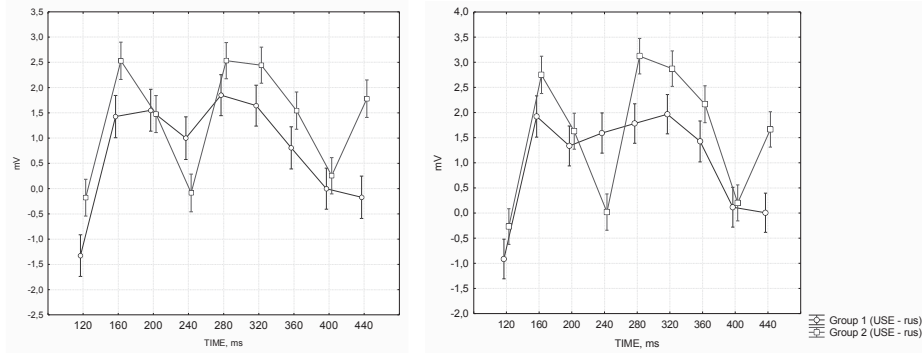


Figure 4. ERPs in response to the presentation of stimuli with an error (left) and without an error (right) obtained in lead Pz in groups of students with lower (blue line) and higher (red line) results on the Russian-language USE

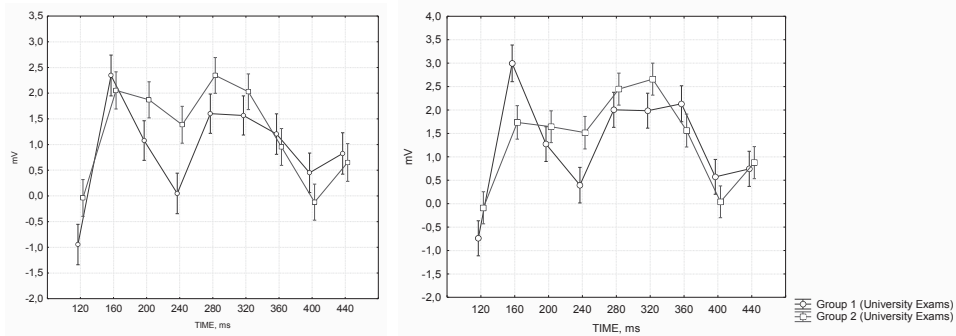


Figure 5. ERPs in response to the presentation of stimuli with an error (left) and without an error (right), obtained in lead Pz in groups of students with lower (blue line) and higher (red line) results in the academic term

Summing up the results, we can say that academic success has key interrelationships with all the types of data measured: with personal characteristics, components of the self-management system, behavioral experimental data, and neurophysiological indicators for solving experimental problems. Students with a higher level of academic success displayed lower values on the scales of “Emotionality” of the five-factor personality questionnaire and “Forecasting” on the “Self-Management Ability” scale, and higher values on the scales of “Planning” and “Goal-Setting,” and made fewer corrections when solving the experimental problem, compared with less successful students. The differences between the neurophysiological indicators of cognitive control are displayed in the characteristics of the P200, N200, P300, and N400 components.

Discussion

Although the tasks of the first type (one of the letters is replaced with another than has a similar sound) were the most difficult from the point of view of speed of performance, we found that students missed errors of any type, and the majority of replaced letters that went unnoticed looked similar to the correct letter (type 3).

The negative relationship found in our study between academic success and the Big Five factor associated with emotional self-control is confirmed by data from both foreign (Poropat, 2009) (meta-analysis) and Russian studies. In particular, A.A. Vorobyeva's study (2015) identified the interrelationship of academic success of students with all the factors of the "Big Five" except for Agreeableness. A study by E.V. Kochergina et al. (2013) with a Russian population sample showed an interrelationship of the "Big Five" factor relating to emotions, and the results of the Russian-language USE; however, the curve is inverse: the greater the subject's Emotionality, the higher the score on the USE, and vice versa. The authors explain the discrepancy between their results and those of researchers abroad by the differences in the educational environments in different countries. We suggest, however, that the inverse correlation of emotionality and the USE results may be related to the fact that the exam situation, which in itself is stressful, combined with high emotional lability, can negatively affect the educational process.

Many authors (Konopkin & Pryigin, 1984; Ishkov, 2004; Osnitskiy, 2009) also stress the importance of the development of all components of the system of self-management for educational success, including for taking the USE (Morosanova et al., 2014). They note that the higher the student's level of conscious self-regulation of his educational work, the greater his academic success, and vice versa. In our study, the more successful subjects were characterized by a higher level of the Planning and Goal-Setting components, and a lower level of Forecasting, compared to the less successful. This is demonstrated when the subjects were split into groups according to their success in the academic term, and could be explained by the fact that higher education is a new situation for recent schoolchildren, with new types of work, increased workload, less adult supervision, the need to organize one's own academic and extracurricular time, and, consequently, it requires completely different ways of operating. The way the student has obtained high grades in school no longer works, and students who are more accustomed to make forecasts based on past experience find themselves less flexible in the new environment.

Summarizing the comparative analysis of the brain's functional activity in first-year students with different levels of academic success, we can conclude that first-year students who were more successful on the USE have lower P200 amplitude, higher N200 and P300 amplitude, as well as lower N400 latency (characteristic only of language competence) when performing the experimental task, than those whose results on the school graduation exams were worse. This may indicate that the former pay more attention and are more engaged in the process of finding errors. On the other hand, flexible regulation of one's cognitive processes and allocation of effort depending on the difficulty of the task play a great role in success at university.

The literature contains evidence that the amplitude of the P200 component, which peaks at 150–250 ms, decreases with increasing attention (Crowley & Colrain, 2004), while the amplitude of the P3b component (with a latency of about 300 ms) increases (Gordeev, 2007). The amplitude of the N200 component is positively correlated with cognitive control, but it is still unclear with which particular executive function (Lamm et al., 2006). The N400 component is characterized by high temporal stability. One of the few factors that can affect the latency of this variable

is the language experience of the subject (Federmeier & Laszlo, 2009) — the greater it is, the less the latency of N400.

Thus we can conclude that subjects who were less successful on the USE have a lower level of attention and cognitive control compared to those who were more successful.

The results obtained in analyzing the differences between students who received higher and lower grades for the first term turned out to be contradictory. On the one hand, the more successful subjects showed smaller N200 amplitudes, which could be a sign of lower cognitive control. On the other, when solving problems that do not contain an error, the amplitude of the positive wave around 160 ms in the more successful students was lower, indicating greater attention compared to the less successful students. We hypothesize that the generally low level of activity of the controlling system with its selective increase allows students to cope with the greater educational burden that results from the transition from school to university.

Conclusion

Our research allows us to draw the following conclusions about the interrelationship of cognitive control and academic success:

- first-year students with a higher level of academic success are characterized by less emotionality, are better at goal-setting but not as good at forecasting; they also less often change their initial answer to an experimental problem than do less successful students;
- students who were more successful on the USE have lower P200, higher N200 and P300, as well as lower N400 latency (characteristic only for the Russian-language section of the USE) when performing the experimental task than those whose results were worse on school graduation exams. This indicates that they pay more attention and are more engaged in the process of finding errors. However, in the differences among first-year students, those both more and less successful in the academic term, the difference in ERP characteristics played a greater role not between groups in exam results, but within groups depending on the problem.

Overall, the three-level analysis of the controlling function in students permits a conclusion on the cross-cutting nature of its manifestations. Greater difficulty in looking for errors in words with similar spelling indicates that missing errors is not particularly related to knowledge of orthography. The obstacle is the similarity of visual word forms, the optical proximity of graphemes, which makes it more difficult to compare a word with the standard. But a high level of development of the self-regulation and self-management system potentially improves the process of finding an error. Neurophysiological support for this process is also related to the flexibility of the management system, the need to vary the concentration of attention from a lower level (weakening of concentration), when an error is obvious (“jumps out at you”), to a sharp increase when a correctly written word is being checked (a “non-obvious” error, so you have to look closely for it).

The results of the present research indicate an insufficient level of self-control for finding errors in words, primarily when letters are replaced with others that are similar in appearance or in sound. Knowledge of the rules of spelling and grammar in the Russian language does not prevent spelling mistakes. We conclude, therefore, that more attention should be paid in the educational process to the development of cognitive control. We recommend teaching aids to improve pupils' validation skills, based not only on the rules of orthography, but also on any other mismatch with the correct spelling of the word. For example, tasks including errors in words because of extra or missing letters or letters that are similar in appearance or pronunciation.

Limitations

Considering that the sample was not controlled for gender, the results may have limitations that require further verification of intersexual differences in the neurophysiological basis of cognitive control.

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Knowledge of Romani language grammar

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Objective. The paper examines knowledge of Romani grammatical categories among Roma children from Bulgaria and Slovakia between the ages of 3 and 6 years.

Design. Roma children from Bulgaria and from Slovakia completed a psycholinguistic test in the Romani language. The test was developed for the first time in Europe to measure an individual's knowledge of the Romani language (comprehension and production). The newly developed test measured comprehension of categories such as wh questions, wh complements, passive verbs and possessiveness.

Results and discussion. The children's knowledge is associated with two theories: the ecological theory of Ogbu (1978) and the integrative theory of child development (García Coll et al. 1996). Ogbu's theory stresses the importance of children's home culture in their development. According to the theory of García Coll and her collaborators, the family's home environment and SES are important predictors of language development.

Keywords: Roma children, language assessment test, integrative theory

Introduction

Research shows that all normally developing children follow the same “paths” in their language development. Children develop the sound system first, then vocabulary and syntax, and later, the ability to narrate (Tomasello, 2003; Roskos and Neuman, 2005; Neuman and Marulis, 2010). Roma children are no exception in this process of language development. The only difference is that Roma parents use different strategies and approaches for language development that are partially from the Roma culture (e.g., fairytales, folk songs, teasing, and language games). In Roma communities, everyone is free to communicate and play with children. Within extended families, Roma children are exposed to different registers when speaking with parents, adults and siblings (Kyuchukov, 2014; Kyuchukov, Kaleja & Samko, 2016).

In some European countries, Roma children are still tested with IQ tests, although in the U.S. and some European countries, the use of IQ tests is forbidden.

Bafekr (1999) studied “two culturally distinct groups: Poles and Romanian Gypsies” using “projective tests and intelligence tests as an aid to understand many difficult situations.” According to the author, Roma children are often absent from school due to their culture because the knowledge acquired at school “does not conform to the values of Gypsy culture, particularly not at the cognitive and semantic levels” (p. 300). Bafekr (1999: 301) also notes,

“On the standardized intelligence tests the [Roma] children scored far below average. At the same time, however, their ‘practical’ intelligence appears to be much higher than many children at the same age. Children as young as eight, for example, are expected to find their way around the city, survive in any situation, and give the impression of the independence. This finding is confirmed in virtually all the literature describing the educational problems of Gypsy children... If the attitude towards education in Gypsy culture is considered along with their view of the world (which is pre-operational at the cognitive level), then different test results are all too understandable since they are based on ‘Western’ standards. At a minimum, then, we should stop assessing the intelligence of Gypsy children against Western standards using Western measures. Perhaps an attempt should be made to educate them in a way that guarantees a minimum of educational and cultural compliance between the two cultures.”

Although Bafekr makes what can be interpreted as racist comments about the Roma culture and schooling, ultimately, he suggests that Roma children should not be measured by Western IQ tests, even though researchers continue to use them. However, only five years later, when researching Czech and Slovak Roma children, Bakalar (2004:291) noted,

“Several studies in central Europe have shown that Gypsies tend to score lower on IQ tests. This has frequently been explained as the results of (a) the poor environmental conditions in which Gypsy families live and (b) language difficulties, because a number of Gypsies speak their own language and not that of the majority population. It is probable that the environment in which Gypsies typically live does not foster the development of intellectual abilities and social mobility. However, *the pervasive social failure of Gypsies in all studied societies raises the question of whether their intellectual deficit is due to biological/genetic causes as well as environmental differences.*” [our italics]

Bakalar argues that one problem Roma children face is they speak their mother tongue, which causes them to score low on IQ tests. However, strangely enough, the author does not question the cultural appropriateness of the IQ test. He clearly thinks that “Western” IQ tests are suitable for all cultures and are not culturally biased. The basically racist comment on the “intellectual deficit” of Roma children is unacceptable in science and reminiscent of the style of Nazi discourse during WWII.

Another study by Kertesi and Kezdi (2011) compares ethnic Hungarian children from mainstream schools and Roma children from special schools and discovers that the test-score gap between Roma and non-Roma is similar to the black/white racial disparities in the United States during the 1980s. The authors conclude that in Hungary, education and poverty play an overwhelming role in the significant score gaps in such tests.

Rushton, Cvorovic and Bons (2007) and Cvorovic (2014) focus on the IQ test performance of Serbian Roma. The first study tested Roma with Raven's Standard Progressive Matrices (SPM), measuring "the ability to identify relationships," "analogical thinking" and the ability to "think clearly". Another test used in the study was the Colored Progressive Matrices (CPM). The Roma averaged very low scores on all tests. The authors found that the SPM and CPM percentile points converted to an IQ equivalent of 70. Although the authors note that the tests used may not be culturally appropriate for the Roma culture, they conclude that "the Roma children grow up in culturally disadvantaged conditions [...] [they] are not as exposed to the intellectual stimulation and test taking attitudes typically associated with high test scores" (Rushton, Cvorovic and Bons, 2007:10).

Cvorovic's (2014) book, *The Roma: A Balkan underclass*, explains that two-thirds of the child subjects had been diagnosed with "light mental retardation." The author collated published IQ tests results, mostly involving Wechsler tests of reasonably sized samples, with local populations as control groups. Adult Roma were shown to have intelligence scores very similar to South Asians, with average adults, in a wide variety of samples, demonstrating IQs in the 70 range. According to the author, "the poor scholarship of the children seems to be due to a mixture of low ability and a strong belief that education beyond primary school is of no interest or benefit." Unfortunately, this study is replete with prejudices, stereotypes and racist statements about Roma. From reading the book, one can conclude the Roma are in this situation because they have clung to their culture since they arrived in Europe eight centuries ago, and in all this time, living in Europe has had almost no impact on them.

In her dissertation from 1943, Eva Justin conducted "psychological" research to measure the intelligence of Roma children in Nazi Germany. Her findings suggest that as a result of their low IQs, "Roma children do not have abstract thinking...; they have problems with concentration and attention...; do not have the discipline of German children...; the boys are genetically predisposed to be criminals... and the girls are genetically predisposed to be prostitutes". The recommendation drawn from her "research" is that Roma should be sterilized "to avoid the reproduction of asocial Gypsies who are not willing to integrate into German society." Forty-one Roma children from Justin's study were sent to Auschwitz, where some were objects of the medical "research" conducted by Dr. Josef Mengele and others were killed in gas chambers. Only two children involved in Justin's study survived the concentration camp.

Comparing the publications on Roma intelligence from contemporary and modern European authors with Justin's 1943 dissertation, for all these authors, the main problem appears to be the fact that the children know their mother tongue and culture. This is, in these authors' view, an obstacle to integration into the majority societies. The authors seem to be unfamiliar with existing theories and publications regarding the importance and use of one's mother tongue and culture in the cognitive development of minority children.

In this article, we partially adapt the model for the study of child development, which was developed by Garcia Coll et al. (1996) in the U.S. and addresses children of color. The authors present an integrative model of child development, drawing on Parsons' (1940) social stratification theory and emphasizing the influence of racism, prejudice, discrimination, oppression, and segregation on the development of minority families and children (Garcia Coll et al., 1996).

According to Bronfenbrenner (1979, 1986), the family's interaction with other groups and institutions influences the way children adapt to non-familial environments such as school. Influential factors in children's success at school are the parents' level of education, employment, the parent-child relationship, home environment, and resources available inside and outside the home. Ogbu (1978, 1981, 1988) [based on Han, 2006] adapts Bronfenbrenner's theory and applies it to emigrant children's families with an emphasis on the importance of the culture. García Coll et al. (1996) stress the importance of the surrounding environment on children's behavioral, emotional, and cognitive development. The neighborhood and school environment either promote or inhibit minority children's development (Han, 2006). According to Han (2006), the social position of a group of people and the racism and segregation directed against them are important factors in the education process. García Coll et al. (1996) do not underestimate the role of culture in the learning process of minority children. Children's extended families, community and friends help them learn new things in everyday life. Han (2006) stresses,

Additionally, child/parent/family characteristics, home environment and parental educational practices (e.g., learning activities at home, participation in extracurricular activities and school events), and school (e.g., student composition and average academic performance, parental involvement, school safety) and neighborhood (e.g., residential neighborhood quality) environments are considered possible mediating factors for any such associations (p. 288).

Forget-Dubois et al. (2009) studied the effect of home environment quality on a child's school readiness. The authors consider SES an indicator of the general home environment quality. They argue that the features of the home environment are significantly predictive of later language skills; SES and maternal speech are very important for vocabulary development; and language skills and school readiness are correlated. Children with low SES but higher language competence evince a good level of school readiness. The relationship between language development and school readiness is not only a predictor of school achievement but also a measure of school readiness.

Rydland (2009) conducted research among bilingual Turkish children from Norway and investigated their pretended play. Through pretended play, the children develop complex language skills and narrativity. Their highly developed oral skills show the children's pragmatic language competence in their mother tongue, which is important for second-language acquisition.

The analysis of the literature shows that Roma children's IQ tests "prove" that Roma children have low scores on IQ tests. However, there are also theories and publications related to minority/migrant children that indicate that the home environment, language and culture play important roles in children's development.

The aim of this article is to present results from international research showing the level of knowledge of Romani as a mother tongue among Roma children in Bulgaria and Slovakia. With this study, we attempt to answer the following research question:

Which grammatical categories do normally developing Roma children know in their mother tongue at the ages of three to six years?

Method

The research included 60 Roma children between three and six years old: 30 children from Bulgaria and 30 children from Slovakia. The children were selected randomly. They were grouped in three age groups:

- 1 gr. 10 children 3.0 — 3.11 years old
- 2 gr. 10 children 4.0 — 4.11 years old
- 3 gr. 10 children 5.0 — 6.0 years old

All of the children were tested in their mother tongues, which were varieties of the Romani language. Roma in Slovakia and Roma in Bulgaria speak different dialects, but the language is the same. The children were tested in community centers by speakers of the two particular dialects. They did not attend kindergarten, and most of the knowledge they acquired about the world was obtained through communication with their family members.

Three picture tests were used to test the language knowledge of Roma children in their mother tongue:

Test 1: Wh- questions (*Who eats what?*) — 8 items — production test. The children were shown eight pictures with different actions completed by the protagonists and asked questions about the actions. In some languages, when there are two wh words at the beginning of the sentence, the first wh word is answered, whereas in other languages, the second wh word is answered. For the children, the expectation is that they will answer both wh words in each sentence.

Test 2: Passive verbs (*The dog was kicked by the horse*) — 16 items — comprehension test with multiple choice. The test measured the children's knowledge of passive statements. Children usually understand sentences such as, *The dog kicks the horse*. However, they find it more difficult to understand sentences such as, *The horse was kicked by the dog*.

Test 3: Possessiveness (*The horse has a balloon. This is not your balloon. This is the...*) — 26 items — production test. The test is based on Berko's Wug test (1958). The children must fill in the missing word verbally, which, in this case, includes the possessive endings in Romani for masculine and feminine and for singular and plural with both known and novel objects.

The tests were adapted to the local dialects spoken by Roma from the two communities in Bulgaria and in Slovakia.

Our hypotheses are as follows:

H1: The SES of the Roma families give an influence the language development of their children.

Results

The findings from the first test, Wh — questions, show that between the age groups, there were statistically significant differences. The first age group from both countries (3–4 years old) showed lower results in comparison to the third age group (5–6 years old). Figure 1 shows the total score of the first test as a function of age group.

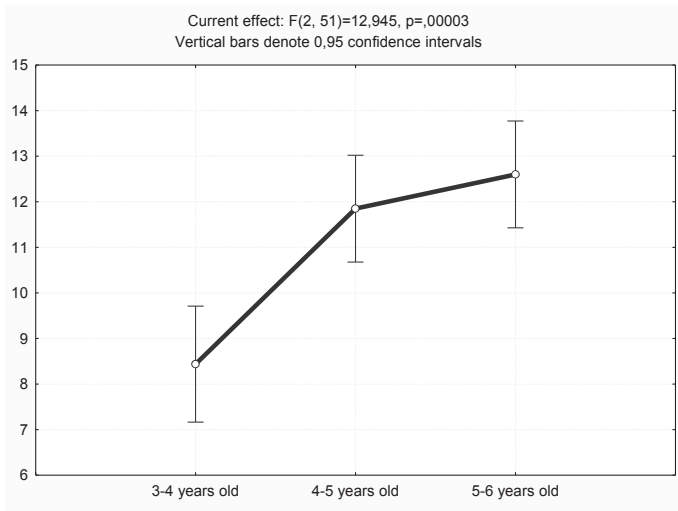


Figure 1. Total scores on Wh-questions test as a function of age group

The impact of the factor of age group on the total scores of Wh questions test as a dependent variable is statistically significant ($F=12,94$; $p<0,0001$). The size effect is large ($\eta^2=0,34$). The post hoc tests show that between all groups, there are statistically significant differences. Comparing the results of the children between the two countries, one can see that the Roma children from Bulgaria have higher results than the Roma children from Slovakia have.

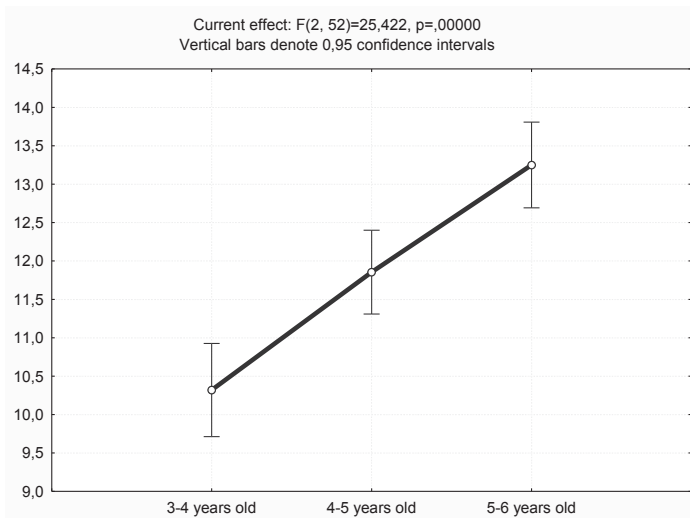


Figure 2. Total scores on passive verbs test as a function of age group

The impact of the factor of country on the total scores of the Wh questions test as a dependent variable is statistically significant ($F=20,28$; $p<0,0001$). The size effect is medium ($\eta^2=0,28$). The Roma children from Bulgaria performed much better on this test than the Slovak Roma children did.

In the performance of the second test on passive verbs, the age groups again show significant differences. Figure 2 indicates that older children from both countries understand and complete the tasks much better than the younger children do. The results are plotted in Figure 2.

The impact of the factor of age group on the total scores on the passive verbs test as a dependent variable is statistically significant ($F=25.42$; $p<.0000$). The size effect is large ($\eta^2=0.49$). The post hoc analyses show that the differences between all three groups are statistically significant. Comparing the children from the two countries, one can see again that the Bulgarian Roma children perform much better on this test. The impact of the factor of country on the total scores for the passive verbs test as a dependent variable is statistically significant ($F=35.45$; $p<.0000$). The size effect is large ($\eta^2=0.41$). Again, the Bulgarian children performed much better than the Slovak children did.

How did the children perform in the third test related to the possessive? The results are given in Figure 3.

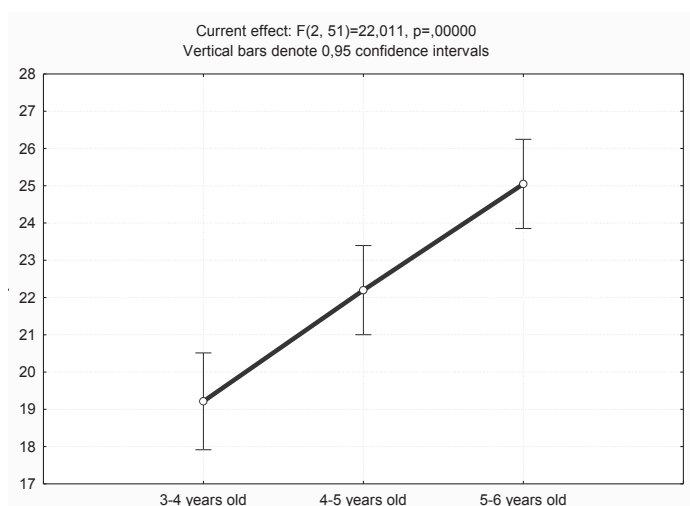


Figure 3. Total scores on possessiveness test as a function of age group

The impact of the factor of age group on the total scores on the possessiveness test as a dependent variable is statistically significant ($F=22.01$; $p<.0000$). Size effect is large ($\eta^2=.46$). Again, the older children from both countries performed much better than the younger children did. The post hoc analyses show that the differences between the three groups are statistically significant. How did the children perform on this test by country? The impact of the factor of country on the total scores on the possessiveness test as a dependent variable is statistically significant ($F=39.86$; $p<.0000$). The size effect is large ($\eta^2=.44$). Again, the Bulgarian Roma children performed much better than the Slovak Roma children did.

Figure 4 shows the total scores on the possessiveness test as a function of interaction between two factors: age group and country.

Figure 4 clearly shows that all age groups from Bulgaria perform much better on the possessiveness test than do the Roma children from Slovakia. The impact of the interaction between the factors of age group and country on the total scores on

the possessiveness test as a dependent variable is statistically significant ($F=6,46$; $p<0,01$). The size effect is medium ($\eta^2=0,20$). The post hoc analyses show the differences between groups by country. One can see that between the first and second groups from both countries, the differences are statistically significant; however, between the third age groups, there are no statistically significant differences.

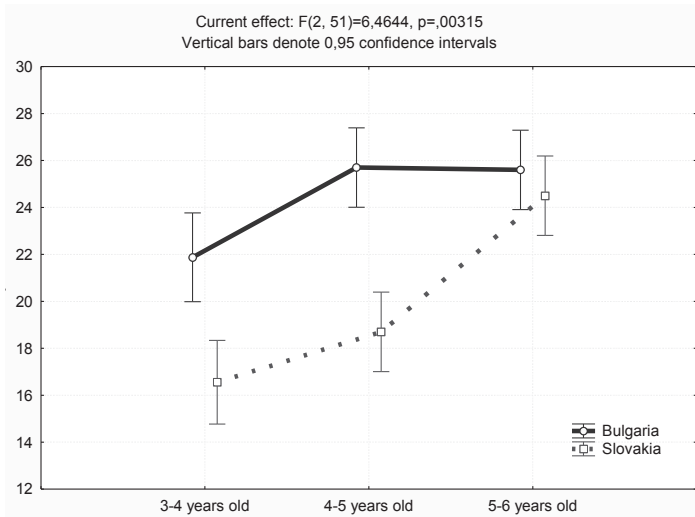


Figure 4. Total scores on possessiveness test as a function of interaction between factors age group and country

Discussion and Conclusion

Returning to the hypotheses of the study, it seems that our first hypothesis is confirmed. We see that the SES of the families influences the language development of the children and their school readiness, as stated by García Coll et al. (1996). Although the Roma children from Bulgaria live in a ghetto-like settlement, they live in much better conditions than the Roma children from Slovakia. It seems that the Slovak Roma children grow up in highly deprived conditions (in some cases, very similar to the conditions prevailing in some African countries) and lack access to toys, books, television, the Internet and other facilities. Growing up stigmatized as Roma, with all the negative stereotypes and prejudices in the society against Roma, confirms the integrative theory of García Coll and her collaborators that a society's negative phenomena and attitudes toward minority groups, such as racism and discrimination, influence the development of families and their children. In this case, the Roma children do not have the necessary readiness for school education because the isolation and segregation in which they live and grow up do not provide them a natural possibility to become socialized in society, as is the typical case for children from the majority population. Their socialization occurs only in the Roma community and follows the community's norms. They do not know how to behave outside the Roma community or in institutional settings such as school.

Unlike the Slovak Roma children, the Bulgarian children have much better conditions and more contacts with the majority society because although they live

in a ghetto-like settlement, they do not live far from the town. Moreover, most of the Slovak Roma children have much better conditions at home. Additionally, the Protestant church plays an important role in their lives. Organized religious cultural activities, such as summer schools, Sunday schools and excursions, bring together Roma and non-Roma. From early ages, the children benefit from these activities because they are introduced to different behaviors and different types of socialization. Therefore, there is an ensemble of factors that influence the lives of Bulgarian Roma children in a positive way, which helps to shape an ecology of positive development for them. As a result, Roma children from Bulgaria have better school readiness, although they do not attend kindergarten before entering first grade.

Romani language, which is mainly an oral language, is learned by the children from oral communication and the rich folkloristic culture, including songs, fairy tales, teasing, jokes and other genres of folklore. It seems that the complex language development of Roma children cannot be achieved until they are five or six years old. Even when they do not attend kindergarten and do not have good conditions at home, between the ages of five and six years, children learn the most complex grammatical structures, as shown by the test for possessiveness. The children between five and six years old from Bulgaria and Slovakia achieved the same level of complex grammatical knowledge based on their performance on the possessiveness test. This can be considered an indicator of school readiness. The research findings with Roma children are contrary to the claims of Bakalar (2007) and Cvorovic (2014), which identified the problem of Roma children's integration as their knowledge of the Romani language as a mother tongue. Although the research is limited, the results from this study show that Roma children should be tested with culturally appropriate tests and in their mother tongue.

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Embodied finger counting in children with different cultural backgrounds and hand dominance

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Background. Embodied finger counting has been shown to have cross-cultural differences in previous studies (Lindemann, Alipour, & Fisher, 2011; Soto & Lalain, 2008). However, their results were contradictory in reference to Western populations with regard to the hand preferred: The first study showed that in Western countries — Europe and the United States — participants preferred to start with the left hand (whereas in the Middle East — Iran — they used the right hand); the second study showed that participants in France preferred the right hand.

Objective. Our study aimed to observe these differences in two countries, Spain (Western Europe) and Russia (Eastern Europe part), although taking into account the variety of cultural or ethnic groups who live there.

Design. The observational/descriptive study, together with correlational analysis of the finger-counting pattern (from 1 to 10) used by children aged 10 to 12 who had not been taught to use their fingers for counting, considered factors of cultural origin and hand dominance. The possible effects of this action on cognition — in our case, math achievement — were considered also.

Results and conclusion. The differences in the frequency of the finger-counting patterns might suggest cultural-individual differences in performance; however, the correlational analysis did not reveal that these differences were statistically significant, either for gender or for mark in math. However, hand dominance was a significant predictor of the preferred hand with which to start counting.

Keywords: embodied numerosity, finger counting, cross-cultural research, individual differences, hand dominance

Introduction

Rosenbaum (2005) mentioned that little attention had been paid to movement control in psychological research, naming this area the “Cinderella of Psychology,” and urging that it play a more important role in the future. Whereas linguistic tests encounter problems with exact interpretation when translated into other languages or

if they are missing values describing context with regard to different cultural views and perceptions, movements are more universal and less biased when we wish to compare results in cross-cultural studies. On the one hand, movements can follow an unconscious pattern when a person selects the optimal way to do something (Rosenbaum et al., 1991), sometimes even the same way in humans and animals. On the other hand, movements are related to perception, emotion, and cognition, in that there are individual differences (Rosenbaum et al., 2012; Liutsko et al., 2012; Iglesias et al., 2014; Liutsko et al., 2015).

Since culture and ethnicity are complex constructs and should not be manipulated to look for “superiority” in comparisons, it has been suggested to compare variables that are distinct in these cultures and thus to consider cultural differences as a set of variables of individual differences (Gasquoine, 1999). Previous studies have shown some individual differences between representatives of different cultures in fine motor skills (Liutsko & Tous, 2014) and memory (Gutchess & Inneck, 2009), among others. The better performance in fine motor skills and math in East Asian-American children was found to be significant, thus showing the predictive relationship of the construct in motor skills and math achievements (Luo et al., 2007).

Cultural differences in neuropsychological assessment are very important in occupational therapy and psychological work (Chui et al., 2007). In general, numerosity was found to have a similarity in the neural code across species (Piazza & Izard, 2009). However, in finger counting habits from 1 to 10, Lindemann, Alipour, and Fisher (2011) reported differences between Middle Eastern (Iranian) and Western individuals (European and American) that resulted in clear cross-cultural differences in the hand and finger starting preference. Whereas the first group preferred to start counting with the right hand and preferred to map the number 1 to their little finger, the second group preferred the left hand and the thumb. Another study in a French population aged 4 to 24 (Sato & Lalain, 2008), independently of the age group, revealed a strong tendency to use first the right hand to count from 1 to 5 and then the left hand to count from 6 to 10.

The embodied cognition framework revealed that neural systems for perception and action were engaged during higher cognitive processes; thus it was shown in fMRI studies that individual finger-counting habits modulate motor cortex activation to number processing (Tschemtscher et al., 2012) and spatial-numerical associations (Fischer, 2008; Fischer & Brugger, 2011). Moeller et al. (2012) evaluated whether the concept of embodied numerosity should be generalized beyond finger-based representations, with particular focus on whether bodily-sensory experiences (such as moving the whole body along the mental number line) may correlate with numerical capabilities. In a previous review (Moeller et al., 2011), they discussed the results of various studies that revealed an important debate between neurocognitive researchers and mathematics education researchers concerning finger-based strategies for numerical development. They also mentioned that some recent studies supported the hypothesis that children with good finger-based numerical representations show better arithmetic skills and that training finger gnosis, or “finger sense,” enhances mathematical skills (Moeller et al., 2011), including in adults, supporting the general idea that abstract cognition in adults may at least partly be rooted in our bodily experiences (Klein et al., 2011).

Crow and colleagues, describing the effects of handedness on academic performance in children (age 11), did not report any differences between right-handers

and left-handers, but they mentioned some deficits in extreme right-handers and more substantial deficits with relatively similar hand use (ambidexters), those who were “at the point of hemispheric indecision” (Crow et al., 1998).

A study by Domahs et al. (2010) supported the idea that finger-counting habits affect how numbers are processed, with the assumption that this effect is culturally modulated. Bender and Beller (2012) argued that the different types of finger counting all constitute distinct representational systems and explored the cognitive implications of their properties, such as encoding information and representation, ease of learning and mastering a system, and memory retrieval and cognitive load, with suggestions for future research in the field of embodied cognition.

The aim of our exploratory study was to observe qualitatively the patterns by which children use their fingers in counting with regard to hand dominance and cultural background, in two countries, with Western and Eastern European culture and possible different ethnic subgroups. A complementary task was a quantitative analysis to check whether there are any statistically significant correlations between the finger-counting patterns and culture, gender, or marks in math.

Method

Participants

One hundred and twenty children, aged from 10 to 12, of whom 53% were males and 93% were right-handed, from different cultural backgrounds and with their permanent residence in either Spain or Russia, participated in this study. Informed consent was given by their parents and themselves. Their cultural-ethnic origins (about 12% of parents were of mixed cultural groups) were the following: 49% Russia (native); 40% Spain (native); 1-5% Belarus, Ukraine, Israel, Azerbaijan, Armenia, Georgia; and less than 1% Morocco, Japan, India.

Instruments and methodology

The children were tested and registered individually with the following instructions:

- 1) “Please, write your name” (or the child’s writing was just observed during class or when doing homework, to confirm which hand is dominant).

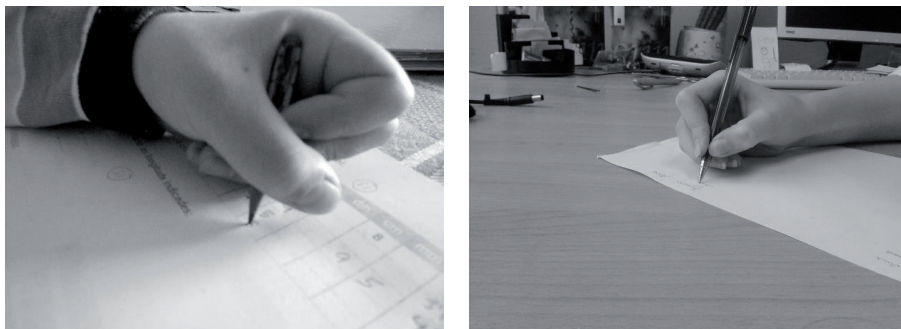


Figure 1. Checking for the active hand in writing (left-hander and right-hander)

Source: Pictures by Liutsko, L. (left: Spain) and Yakupova, V. (right: Russia).

2 “Could you count from 1 to 10 using your fingers, please?”



Figure 2. Finger-counting test (opening fingers, on the left; closing fingers, in the middle; and pointing with the index finger of the other hand, on the right).

Source: Pictures by Liutsko, L. (left: Spain) and Yakupova, V. (middle and right: Russia).

None of the children used or had been taught to use their fingers in counting, either at home or in school. Additional information (cultural background, hand use, grades in math) was obtained from their parents and teachers. The data were processed by Excel and SPSS v.19. *Compliance with Ethical Standards:* All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Results

Children aged 10–12, of whom 53% were males and 93% right-handed, participated in Spain and Russia in the test of finger counting from 1 to 10. Their cultural-ethnic origin (about 12% of parents were of mixed cultural groups) was the following: 49% Russia (native); 40% Spain (native); 1–5% Belarus, Ukraine, Tatarstan, Israel, Azerbaijan, Armenia, Georgia; and less than 1% Morocco, Japan, India.

Since the children were from the whole class/grade group, their marks in math (final mark of the previous semester) were heterogeneous and could reflect average population statistics: 22% “satisfactory,” 62% “good,” and 16% “excellent.” Of the pupils who received an “excellent” mark in math, the following is the percentage distribution for finger counting:

Representation of the number 1: with the thumb 23%; index finger 15%; little finger 62%; and of the number 6: thumb 54%; index finger 8%; little finger 38%.

Way of moving fingers: 69% opened their fingers, 30% closed them, and 1% used open hands and just pointed with the index finger of the other hand to move from one finger to another.

Right hand used to start counting: 87% in the Spanish-based population and 56% in the Russian one. No statistically significant difference was observed in the finger-counting pattern between the two main groups — Spain and Russia; neither cultural influence was statistically significant. 56% in Russia and 77% in Spain used the right hand to start counting; 59% in Russia and 65% in Spain started counting

with the thumb, followed by index, middle, ring, and little finger. The percentages of starting to count with the index finger were 12% in Russia and 6% in Spain; with the little finger, it was 32% and 17%, respectively. The patterns of starting with the thumb, index, and little finger for the number 6 by the other hand were 70% vs. 75%, 5% vs. 4%, and 23% vs. 21% in Russia and Spain, respectively.

Independently of which hand was dominant, the frequency of the pattern thumb-index-middle-ring-little finger in both hands was observed in 59% of families where parents belong to the same culture vs. 50% in heterogeneous (mixed) cultures. Correlational analysis performed for the whole group did not reveal any statistically significant correlation of the finger-counting pattern with such factors as cultural background, gender, or mark in math. However, the difference in the finger-counting pattern was statistically significant ($\rho = .30$, $p = .009$) in relation to hand dominance. Other weak, but statistically significant differences were observed in the patterns of the finger used for the number 1 and the hand chosen to start, with a negative sign ($\rho = .254$, $p = .028$) and between the patterns in fingers used for the numbers 1 and 6 (for different hands), with a positive sign ($\rho = .291$, $p = .011$).

Discussion and conclusion

Although the study was performed in two countries, Spain and Russia, the children represented such cultures as those of Spain, Russia, Japan, Morocco, Armenia, India, Belarus, Ukraine, Israel, Georgia, and Azerbaijan (all of them resided in either Spain or Russia). The most frequent pattern was to start counting using the thumb (the highest frequency observed with either hand), then to start with the little finger and the index finger (the least frequent, although nobody started counting with the middle or ring finger). This pattern is consistent with the results reported by Lindemann et al. (2011), obtained for Western countries, although the preferred hand to start with was the right one here for both Western (Spain) and Eastern (Russia) samples, with all 12 ethnic subgroups.

The preferred hand to start counting with was the right in the Spanish (Western) population, with 77% of total frequency, which coincides with the results of Lindemann et al. (2011) for the Middle Eastern group (Iran) (but not for Western one) and with French (Western) population results in the study by Sato et al. (2008). The Russian results in our study show that in 56% of cases the right hand was used to start and in 44% the left hand. Thus there is no clear preference as to hand in our study, which is comprehensible also since Russian culture is a kind of bridge between Western and Eastern cultures and combines parts of both cultures.

The differences in the frequency of the finger-counting patterns might suggest cultural-individual differences in performance; however, the correlational analysis did not reveal that these differences were statistically significant, either for gender or for mark in math. However, hand dominance was a significant predictor of the preferred hand with which to start counting: Taking into account the negative sign for relationship and the codification pattern used for the fingers (1 — thumb, 2 — index, 3 — middle, 4 — ring, and 5 — little finger), the results suggest that right-handers would prefer to start counting with the little finger and left-handers with the thumb. Moreover, the relationship between the fingers used to start in either

hand (for the numbers 1 and 6) was also statistically significant; since this correlation had a positive sign, the conclusion we derived is that it is more likely use the same finger to start. To sum up, the conclusion from this preliminary study is that we observed some cultural differences in finger counting from 1 to 10, and also in the percentage of which hand and finger was used to start. The preferred finger to start counting was the thumb, then the little finger, and least the index finger.

The pupils who had an “excellent” mark in math performed the preferred pattern for the whole group for numbers 6 to 10, although, the preferred pattern for numbers 1 to 5 was to start from the little finger (higher percentage in use). However, these differences were not confirmed by correlational analysis and a statistically significant relationship was shown only between finger-counting pattern and hand dominance. Further studies with more participants are required to determine the cross-cultural and hand dominance effects on finger-counting patterns.

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Big Five Factors and academic achievement in Russian students

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Background: The Five-Factor Model (FFM) of personality traits is one of the most comprehensive personality models in modern psychology. The traits, or domains, of the model, provide an extensive framework, which allows researchers to analyse the correlation between the aspects of personality and various aspects of social behaviour. Academic achievement is a key factor in a subject's success, and a more comprehensive understanding of its potential factors could improve educational programs and teaching strategies.

Objectives: The purpose of this paper is to consider the correlations between the FFM (Big Five) personality traits and the academic achievement of university students in various fields of study.

Design: This study has adopted a descriptive analytic approach by exploring previous research data. In the present empirical research, the Big Five factors were measured with the Russian NEO Five-Factor Inventory adaptation by S. Biryukov and M. Bodunov. Academic achievement was defined as the average value of the semester final grades. The Spearman correlation analysis was used for statistical analysis. The sample includes 207 first- and second-year university students in the Linguistics Department.

Results: The analysis of the published data revealed that Western psychological studies show that consciousness and openness, two values in the model, are more closely connected with the peculiarities of the students' academic achievement in different fields of study, but similar studies conducted in Russian universities do not fully confirm this data. Findings of our research proved that consciousness is more associated with greater academic achievement of Russian linguistics students in most fields of study compared to the other FFM traits, while other traits showed more specific correlations with particular fields of study.

Conclusions: The data suggests that both environmental and internal psychological factors, such as motivation, intelligence, inclinations, abilities, etc. affect academic achievement. However, further research suggests that volitional and cognitive personality traits considered in the framework of various models of personality may have a great influence on academic achievement and should also be taken into consideration. Personality traits, especially consciousness and openness of the FFM, are significant factors of academic achievement. The associations between academic achievement and FFM traits are more prominent in those fields of study that include such features as their relative

novelty, difficulty or interest for students (Second Foreign Language, Special Disciplines, and Psychology & Pedagogics).

Keywords: Five-Factor Model (FFM), academic achievement, personality traits, linguistics students; Russian NEO Five-Factor Inventory

Introduction

Presently, education may be regarded as an ongoing process that continues throughout one's life. Thus, research into the most important factors associated with academic achievement is one of the key issues to be resolved in psychology.

Modern psychology provides various points of view on this issue, and researchers distinguish different groups of academic achievement predictors (Kappe & Van der Flier, 2012; Gordeeva, 2011; Gordeeva, 2012; Azhar, Nadeem, Naz, Perveen, & Sameen, 2014; Vasileva-Stojanovska, Malinovski, Vasileva, Jovevski, & Trajkovik, 2015; Dhandabani & Sukumaran, 2015; Yushau & Omar, 2015). These factors can be divided into several groups:

- 1) individual features of the students, such as specific abilities, talents, temperament, sex, age, health status, etc.;
- 2) cognitive ability features, mainly one's intellect, level of intellectual development and creativity;
- 3) learning motives and motivation features;
- 4) learning styles or learning strategies;
- 5) personal traits or dispositions;
- 6) various environmental factors, for example, special features of the educational process organisation, culture differences, economic conditions, family conditions, the form of study, etc.

Cross-cultural studies of the factors associated with academic achievement are becoming even more relevant due to the globalisation processes that affect education (among other areas). These studies help to define the influence of different variables, such as personality traits, in different national and cultural samples. We believe that this research direction is highly relevant in the context of the Bologna Process and the formation of the European Higher Education Area (EHEA) and the significantly increased academic mobility of the students.

The purpose of this paper is to consider the Big Five personality traits as the factors of academic achievement in university students across different cultures, as we believe that will be beneficial for higher education teachers working in a new educational environment and dealing with a new brand of international students.

Five-Factor Model of personality (Big Five model) across cultures

Presently, the most common version of the Five-Factor Model (FFM) or the big five model is the one developed by P. Costa and R. McCrae (1992), which is based on a number of previous studies (Tupes & Christal, 1961; Goldberg, 1992; Digman, 1997). The FFM framework states that the factors (also referred to as 'traits' or 'domains') are orthogonal and each of them comprises six facets. The FFM includes such factors as *neuroticism*, *extraversion*, *openness to experience*, *agreeableness*

and *conscientiousness*, which are described in the literature (McCrae & John, 1992; McCrae & Costa, 2004; Furnham, Heaven & 1999; Novikova, 2013; Thompson, 2008; Vorobyeva, 2011).

Cross-cultural studies of the FFM using adapted personality inventories show that the five-factor structure is consistently reproduced in various national samples, although some studies tend to point out insignificant differences in descriptions of certain domains. The original five-factor structure was found in Dutch, Italian, German, Australian, Israeli, Korean, Japanese and other national samples, which suggests that the five-factor structure may be considered as a basic structure of human personality (McCrae, 2002). However, a number of studies show that this structure does not always reproduce, for example, in some cases, a smaller number of factors is obtained, e.g., for the Hungarian sample *agreeableness* is not reproduced (Szirmak & De Raad, 1994), and there are significant difficulties with the reproduction of *openness* in Asian samples. Sometimes, more than five factors are obtained in certain samples (Gurven et al. 2013; Katigbak et al., 2002; Lodhi, Deo, & Belhekar, 2002; Matsumoto & Juang, 2008; Thalmayer & Saucier, 2014; Funder, 2010; Trull & Geary, 1997).

The FFM framework is widely used across many countries to study relations between personal traits and various aspects of social behavior, including Hofstede's cultural dimensions, one's attitude towards health, learning process, profession, computer gaming, etc. (Furnham & Heaven, 1999; Novikova, 2013; Ostendorf, 1990; Fazeli, 2012; Yushau & Omar, 2015).

A number of studies in the Big Five framework were conducted in Russian psychology. The main issues addressed in those studies are the validation of the FFM for the Russian sample, the research of the internal structure of the model (various research data suggests a non-orthogonality of the domains and existence of broader meta-factors), the cross-cultural studies and the research of associations between the Big Five model traits with various aspects of activity, including academic achievement.

Studies concerning the adaptation and validation of the FFM on the Russian sample to create adequate diagnostic tools have been conducted since the 1990s (Bodunov & Biryukov, 1989; Khromov, 2000; Oryol & Senin, 2004; Knyazev, Mitrofanova, & Bocharov, 2010). Cross-cultural and twin studies in the FFM framework should also be mentioned; the results of these studies are consistent with those obtained in other national samples for *extraversion* and *openness* (Nizamova, Ptukha, & Lobaskova, 2013).

However, it should be noted that most Russian studies of the Big Five model in association with other aspects of personality or activity have been conducted since 2010, with earlier research mainly concerning the problem of validation and adaptation of the FFM and its personality inventories. Thus, we can clearly see the increased interest in this model and the relevance of these studies for the development of Russian psychology and psychology in general.

Big Five personality traits as the factors of academic achievement

Recently, a considerable amount of empirical research based on the Big Five model and aimed at the detection of associations between academic achievement and personality traits in students was conducted. A high predictive power of Big Five traits

in evaluating academic achievement was discovered (Entwistle & Entwistle, 1970; Ackerman & Heggstad, 1997; Rosander, Bäckström, & Stenberg, 2011; Salgado & Táuriz, 2014). It was also discovered that *conscientiousness* and *openness* are highly associated with academic achievement in high school and university students (Salgado & Táuriz, 2014; Poropat, 2009).

Conscientiousness is viewed as one of the main predictors of academic achievement in most age groups, e.g. preschool, elementary school, high school, college and university students (Nofle & Robins, 2007) and in adult subjects undergoing additional training (Vedel, 2016; De Fruyt & Mervielde, 1996). *Conscientiousness* shows a high predictive ability of academic achievement over a long period of long time. For example, *conscientiousness* measured on a sample of high school students is positively associated with both the grades received by the same subjects in college (Shiner, Masten, & Robert, 2003) and the results of entrance admission exams (SAT) (Nofle & Robins, 2007). Research demonstrates that high *conscientiousness* may also compensate for a certain degree of deficiency in intellect or cognitive ability (Murray et al., 2014). Most studies conducted on both national and international samples indicate that *conscientiousness* is the main factor (and sometimes the only one) associated with academic achievement (Murray et al., 2014; Duff, Boyle, Dunleavy, & Ferguson, 2004).

Positive associations were found between *openness* and both standard academic grades and, to a lesser extent, cognitive ability (Vedel, 2016). *Openness* showed the most prominent associations with the SAT test results of all the Big Five traits (Nofle & Robins, 2007). However, high levels of *openness* may not always correlate with academic achievement, namely for the academic subjects that require a lesser degree of creativity (to the point where *openness* shows negative correlations with academic achievement in such disciplines) (De Fruyt & Mervielde, 1996; Busato Prins, Elshout, & Hamaker, 2000).

The research indicates certain associations between *neuroticism* and academic achievement (Clough, Oakes, Dagnall, St Clair-Thompson, & Mcgeown, 2016; Rosander et al., 2011). Most studies indicate that *neuroticism* correlates negatively with academic achievement in high school and college students (Clough et al., 2016; Rosander et al., 2011; Shiner et al., 2003).

Studies conducted on national samples, particularly on an Italian sample, revealed negative associations between *extraversion* and academic achievement (Hakimi, Hejazi, & Lavasani, 2011), whereas a study conducted on an American sample revealed a positive association between the two variables (Furnham, Moutafi, & Chamorro-Premuzic, 2005). Most studies, however, do not indicate any degree of association between *extraversion* and academic achievement in students (Nofle & Robins, 2007; Kuncel, Hezlett, Ones, Crede, Vannelli, Thomas, Duehr, & Jackson, 2005), though there are a few studies indicating negative associations (Salgado & Táuriz, 2014; Poropat, 2009).

Some studies reveal a positive association between *agreeableness* and academic achievement (Furnham, Moutafi, & Chamorro-Premuzic, 2005); however, said association is usually indirect and indicates a better adaptation ability of a person with higher levels of *agreeableness*, which transcends to their study habits. In general, the data on this factor is rather insignificant (Salgado & Táuriz, 2014; Nofle & Robins, 2007; Kuncel et al., 2005).

Several studies of the associations between the Big Five traits and academic achievement were conducted on a Russian sample. For example, a study by E. Gavrilova revealed that *conscientiousness* and *agreeableness* may be recognised as more desirable traits in high school students, while *neuroticism* may be recognised as an undesirable trait. *Conscientiousness* also correlates with higher motivation, and *neuroticism* correlates with lower motivation in students (Gavrilova, 2013).

A study conducted by E.V. Kochergina, J. Nye & E.A. Orel (2013) on a sample of students at the Higher School of Economics branch in Nizhny Novgorod is one of the rare Russian studies of the titular problem. The aim of the study was to investigate how the Big Five personality traits contributed to different academic achievements and to compare these findings with those of the Western studies conducted on European and American samples. The authors also analyse the similarities and differences in the psychological portraits of academically successful students in the different countries in terms of the requirements of the educational environment. The authors point out the traditional problem of establishing the success measure variable and conclude that grade point average shows a sufficiently high reliability, and it correlates significantly with other variables, such as the level of intelligence, efficiency of professional activity, professional status, etc. Therefore, in this study, as in most others, grade point average was used as a measure of academic achievement. Big Five traits were measured with a modified Big Five questionnaire consisting of 50 tasks, in each of which the respondent chooses between two given options.

A total of 176 respondents took part in the research, including 70 young men and 106 young women. All the respondents were second- and third-year Russian students of the Economics and Business Informatics Department of the Higher School of Economics branch in Nizhny Novgorod. The Unified State Examination (USE) scores were used for evaluation of academic success prior to university admission, and grade point average was used as a measure of current academic performance. Analysis revealed that *neuroticism* positively correlates with USE scores in math, social studies, Russian language and grade point average. *Agreeableness* positively correlates with USE scores in math and social studies. *Openness* positively correlates with USE scores in social studies. *Conscientiousness* and *extraversion* do not show any associations with GPA, which deviates greatly from the results of Western studies.

The research data indicate that the Big Five personality traits are significant predictors of the USE results, but they do not determine the current academic performance in university, which is confirmed by the results of both regression and correlation analysis. The authors note that the results are only partially consistent with the results of similar studies conducted in Western psychology. Differences in the educational environment of different countries and the various requirements presented by a specific university are listed among the possible causes of these inconsistencies (Kochergina, Nye, & Orel, 2013).

In our opinion, the actual number of Big Five studies in Russia is still too small for the results to be properly compared with those of the Western studies. Thus, further research will be conducted in this direction (Krupnov, Novikova, & Vorobyeva, 2016).

Method

The purpose of the present study was a comparative analysis of the Big Five personality traits and their associations with academic achievement in a sample of Russian university students and as a comparison between the data obtained by the authors and the data obtained in other studies in the FFM framework, both Russian and foreign.

The main hypothesis of the study is that *consciousness* and *openness* are most significantly associated with the academic achievement of Russian university students.

A total of 207 respondents took part in the research, including 41 young men and 166 young women. All the respondents were first- and second-year Russian students of the Linguistics Department of the Peoples' Friendship University of Russia (PFUR). The age of the respondents was from 17 to 25 years; the average age was 19 years. They were advised that participation would be free and voluntary.

To measure the FFM traits, an adapted version of the NEO Five-Factor Inventory was used. The NEO (Neuroticism, Extraversion, Openness) Personality Inventory (NEO-PI), the Revised NEO Personality Inventory (NEO-PI-R), and the NEO Five-Factor Inventory (NEO-FFI) are considered to be the most commonly used versions of the Big Five personality inventories. These versions were designed by P. Costa and R. McCrae (Costa & McCrae, 1989).

The NEO PI-R consists of 240 questions (48 items per domain) and takes about 40 minutes to complete (Costa & McCrae, 1992). The NEO Five-Factor Inventory (NEO-FFI) is a shortened version of the inventory that uses 60 items (12 items per domain) and takes about 15 minutes to complete (Costa & McCrae, 1992).

The Russian version of NEO-FFI, the Five-Factor Inventory (adapted by S. Biryukov and M. Bodunov) consists of 60 questions (direct and inverted) to which the subject expresses the degree of agreement from the five answer choices (from 'strongly disagree' to 'strongly agree'). The resulting values for each of the Five-Factor scales (neuroticism, extraversion, openness, consciousness and agreeableness) range from 12 to 60 points (Bodunov & Biryukov, 1989).

It should be noted that the original NEO-FFI questionnaire and its foreign adaptations use a different assessment range compared to the Russian version. While the answer choices range from 'strongly disagree' to 'strongly agree' for all the versions, the numerical values range from 0 to 4 for the original and most of the Western versions (Costa & McCrae, 1992) and from 1 to 5 for the Russian version (Bodunov & Biryukov, 1989). This point should be considered when comparing the mean values of the traits in Russian and international research.

Academic achievement was assessed as the grade point average (GPA) of a subject in a certain field of study. The GPA was calculated based on the final grades received by the subject in all the specific courses that are included in a field (the raw grades range from 0 to 100). All the specific courses were divided into 5 groups, or fields, based on the national standard for the direction and curriculum (Ministry of Education and Science of the Russian Federation, 2010), which includes such units as General Education Disciplines, Special Disciplines and Foreign Language. It should be noted that the Special Disciplines field includes Psychology, Pedagogics, and Methods of Teaching Foreign Languages and Cultures, and the Foreign Language field includes both the first foreign language (English) and the second

foreign language (selected by the student). However, given that during the final qualification tests (state exams) the subjects pass three exams, namely The Main Foreign Language (English), The Second Foreign Language and Methods of Teaching Foreign Languages and Cultures (which includes three questions, one in psychology, pedagogy and the teaching methods), we found it possible and necessary to divide these courses into separate fields.

Thus, the following fields were distinguished:

- 1) the English Language (as the basic course for the given sample, both in relevance and in the time spent on the study. NB: most subjects have studied English in high school, thus at the university they usually start at the intermediate level);
- 2) the Second Foreign Language (usually German, French, Italian, Spanish or Chinese, selected by the student);
- 3) Special Disciplines (Russian Language and Culture of Speech, Introduction to Linguistics, Indo-European Languages, Introduction to Special Philology, Theoretical Grammar, Theoretical Phonetics, Stylistics of the Russian Language, Comparative-Historical and Typological Linguistics, Introduction to the Theory of Intercultural Communication);
- 4) General Education Disciplines (History, Culturology, Sociology, Educational Anthropology, Philosophy, Political Science, Law, Economics);
- 5) Psychology & Pedagogics (Psychology, Pedagogics, Methods of Teaching Foreign Languages and Cultures).

The number of students who received grades in each field differs from the total of 207 subjects for such fields as the Second Foreign Language (165 subjects) and Psychology & Pedagogics (173 subjects) due to the fact that the sample consisted of first- and second-year students. First-year students do not study a second foreign language nor do they take any of the psychology and pedagogics courses. Eight subjects did not receive any grades in the Second Foreign Language by the time the study was conducted.

Results

Big Five data

At the first stage of the study, we examined the mean values of each of the Big Five domains (See Table 1).

The results show that consciousness (44.32) is the most prominent trait in the sample, followed closely by extraversion (42.98), openness (40.47) and agreeableness (40.73). Neuroticism is the least prominent trait in the sample (34.07). Previous research data suggests a degree of gender differences in the mean values of the traits. In the given sample, women show higher mean values for all traits (except agreeableness) compared to men.

These results match the results of various Western and Russian studies. The data suggest that women usually tend to show higher mean trait values than men and that *neuroticism* is usually the least prominent trait in a given sample (McCrae, Costa, 2004). Thus, the results of this study are in accordance with other studies of the Big Five model.

Table 1. Means and standard deviations for the sample (n=207), broken down by sex (raw scores)

Big Five traits	All subjects		Men		Women	
	Mean	SD	Mean	SD	Mean	SD
Neuroticism	34.07	7.20	32.20	6.39	34.54	7.33
Extraversion	42.98	7.45	41.44	9.06	43.36	6.97
Openness	40.47	5.44	39.68	5.44	40.66	5.44
Agreeableness	40.73	6.19	40.73	7.18	40.73	5.94
Consciousness	44.32	7.04	43.15	8.08	44.61	6.76

Correlation analysis

At the second stage of the study, we examined correlations between Big Five traits and academic achievement in the sample. Spearman correlation analysis resulted in 8 significant correlations out of 25 possible correlations (See Table 2).

Table 2. Spearman correlations between Big Five traits and academic achievement by field

Big Five traits	English Language	Second Foreign Language	Special Disciplines	General Education Disciplines	Psychology & Pedagogics
	N=207	N=165	N=206	N=207	N=173
Neuroticism	.056	-.158*	.002	.066	.014
Extraversion	.111	.240**	.139*	.042	.124
Openness	.043	-.026	.125	.104	.152*
Agreeableness	.087	.096	.073	-.002	.018
Consciousness	.071	.328**	.236**	.167*	.195**

Note. * $p < .05$, ** $p < .01$, two tailed.

As expected, most of the significant and positive relationships are between academic achievement and **consciousness**. **Consciousness** correlates positively with academic achievement in the Second Foreign Language ($r = .328$, $p < .01$), Special Disciplines ($r = .236$, $p < .01$), General Education Disciplines ($r = .167$, $p < .05$), and Psychology & Pedagogics ($r = .195$, $p < .01$), i.e. students with higher levels of **consciousness** tend to score higher in these fields.

But only one positive correlation was obtained between **openness** and academic achievement in the Psychology & Pedagogics ($r = .152$, $p < .05$), i.e. students characterised by higher levels of **openness** tend to score higher in this discipline.

At the same time, **extraversion** correlates positively with academic achievement in the Second Foreign Language ($r = .240$, $p < .01$) and Special Disciplines ($r = .139$, $p < .05$) fields, i.e. students with higher levels of **extraversion** tend to score higher in these fields.

Only one inverse correlation was obtained between **neuroticism** and academic achievement in the Second Foreign Language ($r = -0.158$, $p < 0.05$), i.e. students characterised by higher levels of **neuroticism** tend to score lower in this discipline.

No significant correlations were obtained between **agreeableness** and academic achievement, which is consistent with other studies.

Conclusion

The purpose of this paper is to consider Big Five personality traits as the factors of academic achievement in Russian university students and to compare the present results with the results of previous research, both Russian and foreign. Based on an analysis of the published data, we surmise that such Big Five personality traits as **conscientiousness** and **openness** are more closely connected with the peculiarities of the students' academic achievement in different fields of study. Formulating the hypothesis of this study, we relied, first of all, on the results of numerous foreign studies, since there are few similar studies in Russia, and their results are rather contradictory.

Indeed, we found that **conscientiousness** has the greatest number of positive correlations with the academic achievement in Russian linguistics students. These results are consistent with the results of other Big Five studies, which consider **conscientiousness** as the prime factor used to predict academic achievement. Our research shows that **conscientiousness** is associated with higher academic achievement in different fields that imply various kinds of subjects' activity in the course of study, which corresponds with this thesis. However, academic achievement in the English language does not show any associations with **conscientiousness**, which, in our opinion, is due to the fact that the English language is viewed as the main discipline; thus, the subjects tend to work harder to score higher in this field regardless of their individual level of **conscientiousness**.

However, **openness** displays only one positive association with academic achievement, namely with Psychology and Pedagogics. This result is consistent with the main feature of this field namely the fact that Psychology and Pedagogics are the most unexpected for the subjects and require them to leave their comfort zone of study to try something seemingly unrelated to their educational specialisation. The association between **openness** and psychology as an academic discipline was found in various instances of research and requires further study.

As mentioned in the literature review, research shows that **extraversion** tends to display inconsistent associations with academic achievement, depending on other circumstances (Furnham, Moutafi, & Chamorro-Premuzic, 2005; O'Connor & Paunonen, 2007; Nofle & Robins, 2007). **Extraversion** characterises the general level of a subject's activity. The Second Foreign Language and Special Disciplines require a great degree of individual activity to master the courses due to the subject's lack of experience in these fields, thus this correlation is coherent.

Neuroticism is usually associated with struggles and difficulties in various types of behaviour and activity, including education and is sometimes viewed as a predictor of lower grades (Ackerman, Chamorro-Premuzic, & Furnham, 2011; Rosander, Bäckström, & Stenberg, 2011; Shiner, Masten, & Robert, 2003). Our research shows that this correlation is specific for the Second Foreign Language. Thus, we conclude

that this association is influenced by special features of the discipline, namely the fact that a second foreign language is selected by students themselves, therefore they are in fact more responsible for their grades compared to a mandatory discipline. This situation may provoke additional stress, which may lead to lower grades for a student with higher *neuroticism*. The other fields are either mandatory or familiar to the subjects, which results in a lack of association between these fields and *neuroticism*.

We would also like to mention that the results obtained by the authors are closer to the results of similar foreign studies. As a possible cause, we see the fact that we used a grading system similar to the international variations instead of the traditional 5-point system used in Russia.

Another significant feature of the studies of the correlations between the FFM factors and academic achievement on any sample is the fact that *consciousness* seems to be the universal success factor. A closer analysis of these studies allows us to hypothesise that the educational (and, therefore, grading) systems are focused on correct and meticulous task completion and overall performance but does not take into account the aspects of the learning process related to creative thinking, non-typical problem solving and soft skills formation. We see that as an inherent drawback of the current international education systems, but this problem demands special attention and a different methodical approach, which may be a direction for future research.

Summing up the results of the study, it can be concluded that:

1. *Consciousness* as a Big Five trait shows the most prominent association with academic achievement in different fields of study, which is consistent with the aforementioned thesis and various research data of the Big Five model.
2. Academic achievement displays a greater association with Big Five traits in those fields of study that include such features as their relative novelty, difficulty or interest for students (the Second Foreign Language, Special Disciplines, and Psychology & Pedagogics).
3. The results of the study are more consistent with those of the Western studies compared to other research conducted on the Russian sample. This might be due to both differences in the academic achievement assessment method (as most Russian universities use a traditional 4-point assessment system as opposed to the 100-point system used in Western universities) and the version of the five-factor inventory used in a specific study.
4. Prospects for research related to the study of the Russian students of other subject areas (for example, psychology, physics, economics, etc.).

Limitations

There are several limitations to our study that should be considered when conducting future research in this area. First, one limitation is the sample size and its gender composition. Because linguistics is a more popular major among females, the sample is not balanced enough in the female-to-male ratio. As the study of gender

differences was not an objective of our research, we found it acceptable to ignore the imbalance.

Another possible limitation of this study was the measure used to collect the data. The FFM personality traits can be measured with various tools, the most popular being self-questionnaires. In our study, we used an adapted version of the most common questionnaires, NEO-FFI. This version, however, is a shortened version of NEO-PI, which could provide more extensive data, but it is not yet available in the Russian language.

A related limitation is a certain lack of prior research studies on the topic. There is a formidable amount of data available on FFM traits and their association with various aspects of social behaviour, however, only a small fraction of this data was obtained on a Russian sample, which makes it difficult to compare our results with other researchers' results and to provide a more comprehensive outlook on the cultural features.

To further this research area, future studies should consider a more balanced sample unless the gender or another imbalance can be viewed as a feature of the sample (e.g. military sample, which is male dominant). The FFM traits assessment tools are constantly being improved, which suggests the possibility of an adaptation of the NEO-PI questionnaire. We believe that data collected with the full version of the questionnaire will provide a better understanding of the problem discussed in this article. As a result, more studies will be conducted, thus providing more culture-specific data for a Russian sample to use as a baseline for future research.

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SOCIAL PSYCHOLOGY

Socio-cultural differences in the self-descriptions of two groups of Azerbaijanian students learning in the Russian and Azerbaijani languages

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Background: The dimension of individualism-collectivism is regarded as one of the most important cultural factors that influence a person's self-consciousness, and help shape his/her sense of self as independent or interdependent. Moreover, studies support the conclusion that the salience of both tendencies may vary not only within a single national culture (depending on the place of residence, language environment, etc.), but also on the level of the individual self (depending on the current situation). In our research we have assumed that the language environment (receiving education in one's native or a foreign language) acts as a socio-cultural factor affecting the self-concept of students of the same nationality—more specifically, the intensity of their individualistic and collectivistic characteristics.

Objective: Finding socio-cultural differences in self-image between two groups of Azerbaijanian students (learning in Russian and Azerbaijanian, respectively).

Design: The sample included one hundred students from Baku colleges and universities equally divided into two groups. Participants in the first group were studying in Azerbaijani while those in the second group were learning in Russian. We collected data in the form of open-ended self-descriptions. We examined these texts using content-analysis procedures. Then we calculated correlations between certain defined characteristics for each group.

Results: The self-descriptions produced by students learning in Azerbaijanian contained the following features: norm compliance as a significant factor in emotional well-being; self-criticism related to negative feelings and expectation of outside criticism; the prevalence of self-justification and bravado as basic forms of psychological defense, combined with the lack of self-enhancement; and focus on society and interpersonal relations affecting the respondents' inner feelings. The second group's (those learning in Russian) self-descriptions featured positive self-esteem as an important component of emotional well-being. Self-criticism was not associated with negative feelings and oth-

ers' judgments. In the texts of Russian-speaking students there was a tendency to use self-embellishment as a way of self-enhancement. This group was less inclined to focus on society.

Conclusions: The characteristics of these two groups' self-depictions gravitated toward two different self-constructs: independent (for those learning in Russian) and interdependent (for the participants learning in Azerbaijani), the division being in line with the individualistic and collectivistic culture, respectively.

Keywords: Self-attitude, self-consciousness, open-ended self-descriptions, psychological defense strategies, socio-cultural differences in self-descriptions

Introduction

Self-concept, self-image, and self-attitude aren't just individualized intimate aspects of our mind that reveal the uniqueness and individuality of our person. They also have certain common properties determined by the socio-cultural context in which they were formed and function. There has been a powerful tendency in Russian psychology to emphasize the socio-cultural influence on the formation of the human psyche. This primarily goes back to the cultural-historical approach founded by L. Vygotsky and A. Luria. Using this approach, Luria (1974) carried one of the first cross-cultural studies of self-consciousness in Uzbekistan (1931-1932). His research showed that awareness and evaluation of one's own psychological characteristics is a process that develops under the direct influence of a person's social experience—i.e., one's conditions of social existence. The influence of social media on different aspects of self-concept was explored in works by such Russian authors as I.S. Kon (1984), P. Tulviste (1988), T.G. Stefanenko (1999), and others.

In foreign cross-cultural studies, special attention has been paid to the dimension of individualism-collectivism since the 1990s. This kind of framework led to the development of the self-construals theory (Markus & Kitayama, 1991; Voyer & Bradley, 2014), which allows us to comprehend cultural influences on self-consciousness in terms of individualism and collectivism as key values. According to this theory, individualistic and collectivist cultures affect the self-consciousness in different ways, thus producing one of two types of self-construal: the independent self and the interdependent self, respectively. Individuals possessing the independent self-consciousness are characterized as free-spirited, competitive, and self-sufficient. They seek success, self-actualization, and self-expression. This is accompanied by a higher level of self-esteem, which is based on personal success and achievements. There is also a strong tendency to build up a positive self-attitude (self-enhancement).

The interdependent self, on the other hand, focuses on the desire to create a harmonious relationship with others. Individuals with this type of self-construal are sensitive to external evaluation, and feel the need to be accepted by others, and to comply with intragroup norms and values. Such representatives of collectivistic cultures are ready to sacrifice their independence and individual freedom in order to reach agreement with other members of the group and avoid social rejection. Generally, they tend to be more self-critical, have a lower level of self-esteem, and are less likely to build up a positive self-attitude.

The empirical support for these differences can be found in several studies. They have shown that representatives of individualistic cultures consider positive information about themselves more relevant than negative when it comes to assessing their personality. On the contrary, those representing collectivist cultures view themselves in the light of negative information (see Oyserman, Coon, & Kimmelmeier, 2002 for meta-analysis). In one of the studies, American and Japanese students assessed the way imaginary situations of success or failure impacted their self-esteem. The results showed that the Americans believed that they would be more influenced by success than by failures, and thus experience an increase in their self-esteem. In the case of the Japanese participants, failures had a greater impact (although negative) on their self-esteem (Kitayama, Markus, Matsumoto, & Norasakkunit, 1997).

There is additional evidence demonstrating that individualism stimulates the tendency toward self-enhancement. It is the so-called above-average effect—i.e., when respondents rate themselves above average when it comes to the majority of desirable qualities (Heine, Lehman, Markus, & Kitayama, 1999). This effect—as well as the disposition to favor oneself over other people and the tendency to recall personal achievements and positive events preferentially, while attributing positive characteristics to one's self—relates to self-empowerment strategies aimed at maintaining and enhancing one's self-esteem.

In the above-mentioned article “Is there a universal need for a positive self-regard?” Heine and his colleagues (1999) developed the idea that the differences between North Americans and Japanese are mostly determined by their divergent cultural values. The formation and maintenance of the independent self in individualistic cultures becomes possible because society approves such qualities as successfulness, self-confidence, competitiveness, and high self-esteem. The possessor of such characteristics thinks of herself or himself as an adequate and valuable member of society, thus gaining positive emotions and a sense of satisfaction. Therefore, this person is highly motivated to strengthen positive feelings about herself or himself.

In collectivist cultures, the social values call for harmonious relations with members of other groups and adherence to societal norms. It is quite possible for striving for positive self-esteem to come in conflict with such values. Thus, in this case, positive emotions are not associated with a sense of superiority and high self-worth; they are rather the product of experiencing conformity and peaceful coexistence. That is why a person with such characteristics doesn't prioritize the need to enhance and maintain self-esteem.

According to the authors of this study, one of the cultural norms in Japan is the need for self-improvement; this norm explains the reasons for national self-criticism and the propensity to experience failures as more relevant to one's sense of self. A Japanese person signals to others that he or she is aiming at self-improvement by criticizing himself or herself, and by fixing personal shortcomings. In this way he or she considers himself or herself to be a worthy member of society.

Another important consequence of the social focus in Japan is the heightened awareness of one's audience, both external and internal, and the desire to meet its

expectations. Thus, the authors conclude that the self-enhancement motivation is virtually nonexistent for an average Japanese person, who is rather driven by the motivation for belonging, conformity, and self-improvement.

Further cross-cultural studies researching the differences between collectivistic and individualistic cultures have both verified the phenomena revealed in this study, and challenged these radical views from several points of view.

For example, in his research Kurman (2001, 2003), an Israeli psychologist, aimed to prove that representatives of collectivist countries also seek to improve and maintain their self-esteem. For this purpose, the researcher analyzed the relationship between self-enhancement and the experience of inner well-being. The study actually showed the importance of the self-enhancement motivation for a number of collectivistic cultures, with the exception of the case of Japanese respondents, who showed no significant correlations between positive emotions and positive self-esteem. According to Kurman, the fact that the positive self-concept of the Japanese was not accompanied by positive feelings, indicated the influence of additional cultural factors, e.g., social censure of positive self-esteem and praise for modesty.

However, the roles of modesty as a factor decreasing self-esteem and of the self-empowerment tendency in collectivistic cultures are still being questioned. Some data suggest that modesty here is external in nature; it is to be considered a tribute to cultural demands and conceals a sense of internal self-respect which is universal in all cultures (Yamaguchi & Greenwald, 2007). Other studies assert that self-criticism is deeply rooted in collectivistic cultures (Heine et al., 1999).

Another vector of research in this area advances the idea that the motivation for improving and maintaining self-esteem is universal for all cultures, but has its own specifics in each case. Then, two types of psychological defense strategies are outlined: the first one involves improving self-esteem, while the second strategy calls for self-protection. Representatives of individualistic cultures usually prefer to enhance self-esteem: they accentuate and sometimes exaggerate their assets. This strategy is associated with such tendencies as concentrating on achievements and making social comparisons in one's own favor.

Representatives of collectivistic cultures of East Asia, on the other hand, are prone to self-protection: they deny or justify their shortcomings. This type of strategy is related to conformity and to avoiding the violation of social standards. Being more sensitive to negative feedback and considering it more significant to the self-concept these people try to defend their self-esteem in advance by justifying themselves, or proving the injustice of the expected criticism (Hepper, Sedikides, & Cai, 2013).

While recognizing the universality of the motivation to improve and maintain self-esteem, many authors think that the differences between cultures are based on what are considered key characteristics for self-attitude. It has already been shown that the level of global self-esteem is high in all cultures, but this conclusion requires elaboration as to what contributes to a sense of self-esteem. Representatives of collectivism find the sphere of interpersonal relations more relevant, and communication skills more significant. In the case of individualism, the sphere of personal achievements and business-like qualities are more important. The results

of the research demonstrate that the levels of self-regard and sympathy for oneself differ significantly in these two types of cultures: in the case of the collectivist culture, self-liking makes a greater contribution to overall self-regard, and in the case of the individualistic, that role belongs to self-competence (Allik, 2005; Kurman, 2001; Tafarodi, 1999).

Recently, the concept of pan-cultural self-enhancement has become significantly widespread. According to this concept, the individualistic dimension is important for the self-consciousness in both types of cultures, and the current trend consists in gradually shifting from the collectivistic interdependent self towards the independent self. The research results have shown that dwelling in modern cosmopolitan megalopolises contributes to strengthening the individualistic self, while living in small towns or rural areas reinforces the collectivist self (Kashima et al., 2004; Yamagishi, Hashimoto, Li, & Schug, 2012). However, there is also an inverse relationship: the results of another study indicate that people choose their place of residence depending on their dominant tendency. For example, individuals with a view of themselves as independent and a high level of individualism prefer living in big cities. That is not the case for those possessing the interdependent self (Kitayama, 2014; Sevincer, Kitayama & Varnum 2015).

Overall, the current trend in cross-cultural psychology is to avoid asserting the flat-out opposition of the two cultures, and to dismiss false generalizations regarding their influence on a person's psychological characteristics. Instead of considering collectivism and individualism as the poles in one dimension, it is suggested to view them as two independent dimensions that are found to a certain extent in all societies, and influence which psychological processes come to the fore, depending on the situation (Neuliep, 2017; Oyserman et al., 2002). For example, according to one meta-analysis (Oyserman et al., 2002), in spite of American culture being traditionally described as highly individualistic with hardly any collectivistic tendencies, it turned out that the United States can rival Japan's collectivist trend under certain conditions. Oyserman and colleagues offer the following explanation regarding the mechanism of cultural influence on psychological processes: a person will rely upon the dimension that he or she finds most relevant and essential under particular circumstances. This hypothesis has been confirmed in a number of studies with the help of a priming procedure (Oyserman & Lee, 2008; Guitart & Gómez, 2011).

Research problem statement

Our work is aimed at studying the differences between the characteristics of self-consciousness of two groups of respondents formally belonging to the same culture (Azerbaijani students from Baku universities), but immersed in different language environments. In general, Azerbaijan is usually included in the list of collectivist cultures, although, according to some sources, the collectivist tendencies in the country are comparatively moderate compared to the rest of the Caucasus region (Matosyan, 2015). We have assumed that the self-consciousness of Azerbaijani students whose education is provided in a different language environment (in

our case, Russian-speaking) differs from the self-consciousness of their countrymen who study in their native language.

For historical reasons, the Russian language has long been used as a means of interethnic communication. During the Soviet period, knowledge of Russian guaranteed better opportunities for one's education and career. That fact contributed to Russification until the 1990s, and created a strong contrast between those who knew Russian and the Azerbaijanian-speaking inhabitants of provinces. In spite of its weakening influence, Russian remains the second most widely spoken language in Azerbaijan. Its prevalence is especially strong among intellectuals, mainly in the fields of science and education (Huseynov, 2016). Due to this background, it is plausible to assume that those studying in Russian would be less exposed to the cultural influence of the traditional mentality, and their self-concept and self-attitude would most likely correspond to the average parameters of city dwellers—that is, closer to the individualistic rather than the collectivist self.

As for how to characterize to which camp Russian culture belongs, the empirical findings regarding the issue are few and very contradictory (Arutunyan, 2016; Geert-hofstede.com, 2017). But this is not so important to our study because, in our case, the key factor was not the influence of a particular national culture, but the very fact of studying in a foreign language, which in itself symbolizes the respondents' belonging to a group of modern cosmopolitan youth. Thus we can leave aside the analysis of the Russian mentality per se.

Goals and tasks

Our objective consisted in studying the socio-cultural differences of the self-concept in two groups of Baku students learning in Russian/Azerbaijani.

We set the following tasks:

1. Identify similar ways of viewing oneself, i.e., general patterns of self-description characteristic of both samples;
2. Identify specific patterns that reflect the distinctive features of self-consciousness and self-attitude in each of the two groups.

Method

We chose the method of open-ended self-description (Vizgina, 2011) as an instrument for providing spontaneous actualization of an individual's self-image. This technique is aimed at revealing not only the content of one's self-image and self-attitude (personal qualities coming into one's focus of attention), but also the stylistic and formal characteristics found in the stories about one's self which reflect one's hidden self-attitude, emotional tone, and psychological defense strategies. Therefore, this method can be used to uncover layers of experiences the impact of which a person is not fully aware. Thus, it opens access to real, sometimes contradictory and ambiguous, spontaneously developing processes of self-consciousness.

Research strategy

Our research strategy consisted of finding relationships between various aspects of self-descriptions within each of the compared groups. In traditional correlation

studies, each parameter is identified using a separate questionnaire or scale which is based on self-reporting. In our case, these same aspects of self-image were identified with the help of textual self-expression. These kinds of texts are instant slices of ongoing self-processes which involve not formally related, but actually related aspects of self-attitude, self-concept, strategies for maintaining self-esteem, and emotional tone. We didn't ask participants what feelings they usually experience so that we could compare them with their self-esteem: We singled out these emotions from the text they wrote. Not only did the respondents talk about these emotions, but they also displayed them in connection with a specific topic regarding their personality. Thus, the relationship we observed between the given aspects of self-image, emotional sphere, and psychological defense tendencies shouldn't be random, but should reflect the real processes of how the students experienced themselves in a particular situation. By identifying the relationships between different parameters of self-descriptions, we were able to answer the following questions regarding each group:

1. What is the emotional meaning of positive and negative self-esteem in each group? What is the predominant motivation: self-enhancement or avoiding criticism?
2. What are the reasons for either a positive and negative self-attitude, and what aspects of self-concept are relevant to determining self-attitude?
3. How effective are different psychological defense strategies? How are they related to the individual's emotional tone and self-attitude? On whom subjects focus these strategies: themselves or others?

If the characteristics of the self-descriptions fit the known differences between the independent and the interdependent selves, it could be concluded that these characteristics were related to the culturally specific aspects of self-image and self-attitude, namely, the parameter of individualism/collectivism. In this case it was rather a matter of identifying implicit manifestations of independence and interdependence (Kitayama et al., 2009).

Procedure

The sample included 100 Baku students from Azerbaijan Technical University, the National Aviation Academy, and the Azerbaijan Tourism Institute. The average age of the participants was 19.5 years ($SD = 0.5$). All the students were born and raised in Azerbaijan. They were divided into two groups with an equal gender proportion. Each group consisted of 50 participants. The first group included people studying only in Azerbaijanian who don't speak Russian. The second one contained bilingual participants studying in Russian. Foreign language learning in Azerbaijan usually begins in secondary school and continues at the university level. N.I. Gasanova, a student at the Faculty of Psychology, Moscow State University, provided assistance with our research.

Our respondents were given the following instruction: "Describe yourself in a way that someone can understand what kind of person you are."

The textual analysis of the self-descriptions was done on the basis of already existing analytical categories embodying various content, stylistic, and formal aspects of the participants' self-image and self-attitude. When coding the texts, we used special instructions and 14 categories (grouped into five main blocks for simplicity purposes); these are described later in this article. The system of categories, proposed by Anna Vizgina, had already proven to be a valid tool for text analysis (Vizgina, 2001; 2013). Most categories (with the exception of the integral parameters) were identified "on the first appearance," i.e., the presence of a category was recorded on the basis of a single appearance with the help of binary classification (1–0).

The reliability of the procedure was ensured by the careful design of coding instructions for every category. This was done by specially trained experts: several psychologists, two of whom were native speakers of both Russian and Azerbaijani, and the rest Russian-speaking. The coding procedure was carried out by two independent experts in each language; then the coding instructions for a number of questionable categories were coordinated in order to achieve the maximum consistency. After that, we calculated Kendall's coefficient of concordance: its values for different measurements ranged from 0.7 to 0.9 at a significance level of not less than 0.05.

Then, the results of the coding procedure were used to obtain an intercorrelation matrix for all the measurements for each group of respondents. We chose Spearman's rank correlation coefficient. The data processing was done in the software package SPSS, version 15.

Categories

In accordance with our research tasks, we chose the following categories of content analysis:

1. Integral evaluation of the emotional tone (parameter *Optimism/Pessimism*)
2. Themes in self-descriptions, including personal traits, intentions (motives, aspirations, and interests), relationships with others, and biographical facts
3. Dominant perspective in self-descriptions, which could be either internal (a description of one's experiences, problems, and reflections) or external (a description of oneself as viewed by others, including appearance, opinions, and assessments)
4. Self-attitude expressed in the text, including self-criticism, self-acceptance, and self-respect
5. Psychological defense tendencies, including self-justification, excessive self-praise, bravado, and normativity (indications of one's correctness, conformity, and normality)

Results

The results of the correlations calculated for each sample can be found in the table below.

Table 1. Comparison of the correlations between the parameters of self-description in the two groups of respondents

Parameters of self-description	Respondents studying in Russian	Respondents studying in Azerbaijanian
Optimism/Pessimism	+: Self-acceptance **, Excessive self-praise**	+: Normativity*, Facts** -: Self-criticism**, Self-justification*, Internal perspective**, Bravado*
Self-criticism	+: Internal perspective**, Description of traits* -: Normativity*	+: Internal perspective**, External perspective*, Self-justification* -: Optimism**, Facts*
Self-acceptance	+: Optimism**, Self-respect*	+: Relations with others**
Self-regard	+: Self-acceptance*, Excessive self-praise*, Intentions*	-: Normativity*
Excessive self-praise	+: Optimism**, Self-respect*, Normativity*	+: Description of traits*
Self-justification	+: Relations with others**, External perspective**	+: Relations with others**, External perspective**, Self-criticism**, Bravado**, Internal perspective*; -: Optimism**, Intentions**, Facts*
Bravado		+: Self-justification**, Pessimism**, Relations with others*, External perspective*, Self-criticism, Facts**, Intentions*, Optimism**
Internal perspective of self-description	+: Self-criticism**, Description of traits** -: Normativity**	+: Self-criticism**, Relations with others*, Self-justification*, Pessimism** -: Facts*
External perspective of self-description	+: Self-justification*	+: Self-justification**, Self-criticism*, Bravado* -: Facts*, Intentions*
Relations with others	+: Self-justification**	+: Internal perspective*, Self-justification**, Self-acceptance**, Bravado*
Normativity	+: Excessive self-praise* -: Internal perspective**, Self-criticism**	+: Optimism** -: Self-respect*

Note: * = 5% significance level; ** = 1% significance level.

Discussion

Self-attitude and the emotional tone of self-description

Our results showed that the emotional tone of self-description had a specific psychological meaning for each group. In the Russian-speaking cluster, a positive tone was associated with a positive self-attitude (self-acceptance and excessive self-

praise). Moreover, the parameters of emotional mood and self-criticism weren't negatively correlated. That is, these respondents tended to experience positive emotions by demonstrating self-acceptance and praising themselves, while their self-criticism was not accompanied by emotions of the opposite kind. Although the use of correlations hardly allows us to make any definite cause-effect conclusions, we may still assume that positive self-attitude and self-praise had a greater influence on the respondents' mood than the depressing effect of negative self-attitude. The point is that a positive self-attitude is an important component of a feeling of inner well-being.

According to those who support the idea that one's self is culturally specific, such a combination is characteristic of people representing individualistic cultures (Heine, et al., 1999; Kitayama et al., 1997). This result also is coherent with the tendency to perceive success as a factor increasing self-esteem, while failures do not influence people's self-concept as much (Kitayama et al., 1997). Thus, we may assume that the respondents in the Russian-speaking sample had a clear self-enhancement motivation, which is characteristic of individualistic culture.

In the group studying in Azerbaijanian, we had the opposite situation: a negative emotional tone was associated with self-criticism, while optimism had no significant correlations with positive self-esteem or self-acceptance. In the case of these students, positive self-esteem was not an important component of a sense of general inner well-being as opposed to negative self-esteem (self-criticism), that turned to be a significant element of negative mood. The fact that self-criticism had a more considerable influence on the student's mood corresponds to the already mentioned collectivistic tendency, especially characteristic of Japanese culture (Kitayama et al., 1997), where negative situations are viewed as being more relevant to one's self-esteem. That is, this result possibly means that, in the case of Azerbaijani-speaking students, self-attitude also plays an important role in regulating their emotional tone, but in a negative way. The respondents aren't that interested in feeling positive about themselves, but they would rather not feel negative about themselves, thus demonstrating a motivation for avoiding negative self-esteem.

In general, the self-concept of the Azerbaijani-speaking participants was penetrated with self-criticism to a greater degree, which was indicated by a larger number of significant positive correlations with such aspects of self-description as pessimism, self-justification, bravado, and internal and external perspectives. In the Russian cluster, self-criticism was less penetrating and negative. It was indicated by a smaller number of correlations with the other aspects of the self-image. Also, there were no correlations between this parameter and pessimism. Neither did it correlate with self-justification. Perhaps there was no need for self-justification precisely because self-criticism here wasn't so self-deprecating, and turned out to be more constructive in nature.

Some research data show that, on average, levels of self-esteem are higher in the representatives of individualistic cultures compared to those in collectivistic cultures, who have a more pronounced tendency towards self-criticism. For this reason, it's possible to conclude that the self-consciousness of the respondents who studied in Russian tended to be individualistic, while the self-consciousness of the students studying in Azerbaijanian tended to the opposite pole of the individualism-collectivism continuum.

Psychological defense strategies

We have already described two strategies of psychological defense, each of which exhibit a different type of psychological defense motivation: the first strategy is to assert the presence of positive traits in oneself, and the second strategy is to deny having negative traits. It has been empirically confirmed that the former is related to the individualistic self and has the function of self-promotion, while the latter is specific to the collectivist self and functions as self-protection (Hepper et al., 2013). Our data makes it possible to specify the exact forms that these strategies took in the texts of self-depictions.

First, we will discuss self-embellishment. In the self-description texts, this was expressed by an exaggerated emphasis on one's merits and achievements. It seemed that the student was striving to impress the reader and get the other's admiration. Such statements are a form of realizing the self-enhancement tendency: to increase one's self-esteem by convincing the other person and oneself that the subject deserves his or her positive self-attitude. It is a way to secure inner comfort and positive emotions. In our study, this strategy turned out to be effective for the group of students learning in Russian, as was demonstrated by the positive correlation between excessive self-praise and the optimistic tone of the text.

There were no significant correlations of that kind in the Azerbaijanian sample. Apparently, self-embellishment wasn't relevant for this group.

Another form of self-defense strategy is self-justification. Self-justifying statements are aimed at denying or minimizing one's shortcomings and failures. Searching for excuses and mitigating factors is a way to avoid personal responsibility. The meaning of such statements could be summed up in the phrase: "I'm not as bad as you might think."

The self-justification expressed in both study groups was related to the external perspective of self-description (viewing oneself through another's eyes), as well as to the topic of interpersonal communication. The first connection could be interpreted as a tendency to protect oneself from the expected criticism of a significant other. The second correlation suggested that the most frequent subject of self-justification is relations with other people. The respondents were prone to justify themselves in response to possible accusatory reactions regarding their mistakes and shortcomings, as manifested in interpersonal communication. These correlations allowed us to link this type of statement to the previously mentioned protective strategy intended to repulse and deprecate criticism by others. Thus, the internal dialogical character of this strategy is common to both samples: those who use it are trying to defend themselves in an internal dialogue with an image of the social other.

However, we also found evident differences between the samples. First of all, self-justification in the texts of the Azerbaijanian-speaking students was connected to self-criticism and the internal perspective of self-description. That means that these respondents tried to justify their imperfection not only in the face of an imaginary external critic, but also in front of themselves. Moreover, the process of defending oneself is related to one's individual inner experiences. Thus this tendency turned out to be more deeply rooted in the self-concept of the respondents who studied in Azerbaijanian. Unlike in the case of those learning in Russian, it wasn't just related to the external view of the other and the expectation of criticism. It was also linked to inner experience and self-criticism.

That is, these correlations can be interpreted as follows: having been internalized, the others' critical view turns into self-criticism, thus invoking internal experience and causing the need to justify oneself not only to the other, but also to oneself. In addition, self-justification correlated with a pessimistic emotional tone, so this strategy didn't fully fulfill its self-protective function in the group studying in Azerbaijanian.

Bravado is another kind of defensive speech in response to expected criticism, the meaning of which boils down to the statement: "I do have these shortcomings, but I'm proud of them."

In the Russian cluster, bravado wasn't connected to other parameters of self-description. In the group studying in Azerbaijani, it had significant correlations with self-justification and almost the same set of parameters as discussed above (self-criticism, pessimism, external perspective, relations with others), except for the internal perspective. These connections between self-criticism and pessimism in the text showed that this type of a defensive reaction doesn't allow the complete avoidance of negative experience. Thus, there is a high probability that the statements of self-justification, self-criticism, and bravado coexist in such texts. The former suggest a conflicted self-attitude in the Azerbaijanian-speaking students, which exhibited itself in a swap of positions in the internal dialogue between criticizing and protecting one's self.

The connections we found between the self-protective defensive statements and other parameters of self-description allow us to conclude that the two groups differed on the forms and meaning of self-enhancement and self-defense strategies. The tendency to exaggerate one's own importance in the eyes of others, with the help of a positive self-representation, turned out to be meaningful and effective in the group of students learning in Russian. The other tendency, to protect one's self from expected criticism, was specific to the students studying in Azerbaijanian. In the case of the Russian-speaking group, the need to justify oneself arose not to fend off self-criticism, but to parry the criticism coming from other people. Self-justification here was more superficial and didn't affect inner feelings. The lack of connection between pessimism and self-criticism indicated the relative success of such self-justification.

Thus, by comparing our results with the data of cross-cultural studies (Hepper et al., 2013), we can conclude that the Azerbaijanian-speaking respondents were closer to being representative of collectivistic cultures, because of their similar self-defense methods, while the Russian-speaking respondents resembled the representatives of individualistic cultures when it comes to self-enhancement strategies.

Focus on society

Let us compare the self-descriptions of both samples in terms of respondents' attitudes towards society.

First, we'd like to touch upon the parameter of self-criticism and the focus on external evaluation.

In the Azerbaijanian language group, we found a connection between self-criticism and the external perspective of description (concentration on how others saw them), in addition to a correlation between this parameter and the internal perspective common to the two groups. While criticizing themselves, the respondents

simultaneously described themselves through the eyes of other people. The latter indicated that they were focused on the social audience. In other words, their self-attitude depended on negative social opinions toward them. The self-criticism in the Russian-speaking participants was less dependent: there were no correlations between self-criticism and the external perspective of description.

Many researchers assume that a focus on the audience (external or internal) is a specific feature of the collectivist self. That is, compared to representatives of an individualistic culture, representatives of a collectivistic culture are more inclined to view themselves as objects (Heine et al., 1999; Mosquera & Imada, 2013). Thus, from this point of view, the self-descriptions of the Azerbaijanian-speaking respondents were consistent with the notion of the collectivist interdependent self.

The next subject of discussion is normativity. This parameter reveals the tendency to emphasize one's social correctness, conformity, and belonging to the majority.

We found significant positive correlations between optimism and normativity in the texts of the participants studying in Azerbaijanian. This can be understood in the following way: the experience of being socially compliant is a component of psychological well-being, and that corresponds to the value orientations in a collectivist society (Heine et al., 1999). There weren't any such correlations in the case of the Russian-speaking students.

Finally, let us discuss the sphere of interpersonal relations.

The theme of interpersonal relations was connected with self-liking and the internal perspective of description in the texts of the Azerbaijanian-speaking respondents. Their narration of their harmonious relations with others invoked positive emotions directed at themselves. The relationships were described from the internal perspective, and that indicated their importance for the respondents' self-attitude, as well as the depth of the respective experience. It is also interesting that these correlations concerned only one aspect of their self-attitude: self-liking, but not self-esteem. In the Russian language sample, such connections weren't found: the respondents' self-liking was related to their optimistic tone, while self-competence correlated with excessive self-praise and describing oneself through intentions and preferences.

These results are consistent with the conclusions of several other researchers, according to whose works the sphere of interpersonal relations is more relevant for defining self-attitude in collectivistic cultures, while success and businesslike qualities are more significant for achieving self-esteem in individualistic cultures. Moreover, in the case of the former societies, self-liking makes a greater contribution to a person's general self-attitude, and in the case of the latter, this role belongs to self-competence (Tafarodi, 1999; Schmitt & Allik, 2005; Kurman, 2001).

Thus, our findings showed both common characteristics of self-consciousness (which were fewer in number) and significant differences between the two groups (which were larger in number). The common characteristics included the connection between self-criticism and the internal perspective of self-description, as well as the connection of self-justification to the external perspective of self-description and the topic of interpersonal relations. That is, in the both groups, the process of self-criticism was combined with the actualization of intimate inner experiences,

reflections, and self-analysis. The respondents' self-justification in both groups was focused on the external observer, being devoted to the topic of relations with others.

There were numerous differences between the two groups. We can preliminarily conclude (taking into account the number of the participants) that the specifics of the self-consciousness in these two groups were related to their different self-construals (independent and interdependent), each corresponding to individualistic or collectivistic cultures. However, this can be interpreted in two ways. It's possible that the results reflect stable differences in self-consciousness caused by different cultural and environmental influences. In this case, the similarity between Azerbaijanian-speaking students' self-consciousness and the interdependent self can be explained by the influence of the collectivist culture of Azerbaijan (Mato-syan, 2017), whereas the correspondence between the Russian-speaking students' self-consciousness and the independent self reflects these respondents' belonging to the modern cosmopolitan urban youth culture, which is influenced by globalization and relies less on traditional values.

Another interpretation is based on the assumption that the representatives of both samples belong equally to both cultural dimensions, but responded differently due to the language factor. Language plays the role of a natural priming that actualizes the relevant patterns of individualism or collectivism. Perhaps, if the Russian-speaking students were offered the opportunity to complete the assignment in the Azerbaijani language, they would actualize other patterns of self-attitude, and their results wouldn't differ from the other sample.

The possibility of such an interpretation is indicated by some research data (Kitayama et al., 1997). In this study, Japanese people who came to study in the United States gave different answers to a set of questions regarding the way imaginary situations of success and failure influenced their self-esteem depending on the country of origin of the situations. Assessing the situations generated in the United States, the Japanese respondents perceived success as being more relevant to self-esteem, while, when assessing situations specific to Japan, they believed that failure was more likely to affect them.

Conclusion

On a number of grounds, the features of self-consciousness specific to each group of students which we found, can be related to the two types of self-construals: the independent self (attributed to individualistic cultures) and the interdependent self (attributed to collectivist cultures). Here is the list of the differences we discovered:

1. In the case of the students studying in Russian, positive self-esteem was an important component of internal well-being. For those studying in Azerbaijanian, the role of such a component belonged to norm compliance.
2. In the Azerbaijanian language group, the students' sense of self-criticism strongly depended on the expected opinion of others. It was more absolute in character and had a more negative impact on the respondents' emotional sphere. To the contrary, in the Russian language group, self-criticism was less dependent on the expected assessment and did not carry such a negative emotional load. It had a lesser effect on other aspects of the self-consciousness.

3. In the case of the participants studying in Russian, the self-enhancement motivation prevailed over criticism avoidance. The excessive self-praise here was considered an effective strategy to enhance one's self. An opposite tendency was found in the other group. The students studying in Azerbaijanian used self-justification and bravado to avoid criticism.

4. The participants studying in Azerbaijanian were more focused on society and interpersonal relations compared to those studying in Russian. Moreover, this influence can be described as more profound in nature, affecting the respondents' personal experiences.

Limitations

These findings, however, should be viewed as preliminary and presumptive for a number of reasons.

First of all, our research methodology did not fully coincide with the methodology of traditional cross-cultural studies. Therefore, the comparison between our results and other data requires certain reservations. This concerns the tools used to identify aspects of the self and, consequently, the identified constructs and units of analysis. On the other hand, our research can also be considered as a different way to confirm previously discovered patterns, with the help of different methods and material.

Secondly, the smallness of the sample doesn't allow us to make final conclusions. That is why we plan to increase the number of participants in order to verify and improve the interpretation of our results.

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Runaway behavior among children in residential care in St. Petersburg: A qualitative study

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Background. Runaway behavior among children in residential care is a serious social problem in all countries of the world. Existing scientific data on risk factors and motives of runaway from out-of-home care may not be absolutely relevant to the Russian cultural context.

Objective. To describe risk factors and the motives that cause children to runaway from residential care.

Design. A qualitative study that included 2 focus groups with staff and graduates of residential care supplemented by the analysis of 23 cases of child runaways from residential care in St. Petersburg.

Results. The study revealed the following runaway risk factors and motives: 1) running to parents or relatives, 2) romantic and/or sexual relations, 3) interaction with peers, 4) psychiatric problems, 5) addictive behavior, 6) avoidance of conflicts, 7) physical or emotional violence, 8) unmotivated runaways for entertainment, 9) problems adapting to the care institution, 10) dissatisfaction with the conditions at the care institution. Moreover, in this study, two different types of runaways have been identified, including relatively “true” runaways and those who are not psychologically experienced as such, but are only disobeying the formal rules of the care institution.

Conclusions. Runaways of children from residential care are extremely heterogeneous in nature. In further empirical studies, it should be taken into account that runaways may be true and formal. There can be multiple reasons for running away: the care institution itself, a child's personality, or his or her social network outside of the care institution.

Keywords: runaway, residential care, children, orphanage, focus group, motives

Introduction

Runaway behavior among children in residential care is a serious social problem all around the world. Estimating the prevalence of this phenomenon is a complex methodological task, since not every runaway case is properly registered.

A considerable amount of data has been accumulated on runaways who were raised in families (Tucker, Edelen, Ellickson, & Klein, 2011; Pergamit, 2010). Prevention of runaway behavior is important for two main reasons. First, in most cases, the act of running away signifies that the child is in trouble. Second, research shows that running away can lead to significant negative consequences for the children themselves and their social network (Kim, Tajima, Herrenkohl, & Huang, 2009). The runaway is exposed to a risk of criminal victimization, sexual abuse, and negative health consequences (Lin, 2012). Besides that, international longitudinal studies show that the negative effects of running away can be long term. Thus, children who run away are more likely to drop out of school, get involved in delinquent behavior (including prostitution), and become illegal drug users. In adulthood, these children are also much more likely to suffer from depression. Girls who runaway got involved in sexual relationships 1.7 times more often than their peers within one year after running away (Tucker et al., 2011; Lin, 2012). And the longer children stay out of the home, the greater the risk of various negative consequences occurring (Lin, 2012).

There is much less scientifically substantiated data available on the absconding of children brought up outside of the family. That is probably because different countries provide different types of social care for children without parental care, such as foster families, orphanages, boarding schools, and other types of residential care. Patterns obtained from the studies of foster-family runaways (for example, Crosland, Dunlap, 2015; Karam & Robert, 2013; Lin, 2012;) do not always apply to absconding from orphanages and boarding schools, a common type of residential-care in the Russian Federation.

Despite the fact that 83% of orphans are currently living with families, it is still necessary for some orphans to be put under the supervision of care institutions of various departmental affiliations. A little less than 1,500 such institutions function in the territory of the Russian Federation. Depending on a child's age and health, an orphan or a child left without parental care is enrolled into one of these institutions. From birth and up to three or four years of age, orphans not living with families live in a medical institution called a children's home, or, if the child has health problems, in a specialized children's home. Children aged 4–18 live in an orphanage or a boarding school for orphans and children left without parental care. If the child has health problems, he or she is sent to similar institutions of a special (correctional) type. In the social-protection system, there are also shelters and social and rehabilitation centers for minors, but these are considered a temporary residence for children in difficult life situations. While children are staying in these institutions, their family situation could either improve, and, in that case, they are returned to their parents, or it could get worse, and, in that case, their parents are deprived of their parental rights and the children are transferred to the orphanage or boarding school.

In general, children in residential care are much more likely to abscond than children living with a family. This is no surprise, given the fact that such institutions mainly host children who have faced various social problems (Attar-Schwartz, 2012). A recent systematic review of out-of-home runaway studies (including data on foster family runaways) (Bowden, Lambie, 2015) showed the presence of factors that allow researchers to predict a higher risk of runaway behavior in children from

such institutions, which are systematically identified in empirical studies. At the individual level, these factors are: female gender, older age, nontitle nationality, substance use, behavioral difficulties, and/or a prior history of absconding. Family ties have a lot of influence, as do relationships with peers. The institution itself plays a great role in the prevention of runaways by filling the lives of children with joy and interest, providing more extensive supervision, and establishing regulations. Moving children between institutions is another important factor; those children who changed several host families or institutions during their lives lack time to form a strong connection with any one home and, accordingly, are subject to a higher risk of running away. Moreover, each runaway enhances their reputation as “difficult” children, so the caretakers start to perceive them as unmanageable, which increases the risk (Lin, 2012).

The above patterns can be determined by culture to a large extent and can manifest themselves differently in the cultural context of Russia. To date, only a small number of empirical studies on runaways have been published, and a majority of them describe runaways from families (Kolodina, 2014) or they do not specify where the runaway children came from (Breeva, 2004; Kiseleva 2013; Sheremeteyev, & Vedyashkin, 2012). Studies about residential care are more rare (Albova, Troitskaya, & Shumilina, 2016) and may not focus specifically on the runaway problem, although they do mention it (Astoyants, 2006).

Method

The purpose of this study is to clarify the phenomenology of running away from out-of-home care, namely risk factors and motives for children absconding from residential care in St. Petersburg, Russia. In accordance with the purpose of the study, qualitative methods were predominantly used. In St. Petersburg, two focus groups with key informants were conducted:

1. The first focus group was composed of stakeholders working with children in residential care regarding the causes and conditions of children running away from these institutions. In total, 10 experts were involved in the focus group: two representatives of social protection institutions from different districts of the city, two representatives of district Commissions for the Affairs of Minors and Protection of Their Rights, four representatives of orphanages and boarding schools, one law enforcement representative, and one representative of the youth volunteer movement.
2. The second focus group was composed of graduates of residential care, regarding the reasons and conditions for the running away of children from such institutions. In total, 8 graduates of residential-care institutions for children, 5 girls and 3 boys, were involved in the focus group (Table 1).

Additionally, a case study method was used to analyze cases of children running away from residential care in St. Petersburg. A total of 23 runaway cases were analyzed, including 15 cases recorded by one of the orphanages in St. Petersburg and 7 cases recorded by the Juvenile Affairs Division in one of St. Petersburg districts. Runaways were documented in a specially designed form, filled out on the basis of personal records and interviews with a case supervisor.

Table 1. Participants of the focus group with graduates of residential care

#	Gender	Age	Placement experience
1	Male	29	Urban; specialized for children with special needs
2	Male	18	Urban
3	Female	17	Suburban
4	Female	17	Suburban
5	Female	18	Urban outside St. Petersburg
6	Female	19	Urban
7	Female	18	Urban
9	Male	19	Urban

Results

Participants of the focus groups (hereinafter referred to as experts) note that cases of minors running away from residential care are quite heterogeneous in nature: children may not want to live in an institution (any or specific one) and are determined to leave it, or running away is only formal. Such “formal” cases include: 1) returning later than agreed to the institution and 2) planned runaway from the institution to parents or relatives for a certain period, when parents or relatives cannot provide the institution’s staff with any necessary documents from guardianship and trusteeship authorities. In such cases, children can warn caretakers about their intention and fill in the necessary papers; however, without any proper coordination with guardianship and trusteeship agencies, these cases can formally be regarded as unauthorized leave.

Based on the data obtained in the study, the main risk factors and motives for running away from residential care can be characterized as follows.

1. Going to parents or relatives

Of the 23 cases analyzed, 8 were cases of this type. At present, a significant proportion of children in residential care are social orphans. Children know their parents, stay in contact with them in person or by phone, and often live next to them. Running away to parents can be motivated by a longing for home and care and concern for relatives, including the need to help the family with housework. There are a few cases where children go looking for their parents, for example, knowing that he/she has been released from prison.

2. Runaway in connection with romantic and sexual relationships

Among all the cases analyzed within the study, at least three belong to this type. In general, older children, mainly girls, are more inclined to run away for such a reason. In one analyzed case, there was a homosexual teenage boy. Here we can find runaways connected with both casual relationships and cohabitation. Quite common are cases of cohabitation of underage girls with adult men, and such cases are rarely taken to court, since girls tend to alter their testimony.

Experts believe that these runaways are difficult to prevent, especially when children enter an orphanage residential-care institution while already being in a relationship or having such an experience. For orphans and children left without parental care, sexual and romantic relationships can be a kind of substitute for the love they did not receive in the family.

3. Runaways related to interaction with peers

Such cases are about communication with children and adolescents outside the institution, especially when such children do not have any clear limits on the time of return to the residential-care institution. This may include short-term runaways to specific external events and parties.

4. Runaways related to psychiatric problems

Experts claim that children with certain psychiatric disorders have special needs in terms of their educational environment and medical care, which residential-care institutions are often not able to fulfill. Such children cannot cope with the daily routine and find it difficult to connect with other minors. The staff also lack sufficient skills and resources to effectively communicate with such children. It is not uncommon for children to be moved to residential-care institutions directly from psychiatric hospitals. In this case, the existing psychiatric problems can be aggravated by the difficulties of adaptation to the institutional environment.

5. Addictive behavior

Children with alcohol and drug dependency are likely to run away frequently. Just like in the case of psychiatric problems, the staff of a residential-care institution may not have sufficient skills and resources to cope with such behavior.

6. Runaway in attempt to avoid conflicts

Experts say such cases are frequent. Quite often, after a theft of property has occurred, a runaway is prompted by the fear of punishment from peers and/or caretakers.

7. Runaway as a result of physical or emotional violence

Among the analyzed cases, none of this type were encountered. Nevertheless, experts and graduates of residential care said that such cases may take place. Violence in an institution may be caused by hazing or bullying on the part of older children. Also, according to the testimonies of graduates of residential care, in some cases, such manifestations of hazing can be provoked or encouraged by caretakers:

Violence in orphanages doesn't come from caretakers, but from older children. That is, the caretaker approached the eldest and asked to help her. Then she left, closing the door, as if she did not see anything. That's how it happens (graduate of the residential-care institution, #2, male, 18 years old).

Extremely traumatic for the graduates of residential care can be their experience of psychological violence on the part of caretakers:

— Caretakers insulted, humiliated us in any possible way. They used to say that our mothers were whores, who gave birth to us, but did not bother to bring us up. They said we are

useless and should be interned and sent to a psychiatric hospital (graduate of the residential-care institution, #7, female, 18 years old).

— How kind of them.

— Our caretakers were good.

— Same with us.

(Graduates of residential-care institutions).

It should be noted that the prevalence and influence of this factor obviously varies greatly depending on the institution of residential care.

8. Unmotivated runaway for the purpose of entertainment

Runaways from residential-care institutions often do not have clear motivation and happen despite the background of child's general satisfaction with the institutional environment. Moreover, often children themselves cannot explain their reasons for running away:

Everything was fine in my orphanage. My case is different. I ran away because I was curious what they are doing there when they run away. I ran because I wanted to see where and how they live, what they eat. Well, yes, I slept in the basement, on the pipes, on a mattress. I intended to spend a week out there. One day is not enough to see everything. A car used to come with bread; we helped unload it. They gave us a loaf; that was great! We ran away together: two people, and I was the third. Well, I have seen what I wanted to see (graduate of the residential-care institution #1, male, 29 years old).

9. Runaway associated with adaptation period to a residential-care institution

Experts highlighted the highest prevalence of runaways among children in the first year of their stay in a residential-care institution. Quite often, children who were separated from their parents at a later age tend to run away. This is confirmed by graduates of residential-care institutions:

Imagine, a child lived in the family from the early childhood, and suddenly his parents decided to send him to an orphanage. And he runs away because the orphanage is alien to him, he is used to living in a family. Moreover, he has a lot of friends there, where he lived with his parents, and that's why he runs away. (Graduate of the residential-care institution #1, male, 29 years old).

Runaway behaviors are extremely common among children who are often moved from one residential-care institution to another. These children do not have time to adapt to the ever-changing rules and develop runaway behavior patterns to cope with stress. On the other hand, quite often runaways formed a connection with another residential-care institution and the children there. When separated from their main social connections, these children leave to meet their friends from the former place:

— And often those who move continuously from one orphanage to another, run away. Some can change five orphanages in a row.

— I changed several orphanages because of problems with my eyesight. I was moved from one orphanage to another. Now it's fine—I have been cured. But in my childhood I was thrown around. You start to get used to an orphanage, and ... (graduate of residential-care institution #3, female, 17 years old).

Runaway behavior can also be associated with transitional adaptation from one type of institution to another, for example, from a close- to an open-type institution. Less strict rules, the possibility to spend time on their own outside the institution, sometimes, pocket money (for example, scholarships)—all this is completely new and unusual for a minor.

In such cases, running away can be part of a normal adaptation process to such new living conditions.

In other cases, on the contrary, adolescents can expect more from a new social role, for example, that of a student. They expect even greater freedom than they used to have and are psychologically unprepared to follow the rigid rules.

10. Runaways associated with dissatisfaction with the living conditions in the residential-care institution

Experts consider it a difficult case when a child is enrolled in a residential-care institution with a considerable prior experience of independent and/or antisocial life, for example, several years of cohabitation, including the experience of maternity/paternity, self-reliant separate living, or street and criminal history. In this case, according to experts, it may take a very long time for such a child to adapt to life in the residential-care institution, with the need to study, strict hierarchy and rules, daily routine, etc. Depending on the child's personality, he or she may never get used to it. According to experts, for such minors, it might be more appropriate to develop a different type of care institution.

In other cases, runaway behavior can be developed on the basis of children's discontent with individual requirements, including the daily routine, study requirements, limited choice of profession, etc.:

We were killing time, and it was going well on weekends, but anyway, from Monday to Friday all days were the same; we couldn't cook anything special or go anywhere. Anyway, from Monday to Friday—it's very boring, although there are workshops and clubs. But people are different. Maybe a certain workshop is good for me now, but for another person ... (obscene language)—it's of no interest. Maybe you want to go for a walk, but you can do it at a certain time only, otherwise you will not be allowed. Well, that's it (graduate of the residential-care institution #6, female, 19 years old).

In general, experts note that among other factors, a positive climate in the care institution and common goals and hobbies will help prevent minors from running away from residential-care institutions.

Discussion

In a broad sense, we may distinguish several types of runaways: those at the level of the institution (usually this is something the child runs away from), at the level of the child's personality, or at the level of his/her social network external to the institution (something the child looks for when he or she runs away). This partly corresponds to the empirical classifications of Zide and Cherry (1992) and Biehal and Wade (2000), which mainly distinguish between two types of runaways a) where children seek something outside the system—the authors mostly describe the ones motivated by adventure; and b) where children run from some ill-being.

Our empirical classification adds a third dimension—a child's personal characteristics, which may cause poor adaptation within the institutional system and shows that, at least in our study, seeking something outside the system is mostly connected to the importance of social contacts. Both these additions correspond well to the findings of Finnish researchers (Hoikkala & Kemppainen, 2015). In other studies, we haven't found the distinction between true runaways and unauthorized leaves, which happen mostly due to formal reasons but might not be attributed to a serious motivation to leave the institution. This finding might be culturally specific and/or overlooked in previous studies.

Conclusion

As this study has shown, runaways of children from residential care are extremely heterogeneous in nature. Running away can be a turning point in a child's life, perceived as such by the child and caretakers, or it may be one of the routine behavioral patterns of no importance either to the child or caretakers. In our opinion, such a division has important methodological applications and should be taken into account when conducting empirical studies on runaways, especially quantitative studies. Perhaps, it is the underestimation of the objective and subjective significance of the event (conditionally true runaways vs. formal violation of the rules related to imperfect legislation) that may, among other factors, describe the origin of contradictory patterns found in different empirical studies.

However, this preliminary descriptive study has important policy implications. There are institutional-level measures that might effectively prevent runaways among all children. Those include prevention of physical and emotional violence among children and between children and caregivers, the presence of an effective conflict-management system, taking children's views on ways to improve living conditions into account, the avoidance of the unnecessary transfer of children from one organization to another, and the prevention of runaways while children adapt to a new institution. A different set of measures needs to be developed to ensure the adaptation of children with special needs to the institutional-care system, including children with behavioral and psychiatric problems and addictive behavior. Finally, the third direction of efforts might be focused on the need to deal with the social connections of the children with people outside the care facilities, including family, friends, and romantic partners.

Limitations

The study has several limitations for the possible generalization of the results obtained. First of all, it's the geographic scope of the study—the city of St. Petersburg, the second largest metropolis in Russia. Second, the institutions covered in the study; perhaps incorporating a wider range of institutions would reveal risk factors and motives of runaway behavior other than those identified in this study. Also, since the focus group was conducted with young people who are no longer in residential-care institutions, we assume that some new phenomena could have slipped through the net, and some of the phenomena described by the participants, on the contrary, may be somewhat obsolete. At the same time, this approach, in

our opinion, made it possible for young people to speak more openly about their experience.

In general, to the best of our knowledge, this is one of the first published qualitative studies on this issue in Russia, and we hope that these data will be used to further develop large-scale quantitative studies on this topical problem.

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VIRTUAL REALITY

A study of Generation Z's involvement in virtual reality

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Background. This study analyzes the characteristics of modern teenagers' involvement in virtual reality (VR). It also examines various approaches to VR in Russian science. In the current study the concept of virtual reality is defined as a particular informational environment in which a person can exist and develop. It is created by a special class of technical systems, formed on the basis of computer hypertext technology, and has a number of social and psychological characteristics. We pay special attention to the significance of virtual space for generation Z (according to the William Strauss and Neil Howe generational theory). The main factor determining the unique psychological features of the generation Z is its active involvement in virtual reality from the moment of birth. Involvement in a virtual reality is measurable by a teenager's activity on the Internet.

Objective. Our study set out to determine the level of Russian generation Z's involvement in virtual reality.

Design. We analyzed the results of a survey conducted among Moscow adolescents using multivariate profiles. Two hundred fifty-four teenagers 12-14 years old were interviewed during the study.

Results and conclusion. Analysis of the data revealed the following: Modern teenagers are involved in VR with varying degrees of depth; their main type of activity on the Internet is searching for educational information and news; and no significant differences by gender in the purposes of using the Internet were found. However, it was also determined that girls' activity in VR is more related to communication and interpersonal interaction, even though it's indirect via the Internet, while boys prefer the "gaming" possibilities of VR; that teenagers are rather critical of the information they obtain by the Internet, and that their level of trust in the online information is low. The same trend is evident in the fact that students prefer not to make new friends in virtual reality.

Keywords: virtual reality (VR), generation Z, involvement, Internet, socialization

Introduction

The Internet is an integral part of the world of modern man. According to the Public Opinion Foundation survey conducted in May of 2015, 49% of the Russian adult population (57.1 million) go online daily (*Interest in online news*, 2015). According to research conducted in the Stavropol region in 2014, only 6.3% of students (14–18 years old) are not interested in computers. (*Social Portrait of the youth of the Stavropol region*, 2015). At the same time, Internet users note the following negative aspects: the presence of unnecessary, harmful information (23%), formation of Internet addiction (19%), the negative impact on children (access to harmful information, limitation of direct communication, etc.) (12%), and replacement of direct contact with people by the Internet (6%) (*About the benefits and dangers of the Internet and the peculiarities of its use*, 2014). The high degree of popular involvement, and, above all, the involvement of adolescents, with the Internet determines the relevance of this study and its objective: to reveal the peculiarities of the involvement of adolescents (representatives of generation Z) in a virtual reality.

In our study, a virtual reality is referred to as a particular informational environment in which a person can exist and develop, and which is created by a special class of technical systems, formed on the basis of computer hypertext technology. A virtual reality has a number of social and psychological characteristics: the ability to simulate activity by one or more users; disembodied and ontologically uncertain identity; anonymity (hiding one's real status); deliberate impersonality; identity expansion; the ability to have many different virtual personalities, etc. Today, VR may mean using the Internet, as well as the hardware for entering into a virtual reality (Omni, OculusRift), or creating an augmented reality (Google Glass, etc.). The technical means for creating a virtual reality are represented currently by computers, game consoles, smartphones, tablets, and programs for training, developing and entertainment.

The very concept of virtuality appeared in the history of culture quite a long time ago. In 1966 I. Sutherland invented a virtual reality helmet (*Display windowing by clipping*, 1972), and in 1989 programmer G. Lanier introduced the concept of “virtual reality” (Braslavsky, 2003).

Thus, the term's first meaning comes from its traditional use in the technical field: “The term “virtual reality” refers to a special class of technical systems for information display.” (Velichkovsky, 2001).

The second approach to understanding virtual reality can be found in the work on virtualistics by N.A. Nosov (2017) and others. In this approach, the term “is used in those contexts for which J. Piaget used the term “symbolic function,” and A.R. Luria used the expression “linguistic reality” and spoke of “a doubling of reality” (Kuznetsova & Chudova, 2008). In this sense, according to Y.M. Kuznetsova and N.V. Chudova, the whole psychology of cognition is the psychology of “virtual reality” (Kuznetsova & Chudova, 2008, pp. 6–7).

We may find the development of this idea in the works of A.E. Voiskunskiy and M.Ja. Menshikov, who wrote: “Virtual reality, created by the visualization of three-dimensional objects by means of computer graphics, animation, and programming, is a product not only of informational, but also psychological technologies” (Voiskunskiy & Menshikov, 2008).

The research carried out by V.V. Selivanov and his colleagues is based on the following characteristics of VR: 1) the creation of three-dimensional images of objects as close as possible to the models of real objects by means of computer programming; 2) the possibility of animating them; 3) network data processing carried out in real time; and 4) the creation of the presence effect by means of computer programming (Selivanov & Selivanova, 2014).

Currently we can say that VR has become a part of our everyday life, is quite commonplace, and penetrates more and more into various areas of our lives. From the psycho-pedagogical viewpoint, an active intrusion of virtual reality (VR) into our lives has an ambiguous character. On the one hand, it has made possible the development and transformation of human activity by the emergence of new skills, operations, procedures and types of actions, new activities, new target and motivational-semantic structures, and new forms of mediation (Pleshakov, 2011). In particular, VR is used in pedagogy as a special information space where the student can get specific information, as well as make contacts and carry out some elements of scientific training and project activities. Experiments by P.A. Pobokin have shown that virtual training programs have a positive, stimulating effect on the cognitive aspect of a student's mind, and on the personal and subjective aspects of intellectual search (Pobokin, 2015).

On the other hand, VR addiction can develop and gradually worsen, and as a result, a person could begin to prefer the virtual world, believing it would be the most appropriate for him. Such an addiction appears in the process of cyber-socialization (virtual computer socialization) for reasons specifically related to an individual's dissatisfaction with his or her actual reality (personal, economic, social, cultural, etc.). As negative consequences of this process we may also specify technological stresses, computer phobia, cyber-addiction, hacking, narrowing of range of interests, uncommunicativeness and social withdrawal, and qualitative transformation of the mental processes (Krasnoyarova, 2010).

The large-scale involvement in VR by the adult population will inevitably lead to its prevalence among the younger generation, and especially among teenagers. Modern teenagers (12-17 years old), according to the generational theory of William Strauss and Neil Howe, belong to the so-called digital generation or "Generation Z" (Strauss & Howe, 1991). They have been familiar with digital technology and virtual space since early childhood, and then become active Internet users. "Literally born with the iPad in their hands," the researchers wrote in their report on Generation Z, "Generation Focus Group Report," prepared for the 3M company (Novitskiy & Vinogradova 2016).

That report was a generalized psychological portrait of Generation Z, which resulted in the following findings. Gen Zers really care about the preservation of their health and safety, carefully read instructions, and follow them. Gen Z adheres to the principle "living in the present," prefers to spend time having fun, and tries not to worry too much about anything. The main purpose of their lives is "to be happy." How does Gen Z understand happiness? They associate it with physical and psychological comfort, personal freedom, and the possibility of seeing the world. Gen Z would like to spend life travelling and having fun (with friends or family). They work to earn their living. This is a generation of consumers.

The biggest myth, the report said, is that Gen Z has a good understanding of advanced technologies. In fact, its members are far from knowing the simplest laws of mechanics, chemistry, and physics. Gen Z has the ability to perform an incredibly large number of tasks simultaneously. Gen Zers have no loyalty to their employers or organizations they work for. It will be much more difficult for them than for previous generations to endure pain, suffering, and deprivation. Most of them have never experienced hunger or homelessness (Konyukhov, 2016; Vinogradova, 2016; Novitskiy, 2016).

Many researchers consider active involvement in VR as the main factor determining the psychological characteristics of Gen Z. By involvement in virtual reality, the authors mean the activity focused on interaction with the objects from the virtual environment in the form of communication and activities of varying degrees of intensity. Thus, the authors of the present study set the objective of determining the degree of involvement of Russian Generation Z in virtual reality. To achieve this goal we identified the following problems to be solved:

First: to determine the degree of Generation Z's involvement in VR.

Second: to identify the range of adolescents' activity in VR.

Third: to prove the existence of gender differences in Generation Z's activity in VR.

Fourth: to identify the personal attitude of a teenager to VR.

Method

To accomplish the above-mentioned objectives, we conducted a survey of teenagers in 2015. Our questionnaire included 14 questions, 10 of which were "closed," i.e. multiple choice. The questions were divided into the following blocks:

1. Socio-demographic characteristics of the respondent;
2. Types of activity in VR (e.g., "What are you doing on the Internet?" (14 options were available);
3. Time spent in VR (e.g., "How often do you use the Internet?" (five options were offered);
4. The personal attitude of the teenager toward VR (e.g., "Do you think online communication helps you to understand yourself and the world better?", "How much do you trust the information on the Internet?").

The answer to the first problem ("To determine the involvement degree of Generation Z in VR") was provided by the third block of questions. The answer to the second problem ("To identify the range of activity of adolescents in the VR") was provided by the second and the fourth blocks of questions. The third research problem ("To prove the existence of gender differences in generation Z activity in VR") was solved using the non-parametric Mann-Whitney test. The answer to the fourth problem ("To identify a teenager's attitude to VR") was provided by the answers to the questions of the fourth block.

A representative sample was chosen by random selection (randomization) of students from three Moscow schools. At the start of the survey, we questioned 254 adolescents 12–14 years old at the schools. After initial processing of the completed

questionnaires and exclusion of “spoiled” ones (not completely filled), 204 questionnaires were accepted for further analysis. The sample included 107 boys and 97 girls (Glazkov, Ermolaev, Puchkova, & Sukhovershina, 2015).

In order to identify the teenagers’ specific activity in VR, we applied Spearman’s correlation analysis between the questions “How often do you use the Internet?”; “Do you use the Internet: at home; at school, in public transport?”; and “What do you prefer to do in your spare time?” (significance level $p \leq 0.05$). Answers to the question “What do you do on the Internet?” were subjected to *Friedman’s* two-way analysis of variance by ranks (significance level $p \leq 0.05$). To find gender differences, all the answers were analyzed using the non-parametric Mann-Whitney test (significance level $p \leq 0.05$).

The integral level of involvement in the virtual environment was determined by statistical analysis of the average score. In order to minimize possible social desirability bias in the responses, we relied on two procedures: 1) the voluntary participation of adolescents in the study; and 2) confidentiality of the results.

Results and discussion

Let us hereby proceed to the results obtained through the answers to the first research problem: “To determine the degree of Generation Z’s involvement in VR.”

Statistical analysis of the answers to the question “How often do you use the Internet?” revealed the following. Nearly thirty-five percent (34.8%) of the teenagers said that they go online “several times a day”; 22.1% “once or twice a day”; 22.5% “almost always online”; 12.7% “several times a week,” and 7.8% “once a week or less.” Thus, all the respondents were involved in VR, although with varying degrees of intensity. More than 75% of the teenagers were involved to an average or high degree.

Let us compare the data we obtained with the results of the study “Teens and the Internet” conducted by FOM in 2008 (*Teenagers and the Internet*, 2008). That study showed that 24.5% of adolescents didn’t use the Internet. Three-quarters of them explained that fact by pointing to obstacles beyond their control (“I don’t have a computer or Internet access,” “I can’t afford it,” or “I have no possibility to use it (at school too)”). Only about a third of them explained it with subjective reasons (“I don’t know,” “I don’t want to,” “I’m not interested”). Thus, over the last seven years, the number of teenagers who don’t use the Internet has decreased by about a third.

In 2008, 18% of Moscow teenagers spent at least 6 hours a day on the Internet on weekdays, while 26% did the same on weekends.

In exploring how much young people spend their spare time in VR (“What do you prefer to do in your free time”), we found that 20.69% of the teenager respondents chose the Internet more than 5 times out of 27 possible options, 26.6% chose it 3-4 times, and 36.95% of respondents chose VR once or twice, while others (15.76%) didn’t choose VR at all. In other words, most of the students do not spend their free time only in virtual reality.

The Spearman analysis of the correlation coefficient between the teenagers’ preferences in “spending their free time” and the rest of surveyed characteristics showed that the more spare time a teenager spends on VR, the more often he does it in an accessible location—i.e. at home, at school, on public transport—and com-

bines it with other activities (doing something else and using the Internet at the same time). A teenager uses instant message applications, makes or receives calls over the Internet, makes posts (or comments) in social networks, visits entertainment websites, views content connected with his hobbies and interests, and plays online games while watching TV, eating, doing domestic duties, etc.

We then analyzed the types of Internet activities which teenagers prefer (we used Friedman's two-way analysis of variance by ranks). Our ranking of the answers to the question "What are you doing on the Internet?" is presented in *Table 1*.

Table 1. Ranking of the responses to the question "What are you doing on the Internet?"

Response options	Mean / Rank	Significance (in descending order)
Looking for information and news	9.33	1
Using instant messaging (Skype, Viber, ICQ, Whatsapp, private messages, etc.)	9.29	2
Browsing content related to hobbies, interests	8.06	3
Spending time at entertainment websites	7.58	4-5
Reading your friends' newsfeed	7.58	4-5
Playing online game	7.43	6
Making or receiving calls over the Internet (Skype, etc.)	7.05	7
Checking e-mail	6.88	8
Making posts (messages) in social networks	6.57	9
Posting your photos, pictures, recipes, and other results of creative activity on the Internet	6.11	10
Commenting on blogs / posts / photos of other people	6.10	11
Posting your comments on discussion forums / platforms	5.18	12
Posting in your blog or microblog (Twitter)	3.83	13

Let us proceed to the analysis of the answers to the second and third research problems ("To identify the range of adolescents' activity in the VR", and "To prove the existence of gender differences in generation Z activity in VR") by comparing them with the data of the 2008 study (*Teenagers and the Internet*, 2008).

In 2008, the teens' most common activities on the Internet as per the monthly Internet survey were searching (71%), downloading and listening to music (67%), downloading all sorts of programs (55%), using email (49%), downloading and watching movies and videos (43%), instant messaging (38%), online games (38%), and communication on blogs, forums, and social networks (36%) (*Teenagers and the Internet*, 2008).

According to our study results, we can say that teenagers now primarily use the Internet to search for information and read the news (first place among all preferences), and, taking into account the data of the comparative analysis (non-parametric Mann-Whitney test), the answers of boys and girls on this scale showed

no significant difference. This suggests that teenagers generally prefer this type of mass media to get news and other information.

The answer “using instant messaging (Skype, Viber, ICQ, Whatsapp, private messages, etc.)” occupies the second place by preference (with a minimal difference from the first) for the respondents. As noted earlier, girls chose this option of using the Internet significantly more often than boys.

The third most important factor in teenagers’ involvement in VR is the possibility “to view content related to hobbies, interests.” The answers to this question don’t differ for boys and girls. The answers sharing fourth and fifth place in the “activities on the Internet” rating, are “spending time at entertainment websites (difference in the responses of boys and girls is not found),” and “reading your friends’ newsfeed.” As noted earlier, girls are more likely than boys to spend their time on the Internet on interpersonal interactions. Despite the fact that online games occupy seventh place in the overall rating, boys are significantly more likely than girls to spend their time on this activity.

Among other types of the ranked Internet activities, “posting your photos, pictures, recipes, and other results of creative activity on the Internet” and “commenting on blogs/posts/ photos of other people” are more common for girls.

Comparative analysis of the survey results by gender shows that the average score on the scale of “total involvement in a virtual environment” does not show any significant differences. That means that boys and girls are using the Internet in the same way.

However, significant differences (by Mann-Whitney criterion) were detected during the processing of the statistical results. To the question “What are you doing on the Internet?” girls often chose the following answers: “using instant messaging (Skype, Viber, ICQ, Whatsapp, private messages, etc.);” “posting your photos, pictures, recipes, and other results of creative activity on the Internet”; “reading your friends’ newsfeed”; and “commenting on blogs/posts/ photos of other people”. To the question “Do you use the Internet in the learning process?” girls more often than boys answered: “Yes, for exchange of studies-related information with classmates.” Boys were significantly more likely than girls to choose the answer “playing online games” to the question “What are you doing on the Internet?”. And on the question “In your spare time you prefer ...” boys were more likely to choose the answer “to be in the virtual space.”

Thus, the purpose of using the Internet has changed over the last seven years: previously it was downloading all sorts of programs and music, and today it is searching for information and instant messaging (Skype, Viber, ICQ, Whatsapp, private messages, etc.). Previously entertainment purposes were dominant, and today the purposes are informational and communicative. Girls are more likely to use the virtual environment for the purposes of communication, interaction, and exchange of information with their friends, while boys prefer to spend their free time on the Internet playing online games.

The solution to the fourth problem posed by the study (“To identify teens’ private attitudes toward VR”) is presented below.

A statistical analysis of the responses to the question “How much do you trust the information on the Internet?” shows that the majority of respondents (34.8%) answered this question with “I trust about half the information,” while the second

most popular answer was "I trust most of the information." (31.37%). Only 4.41% of respondents fully trusted information obtained from the Internet, and the rest of them chose "Trust a small piece of information," or "I do not trust it completely" (23.04% and 4.4%, respectively). These results lead to the assumption that teenagers are quite critical and do not believe all the information that they find on the Internet.

It was found that 11-14 year old adolescents prefer not to find new friends on the Internet (shown by answers to the question "Did you make new friends on the Internet?"): up to 30.4% of respondents have "never" made new friends in the virtual reality, or do it very "rarely." About 20% of the students make new friends "sometimes." Sixteen percent (16%) of the respondents use the Internet for finding new friends "often" and "always."

The assumption that the avoidance of making new friends virtually may be connected with a low level of trust in the information on the Internet is not confirmed, due to the absence of a significant correlation between the scales. Maybe teenagers are satisfied with their present "friend list," and their "friend list" consists of "real" people with whom the students interact outside VR (friends from school, sport clubs, recreational facilities, etc.).

Analysis of the responses to the question "Do you think that online communication helps you to understand yourself and the world better?" showed that almost half of respondents (47.5%) think that Internet communication sometimes helps them "to understand themselves and the world," and sometimes doesn't. Eighteen percent (18%) of teenagers were still inclined to believe that it is possible to understand themselves and the world through online interaction "mostly" or "completely," but nearly 35% have the opposite opinion.

Responses to the question "Whose opinion of yourself do you consider more important?" included the option "Internet friends." The respondents were also asked to rank the level of the opinion's importance. The results showed that more than 40% of the teenagers have ranked Internet friends' opinions about themselves as having a low level of significance (40.2%), a slight level (6.9%), or even of no significance at all (17.6%). However, for 6% of the respondents, the opinion of Internet friends was quite significant, and for 24% of adolescents, their Internet friends' opinion was very important. Perhaps in answering this question, the students had in mind the number of "likes" (signs of attention and approval) under the posted information, photos and comments, which express approval, support of the posted information, and feedback.

The ranking of the responses to the question "Do you use the Internet in the learning process?" revealed that the students put "searching for information" in first place. This response was correlated with the response to the question "What are you doing on the Internet?": "looking for information and news." Thus, the predominance of the student's cognitive motivation determined the direction of his/her Internet activity.

The students put the answer about the exchange of studies-related information with the classmate in second place. This is also an important factor in the interaction of modern teenagers. It is possible to post a message in a network community created by teenagers; and although feedback may be delayed, a student will receive it once he goes online. Using special functions, a teacher (or a classmate, or a class

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Creativity in online gaming: Individual and dyadic performance in Minecraft

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Objective: This study was designed to examine possible new aspects of creative activity related to virtual environments.

Design: The online gaming interface Minecraft was used to construct (on computer screens) complex structures such as buildings from ready-made blocks. Two modes were used: individual and dyadic. Participants (N=49, 29 males and 20 females, 18 to 29 years old, recruited on a snow-ball basis) were required to build staying at a distance two complex structures — a ship and a house; each structure was required to be highly creative, i.e. unusual and never seen before. Creativity was evaluated not by the final structure but by the number of ideas generated by the participants and produced either in practice or verbally. Each participant participated once in an individual and once in a dyadic session; the partners were selected randomly. The participants' verbal activity and digital operations with the Minecraft interface were recorded using the FastStone Capture software package. All the ideas produced by participants were classified in accordance with the following criteria: type (conceptual, functional, selective, corrective, and intentional); level of the structure which the ideas referred to (the whole structure, a particular component of the structure, or an element of the structure); and the status of the verbalized ideas (implemented or unimplemented).

Results and Conclusion: The results show that participants produced significantly more ideas and took significantly less time to build the prescribed structure (a house or a ship) within the individual session compared to the dyadic session. The originality of their ideas was measured by two psychologists independently: the two measures turned out to be close ($r=0.876$); the number of original ideas produced during individual and dyadic sessions do not differ significantly. Analysis of the implementation of the ideas showed that, within the dyadic sessions, participants produced significantly fewer ideas which were subsequently implemented. For the most part they frequently dropped and left unimplemented ideas referring to the levels of either components or elements of the structure. The results also showed that intentions were the only type of ideas which, after

being generated equally often in the individual and dyadic sessions, were more often left unimplemented in the group sessions, compared to the individual sessions.

Keywords: creativity, online gaming, dyadic vs. individual activity, idea generation, Minecraft

Introduction

Creativity and new technologies

Creativity can be regarded as an activity closely related to making new products in various forms. Its theoretical definition is related to the generation of novel ideas, products, or processes by an individual or group (e.g., George & Zhou, 2001; Gruys, Munshi, & Dewett, 2011). Creativity is a broad topic that is important at individual, social, economic, and cultural levels. Definitions of this psychological concept focus on various aspects, including biological, cognitive, and motivational (e.g. Amabile, 1996; Martindale, 1999). In the context of the psychometric approach to the study of creativity, it can be assessed by analyzing various parameters of the ideas that were generated (e.g. number of these ideas, their novelty, etc.). These ideas are regarded as products of individual or group creative activity. They partially depend on knowledge and expertise (e.g. Rich & Weisberg, 2004).

At least three distinct forms of knowledge play an important role in producing creative ideas: 1) schematic knowledge, 2) associational knowledge, and 3) case-based knowledge (Hunter, Bedell-Avers, Hunsicker, Mumford, & Ligon, 2008). At the same time, creative ideas include operational components, which transform relevant knowledge and expertise in the context of a given task or problem (e.g. Estes, Ward, 2002; Scott, Longergan, & Mumford, 2005). Numerous cognitive processes determine the effectiveness of idea generation, such as problem construction, information gathering, conceptual combination, critical processing activities, etc. (Dailey & Mumford, 2006; Kaufmann, 2003; Lubart, 2001; Russ, 2003).

The process of idea generation often takes place while individuals are interacting with computers or with other people via the Internet. New technologies today are forming frameworks in which creative work will be done in the near future. More and more types of work, including creative work, are already, or will soon be, mediated by digital technologies. More and more group work will be done with coworkers at a distant location. Future interfaces of mediated group-work settings are being designed and tested right now. In a way, the future comes through our current work. That means, we have a good opportunity today to develop, test, and approve or disapprove possible interfaces for group-work which will be performed in the future. We may call online interfaces favorable, or prospective, if they support collective styles of work which may be more productive than individual styles of work (except in cases where individuals are exceptionally productive persons).

The results reported in this paper derive from the development and testing of one hypothetical type of interface for joint work. The interface includes a joint work space for the team members presented on their digital screens, plus a voice interaction channel shared by team members. Team members at different locations may perform joint work, such as compilation of a document or a project description, design, and development of a visual object and its details, etc. This interface may

be called a “zero-level interface” since it supports both individual and group work, but provides no advanced service: i.e., it provides no hints or prompts dealing with decision making; provides no lists of ideas (either previously mentioned, or known from previous studies, or prepared beforehand by the experimenters); and involves no discussion procedures such as, for example, suggestions that the most respected partner, or the person who has come up with the most recent idea, be given the lead (with or without interruptions).

The current paper presents results based on the performance of two groups of participants, who used ready-made building blocks to perform a construction task within a videogame environment. The final construction needed to be creative: i.e., unusual and original. To estimate the prospects for the interface, we compared the results of the group work (in our case, dyad work) with the results of individual work in the same setting. The current paper is a work-in-progress description; thus, it is restricted to an analysis of the results dealing with the productivity of the singles and dyads. Productivity is measured by the number of “ideas” produced either verbally or practically. Ideas refer to goals of creative actions, according to the psychological “personal meanings” theory of human thinking developed by Tikhomirov (1988). The number of goals, or ideas, is one of the parameters identified in Torrance-related studies of creativity: it refers to intellectual fluency and is universally accepted as a useful parameter.

Creativity, computers and the Internet

The Internet provides a variety of instruments for the realization of human creative potential. Networkers create new verbal/audio/visual content; they develop, consume, and improve various Internet resources and applications. These activities can influence the participants’ intelligence and creativity. Greenfield (2009) states that Internet users score higher in verbal and non-verbal intelligence compared to those who are not involved, or are involved to a lesser degree, in activities related to digital technologies. Computers and the Internet are shown to enhance motivation for learning new things (Wang & Braman, 2009), and to help restructure the brain mechanisms involved in retrieval of information units (Small & Vorgan, 2008), i.e., to take advantage of the “cognitive surplus” (Shirky, 2010).

The cultural-historical theory advanced by Lev Vygotsky and his school of thought provides evidence that the use of external instruments and sign systems results in transformations of the human being’s inner psychic activities (Vygotsky, 1978). Thus, information technologies, such as universally used semiotic instruments, are not neutral for mental development. Theoretical and practical arguments and the consequences of this thesis are thoroughly discussed in Tikhomirov’s works on the “personal meanings” theory of thinking and on the psychology of computerization (Tikhomirov, 1974; Tikhomirov, 1988; Voiskounsky, 2013), as well as in the works of other adherents to Vygotsky’s theory.

Computers and the Internet impact artistic creativity. Entirely new types of contemporary art have already emerged, such as digital art. Virtual environments, such as virtual office images, have been shown to contribute to higher marks in creativity (measured by psychological testing procedures), compared to several types of real-life environments (Guegan et al., 2017); that means, artificial environments

influence creative processes irrespective of the kinds of interfaces. Image editing software is rapidly changing production processes in the arts. Hypertext structures advance new perspectives for verbal art (Landow, 2016). Digital technologies (e.g., program packages for 3D modeling and simulation) play a crucial role in contemporary visual art and design. Architectural cyber-theory is laying claim to be a theoretical platform for examining the impact of computer technologies on various aspects of design, starting with architectural construction (Kuloglu, 2010).

Computer gaming

Both adults and adolescences are active users, and sometimes developers, of numerous services and resources on the Internet (Babaeva & Voiskounsky, 2002). Computer games (we use this as a general term that includes videogames, online games, multiuser roleplay games, browser games, games played on consoles, etc.) are extremely attractive to all ages, partly due to the fact that the games give everyone an opportunity to feel like an inventor while playing them. Ignoring the negative outcomes of computer gaming, such as psychological addiction or the increase of aggressiveness, we will limit our discussion of the possible impact of gameplay to the thinking and creative abilities of adolescents and adults. "Serious games" are being widely developed in order to enhance the quality of teaching and learning (Shaffer, 2007).

There are a number of studies which have examined both the creativity and the thinking abilities of those who play computer games regularly. For example, 12-year-old adolescents who are experienced online gamers have shown higher creativity measures on the Torrance tests compared to their less-experienced peers (Jackson et al., 2012). Gackenbach and Dopko (2012) showed that adults' gaming experience has no influence on their verbal creativity, but positively influences their scores on the Torrance non-verbal creativity test. Young adults who used to be hard gamers and went on playing computer games, are described as becoming effective and competent, though risk-taking, businessmen or stock exchange brokers (Beck & Wade, 2004).

Computer games can be regarded as a platform for examining the thinking abilities and creative performances of both gamers and game developers, including producers, coders, musicians, experts in animation and computer graphics, and educationalists (Lee & Peng, 2006; *Video games and creativity*, 2015). Specially designed games force players to develop and organize mental tools to perform activities within extremely complex virtual environments. In investigating these computer-game-mediated activities, researchers can examine human expertise and abilities to put forward and test hypotheses while solving problems within extremely complex environments (Dörner, 1997).

Numerous studies have revealed some positive influences of computer gaming on cognitive abilities (Greenfield, 2009; Lee & Peng, 2006; Shirky, 2010). This perspective is nevertheless questionable and warrants a more detailed investigation, as Boot et al. (2008) have suggested. Computer games provide a person with opportunities to intensely use his/her competence and intuition. While intuition often helps to solve problems, it just as frequently leads to mistakes in decision-making (Kerdellant & Gresillon, 2003; Beck & Wade, 2004; Usher et al., 2011).

Among the most promising directions of research on the psychological aspects of computer gaming is the examination of the transfer of gaming skills from the virtual world to the real one (Greenfield, 2009; Lee & Peng, 2006; Oei & Patterson, 2015). In the context of cognitive control studies, computer gamers exhibit high competence in the transfer of habits and skills from the game-related virtual world to everyday life (Van Muijden et al., 2012; Anguera et al., 2013). The characteristics of virtual avatars are shown to impact the real-life choices of these avatars' owners (Yee, 2014). Proficiency in 3D computer gaming highly correlates with effectiveness in performing numerous activities, such as driving and learning to perform laparoscopic surgery (Greenfield, 2009; Kerdellant & Gresillon, 2003), as well as management and business-related activities (Beck & Wade, 2004).

Electronic brainstorming

Many Internet projects and multi-person computer games enhance distributed cognition performed by many people simultaneously in parallel ways. In this context, a new type of thinking is expected to emerge, manifesting itself within Internet-mediated activities. It has been called "network (or swarm) thinking," and it relates to so-called "collective creativity" (Tapscott & Williams, 2006; Woolley et al., 2010), although the latter has not yet gained fundamental psychological validation and should rather be referred to as "hypothetical collective creativity." The key factor in "collective intelligence," as well as a likely element of "collective creativity," is alleged to be the social sensitivity of group members (Meslec et al., 2016).

Digital technologies have been widely adapted to become tools that support the manifestation of individual and group creativity (interconnected computers are an example of these tools). In this context, there is an effective method for generating group creative activity—electronic brainstorming (EBS). Over recent decades, interest in EBS has been increasing. This method possesses some advantages compared to traditional face-to-face brainstorming, since it involves parallel interaction, anonymous work, the opportunity to articulate new ideas immediately upon generating them, the ability to get additional information to produce qualitative ideas, and freedom from apprehension effects (Benedek, Fink, & Neubauer, 2006; Kerr & Murthy, 2009; Yagolkovskiy, 2016).

On the other hand, the computer mediation which is specific to EBS, leads to a lack of emotional contact among participants and of opportunities for them to communicate non-verbally. Moreover, it could be rather time-consuming for a participant to type up all the ideas he/she produces on a keyboard. Thus, the specificity of computer mediation as a factor of creative activity may be seen as a promising point for future research, the aim of which will be to examine its potential to stimulate either individual or group creativity.

Minecraft

Minecraft is one of the most popular computer games. Nowadays, over a hundred million people play this game (<https://en.wikipedia.org/wiki/Minecraft>). A recent mass survey (Yee, 2015) of gamers' demography and motivation showed that the proportion of females playing Minecraft was slightly higher than the average in a sample of over 100,000 gamers playing diverse computer games; they score high on

such empirically based motivations as Discovery (interest in experiments and explorations) and Community (interest in interactions and making teams), while low on Excitement (especially fast-paced and intense) and Story (interest in narrative scripts and elaborated characters).

The Minecraft world consists of cube blocks used to construct complex objects. The game has three modes: a creative mode and two modes of survival within hostile worlds. The creative mode provides a gamer with unlimited resources. In both of the survival modes the given resources are limited. Playing Minecraft, as well as similar games such as *Second Life*, involves construction of fanciful virtual worlds.

The use of Minecraft in psychological research work and practice has been increasing, although not as intensely as *Second Life*-related studies. *Second Life* is an older online platform for socializing and demonstrating personal creativity. Minecraft can serve as a means for developing communicative skills and logical thinking (Trcek, 2014; Cipollone, 2014). It may be also used as a learning platform to support educational processes in elementary school (Shaw, 2014).

In fact, we used Minecraft not as a competitive game environment, but as an environment for constructing new objects, or structures—in our case, the objects which the participants believed to be creative. We have chosen Minecraft as a computer environment to access participants' creativity for the following reasons. First, it is not time-consuming to train gamers to play this game. Second, it allows the parameters of participants' playing activities in either individual and group formats to be compared.

Goals

Our main goal was to explore the prospects for the online interface which has been developed to support productive and creative (1) individual and (2) group work. By prospects we mean that a group (a sort of a "collective intellect") using this interface outperforms a single person. In such a case we will have a tacit proof of the fact that the online interface suggests good prospects for group work.

The present study compared participants' creative productivity while they created new structures using the Minecraft constructive elements, either individually or in dyads.

We hypothesized that the dyadic productivity and originality in constructing complex objects would be more effective than the individual productivity and originality of those involved in performing a similar task.

Since this paper reports on a work in progress, among the goals of the ongoing study is detection of probable cases which may contradict the results and form the basis for subsequent qualitative analysis. If such cases are not found, that may reduce the program of subsequent studies.

Method

Sample

The sample consisted of forty-nine participants (29 males and 20 females) between 18 and 29 years of age ($M=22.3$, $SD=3.26$). They were recruited via the Internet and personal ties (snow-ball). Most of them were university/college students. All par-

ticipants were experienced computer users (with proficiency in intensive computer use for no less than five years). All participants got a short online training course on how to play Minecraft, although some were already experienced.

Design

Each participant performed creative activity under both individual and dyadic (hereafter called group) conditions. Approximately half of them (25 randomly selected participants) performed the given task first in the individual format, and subsequently in the dyadic format; the rest, vice versa. Participants under the dyadic conditions were randomly recruited exclusively from those who either had performed the given task individually, or had not yet participated in the experiment.

Materials and tasks

The online platform for gaming activity was Minecraft version 1.7.9 (Creative mode). A specially organized Minecraft game server supplied each participant with all the necessary instruments and online resources to play the game. This server was repeatedly re-booted after each online gaming session. All the data from each session was saved on the server.

The initial virtual environment in Minecraft for each participant had been pre-established by experimenters to provide equal starting conditions.

There were two complex objects (structures) to be built: a house and a ship. Each participant built both of these objects: one within the first session, the other within the second session. We chose these objects as the core element of the task because they seemed to be similar in complexity, and are familiar to almost everyone.

Participants used Skype to communicate with each other. Every image on the participants' screens and every sound they made was video- and audio-recorded using the FastStone Capture software package.

Procedure

Preliminary Minecraft online training

Participants were preliminarily trained in how to play Minecraft. At the very end of the training course they had to build a trial archway, to test their competence and skills.

The experiment

Participants logged in from a distant location to the Minecraft game server, and installed Skype and FastStone Capture. They could communicate via Skype with each other, as well as with the experimenters.

The experiment was comprised of an individual and a group session. Each participant performed different tasks in the individual and dyadic format. He/she was randomly assigned to a particular sequence of these sessions and to the first object to be built. There was one-day break between sessions.

All participants were to build complex objects (structures) that had to be creative, i.e. as singular and unique as possible.

Participants were required to articulate all their ideas and comments aloud. They were aware of being recorded. They could view each other's avatars at all times. Moreover, they were provided with all the visual and audio information on what their partners were doing in real time.

Participants were not given a time limit, but they were aware of the preferred time frame for accomplishing the mission—one hour. Participants got the following verbatim instructions:

Please build a ship/a house which you have never seen. Try to make it as unique, unusual, and original as possible. You can build whatever you want. There are no special requirements about the structure and shape of the construction. Activate the potential of your imagination, throw away all barriers and limitations, and just do it! Upon the completion of the task, please assign an unusual name to the constructed object. Please verbalize aloud everything you are doing at the moment, articulate all your intentions concerning the task, and—this is especially important—express verbally all the ideas you produce. Try to accomplish the mission within one hour. Upon the completion of the mission, please give a guided tour of your house (or your ship) and tell a short story about it.

Coding

Productivity (personal and dyadic)—i.e., the number of ideas, or goals the participants generated—was measured, as well as the originality of these ideas. In his presidential address to the American Psychological Association, J.P. Guilford (1950) called attention to the importance of productivity (fluency) as a parameter of individual creativity: "...the person who is capable of producing a large number of ideas ..., has a greater chance of having significant ideas" (p. 452). We regard this parameter of creative performance as an important indicator of an individual's productive contribution to the construction of a given complex object.

Certainly, the ideas referred to different levels of the final product, i.e. the development of a ship or a house. According to the "personal meanings" theory (Tikhomirov, 1988), the goal setting structure of the process of decision-making may be empirically classified depending on the role of a particular goal in the whole structure and its closeness to the final outcome. Relying on this tradition, we classified the ideas (i.e., goals) according to different empirical criteria.

For example, in assessing idea generation, we differentiated five types of ideas:

- Conceptual (large-scale ideas concerning the main concept of the object)
- Functional (assigning to an object's non-standard functions)
- Selective (selection of appropriate material and color from the given options)
- Corrective (ideas how to change or re-build various components of the structure)
- Intentional (novel ideas with no proposed practical applications)

The classifications of the types of ideas, as well as what level of the object to be built they referred to, were developed after the pilot work was done and analyzed. These classifications were the product of discussions (and consensus) among all

four authors. All the mentioned ideas referred to various aspects of the object (i.e., the structure the participants built). They were as follows:

- the whole structure (refers to the house or ship)
- a particular component or part of the structure (walls, ceiling, floor, furniture, sail, etc.)
- an element (smaller parts of the object built).

Two sets of experimental data were obtained. The first set referred to the objects (structures) built; the second set was the data extracted from the audio/video records of the process. All the ideas were articulated by participants in either a positive (referring to enrichments of the structure to be built, e.g. by adding elements) or negative (referring to unwillingness to carry out particular enrichments of the structure to be built) context. Each idea was also marked as either implemented or unimplemented.

The total number of ideas in each category was calculated. Many participants did not follow the experimenter's recommendation to try to accomplish the mission within one hour: Actually, the duration of the sessions in the main experiment varied from 20 minutes to 2 hours. For this reason we used the average number of ideas produced within one minute as the basis for the comparison of the participants' idea generation.

We also assessed the creative quality of the ideas generated. This quality is closely related to the originality of these ideas (Guilford, 1950). To measure the originality of the ideas produced by study participants, we used the Consensual Assessment Technique (CAT) developed by T. Amabile (1982). This technique calls for independent experts to assess the data according to their personal understanding of creativity.

Results

To process the data, the program package IBM SPSS Statistics 20 was used. The most general parameters of the participants' activities are shown in Table 1. The nonparametric Wilcoxon signed-rank test was used to compare the parameters. To the degree that we obtained results referring to various parameters of the participants' idea generation processes, we present the most important and significant data.

Table 1. Comparison of the parameters of participants' activity across the sessions

Parameters	M (ind. session)	SD (ind. session)	M (group session)	SD (group session)	P level	Z-value
Average duration of a session, minutes	50	32.093	69	28.013	0.001	-3.402
Average number of ideas generated per minute	2.268	1.24	1.493	0.91	0	-3.914

Notes: M — mean; SD — standard deviation; P — level- the level of significance; Z-value — the Wilcoxon signed-rank test's z-value

The average duration of the group sessions was significantly longer than the average duration of individual ones. Contrary to our main hypothesis, the participants generated significantly more ideas per minute during individual sessions compared to the group format. Further analysis will show which types of ideas occurred more often in individual sessions compared to group sessions, and possibly vice versa.

In Table 2, the data on the number of ideas of different classification types are presented.

Table 2. The number of ideas of different types across the sessions

Parameters	M (ind. session)	SD (ind. session)	M (group session)	SD (group session)	P level	Z-value
Conceptual	0.935	0.49	0.619	0.379	0	-3.865
Functional	0.174	0.218	0.057	0.051	0	-4.561
Corrective	0.48	0.383	0.332	0.346	0	-3.556
Selective	0.512	0.397	0.325	0.203	0.004	-2.89
Intentional	0.166	0.172	0.165	0.131	0.762	-0.303

During individual sessions the participants generated significantly more ideas of all types (except the intentional ideas) than in the group format: the mean number of intentional ideas was about the same in the single and individual formats. Novel non-practical intentions were expressed equally often irrespective of having a partner or not. After we found that ideas were produced more often during the individual sessions, it was useful to learn whether the participants produced proportionally equal (or close to the same) number of ideas in the two formats, at each of the three different levels of the constructions they were building (namely, the levels of the whole structure, components, or elements). Table 3 contains the data on the levels to which the generated ideas referred.

Table 3. The number of ideas referring to different structural levels across the sessions

	M (ind. session)	SD (ind. session)	M (group session)	SD (group session)	P level	Z-value
Structure level	0.088	0.091	0.099	0.092	0.135	-1.494
Component level	0.477	0.313	0.328	0.177	0.007	-2.711
Element level	1.589	1.051	1.073	0.752	0.001	-3.477

The data show that during individual sessions the participants generated significantly more ideas on the component and element levels, than in the group format, and insignificantly less on the level of the whole structure. We can suggest that a likely reason for that is that while building a complex object (house or ship) in

a group, participants were not paying appropriate attention to the small details of the would-be object, such as the interior design and furnishings of the house or the ship; those ideas were significantly more often generated in the individual format. On the contrary, the number of the whole structure ideas generated in the group mode was slightly greater than the number of the same type of ideas produced during individual sessions. We can conclude that the number of global-level ideas about the structure to be built was about the same in the two formats, but the participants felt somehow reluctant and wary of descending to the less global levels such as components, and especially elements. Indeed, ideas dealing with interior decoration seemed to be considered more or less a private matter, and thus were not easily shared with a partner.

Our experiment differs from verbal brainstorming sessions by virtue of the fact that the participants needed to both generate verbalized ideas and construct a virtual structure (a house or a ship) using the Minecraft building blocks. Thus, one of their tasks was to realize their ideas. The data show that many ideas which had been expressed verbally were nevertheless not implemented, either in the individual or group format: these ideas were forgotten and dropped. The two research formats differed in the number of ideas generated and not implemented: the number of unimplemented ideas was significantly higher ($p < 0.0001$, $Z = -5.834$) in the group sessions compared to the individual sessions ($M = 0.141$, $SD = 0.123$ for the individual format and $M = 1.565$, $SD = 1.063$ for the group format).

Participants generated fewer ideas during the group sessions, compared to individual sessions, and at the same time, they dropped more of their ideas. The particular types of ideas (to which level of the structure they applied) which were more frequently unimplemented in the group format than during the individual sessions, are presented at Table 4.

Table 4. The types of ideas which were more often left unimplemented during group sessions

	M (ind. session)	SD (ind. session)	M (group session)	SD (group session)	P level	Z-value
Functional, component level	0.0004	0.002	0.003	0.007	0.028	-2.192
Intentional, component level	0.006	0.014	0.017	0.024	0.003	-2.93
Intentional, element level	0.015	0.024	0.029	0.032	0.034	-2.119
Corrective, element level	0	0.002	0.004	0.11	0.021	-2.312

The data in Table 4 show that during the group sessions the participants more frequently dropped (and left unimplemented) ideas referring to the levels of either components or elements of the structure, than they did during the individual sessions. It is important to note that the ideas of the intentional type are among those which were most often not realized (i.e., dropped) during the group format. We

also can conclude that this type of ideas (intentions) was the only type which was generated equally often in the two formats. More specifically, this conclusion refers to ideas at the component and element level, not at the level of the whole structure.

As mentioned above, we also assessed the originality of the ideas generated. Two psychologists performed the assessments independently, and since the conformity between their assessments turned out to be high ($r=0.876$), we consider the result presented in *Table 5* to be reliable. Since the duration of particular work sessions, as well as the number of ideas produced by particular participants and dyads, varied, the data in *Table 5* are represented as the number of original ideas produced during the session, divided by the general number of ideas produced by a participant or a dyad during the work session.

Table 5. The originality of ideas produced during individual and group sessions

	M (ind. session)	SD (ind. session)	M (group session)	SD (group session)	P level	Z-value
Originality/ number of ideas	0.123	0.006	0.115	0.076	0.345	-0.945

The results show that individuals produced original ideas slightly more often than the dyads, although the difference is insignificant. Thus, we need to accept the fact that both hypotheses of the current study were incorrect. Contrary to our assumptions, individuals are more productive in generating ideas than dyads, and secondly, dyads are not more productive in generating original ideas than individuals. These results lead us to declare that the interface which was developed is not “dyad-friendly;” i.e., it does not push dyads to work productively and in an original manner. This result may be called negative because it means that the interfaces of the future need to differ from the one we have developed.

Discussion

Both dyadic and individual creative problem-solving has been investigated over decades in academic and applied psychology (to name just a few studies: Amabile, 1996; Doerner, 1997; Guilford, 1950; Lubart, 2001; Osborn, 1957; Tikhomirov, 1988). Rather unexpectedly, the findings produced in the current study show that the productivity of creative performance, measured as the number of generated ideas, was significantly higher in the individual format compared to the dyadic format. This result contradicted our hypothesis about the positive influence of group activity on creative productivity. We have to admit that the finding is partially in line with the results of earlier studies from previous decades, specifically those which revealed that nominal groups outperform interactive groups due to negative group interaction effects, such as the fear of being negatively assessed, conformity, and social loafing (Diehl & Stroebe, 1987; Lamm & Trommsdorff, 1973; Mullen, Johnson, & Salas, 1991; Taylor, Berry, & Block, 1958).

At the same time, numerous studies have shown that groups are more effective in idea generation than separate individuals (Hwang & Guynes, 1994; Os-

born, 1957; Wooley et al., 2010). Since contradictory views have been expressed as well, the available empirical results are controversial. The results presented in the current paper strengthen the positions of those who believe that individuals are more productive than the same individuals combined in small groups such as dyads.

The analysis of the results shows that, under conditions of dyadic creative activity, the participants generated fewer ideas of the conceptual, functional, corrective, and selective type on both the component and element levels. The decrease of idea generation in the dyadic format may be interpreted as the tendency of study participants to let others manage the time needed for performing particular actions (e.g. make a window in the wall built earlier). This effect approximates the social loafing effect and the free-riding effect in group work (Hall, Buzwell, 2013).

To organize and manage online group activity, an aptitude for leadership, as well as the ability to distribute roles and responsibilities within a mission, and a well-developed emotional intelligence, are required (Herodotou et al., 2011). These requirements are not common within the general population. While participants in the current study were recruited randomly, we can assume that only a few of them met the above mentioned requirements. Thus, it might have been problematic for them to manage the process of dyadic construction of a house or a ship. On the contrary, within the individual sessions, the participants were ready to take responsibility for time management, as well as for the efficiency of idea generation.

Processes of decision making differ in dyadic and individual sessions. Our analysis shows that within dyadic sessions the number of ideas which were implemented was lower ($M=1.34$) compared to the individual format ($M=2.14$, $Z=-4.116$, $p=0.000$). Two considerations seem to be relevant.

First, working in dyads, participants generated many ideas—articulated them and discussed them with partners—which were subsequently forgotten or not implemented for other reasons. Quite often these ideas seemed to contradict the partners' plans (as projected in the partners' verbalization of their ideas, or in their practical actions on a computer screen) for the mutual structure to be built, and as a result, impeded joint work by dropping some of these ideas as prospective directions for the further work. This is a type of disadvantage related to interaction at a distance, even in communication-rich cases.

Second, analysis of the protocols shows that during the group sessions, the participants often produced more complicated and challenging ideas than they generated in the individual format, and paid too little attention to the feasibility and applicability of their ideas. In the authors' view, such a decrease of personal responsibility during one's performance in a group approximates the social loafing effect mentioned earlier in this section.

To competently discuss this study's main finding (i.e., that individual work turned out to be more productive and no less original than dyadic work), we undertook one additional analysis of the protocols. This analysis showed that approximately one third of study participants (14 out of 49) were more productive in dyads than in individual sessions. While their dyadic sessions were only 1 minute longer (69 min) than the average dyadic session (68 min), they produced more ideas ($M=108$) than an average value ($M=100$). As individuals, they produced

many fewer ideas ($M=76$) than the average number of ideas in the individual sessions ($M=104$), working one minute less (48 min against $M=49$ min). These 14 participants benefitted from the dyadic sessions; the reasons are possibly connected with their personality traits and preferred interaction modes. Since the study participants were not tested for psychological parameters, we may only guess at which particular personality traits these participants shared. Sources in the literature suggest that these traits may include social intellect (Meslec et al., 2016; Woolley et al., 2010). These results will be eligible for a subsequent qualitative analysis.

The participants performed the study's building tasks in the Minecraft environment, which provided them with opportunities to apply their creativity with minimal limitations and constraints. Live interactions between participants were organized; this is one of the specific features of the design of the current study. The zero-level interface developed for this study does not seem to be the most beneficial for group work to be performed in the near future. Thus, in the studies to follow, more elaborated interfaces need to be developed, very likely including elements of artificial intelligence which would help the study participants by suggesting hints and prompts, producing lists of ideas to discuss, and letting the participants most involved in suggesting prospective ideas and solutions lead the discussion. Even irrespective of the character of the interfaces, special environments may lead research participants "not to produce more ideas, but to explore idea categories in greater depth" (Guegan et al., 2017, p. 4). This is one of the most common ways to enrich the originality of ideas. The environments and the interfaces should complement each other.

Limitations

The current study had certain limitations. First, although the participants had not been acquainted with each other prior to being combined into dyads, social factors such as teambuilding or attitudes towards their partners were not observed, fixed, and analyzed. Second, the use of Skype as a means of interaction between the participants during group sessions, as well as the observation of the partners' avatars, reduced the quantity and quality of emotional contacts during the sessions. This format of creative activity does not have the possible advantages peculiar to an electronic brainstorming session (EBS); thus the next research question is to learn whether the EBS-related findings are relevant to the conditions of the current study. Third, the interface that had been developed was not friendly to the group style of work, and thus it needs to be enriched for future studies.

Conclusion

Here are the most important conclusions of the study:

1. Within the dyadic sessions, participants produced ideas less intensely and consumed more time in accomplishing their missions than they did during individual sessions.
2. Participants working in dyads generated fewer ideas on components and elements (but not on the whole structure).

3. When working in dyads rather than in individual sessions, participants tended to produce more ideas which were subsequently unimplemented, and fewer ideas of some categories that were subsequently implemented.
4. The perspective for generating original ideas in dyads is great enough; while the number of ideas produced by dyads is less than the number of ideas produced individually, the number of original ideas is about the same in the two types of work. Thus, if we find ways to enrich the interface, we have a good chance of developing interfaces which will make dyadic work more beneficial than the individual style of work.

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CLINICAL PSYCHOLOGY

An inner picture of health as a factor in changing a child's behavior to health-promoting behavior

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Background. An inner health picture (IPH) includes a person's image of him- or herself as healthy, and knowledge of the methods needed to achieve the behavior necessary to maintain his (her) health. The IPH of a preschooler is formed by his (her) parents, and the high level of physical activity which is needed for supporting his (her) IPH could change a child's capacity to orient in sensory flow.

Objectives. The objectives of this study were twofold: 1) to compare the children's IPH with that of their parents, and 2) to study the connection between a child's IPH with his (her) capacity to recognize consistent patterns in the structure of a stream of sensory signals.

Design. 82 primary school children and their mothers participated in the study. The study was conducted in two stages. During the first stage, the internal picture of health (IPH) of the children and their parents was evaluated by means of a questionnaire. To describe a child's ability to discern some kind of order in a stream of sensory signals, the models of simple and complex sensorimotor reactions were used.

Results. Parents whose children have a well-developed IPH steer their children toward a healthy lifestyle, whereas they themselves do not do what is necessary to maintain their own health. The process of developing an IPH is accompanied by an increase in control during performance of a serial reaction task, which is reflected in a decrease in the number of lapses or missed stimuli. **Conclusion.** An IPH is an internal mental model that not only predetermines a child's notion of themselves as a healthy person; it also has a psychological basis in the form of a system that strengthens the child's control over his (her) own actions.

Keywords: an internal picture of health, simple and complex sensorimotor reactions, primary school children

Introduction

One of the most important problems that humanity is facing today is the disparity between our modern lifestyle and the evolutionary demands of a healthy body (Nikolaeva, 2015). Our body evolved under conditions of constant motion and limited access to food, as well as the absence of great quantities of readily obtainable carbohydrates in the environment, and, all the more so, substances that are today recognized as being harmful to our health.

The human body has not changed over the last 100,000 years, but our lifestyle has (Frith, 2011): spending time at a workplace or at school has sharply limited our mobility, and the unique features of food preservation have led to the constant availability of food for the vast majority of people. In neither case does this conform with the evolutionary framework that determines how effectively we function and how healthy we are.

It is obvious that even when a person understands that his (her) behavior is undermining his (her) health, this does not, in the overwhelming majority of cases, lead him (her) to change his (her) way of life (Webb & Sheeran, 2006). In order to prove that this is true, we do not need to do any research; all we have to do is to go out onto the street, where we will see a great number of people who are overweight.

The most widely accepted theory which allows us to predict the likelihood of a behavioral change that would lead to a healthier lifestyle is the theory of planned behavior (Ajzen, 1985, 2011). It establishes how much a person's change in behavior depends on his (her) intention to perform the behavior, and on his (her) perceived behavioral control. In turn, a person's intention depends on his (her) attitude towards the behavior, his (her) subjective norm, and his (her) perceived behavior control.

This theory is most accurate in predicting behavioral changes if the research is conducted on students or young adults (McEachan et al., 2011). There is a problem, however: the most effective time to influence a person's behavior is during childhood, and this influence is most successfully accomplished by a person's parents. In this case, a parent answers for control of his or her own behavior as well as for that of the child, and the child's intentions are often introjected intentions of the parents.

In an earlier study, we asked preschoolers this question: "What do you need to do to be healthy?" More than 60 percent of the five-year-olds answered that you "need to take pills and go to the doctor." Children between the ages of six and seven, however, gave such an answer in just 40 percent of the cases. Clearly, the children's answers were prompted by the behavior of their parents. As long as a child is healthy, health is not a topic of conversation with them, since it is a given. Accordingly, these children are not told about what it is that leads to good health. But when they fall ill, their parents become emotional when they describe both the child's condition and the measures that need to be taken to return the child to a state of health (Nikolaeva et al., 2014).

It is for this very reason that, when describing the influence that parents have on behavior in their children that would lead to good health, the concept of an "internal picture of health" (IPH) seems appropriate (Nekrasova, 1984). It includes, on the one hand, a person's image of him- or herself as healthy and, on the other hand, a knowledge of the methods needed to achieve the right behavior to maintain

health and—this is extremely important—to actually perform it. Consequently, it is assumed that, to form an internal picture of health, a person needs to know not only what he (she) has to do; the person also has to do it, i.e. realize the knowledge so that it becomes a part of his (her) own behavior. It is likewise assumed that the concept of an internal picture of health raises the threshold of a person's susceptibility to disease (Nikolaeva & Merenkova, 2013).

This internal picture is formed by the child's parents, but how are the parents' IPHs and child's IPH connected? They could be identical, or they could be different. In cases where parents teach their children based on their own example, the parents and children have the same IPH. But parents could teach their child to play sports but not behave this way themselves. These strategies would have a different influence on the child's IPH. But we lack information about the real situations in families.

The IPH is a mental picture. If it is an actual picture, it influences the brain's characteristics and is influenced by them (Frith, 2011). It includes both the functions of the person's behavior planning and the control of this behavior. In our study we assumed that a person's conscious attitude towards his (her) own health, which is manifested in specific behavior (for example, a child going out for sports regularly), should be connected with objective psycho-physiological characteristics: first of all, the ability to orient one's self within the structure of a stream of sensory signals, and to perceive (perhaps unconsciously) the order in that structure, if it exists. It is known that sensory and motor processes are temporally integrated in order to control behavior (Karmarkar & Buonomano, 2006; Merchant et al., 2013). This assumption seems warranted since the formation of an internal image of health, and the ability to control it, call for a person to be sensitive to streams of sensory stimulation.

For this reason, the objectives of our study were twofold: 1) to compare the children's internal pictures of health with those of their parents, and 2) to study the connection between a child's ability or inability to form an internal picture of health with the child's capacity to recognize consistent patterns in the structure of a stream of sensory signals.

Method

Participants

There were 82 primary school children who participated in the study (the mean age was 9.1 ± 0.5 years); 39 of them were girls and 43 were boys. The study was carried out at a school in Lipetsk, a city in the central part of European Russia. The children's mothers (the mean age was 33.8 ± 5.7 years) also took part in the research. Practically all of the fathers agreed to enroll in the study, but in reality only a few were involved, not enough to provide evidence-based conclusions. Hence, only the results for the mothers and children were subjected to analysis.

Design and procedure

The study was conducted in two stages. During the first stage, the internal pictures of health (IPH) of the children and their parents were evaluated by means of a questionnaire (Nikolaeva et al., 2014). Parents filled out the forms themselves,

and the children were asked questions by psychologists who filled out the forms for them.

The questionnaire for parents consisted of two parts: in the first part, the parents needed to answer questions about what it means to be healthy; in the second part, they had to answer what they thought was involved in creating health. For each question, the subject chose one from a set of given answers, and each answer was given a certain numerical score. Then the results of the first and the second parts were compared, allowing us to assess whether the person acts in accordance with his (her) ideas of a healthy person.

The child was asked questions about what he (she) needs to do to be healthy. The answers were compared with the scale of answers that corresponds to certain numerical scores, which correspond to age norms.

To determine a child's ability to discern some kind of order in a stream of sensory signals, the following methods of evaluating simple and complex sensorimotor reactions were used. To test his (her) ability on a model of simple sensorimotor reactions, the child sat in front of a display screen on which different colored circles would appear. When a circle appeared on the screen, the child was supposed to press down on the spacebar. When they were being tested on a model of complex sensorimotor reactions, the children were instructed to press the spacebar at the appearance of any circle except a red one. The inhibitory processes in the children's central nervous systems were thus evaluated. The program ReBos was used (Vergunov, Nikolaeva, 2014).

Measures

While a child was describing his (her) IPH, it became clear what he (she) felt when he (she) was healthy, how he (she) looked at that time, and what he (she) thought was needed in order to be healthy. Using a special inquiry form, the child's frequency of attendance at specialized sport clubs, swimming pools, and classes involving outdoor games was also evaluated. After analysis, it was possible to divide the children into three groups. A response reflecting the child's notion that a healthy lifestyle involves the need to constantly be active, engage in sports, and eat the right food showed that the child had a well-formed IPH (more than 12 points). If, in his (her) assertions, a child associated a healthy way of living with taking pills and going to the doctor, then the child was relegated to the group with an unformed IPH (no more than 8 points). Children who received between 8 and 12 points were put in a group considered to have a partially formed IPH. Allowing for the difference in their ages, the children's mothers were asked similar questions in versions designed to assess their IPH.

In this study, the evaluation of the process of constructing order in a sensory stream was based on the fractal properties of the stream. Fractality is characteristic of long-period correlations in streams of signals that can be represented by using the Hurst Index, which is one of the markers of the degree of order in stimuli (reactions) over the course of time. The range of values from 0.5 to 1 corresponds to an increase in the order of the stream, and a Hurst Index equal to 1 reflects a linear dependence during the sequence of the stimuli in the stream (Fraisie, 1984; Coull et al., 2011).

In our case, the structure of the stream corresponded to a Hurst exponent of 0.953 for the simple sensorimotor reactions, and 0.827 for the complex reactions.

There were, however, two Hurst exponents that were evaluated:

- Hurst exponent H_y , which pertains to the time between the appearances of stimuli on the screen. (On different computers with different Windows systems, the appearances of the stimuli occur with an accuracy of ± 15 msec from what is prescribed, and therefore measurement of the time that the stimuli actually appear is part of the procedure for testing simple and complex sensorimotor reactions.)
- Hurst exponent H_x , which is related to the recording of the intervals between the times the test subject presses down on the spacebar.

The stream of signals used in testing both the simple and the complex sensorimotor reactions consisted of two identical parts, but the children were not informed of this. Thus, it was possible to evaluate the test subject's ability to recognize a highly-ordered stream of signals in the first part of the task, and to use that recognition in the second part (consciously or unconsciously).

In addition to the Hurst Index, the following variables were also recorded: the reaction times in the tests of both the simple and complex sensorimotor reactions; the number of lapses (when a child failed to react to a stimulus); and the number of mistakes (the test subject failed to follow the instructions for the complex sensory-motor reactions and pressed down on the spacebar after a red circle appeared on the screen).

At the halfway point of every task, the Δ exponent was assessed by subtracting H_x from H_y , taken in absolute value. Low values of this exponent indicated that the degree of order in the test subject's reactions conformed to the given degree of order in the actual stream of stimuli.

Since one and the same stream of signals was repeated twice in every task, it was possible to assess a child's ability to recognize and use that order, whether consciously or unconsciously. This could be done by comparing the value of $\Delta 1$ for the first half of a task with the value of $\Delta 2$ for the second half. This comparison produced the Ω parameter, which gauged the difference between $\Delta 1$ and $\Delta 2$. If the value of $\Delta 2$ was less than or equal to that of $\Delta 1$, that meant the child was able to recognize the structure in the stream of signals and adapt their reactions to it. Assessment of the parameters specified above was carried out based on dividing the test subjects according to their IPH levels, as well as analysis of their ability to predict when the stimuli would appear (hereafter we will denote this parameter as either "recognized" or "did not recognize"). A statistical data analysis was performed using IBM SPSS Statistics Version 23.

Results

First of all, the children's and parents' answers to the questions were checked against each other. On the question of what a person needs to do in order to be healthy, there were no differences between the answers of the children and the parents (Table 1).

The differences were substantial, however, when the children and their parents answered the question about what they actually do to be healthy. The children significantly more often said that they work out, go to the swimming pool, attend

specialized sports clubs, etc. The parents talked about how they don't have time to engage in the activities that are essential if they want to maintain their health, or that they don't have enough money to pay for their own sports activities, since in their hierarchy of values, the health of their child comes first (Table 2).

Table 1. Answers to the question "What a person needs to do in order to be healthy" (scores)

Mean and SD	
Mothers	Children
8.02±4.99	7.32±3.74

Table 2. Answers to the question "What you actually do to be healthy"

Mean and SD	
Mothers	Children
1.24±0.88	1.6±0.8*

Note: * = 0.007 (Wilcoxon's criteria)

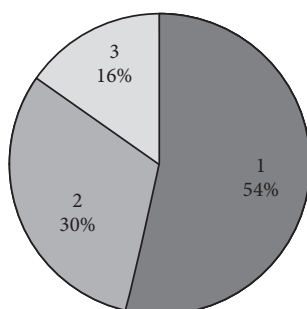
It was no surprise then, that on average, the children turned out to have higher ratings in terms of an IPH than the adults (Table 3).

Table 3. Comparison of the IPH levels of children and their mothers (mean and SD)

Groups	Level of IPH
Mothers	5.50±3.04
Children	7.32±3.74*

Note: * = 0.000 (Wilcoxon's criteria)

Even so, a breakdown of the children according to the level of their IPH showed that a majority of them (54 percent) do not have a completely formed IPH (see Figure 1).



Note: 1=Not formed IHP;
2=partially formed IHP;
3=completely formed IHP

Figure 1. The distribution of the children on the levels of IHP

Table 4 shows our evaluation of how well children with different levels of IPH recognized the order in a sensory stream.

Table 4. The quality of recognizing the order in a sensory stream by children with different levels of IPH (%)

Type of reaction	Level of IPH	Quantity of children (%)	
		recognized	did not recognize
simple sensorimotor reaction	0	38	62
	1	67	33
	2	78*	22*
complex sensorimotor reaction	0	58	42
	1	67	33
	2	56	44

Note: * = 0.013 (Wilcoxon's criteria)

An analysis of these results provides evidence that among those children whose IPH is undeveloped, more of them do not recognize the order in a simple sensory-motor reaction than the children of the other two groups do. In our study, this difference was significant for the children with highest level of IHP in comparison with two other groups.

At the same time, when it came to the complex sensorimotor reactions, there were no significant differences among the children. This can be explained by the difficulty that all children of this age have in completing tasks connected with the inhibitory process, since the frontal lobes, which are in charge of this process, have not yet fully developed. This is also confirmed by the results in Table 4, where other relevant parameters of the simple and complex sensorimotor reactions are presented.

As can be seen by the findings presented in Table 5, in the testing of simple sensorimotor reactions, the children with an undeveloped IPH did not notice that the second segment of the stimulus material was a duplicate of the first. They had even more lapses (i.e., omitted more stimuli) in the second series than in the first, which was perhaps a reflection of their inattention. The children with a partially developed IPH were significantly better at completing the task, and in the second part they had considerably fewer lapses than in the first. This shows that they had inner control and were attentive as long as the stimulus material was being presented. As for the children who had a well-developed internal picture of health from the very start of the testing, they had fewer lapses than those in the other two groups, and they performed at a consistently high level throughout the entire task.

In the part of the study devoted to complex sensorimotor reactions, no differences were found between the groups of children. Analysis of these reactions can bring to light the processes of inhibitory control, which are just beginning to develop in children at the age of those in the experiment.

The findings certify that there were no significant differences in reaction times in any of the groups for either the simple or the complex sensorimotor reactions, and in either part of the series.

Table 5. Omission of stimuli by children with different levels of IHP

Type of reaction	Level of IHP	Lapses (part 1 of task)		Lapses (part 2 of task)	
		recognized	did not recognize	recognized	did not recognize
simple sensori-motor reaction	0	8.7±6.7	3.4±2.6	9.3±6.7	5.2±4.4
	1	3.5±0.7	12.0±0	2.0±2.8	7±0
	2	2.4±2.1*	6.0±4.2	2.3±1.6**	8.0±2.8
complex sensori-motor reaction	0	5.8±3.98	6.5 ±4.04	3.5±2.9	5.9±5.4
	1	8.0±7.07	7.0±0	3.5±3.5	3.0±
	2	3.8±2.2***	2.8±0.5	5.0±2.2	4.0±2.2

Note: * = 0.001; ** = 0.000; *** = 0.008 (Wilcoxon's criteria)

Discussion

Our data confirm that parents' IHPs have an obvious influence on their children's IHPs, but this is impossible to prove, since many parents whose children do have a well-developed IHP steer their children toward a healthy lifestyle, whereas they themselves do not do what is necessary to maintain their own health. Furthermore, as they point out, they pay for the activities that their children need to be engaged in, and economize on their own health. On top of that, due to the time required to transport their children to these activities, they do not leave themselves any time to participate in such activities.

It is interesting that parents do a lot to provide for their children's physical activity in special places (swimming pool, sport classes, and other), but do not organize joint family activities. That is, children participate in various sport classes, but they do not see their parents involved in the same activity. It is possible that later, when they grow up, they will prefer to help their own children participate in sport classes, but not participate in them themselves.

Our findings also show that children with a well-developed internal picture of health are better at recognizing order in the structure of a stream of sensory signals when called on to make simple sensorimotor reactions. They are also in better control of their actions, which leads to fewer missed signals.

In their complex sensorimotor reactions, children at this age with varying IHP levels do not excel in the quality of their performance. This is attributable to the difficulty that all children at this age have in executing inhibitory control, because their cerebral structures are insufficiently prepared to do so (Anderson & Weaver, 2009; Berkman et al., 2014).

Obviously, a child of this age is unable to control his (her) own actions related to health, since such actions are, to a great extent, determined by adults. Our findings, however, show that children whose parents actively control this process not only have an idea of what good health is, but they are also more successful at controlling their own simple sensorimotor reactions.

It is generally thought that sensorimotor reactions reflect the particular way that sensorimotor integration manifests itself in the human brain. We can assume that the processes of sensorimotor integration are more effective in the brains of children with a well-developed IPH. This allows a child, consciously or unconsciously, to recognize order in sensory signals.

It is assumed that a well-developed IPH raises the threshold of a person's susceptibility to disease. We can suppose that what lies behind this raised threshold is the ability to recognize order in the structure of an external or internal sensory stream, and, in the case of a child, to inform the parents in a timely fashion of changes that have occurred, which will allow the latter to do whatever is necessary.

At the same time, it can be said that an IPH is not simply a mental model that incorporates a child's notion of what it means to be in good health, and what they need to do in order to maintain that condition; it also has a psychological underpinning in the form of more effective sensorimotor integration, and, accordingly, it gives the child a more effective system of control over his (her) own actions when he (she) is met with a stream of signals.

Conclusion

Thus, the following conclusions can be drawn:

1. Parents' IPH has an obvious influence on their children's IPH, but this is impossible to prove, since many parents whose children do have a well-developed IPH steer their children toward a healthy lifestyle, whereas they themselves do not do what is necessary to maintain their own health.
2. The children with a partially developed IPH found it significantly easier to complete tasks on the model of simple sensorimotor reaction, and in the second part of the task, they had considerably fewer lapses than in the first. This shows that they had inner control and were attentive as long as the stimulus material was being presented.
3. The children who had a well-developed internal picture of health from the very start of the process involving simple and complex sensorimotor reactions, had fewer lapses than those in the other two groups, and they performed at a consistently high level throughout the entire task.
4. The process of developing an internal picture of health is accompanied by an increase in control during performance of a serial reaction task, which is reflected in a decrease in the number of lapses, or missed stimuli.
5. An IPH is an internal mental model that not only predetermines a child's notion of him- or herself as a healthy person; it also has a psychological basis in the form of a system that strengthens the child's control over his (her) own actions.

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Syndromic analysis in child neuropsychology: A case study

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Background. Neuropsychology is a science with its own specific concepts, terms, and methods of analysis of disturbances in psychological development. One of the essential concepts of neuropsychological methodology, according to A.R. Luria, is that of a neuropsychological syndrome, which takes into account both the functional organization of the brain and the behavioral system. However, this concept isn't mentioned in the majority of his publications, and thus is not well known by neuropsychologists. There is no clear understanding of this concept within the works of modern neuropsychologists. This omission has a strong influence on the way analysis and interpretation of developmental difficulties is carried out today.

Objective. The objective of this study is to present an example of the successful application of qualitative syndromic analysis to the case of a Mexican preschool child with developmental problems and learning disabilities.

Design. The clinical analysis was applied to the case of a 6 year old girl with learning disabilities, whose difficulties had been attributed primarily to a low level of general brain activation.

Results. The authors assert that the advantages of A.R. Luria's syndromic approach to clinical cases of difficulties in development and learning disabilities, are that it opens up the potential for finding the general causes on different levels: neuronal maturation, brain mechanisms, activity and personality.

Conclusion. The authors conclude that the topic of syndromic analysis in child neuropsychology requires further scientific discussion. The necessity for revising levels of analysis of clinical cases should be taken into account.

Keywords: neuropsychological syndrome, child neuropsychology, assessment of development, qualitative assessment, Luria's approach, developmental problems, subcortical levels

Introduction

One of the essential concepts of neuropsychological methodology, according to A.R. Luria, is that of a neuropsychological syndrome, which takes into account the functional organization of brain (functional brain units) and the behavioral sys-

tem as a whole. However, this concept is not mentioned in the majority of Luria's publications in languages other than Russian (Luria, 1970, 1973). Tsvetkova (2004) wrote that a neuropsychological syndrome represents "selective deficits of groups of psychological functions, which structure includes the same damaged factor along with the conservation of other functions, which do not include this factor." Clinical application of the concept of neuropsychological syndrome means to consider the common reason (cause), or common base, of all the difficulties observed in each case. This base or level should be considered a link between the level of material brain structures and the level of psychological actions.

According to Luria, such a reason (cause), base, or "factor" could be understood as the psychophysiological mechanism responsible for all the observed symptoms, developmental difficulties, and problems in school, intellectual tasks at any age, and day-to-day behavior. Such a cause could not be identified solely by quantification or assessment of isolated cognitive functions such as language, memory, attention, and so on.

Another consequence of utilizing Luria's analysis is that the cause or "factor" not be confused with symptoms or diverse expression of patient's behavior. We remind readers that, in all modern classifications of clinical developmental syndromes, each syndrome is understood as the combination of symptoms and features of external behavior.

The difficulty in finding the precise neuropsychological factor or common cause responsible for each child's difficulties, is that usually it is isolated cognitive functions which are measured during neuropsychological assessment (Tsvetkova, 2004). For followers of A.R. Luria, isolated evaluation of cognitive functions is inadequate (Vigotsky, 1991). Qualitative assessment has to provide specific information for the specialist to identify the predominant reason or "factor" causing the difficulties, from the point of view of the functional participation of central nervous system (Quintanar & Solovieva, 2008).

At the same time, the "factor" is not merely the level of development of the child's anatomical brain structure itself, but the result of participation of this structure or structures in the child's psychological actions. We understand psychological actions not as isolated "cognitive functions," but acts driven by goals (Solovieva, 2014; Solovieva & Quintanar, 2016a). In early infancy such actions are types of communication and play activity. At school age they are learning skills, such as writing sentences, repeating words spoken by the instructor, reading, etc. It is important to provide detailed analysis of the level of development of the child's psychological actions relative to his/her specific psychological age (Solovieva & Quintanar, 2016b). Then it's possible to establish the relationship between the child's psychological actions (functional) and the structural levels of participation of the child's central nervous system.

In child neuropsychology, the relationship between the child's psychological actions and the central nervous system might mean establishing the level of maturation of his/her subcortical or cortical functional relations (or the existence of a lesion on the system). It is important to separate cases where there is a lack of neurophysiological maturation at different subcortical levels, from the kinds of cortical difficulties which appear in adults as a consequence of brain damage. One specific feature of clinical assessment in infancy is that the effects of brain damage or im-

maturity can be expressed in a very generalized and diffuse way, compared to its effects on adults. The whole personality and activity of the child suffers (Slepovich & Poliakova, 2012), and there may even be no progress in psychological development. It is also possible to speak about developmental risk situations at an early age (Katona, 1988) from a global point of view (Muñoz-Ledo, 2003), and the potential for preventing difficulties in development during the first year of life (Pelayo, Solovieva, Marroquín-Andrade, Corona & Quintanar, 2013).

The concept of a neuropsychological syndrome was proposed especially for cases of adults with brain damage (Luria, 1970). Luria's colleagues and followers have also used his concept for developing different clinical pictures for adults and children (Simernitskaya, 1985), (Xomskaya, 1987), (Santana, 1999), (Tsvetkova, 2001), (Solovieva, Lázaro, & Quintanar, 2008), (Tsvetkova, 2004).

The functional or qualitative idea of the existence of a specific neuropsychological syndrome differs from syndromes established in DSM-IV (American Psychiatric Association, 2000). A neuropsychological syndrome should never be reduced only to one "cognitive dysfunction," such as "attention deficit disorder," dyscalculia, dyslexia, or dysgraphia. The syndrome always includes difficulties with diverse kinds of school activity or play, according to the age of the child. Even separate identification of some aspects of cognitive functions, such as language, memory, and attention, could not help identify the common factor of child's difficulties (Glozman & Potanina, 2004).

Instead of the psychometric method of assessment, or the assessment of isolated cognitive functions corresponding to various features of behavior, we propose another scheme for syndromic analysis. In this scheme we include psychological mechanisms as neuropsychological factors, which have to be evaluated functionally during a process of assessment. Assessment is understood as involving interaction with the child, with the possibility of providing help and different tasks which may be more accessible for the child. Such a conception differs from the rigid presentation of tasks to be performed on established tests (Solovieva & Quintanar, 2015). Other levels of analysis are intellectual or through play. Such activities are, for example, classroom learning or, at a preschool age, playing games.

As a consequence of the qualitative analysis and conclusions drawn after the completion of syndromic analysis, we obtain a judgment based on four possible levels:

- 1) the neuroanatomical structure or level of neuronal maturation;
- 2) the neuropsychological "factor" or base of difficulties;
- 3) actions corresponding to the child's psychological age and personality;
- 4) speech production or the neurolinguistic level.

Each level should be characterized according to the positive and negative aspects of development and learning of each child. Such levels could be studied in an interdisciplinary manner, including by specialists in neuroimaging or electrophysiology (Solovieva, Machinskaya, Quintanar, Bonilla & Pelayo, 2013). The authors are aware of the fact that the first level, involving neuroanatomical structures or the level of maturation, might be the hardest level to identify precisely during neuropsychological assessment. The identification of this level requires other meth-

ods and techniques, such as electrophysiological or neuropsychological methods, which are rarely accessible for all clinical cases attended by neuropsychologists. Nevertheless, it is possible to speak of hypotheses on the level of participation of neuroanatomical structures and level of maturation.

The second level, or level of “factor,” is the level of central interest for neuropsychological assessment. Identifying this central factor permits us to determine which activities are well developed and which are disturbed. Such a “factor” might be the “level of general brain activation,” as we show in this article, but other examples are also possible.

The third level, or the level of psychological actions, permits us to develop a detailed analysis of the types of difficulties which have arisen in the child’s school activity, play, overall behavior, and even his/her personality. For example, this level includes identifying specific mistakes in writing and reading as the consequence of a low level of general brain activation.

Finally, the fourth level is the level of verbal interaction, with linguistic analysis of different difficulties in the development, production, and comprehension of speech at different psychological ages, in relation to the identified neuropsychological factor.

Objective

The objective of the study is to present an example of successful qualitative syndromic analysis in the case of a child with developmental problems and learning disabilities.

Method

The authors present a case of a child channeled into neuropsychological assessment because of her serious learning disabilities.

Syndromic analysis was carried out by qualitative comparison of all the data obtained from the clinical picture, the child’s school productions (drawings, writings, tasks in mathematics), and the results of the neuropsychological qualitative assessment. Verbal production, kinds of verbal and non-verbal communication, tastes, aspects of personality, and commentaries by parents and teachers were also taken into account. The neuropsychological assessment was carried out during four individual sessions of 50 minutes each.

The patient

A 6 year old girl, a pupil in the last year of a private preschool institution in the city of Puebla (Mexico), was being seen by the Social Services department of Neuropsychological Assessment at Puebla University Hospital, which is run by Master in Neuropsychological Diagnosis and Rehabilitation on the Faculty of Psychology at the Autonomous University of Puebla. The girl is right-handed; her parents are employed professionals with high levels of education (16 years within the formal Mexican educational system). The reason for the Neuropsychological Assessment was the recommendation of the school psychologist, due to the child’s poor school performance and behavioral problems (impulsiveness, problems with attention and concentration).

The clinical history did not reveal any pathological data, no pregnancy complications, and no risk data, as there was an adequate course of postnatal development. The parents mentioned the lack of independence in the girl's behavior; she was not able to fulfill day-to-day tasks of bathing, dressing, eating, and so on, alone. The preschool institution noted her constant difficulties with communication and the learning process. The girl was not able to fulfill school tasks, showed impulsiveness, and got low marks. Neither medical reports nor other clinical studies were available.

Neuropsychological assessment

The neuropsychological assessment was directed to identifying the strong and weak functional areas of neuropsychological functioning, or brain mechanisms, in relation to her cortical (and subcortical) brain levels (*Table 1*).

Table 1. Relation between brain functional mechanisms and cortical-subcortical levels

Neuropsychological level (brain mechanisms)	Neuronal anatomical or level of maturation (cortical and subcortical zones and connections)
Programming and control	Frontal cortex and connections with frontal thalamic regulation system
Sequential organization of movements and actions	Premotor cortex, secondary motor (partially primary motor) zones
Phonematic and phonemic analysis and synthesis	Temporal secondary zones
Kinesthetic tactile analysis and synthesis	Parietal somatic zones, subcortical posterior zones
Audio-verbal retention	Temporal medial zones, subcortical structures including hypothalamic structures
Visual retention	Secondary occipital zones, parietal-occipital zones including subcortical hypothalamic structures
Spatial analysis and synthesis	Posterior complex associative zones (PTO)
General energetic brain activation (Cortical tone)	Subcortical structures, including reticular formation (diencephalon level)
General emotional activation (participation in activity)	Profound structures, including at the level of the limbic system

In order to obtain information about the level of functioning of these mechanisms, specific tasks were used. The tasks were selected according to their potential for identifying the positive or negative functioning of each mechanism. We stress that there is no one task which could “measure” only one mechanism. Clinical evidence was obtained during the whole assessment and was based on identifying various kinds of mistakes (difficulties), external help, and verbal communication.

During assessment, different tasks were used to determine the level of functionality of various factors. The tasks were selected from the Brief Neuropsychological

logical Assessment for Children (Solovieva & Quintanar, 2013). Intellectual activity appropriate to the child's psychological age was assessed with tasks selected from the Assessment of Voluntary Activity (Quintanar & Solovieva, 2010) and from the Assessment of School Success (Solovieva & Quintanar, 2012). All these instruments are based on a qualitative methodology created for Spanish-speaking children (Table 2).

Table 2. Types of tasks used for assessment

Neuropsychological mechanisms	Tasks of assessment
Programming and control	Verbal conflictive task, dynamic praxis, copy and continuation of graphic sequence, all drawing tasks, writing by dictation, free writing, copy of complex image "house", constructive tasks (cubes of Kohs), comprehension of stories and verbal instructions.
Sequential organization of movements and actions	Dynamic praxis, copy and continuation of graphic sequence, all drawing and writing tasks. Quality of speech production and syntactic organization.
Phonematic and phonemic analysis and synthesis	Repetition of words and syllables with opposite sounds, identification of phonemes in words and in series of sounds. Comprehension of oral and written language. All verbal tasks.
Kinesthetic tactile analysis and synthesis	Repetition of words and syllables with proximate consonants according to precise point and mode of articulation. Comprehension of oral and written language. All verbal tasks. Reproduction and retention of tactile stimuli. Tactile recognition of objects, imitation of articulation positions, etc.
Audio-verbal retention	Repetition and retention of two series of 3 words each. Oral comprehension of long sentences. Comprehension of texts.
Visual retention	Free drawing of animal, vegetables, human figures. Reproduction of series of letters and complex figures after copying. Recognition of visual stimuli in series of distractors.
Spatial analysis and synthesis	All kinds of visual and perceptive tasks including drawing and writing. Comprehension of instructions and sentences with complex logic grammar structure (temporal, possessive, cause and consequence effects). Constructive tasks.
General energetic brain activation (Cortical tone)	The overall assessment, especially graphic and written tasks. Tasks for retention in all modalities (visual, tactile, audio-verbal).
General emotional activation (participation in activity)	The overall assessment, especially significant activity according to the age.

Results

The results of the clinical assessment pointed to poor levels of acquisition of voluntary activity, of development of graphic activity, and of preparation for school learning in general. A functional deficit in self-regulation and control, and an insufficient level of tone of general activation were identified. The signs of such deficits were observed in all tasks used for the assessment. A functional immaturity of subcortical profound structures could be the neurophysiological reason for the difficulties observed in this case.

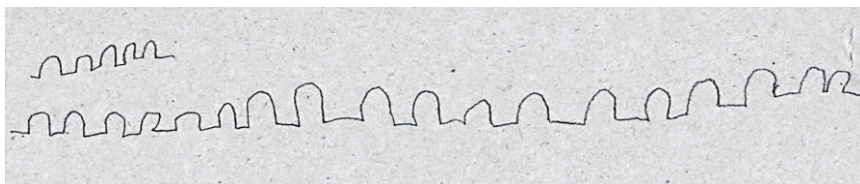


Figure 1. Task of copying and continuing a graphic sequence

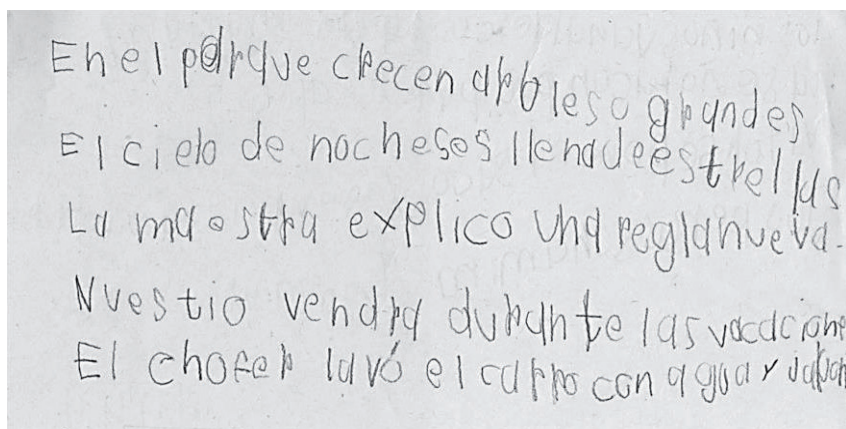


Figure 2. Writing by copying

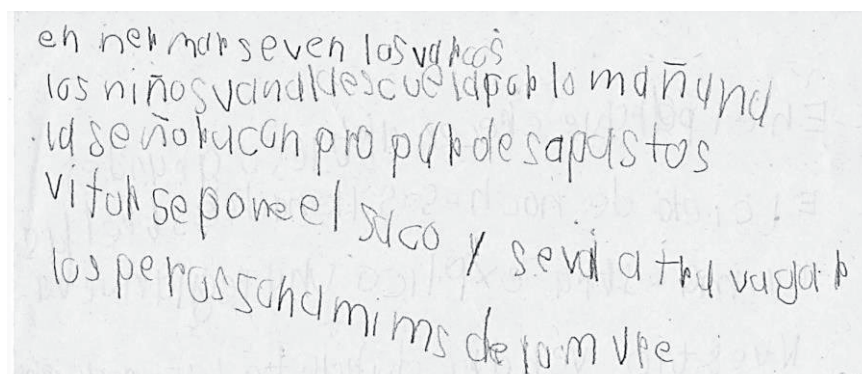


Figure 3. Writing by dictation

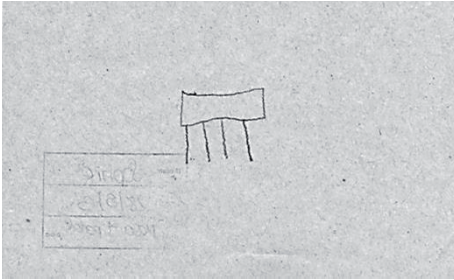


Figure 4. Free drawing of a table



Figure 5. Free drawing of a "round" watch.



Figure 6. Free drawing of a house.

The kinds of errors, difficulties, and lack of executive stability, ability to follow a proposed orientation, and verbal production obtained from all the applied tasks, all of which led to such a conclusion, may be seen in the examples of the girls' performance in various tasks during neuropsychological assessment (Figures 1, 2, 3, 4, 5, 6).

Table 3 reprises all the types of mistakes and difficulties which appeared during the qualitative neuropsychological assessment.

Table 3. Qualitative observations, according to brain mechanisms

Neuropsychological mechanisms	Tasks of assessment
Programming and control	Difficulties in independent execution of verbal conflictive tasks and constructive tasks, absence of perseverations, positive response to external help of an adult, possibility of comprehension of stories with external help of guidance by questions, good understanding of verbal instructions.
Sequential organization of movements and actions	Adequate motor fluency in dynamic motor tasks for hand and for fingers, absence of perseverations. Absence of expressive syntactic problems. Executive difficulties and fluctuation of tone in elements of graphic sequence. Constant repetition of last elements in stage of fatigue, constant changes of size, and some difficulties with precision of elements (<i>Figure 1</i>).
Phonematic and phonemic analysis and synthesis	Perfect identification of phonemes, syllables according to sound oppositions of Spanish phonetics
Kinesthetic tactile analysis and synthesis	Absence of difficulties in articulation; adequate stage of oral and manual praxis
Visual retention	Possibility to reproduce 5 of a series of 5 elements in reproduction of letters; 4 of 5 elements in reproduction of visual figures, noticing the lack of one figure in own execution. In conditions of homogeneous interference, manage to reproduce 3 of 5 elements of letters and figures. In conditions of heterogeneous interference, cannot reproduce stimuli. In memory tasks with usage of external signs (pictograms), manages to fulfill the tasks correctly.
Audio-verbal retention	Possibility to reproduce 1 of 6 elements of the series for involuntary memory. For voluntary memory manages to reproduce 2 of 6 elements. In conditions of heterogeneous interference, cannot reproduce stimuli.
Spatial analysis and synthesis	Some problems with distributions of elements. Fluctuation of executive tone, some tendency to asymmetry, lack of proportionality, losing of the basic line in drawings and in writing. Writing with difficulties in finding right distribution of elements, execution in blocks (figures 2 and 3). Neither rotations nor inversions are observed. Difficulties with precision of lines, unstable lines in all graphic tasks (figures 4 and 5). General lack of development of graphic activity, imprecise images.
General energetic brain activation (Cortical tone)	Reduction of volume of reproduction in memory and retention tasks. Good results in all voluntary and mediated memory tasks. In all tasks during assessment constant fluctuations, disorganized execution, necessity for constant orientation and guidance, usage of external language as orientation. Separation of pencil during drawing and writing, impulsive execution in tasks for identification of phonemes and words, difficulties in verifying executions. Bigger difficulties in a situation of saturation (fatigue) and in long tasks with presence of multiple elements. Frequent changes from wrong to right answer. Better responses in conditions of external verbal and emotional orientation.
General emotional activation (participation in activity)	Positive emotional contact, interest in playing and communication with the adult

Discussion

According to the results of the neuropsychological assessment, it was possible to draw conclusions about four levels of syndromic analysis. We include personality in this analysis in order to specify certain features of behavior (Table 4).

Table 4. Levels of neuropsychological syndrome in the studied case

Level of nervous system	Subcortical immaturity, adequate level of functioning of cortical zones.
Neuropsychological level	Insufficient functioning of cortical tone or of general brain activation. Lack of executive stability in all tasks, difficulties with verification and planning of activity. External help of adult is useful and permits to fulfill the tasks correctly. Tendency to perseveration as reaction to tiredness and in complex tasks.
Psychological level	Different types of games are attractive for the girl, which is typical for her age. Symbolic games and complex games with social roles are accessible. Insufficient acquisition of graphic and visual perceptive activities. Forced introduction of writing and reading with poor voluntary activity makes a negative general effect on school success and intellectual activity. Possibility to respond positively to external regulation and helps from an adult.
Linguistic level	No specific particularities were found in speech production or comprehension.
Personality	Impulsivity, extreme dependence on adults and constant emotional approval of all actions. Positive acceptance of all external orientation and help during assessment (zone of proximate development). Preschool does not use any strategies of external help, which leads to a lack of satisfaction and negative relationship with learning.

The case was analyzed in relation to a variety of aspects of activity and personality appropriate to the girl's age. Systemic observation of the functional stage of brain mechanisms, which conform to functional systems for all school behavior, permitted us to establish central mechanisms as the cause or "factor" of the learning disabilities. Both strong and weak aspects of the girl's development were identified. Among the strong aspects we can mention phonemic, tactile and spatial analysis and synthesis; motor sequential organization; and general emotional level. Among the weak aspects is insufficient development of voluntary activity due to a low general activation (subcortical structures, possibly including reticular formation and other levels). As we have mentioned, the presence of characteristics of both strong and weak aspects is a necessary component of the syndromic analysis model proposed by Luria and his followers (Akhutina & Pilayeva, 2012).

We understand that the logic of syndromic analysis is not common in neuropsychological practice, and that the use of the psychometric perspective is much more popular. Nevertheless, we assert that it might be useful and interesting for our colleagues abroad to know about such a methodology and its use in cases of Mexican children with developmental difficulties and learning disabilities. Future studies would allow us to identify other specific syndromes and to improve the whole

qualitative methodology. Such a methodology differs essentially from the quantitative approach, and could be not easily applied in statistical analysis or psychometric assessment of large populations (Plaisted, Gustavson, Wilkening & Golden, 1983), (Teeter, 1986), (Rosselli, Matute, Ardila, Botero, Tangarife, Echevería, Arbelaez, Mejía, Méndez, Villa & Ocampo, 2004).

The usefulness of the qualitative approach lies in its providing the potential for clinical-personalized assessment of unique cases of developmental difficulties, which is helpful for strategies of correction and development. It is also useful for establishing a clear relationship between the level of the individual's central nervous system, neuropsychological mechanism or factor, psychological activity, and personality. Besides the significant advantages of such a complex integrated approximation in clinical cases of children's difficulties in development and learning, we can mention the possibility of discovering their general causes on different levels: neuronal maturation, brain mechanisms, activity, and personality.

Conclusion

1. Syndromic analysis represents a qualitative method in child neuropsychology.
2. Syndromic analysis is the subject of recent qualitative clinical work and includes diverse levels of assessment: neuronal anatomic (level of cortical and subcortical maturation), neuropsychological (brain mechanisms), psychological (dominant activity), and personality (features of behavior).
3. Syndromic analysis helps to establish the relationship between learning activity and personality of a child with difficulties, with the level of maturation of cortical and subcortical functional stage.
4. Syndromic analysis offers a new integrative vision in psychology and neuropsychology, and implies identification of the central reason (factor or cause), which explains or combines different symptoms of difficulty in development and learning.

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WELL-BEING IN ADULTS

The subjective well-being of a person as a prism of personal and socio-psychological characteristics

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Objective. This article examines the concept of subjective well-being and the approaches to researching it and its qualities; it also attempts to create a reticulated personal and socio-psychological portrait of a person who sustains a certain level of subjective well-being.

Design. To accomplish this objective, we conducted a meta-analysis of modern empirical studies of those personal traits and socio-psychological aspects of a person's existence which are "responsible" for the person's interaction with a complex changing world. They included: personal self-perception, including issues of identity; the person's defense mechanisms and reactions to stress, including the stress of others (characteristics of empathy); self-attitudes; will power; conscious setting of goals; interpersonal relationships; and ability to deliberately regulate one's personality.

Results. The results of different Russian and international empirical studies are analyzed. We concluded that subjective well-being is the result of the interaction of internal powers (conventionally, personal factors) with social context (conventionally, objective external aspects).

Conclusion. Based on this finding, the most insightful and timely method for studying subjective well-being can be the creation of models which involve the double correlation of "internal" and "external" sides of the process of achieving subjective well-being.

Keywords: subjective well-being, objective well-being, social problems

Introduction

Current research by sociologists and social psychologists, on one side, and clinical psychologists and psychiatrists, on the other, raises the question of a dangerous trend in modern society. In one respect, it is hard to overlook the growing popular-

ity of discourse in the media, blogs, and popular science regarding the quickening pace of modern society's development, which inevitably causes complications in people's ability to adapt to the modern world and, as a result, leads to problems in people's perceptions of their personal well-being.

Discourse on this issue cannot be considered new; the concept of "future shock" leading to maladjustment, neuroses, escapism, and, as a consequence, to psychological ill-being (Toffler, 2002), was put forward several decades ago. Nonetheless, the fact that the subject conjures up a certain tired rhetoric does not render it less appropriate to our time: a person has to alter his or her behavioral strategies in order to support optimal indexes of his or her inner "thermometer" in a changing environment.

The concept of "well-being" is multifactorial, and in our opinion, this concept cannot be defined separately from the person who experiences it, and who evaluates it subjectively. So-called objective (economic) well-being is based on nothing more than having a sufficient quantity of economic goods and social resources, as well as the potential to own them. We consider subjective well-being in relation to two theoretical approaches—the hedonistic and eudemonistic. We understand the hedonistic approach to be a set of internal judgments and assessments regarding the degree of satisfaction with various aspects of one's own life, and the eudemonistic approach as the potential for achieving self-realization as a whole (Sozontov, 2006; Zotova & Karapetyan, 2015; Diener, 1984). These definitions are very general, so they will be concretized below, because subjective well-being always needs to be operationalized through linkage with individual psychological and socio-psychological factors.

The situation would be simpler for researchers and practitioners if the hypotheses advanced earlier (and considered natural by virtue of intuitive logic) regarding the direct and proximate connection between one's subjective and so-called objective manifestations of well-being were confirmed. Indeed, objective well-being that relies on real economic, political, and social living standards in a certain country could directly affect the entirety of a national population's subjective perceptions.

However, both evocative cases (such as frequent instances of mass-shooting in U.S. schools, which seem to indicate some citizens' subjective ill-being, despite the fact that the United States has decent indicators of *objective* well-being, such as a high levels of economic development and technological and social infrastructure), and standard studies (such as those showing similar levels of subjective well-being among the population of desperate areas in Latin America, and the European middle class) demonstrate the complexity of such a connection.

Thus, if subjective well-being is not easily correlated with objective well-being, then obviously objective well-being is not the only factor determining it. But what else affects subjective well-being? And what personal mechanisms are necessary to the support of one's sense of well-being? What is the relationship between external and internal factors of well-being?

Results and discussion

We begin by examining the *concept* of subjective well-being, as well as the main *approaches* to its study. It is worth noting that initially, the analytical models can be

divided into the hedonistic and eudemonistic, according to the well-being classification devised by R. Ryan and E. Deci. The eudemonistic approach sees the sense of well-being being reflected in the fullness of self-actualization, and as having been formed by cultural, social, psychological, physical, economic, and spiritual factors. This approach was put forward in positive psychology by C. Rogers, K.G. Jung, E. Erikson, and others. Hedonistic theories of subjective well-being refer to the term “satisfaction,” and see well-being itself as determined by a balance between positive and negative effects, which also apply to the person’s attempt to attain pleasure and avoid the discontent caused by negative social comparison (Sozontov, 2006).

Working in the eudemonistic framework, M. Seligman analyzes subjective well-being by putting forward a concept of “authentic happiness,” in which subjective well-being serves as a “measure of happiness” (Seligman, 2006). At the same time, C. Ryff, in her theory of well-being, considers it a psychological aspect of human life, with subjective well-being being one component part of the psychological makeup (Carapetyan, 2014). In the opinion of D.A. Leontiev, subjective well-being is mostly dependent on a person’s individual characteristics rather than on any objective conditions of life; meanwhile, happiness is a sum of a person’s desires and his reality. The main determinants of well-being, according to Leontiev, are as follows: relations with other people; goals; one’s world view; and one’s values (Leontiev, 2011). It ought to be mentioned that today the term “subjective well-being” is more carefully studied in Western literature than in Russia and comports with the most prevalent hedonistic theories: the theory of adaptation, the multiple discrepancies theory, the dynamic model of equilibrium, and the homeostatic model (Yaremchuk, 2013).

The theory of adaptation was put forward by Brickman and Campbell. They based it on the fact that, although individuals immediately react to positive or negative events in their lives one way or another, nevertheless some time later they return to a certain neutral attitude. Thus, feelings of happiness or unhappiness do not appear to be a stable condition, but act as short-term reactions to some circumstances in their lives (Brickman & Campbell, 1971).

However, American scientist E. Diener later introduced some critical points to this theory, stating that one’s subjective well-being has an individual character, and that the level of one’s well-being thus is not hedonistically neutral. He observed that 1) people maintain subjective well-being on different levels, which partially depend on their temperaments; 2) various components of well-being (positive and negative emotions, life satisfaction) are dynamic and tend to “shift” towards different vectors; 3) individuals are unlike each other in the way they adapt to events; and 4) some components of subjective well-being can change and some can’t (Diener, Lucas, & Scollon, 2006).

A. Michalos’s theory of multiple discrepancies relies on the idea that one’s subjective well-being is heavily linked to what one desires compared with his or her reality. Thus, the bigger the discrepancy between those two indexes, the less happy one feels. Additionally, the criteria of social comparison with other people, one’s past, one’s expected future, interests, and merits are taken into account (Yaremchuk, 2013). The dynamic model of well-being emphasizes that, with the passage of time, one also returns to one’s previous condition; however, a major role in this is played by one’s personal traits (Yaremchuk, 2013).

Other models are also interesting: They include the concept of V.A. Petrovsky, who considers well-being the correspondence between one's needs and apperceived resources (there are four models: reserve, working, external, and mastered) (Petrovsky, 2008); and the concept of R. Cummins, in which well-being is described as a result of homeostasis between internal (personal) and external (societal) buffers (Cummins, 1998).

There are various classifications as to what comprises subjective well-being. One focuses on spheres of the individual's life and divides subjective well-being into the psychological, social, and physical components (Tarasova, 2013); or, more generally, into social, immaterial, material, and psychological well-being (Kulikov, 2004); or psychosomatic health, social adaptation, mental health and psychological health (Voronina, 2002). Another differentiates cognitive, emotionally evaluative, and motivational behavioral aspects of well-being (Eliseeva, 2011).

One of the most prolific researchers to have addressed factors of subjective well-being, C. Ryff, details various characteristics of personality as contributors: she mentions the presence of life goals, positive personal development, an opportunity to affect one's environment, self-acceptance, and autonomy. She also notes such important socio-psychological characteristics as good relationships with others (Dubovik, 2011). Shamionov looks at these aspects in a different light and deduces a list of factors based primarily on the characteristics of the person's social interaction: relations with a small contact group (family); relations with a larger community (processes in society); labor processes (work, relationships in the workplace, nature of profession, income); interests (communicative and intellectual aspects); aspects of a person's intrapersonal processes (system of value orientations, balance between personal and social areas); and social experience (behavioral patterns, social orientation). But Shamionov also pays attention to such individually specific determinants of well-being (though he designates it more superficially than Ryff) as conditions and qualities (personal temperament, qualities, and traits) (Shamionov, 2015).

Thus different authors emphasize different determinants of subjective well-being: either mostly individual, or predominantly socio-psychological (interactional) factors. Ideological differences lead to different scientific viewpoints on this concept, and change the specifics of its study in each case.

We propose to consider subjective well-being in connection with its personal factors, manifested in the context of the surrounding social environment. Our portrait of subjective well-being may overlap with the previously described classifications, but it does not fully correspond to any of them, since the factors we discuss were revealed in the meta-analysis of empirical studies. The psychological features that are related to subjective well-being may not constitute an exhaustive list of its determinants, since this concept is very multifaceted, as we said at the beginning of this review.

Personal portrait of subjective well-being

The construct of subjective well-being per se has not been of sufficient interest to modern researchers, but rather, as mentioned above, it's been considered in relationship to personal psychological factors.

The matter of personal *identity* has been raised in many Russian and foreign studies (Tarasova, 2013; Usova, 2014; De Leersnyder, Kim, & Mesquita, 2015; Moreira et al., 2015, etc.).

The level of subjective well-being directly affects a person's degree of cultural identity, which is expressed, *inter alia*, in the similarity of emotional reactions within a population. Thus, it was shown among an international sample of white Americans (N=300), Koreans (N=80), and Belgians (N=266) that the higher the level of subjective well-being, the higher the degree of identification with one's own cultural environment, and the closer the patterns of emotional reactions to the patterns common throughout society. It is interesting that this result manifested itself in such divergent cultures, i.e. the individualist American and the collectivist Korean (De Leersnyder, Kim, & Mesquita, 2015). Several Russian studies have also supported this finding (Tarasova, 2013).

Similar results appeared in a study of connections between well-being and religious identity: a positive relationship between religious identity and the feeling of subjective well-being was detected in a sample of 319 Italian Catholics (Carlucci et al., 2015).

In this context it is interesting that not all Russian studies show similar results. Thus, N. Usova, in her research based on a sample of 160 people, established a parallel between an evaluative component of subjective well-being and a person's attitude toward their own ethnicity (the study was conducted in a multicultural region). The results contained evidence that the main predictors of subjective well-being in relation to ethnicity were ethnic education and ethnic freedom (communicative, political, and religious). Yet it is worth mentioning that such aspects as ethnic reflection and ethnic pride were negative predictors of subjective well-being. The researcher connected this finding to the notion that these characteristics contribute to other ethnic individuals' alienation from their social environment, which also, in our opinion, can be correlated with personal adaptability, a quality which plays a major role in increasing a person's feeling of subjective well-being (Usova, 2014).

Studies of *personal characteristics* and *self-attitude* in the context of the well-being issue are widespread in modern science. In particular, they support the logical conclusion that the optimism of a person's orientation increases his or her level of subjective well-being (Carver et al., 2010). People who have a high level of subjective well-being demonstrate less aggression and worry, along with higher self-esteem and self-effectiveness (McKnight et al., 2002). Studies into the so-called "Big Five" reveal a negative connection between the level of well-being, and neuroticism and openness factors, and a positive one with extroversion factors; this result has appeared in foreign research (Garcis, 2011) as well as in Russian studies (Uryvaev & Tarasova, 2011).

A newly conducted cross-cultural study on aspects of self-attitude (Finland, Israel) revealed that so-called self-directedness and a feeling of self-excellence (accentuations of a narcissistic nature), appear to be relatively clear predictors of various aspects of subjective well-being (life satisfaction, feeling of social support, and subjective esteem of one's state of health) (Cloninger & Zohar, 2011; Joseffson, 2011).

Studies of a person's axiological sphere support the importance of the absence of discrepancies in his or her system of "value-accessibility" for his/her subjective well-being's development (Kolmogorova, 2015). The prevalence of external motivational indexes over the internal appears as a negative predictor for the development of subjective well-being, while a person's orientation toward responsibility in the structure of values is, by contrast, positively correlated with a degree of personal adaptation (Shadrin, 2015).

External objective factors which have a negative impact on a person's psychological well-being, directly involve resilience against stress. In this context, the logical gender differences can be demonstrated empirically: women are more prone to stress factors which affect their general state, mood, and resistance to negative life situations; however, as their subjective well-being rises, so does their problem-solving ability. Meanwhile, in men a correlation between stress and subjective well-being was much less explicit (Vturina, 2013).

There are interesting studies of a sense of humor as a coping strategy in response to environmental stress factors. A series of foreign research projects revealed that the ability to demonstrate a sense of humor directly correlates with multiple subjective well-being indexes. The authors identified the sustainable positive influence of the majority of kinds of humor the subjects of the studies described, since they helped people build a specific system of defense and support of well-being on a certain level (Cann & Collette, 2014).

Regarding aspects of *will power* and *conscious setting of goals*, meta-analysis of 85 foreign studies demonstrated the importance of the setting and reaching of goals in shaping subjective well-being. It was revealed that the more a test participant reflected on the progress of their personal achievements, and the better their goals were defined, the stronger the positive connection to a sense of personal well-being (Klug & Maier, 2015). Despite the fact that, according to the authors, these results are more characteristic of individualistic cultures than collectivist ones, there are similar trends in Russian studies: in newly conducted research by A. Chumakov, it was discovered that people with more developed volitional powers consider their lives to be better. This can be explained as an effect of their aptitude for tolerating negative impacts and their ability to actively transform their environment (Chumakov, 2015).

Some studies describe the entirety of personal characteristics that connect subjective well-being with *interpersonal relations*.

In this context, any statement regarding the positive influence of a developed social network on the development of subjective well-being is axiomatic, while the thesis of mutual reciprocal influence on the two factors appears logical (Diener & Biswas-Diener, 2008). This conclusion repeatedly arises in the majority of studies and appears to be a point of agreement among all the classicists of world psychology: people perceive themselves as happier in the company of other people, writes D. Kahneman (Kahneman & Krueger, 2006). This supports the evidence of a positive connection between the feeling of well-being and precise indexes of interpersonal relations: leadership abilities, sociability, etc. (Cunningham, 1988).

It is peculiar that studies conducted involving children and teenagers showed similar but less explicit results: meta-analysis of 246 studies revealed that the positive connection between the level of social support and subjective well-being grows

along with a person, and while it exists in a sample of schoolchildren, it is not as sufficient (Chu et al., 2010).

Russian studies confirm this general trend. In particular, E. Troitskaya, who based her work on D. Leontiev's concept of personal potential, revealed that a feeling such as empathy positively correlates with the level of subjective well-being, along with resilience and risk-taking; the phenomenon known to social psychologists as "belief in a fair world" serves as a foundation for this connection (Troitskaya, 2014).

Let us assume that the overall level of subjective well-being in each particular case can be determined by different combinations of these factors, since the possession of all the indicated characteristics simultaneously does not seem realistic. Also, as we saw, only some factors relate to external objectively fixed circumstances (in particular, indicators of the social and economic sphere); these include the level of stress-resistance and the choice of coping strategies, which are possible components of psychological well-being, but do not comprehensively define it.

Conclusion

The topic of subjective well-being belongs to the area of psychology where practical needs are prominent on the agenda. With all the evidence of psychology's practicality as a science, it must be noted that the matter of subjective well-being may be of concern not only to psychology practitioners and consultants, trainers, and life coaches, but, more broadly, to various social institutions, including government bodies. This is because it is the subjective, not objective, well-being of a country's citizens that ensures the absence of most social problems.

In this context, the afore-cited analysis could become a basis for the development of training practices and educational programs which would increase characteristics of subjective well-being. However, such a plan does not appear particularly viable for the following reasons.

First, a lot of data concerning particular personal traits clearly establishes the following: the prevalence of an orientation towards optimism within the personal structure of psychologically well-off people, or the ability to create and reach goals, as a source of one's well-being, can hardly surprise either theorists or practitioners of psychology.

Second, the majority of the evidence does not belong to the sphere of influence of practical psychology: teaching a person to master extraversion or to accentuate narcissistic tendencies, with the goal of stimulating the growth of their psychological well-being, is not quite possible, and, it goes without saying, not always ethical.

Third, in areas where practical recommendations or creation of some state programs of active learning are conceivable, the results of the studies are sometimes contradictory: for instance, the degree of one's identification with ethnicity, as afore-cited, is ambiguously connected to the growth of well-being.

Fourthly, as shown in the conclusions of up-to-date Western studies (Cloninger, et al., 2015; Joseffson et al., 2011), the influence of personal characteristics on subjective well-being (as with the influence of objective parameters) can frequently not be described with linear connections. Moreover, all too often non-linear complex analysis specifically shows the most important results.

In this situation, psychological theory has only one conclusion that appears to be a logical methodological conclusion from the afore-cited data, and is based on the classical philosophy of social psychology: subjective well-being as a psychological phenomenon is the result of interaction of internal powers (conventionally, personal factors) and social context (conventionally, objective external aspects). Based on this, the most insightful and timely method for the study of subjective well-being can be the creation of models which involve double correlation of the “internal” and “external” sides of the process of developing subjective well-being.

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Regulatory and personality predictors of the reliability of professional actions

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Background. The present research is carried out in the context of the conscious self-regulation of professional activity.

Objective. It investigates the regulatory and personality predictors of reliability in rescue operations under stressful conditions.

Design. The research sample includes 87 rescuers (72 men and 15 women aged from 25 to 50 years). Respondents were asked to complete the Morosanova's Self-Regulation Profile Questionnaire – SRPQM, the Eysenck Personality Profile - Short (EPP-S), and the expert questionnaire “Professional Reliability of Rescue Operation” designed for this particular study.

Results. On the basis of a correlation analysis, the structural model of the predictors of action reliability was constructed using the maximum likelihood method. Consistency indices showed a good agreement between the model and empirical data. The model contains three latent factors: “Self-regulation”, “Neuroticism” and “Reliability of actions”. As the model displays, the “Self-regulation” factor is a significant predictor of professional action reliability. There are two indicator variables for the factor “Self-regulation”: the self-regulation reliability considered as its stability in the stressful situations, and the rescuers' levels of development of professionally critical regulatory features - modeling of conditions significant for the achievement of goals and the programming of actions. The study results also show that personality dispositions (by Eysenck) have only indirect influence on action reliability. As the structural model reveals, the conscious self-regulation is a mediator in the relationship of neuroticism traits and action reliability.

Conclusion. The conscious self-regulation is a significant predictor of professional action reliability under stressful conditions. It is also the mediator of the effects of personality dispositions on the reliability of action.

Keywords: professional activity, reliability, conscious self-regulation, personality traits, structural model

Introduction

In this paper, the impact of self-regulation on action reliability is considered in the context of research on conscious self-regulation in the Russian scientific school of the psychology of self-regulation. O. A. Konopkin, a member of the Russian Academy of Education, was one of this school founders. His theory of the conscious self-regulation of activity and the regulatory model being widely accepted among professional psychologists has proved its applicability for the study of the fundamental psychological problems and has given the basis for solving applied problems in various areas of psychological practice.

The main provisions of Konopkin's theory originally have been put forward, substantiated and proved not only on the basis of theoretical research but also by summarizing the results of the professional activities research on the establishment of engineering psychology and the development of occupational psychology in Russia that was carried out during 60-70 years of the XXth century (Konopkin, 2011).

In psychological studies of human reliability in professional activity, the concept of self-regulation takes one of the central places. Russian and foreign authors emphasize the need to incorporate this concept in the theoretical understanding of the psychological structure of professional activity (Bodrov, 1998; Lomov, 1966; Nikiforov, 1977; Konopkin, 2011; Oshanin, 1973; Shadrikov, 1982) as well as the need to develop special methods of its analysis (French, Simon, Bedford, Soane & Emma, 2011; Morosanova, 1986, 2012).

It is noteworthy that existing studies of professional reliability are mostly focused on the effects of the ergonomic conditions of professional activity, as well as stress and other functional states influencing action reliability. The personal determinants of reliability are examined to a lesser degree.

However, the first results of the professional activity self-regulation research indicated that a professional's personality influences the results of his actions to the extent that it determines his ability to put forward the goals of his actions and take steps to achieve them (Konopkin, 2011; Nersessyan & Konopkin, 1978; Konopkin, Morosanova & Stepansky, 1988).

We have obtained convincing data proving that people with different types of character and temperament can reach equally high professional results due to their individual differences in the development of a conscious self-regulation, primarily at the expense of subject activity aimed to achieve personally meaningful goals (Morosanova, 2003, 2010b). Individual differences in self-regulation manifest themselves in a way in which a person plans and programs how to achieve his goals, takes into account the significant external and internal conditions, evaluates the outcomes and adjusts his actions to achieve subjectively acceptable results. Their phenomenology is very diverse and is manifested in any professional and educational activity.

Among individual differences, we categorize stylistic features of self-regulation as their narrower class, considering them to be individual characteristics of self-regulation typical for a certain person, steadily manifested in achieving different goals in different life situations. At present, we can speak of the existence of different levels of a subject's individual characteristics that manifest themselves in conscious self-regulation. There is an operational level of subject manifestations in the

stylistic features of the regulatory processes that implement major components of the self-regulation system. This level can be described as regulatory profile indicating the development of regulatory processes such as objective planning, modeling of significant conditions, programming, and adjusting the activity and its results. Personality levels and personality traits such as responsibility, perseverance, flexibility, and reliability can be described as regulatory. Finally, the integrative level of self-regulation characterizes the general development of a person's subject activity (Morosanova, 2010 a, b).

Professional activity in extreme situations requires high reliability of a professional's self-management and self-regulation abilities. Therefore, a special place for their contribution to the success of professional activity takes regulatory reliability as a key quality in forming a person's style, ensuring fault-free operations in psychologically stressful conditions (Morosanova, 2010b, 2012).

In our studies of psychological reliability of athletes (shooters of the highest qualification), we have demonstrated that regulatory reliability, measured as sustainability of the conscious self-regulation system, is actually the basis of the faultless performance and accuracy of corrections in the competitive situations of different tension (Morosanova, 1986). Another study has revealed that a high level of development of conscious self-regulation increased the psychological reliability of professional rescuers compensating for the adverse impact of the stress manifestations on their performance. It also prevented fixation on the negative functional states (e.g., stress) in the form of stable behavioral and personal deformations (Morosanova, Leonova, Kondratyuk & Kachina, 2009).

In the present article, the problem of personal reliability in professional activity is considered from the standpoint of a differential-psychological approach to the conscious self-regulation of human activity, which is now being developed in the Laboratory of Self-Regulation Psychology of the Psychological Institute of the Russian Academy of Education under the guidance of Prof. Varvara Morosanova. Numerous studies of laboratory colleagues have displayed that any activity (regardless of its content) is a specific kind of deliberate and purposeful activity, the efficiency of which is largely determined by the overall perfection characteristics and the individual characteristics of conscious self-regulation (Morosanova, 2010b; Morosanova, 2011).

The theoretical basis also includes a representation of the stylistic features of self-regulation as the psychological tools of a person in achieving his professional, educational and life goals.

On the one hand, the differential, natural side of this resource is actually a person's temperament – in particular extroversion and neuroticism – which largely determines the individual specifics of self-regulation features (Morosanova, 2003). On the other hand, the efficiency of using this resource in many ways depends on the conscious self-regulation of achieving goals, the development of which may compensate for disadvantageous traits of temperament, and, in particular, the ability to improve the efficiency and reliability of educational and professional activity (Morosanova, 2014).

This article, which is based on the results of our empirical research, is intended to answer a series of questions. What are the roles of conscious self-regulation and the stability of the self-regulation system in ensuring the reliability of actions under the

stressful conditions? Can we say that the reliability of self-regulation is a predictor of the reliability of actions under stress? Which of the self-regulation features appear to be psychological resources ensuring the reliability of a professional's performance? In which way are the self-regulation and personality traits related to the reliability of actions? And, finally, is self-regulation mediating the influence of personality characteristics on the reliability of human action under stressful conditions?

Method

The main objective of the study was to examine the regulatory and personality predictors of the reliability of human action in demanding conditions of professional activity. This study was conducted on a sample of professionals with an extreme profile — rescuers. The choice of profession was determined by the fact that rescuers' activities involve the elements of danger and stress. In addition, their activities are structured in a way that allows us to get real results of the reliability and effectiveness of each participant, which can be evaluated by professional colleagues.

Based on the analysis of the documents regulating the professional activity of the rescuers and observations of their activity, it was revealed that the reliability of the rescuers actions must be considered separately in regular and emergency situations, as their operations in these different situations has substantial differences in their form, purpose and degree of psychological tension. The rescuers consider as regular situations those that do not constitute a menace to human life: opening premises or other objects at the request of citizens and organizations, providing technical assistance to individuals and organizations, working with animals, addressing utility failures, maintenance work, and situational assessment, as well as the daily activities of rescuers in the unit. Emergency situations include emergencies and accidents representing a direct threat to human life and situations that may lead to the loss of human life or to other health hazards, such as explosions, collapsing buildings, fires, suicide threats, lost children, threats of a terrorist attacks, and opening rooms with a child inside.

Sample

The study involved 87 rescuers (72 men and 15 women aged from 25 to 50 years). Their work experience as rescuers ranged from 1 to 11 years ($M=4$ years 6 months).

Procedure

The study was conducted individually with each participant during a working day. All the tests and the questionnaire were filled in the same order in the presence of the researcher. The average execution time was 1 hour 20 minutes. The researcher obtained measures of personality characteristics and regulatory features, as well as estimates of action reliability for each participant. All the data obtained in the survey were recorded and processed anonymously.

Methods

The diagnostics package included two methods for assessing personality and regulatory parameters, as well as the expert questionnaire to obtain the estimates of the participants' action reliability.

1. To scrutinize individual features of self-regulation, we used Morosanova's Self-Regulation Profile Questionnaire (SRPQM), modified release of 2011 (Morosanova & Kondratyuk, 2011). The 52-item questionnaire includes 8 scales assessing basic regulatory processes: goal planning, modeling of significant conditions, programming of actions, evaluation of results and personal regulatory features: flexibility, independence, and regulatory reliability. The questionnaire also includes the integrated indicator characterizing the overall development of the conscious self-regulation system. The general level of self-regulation is calculated as the total sum score. Participants responded on a scale ranging from 1 to 4 ("strongly agree" to "strongly disagree"). This version of the questionnaire went through all the psychometric procedures and standardization based on a sample of 820 subjects aged 18 to 66 years (Morosanova & Kondratyuk, 2011).

2. Eysenck Personality Profile - Short (EPP-S) (Russian version adapted by "Kogito-centre", 1998) is a 200-item questionnaire including 3 basic bipolar scales to assess extraversion, neuroticism, and psychoticism. The Russian release went through all the procedures of psychometric validation.

3. The expert questionnaire "Professional Reliability of Rescue Operation", which had been designed for this particular study to get independent scores of each participant's actions reliability in terms of faultless and effective operation in situations of different levels of stress. Estimates of the rescuers' operation are obtained separately for regular and emergency situations according to three basic criteria: accurateness (Ac), understood as faultless operation; effectiveness (Ef), measured as precision in the performance of required actions, tasks, instructions and guidelines; and the reliability of group interaction (RI).

For expert evaluations, all subjects were asked to rate operation of all the members within the group, except themselves (an average of 25 people in each team) according to the above-mentioned criteria, regardless of their personality characteristics. For each rescuer, an average score on a 5-point scale was calculated for all three criteria.

Results

Correlation analysis has been carried out, which allowed us to identify and describe the significant relationships between the characteristics of self-regulation (on the scales of the SRPQM), personal characteristics (on the scales of EPP-S), and expert assessments of professional reliability of rescuer action in regular and emergency situations. Correlations of variables included in the study, the mean values and standard deviations are presented in Table 1.

In the analysis of descriptive statistics, attention is drawn to the fact that integrative indicators of the reliability of rescue operations in emergency situations in the group average are significantly higher than in regular situations (indicators 7, 8 in Table 1 when compared with Student criterion at $p < 0.005$). At the same time, the variability of these parameters is higher for emergency situations compared that for regular situations.

Correlation analysis has revealed no statistically significant relationships between indicators of action reliability in regular situations and personal-regulatory features, except the relationship between the indicators "Modeling of significant conditions" and "Accurateness (faultless operation)".

Table 1. Mean values, standard deviations, and correlations of the variables of the study

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Action Reliability																					
1. Ac. R	4.28	0.67	1.00																		
2. Ac. E	4.33	0.74	.48**	1.00																	
3. Ef. R	4.36	0.63	.50**	.38**	1.00																
4. Ef. E	4.73	0.53	.26*	.51**	.33**	1.00															
5. RI R	4.30	0.63	.41**	.35**	.40**	.37**	1.00														
6. RI E	4.63	0.63	.31**	.52**	.31**	.82**	.49**	1.00													
7. RA R	12.94	1.51	.82**	.50**	.79**	.38**	.75**	.45**	1.00												
8. RA E	13.69	1.70	.44**	.86**	.41**	.79**	.47**	.84**	.53**	1.00											
Self-regulation																					
9. PI	6.13	2.34								1.00											
10. Pr	7.26	1.55				.29**		.25*		0.24*	1.00										
11. M	7.23	1.38	.24*	.24*		.35**		.30**		0.31**	.28**	.39**	1.00								
12. RE	6.03	1.73								.47**	.37**	.37**	1.00								
13. I	4.13	2.11						-.22*				.37**	1.00								
14. F	7.53	1.34							0.27*			-.27**		1.00							
15. RR	7.01	1.55				.28**		.31**			.43**	.50**	.53**		1.00						
16. GL	37.02	5.40				.22*				.61**	.66**	.54**	.59**	.42**	.251*	.46**	1.00				
Personality Dispositions																					
17. E	25.04	4.84									.30**			.30**			.264*	.37**	1.00		
18. N	6.22	5.38									-.36**	-.49**	-.36**	-.26*			-.48**	-.39**	-.37**	1.00	
19. P	16.98	5.96									-.45**	-.256*	-.33**	-.28**		.244*		-.35**			1.00

Note. * $p \leq 0.05$; ** $p \leq 0.01$. 1 - Accurateness (faultless operation) in regular situations, Ac.R; 2 - Accurateness (faultless operation) in emergency situations, Ac.E; 3 - Effectiveness as precision of the required actions, tasks, instructions performance in regular situations, Ef. R; 4 - Effectiveness as precision of the required actions, tasks, instructions performance in emergency situations, Ef. E; 5 - Reliability of group interaction in regular situations, RI R; 6 - Reliability of group interaction in emergency situations, RI E; 7 - Reliability of action in regular situations, RA R; 8 - Reliability of action in emergency situations, RA E; 9 - Goals planning, Pl; 10 - Action programming, Pr; 11 - Modeling of significant conditions, M; 12 - Results evaluation, RE; 13 - Flexibility, F; 14 - Independence, I; 15 - Regulatory reliability, RR; 16 - General level of self-regulation, GL; 17 - Extraversion, E; 18 - Neuroticism, N; 19 - Psychoticism, P.

In contrast, the analysis of emergency situations shows that regulatory processes and personal-regulatory features, including the general level of self-regulation, significantly correlate with the reliability of rescue actions (r in the range of 0.28 to 0.35 at $p \leq 0.01$ and r in the range of 0.21 to 0.24 at $p \leq 0.05$). It is likely that for the rescuers (as professionals), their actions in emergency situations are more important, as they demand mobilizing all available psychological resources.

This result does not contradict the findings made in observations and personal communication with the rescuers in the process of conducting a survey in the units for several months and confirmed by psychologists of the rescue services. Apparently, in emergency situations, the pressure and suspense are higher, which suggests that action reliability in this case largely depends on the personality and regulatory characteristics of each individual.

As for the indicators of self-regulation, we found that various parameters of action reliability in emergency situations significantly correlate with indicators of "Modeling of significant conditions" (at $p \leq 0.01$) and "Action Programming" (at $p \leq 0.01$), as well as personal-regulatory features "Self-regulation Reliability" (at $p \leq 0.01$) and "Independence" (at $p \leq 0.05$).

In terms of professional reliability, among the personal-regulatory features, the indicator "Personal-regulatory reliability" is of the most interest for us. Based on the understanding of the self-regulation reliability as the sustainability of the mental activity self-regulation in psychologically stressful situations, an existence of relationship between "Self-regulation reliability" parameters and indicators of "Action reliability" seems to be quite natural and expected. Surprisingly, there were no statistically significant relationships between the indicators of "Action reliability" and "Results assessment". Evidently, the conscious assessment of one's own action results in rapidly changing emergency situations is difficult and is likely to occur after the event, when it is possible to analyze the operation. The indicator of "Goals planning" also did not show statistically significant relationships with any of the parameters of the reliability of rescue actions. The explanation of this result is related to the specifics of the rescue activities, excluding advance planning of professional tasks by virtue of their rapidly changing circumstances in emergency situations, and to the "paramilitary" nature of rescue services regulated by instructions and superiors.

As for the personality dispositions, extraversion, neuroticism and psychoticism were not related directly to the action reliability. They were significantly associated with various components of conscious self-regulation (positive correlation in case of extraversion and negative correlation in case of high scores on neuroticism and psychoticism).

Thus, based on the correlation analysis we can say that the relevant personality traits are associated with the characteristics of self-regulation rather than operation reliability. These results are largely consistent with the findings of our previous studies showing that personality traits have an indirect impact on the productive aspects of human activity, and their impact is mediated by the conscious self-regulation (Morosanova, 2003, 2010a). With regard to the relationship of self-regulation and personality traits, it was shown in our earlier research that the individual characteristics of self-regulation are determined by the properties of temperament and character of the person. (Morosanova, 2003, 2010 a, b). This view is consistent with

the data of foreign researchers. Thus, R. Hoyle notes: "The characteristic means by which people self-regulate and the routine success or failure they experience are reflected in personality traits. Many of these traits are rooted in temperament..." (Hoyle, 2010, p 2.).

On the whole, the results of correlation analysis correspond to our idea that personal dispositions do not directly determine the reliability of action – they do it indirectly, through the relationship with conscious self-regulation. In addition, the results of correlation analysis suggest an existence of self-regulation features that are professionally significant for rescue action reliability. Among them we attach special importance to the regulatory processes of "Modeling significant conditions" and "Programming of actions", as well as the personal-regulatory feature of "Self-regulation reliability".

Structural equation modeling

We used the structural equation modeling method to analyze the personality and regulatory predictors of rescue operation reliability in stressful conditions. We aimed also to investigate the role of self-regulation as a mediator between personality traits and action reliability. The resulting structural model is presented in Figure 1. We constructed the model using the method of maximum likelihood, implemented in the program EQS 6.1.

The model contains three latent factors: "Self-regulation", "Neuroticism" and "Reliability of actions". As expected, the indicator variables for the "Self-regulation" factor are "Modeling of significant conditions", "Actions programming", and "Self-regulation reliability".

It should be noted that the factor loading of the modeling process is slightly larger compared to the programming, which supports an assumption that the modeling of conditions significant for the achievement of goals and the development of the regulatory process of modeling is of high importance for the rescuers and generally for rescue operation as a professional activity.

For the factor "Reliability of actions" the indicator variables are the following: "Effectiveness", which measures precision in performing required actions, tasks, instructions, and directions, "Accurateness", which is defined as faultless operation, and "Reliable interaction within a work shift".

For the factor "Neuroticism", the indicator variables are all three traits presented in the Eysenck Profile: "Anxiety", "Inferiority" and "Unhappiness".

The results indicated that our model provided adequate fit indices. Chi-square ($df=17.25$)=22; $p=0.75$; CFI=1.00; SRMR=0.03; RMSEA=0.00 (90% interval from 0.000 to 0.065). All the factor loadings and regression coefficients were statistically significant and in the expected direction.

The model demonstrates that self-regulation plays an important role in reliability of rescuers' actions. A significant fact by the analysis is that rescuers' degree of development of self-regulation is determined primarily by the indicators of modeling significant conditions (MC), programming of actions (PA), and reliability of self-regulation (RS). We hypothesize that the aforementioned self-regulation characteristics are critical (professionally significant) for rescuers. Neuroticism, however, has negative indirect effects on the reliability of actions mediated by self-regulation ($z=2.87$, $p<0.05$).

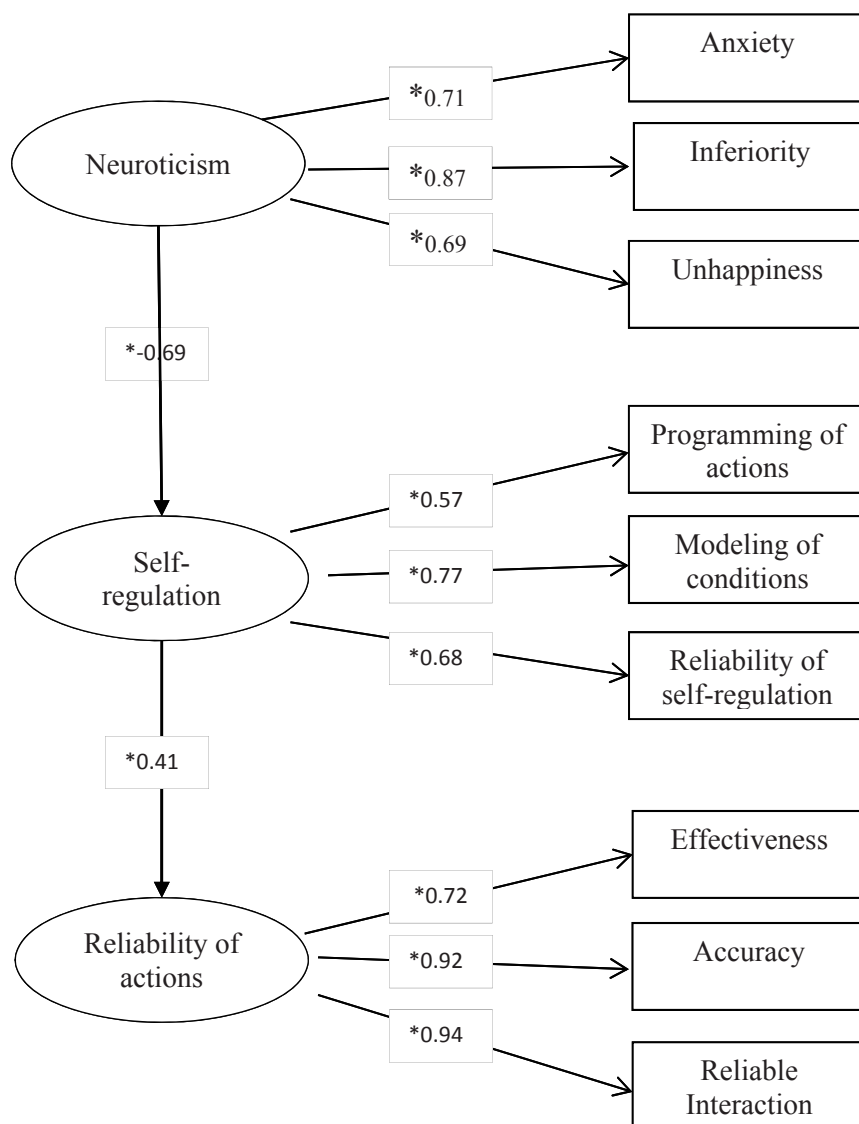


Figure 1. The structural model of the psychological predictors of the action reliability

Notes. Effectiveness — precision in performing required actions, tasks, instructions and guidelines. Accurateness — faultless operation. Reliable Interaction — within a work shift.

* — load is significant at $p < 0.05$.

Although there were no significant correlations between extraversion, psychoticism and scores of actions reliability in regular and emergency situations, the significant correlation between extraversion and self-regulation reliability ($r=0.26$; $p=0.05$) allows us to suggest that extraversion will affect the reliability of actions indirectly. However, with the introduction of this parameter into the model, the model parameters deteriorated significantly. An additional study of the relation-

ship of extraversion with the reliability of rescue actions (both direct determination and indirect one through mediators) using the path analysis method has not identified any significant effect.

Similarly, there was no evidence of a psychoticism-mediated relationship with indicators of the rescuers actions reliability. These data indicate that both extraverts and introverts, as well as individuals with different levels of psychoticism, can be reliable in stressful situations when they possess professionally important regulative characteristics.

Discussion

The analysis results give grounds to say that indicators of conscious self-regulation serve as predictors of professional operation reliability. These findings highlight the importance of self-regulation in addressing the problem of human reliability under stressful conditions of professional activity. The revealed facts correspond with the results of other studies showing that the degree of development of self-regulation and its features determine achievements in the educational process (Morosanova, 2010a; Morosanova et al., 2015; Morosanova et al., 2016), as well as in professional activity (Morosanova & Kondratyuk, 2012; Morosanova, 1986, 2014; Gaidamashko et al., 2015). All these research papers support Baumeister and Alquist's statement that "self-regulation is an important human capability and one that contributes to success and well-being in a broad variety of spheres" (Baumeister & Alquist, 2009, p.31).

Another important result of our study is the data testifying that the rescue action reliability in more complex and stressful situations varies to a greater degree and is even slightly higher than in the regular situations regulated by instructions and in less stressful situations where rescuers' activities are carried out as part of routine procedures and do not require extensive thinking over the action program.

The so-called emergency situations involving dangerous elements and potential threats are likely to enhance rescuers' subjective activity due to the high individual significance of these situations, and in addition, are likely to promote a more definite expression of individual differences in self-regulation that are not so obvious under normal conditions. As Konopkin underlined, "as soon as a person is faced with the need to solve a new problem personally meaningful to him, the process of conscious regulation appears very clearly. Problem situation, potentially associated with the implementation of something subjectively important, with achievement of the result, which embodies one of the fundamental value orientations, usually causes and reveals the detailed conscious regulation..." (Konopkin, 2011, p.244).

Therefore, the obtained data constitute a new empirical argument in favor of our earlier-developed concept that conscious self-regulation in new, unexpected and unusual situations is one of the main means of overcoming them.

Our research has identified the regulatory features serving as predictors of the reliability of rescuers' operations in difficult and unexpected situations. These professionally significant regulatory features are actually special psychological resources that promote mastery of the emergency rescuer profession, and, from this point of view, can be used as prognostic indicators of a person's success in maste-

ring this profession. The most significant of them are the self-regulation reliability, modeling of significant conditions and action programming. These data confirm and develop our previous research results, which revealed that the development of the regulatory processes “modeling of significant conditions” and “action programming” is an important component of psychological resources for rescuers (Morosanova, Leonova, Kondratyuk & Kachina, 2009).

The results of this study show that the impact of personality dispositions on the productive aspects of an activity is not imminent, and largely mediated by the development of professionally significant regulatory features. On the basis of the obtained results, we can say that the reliability of self-regulation manifested in the stability of conscious self-regulation features (specified by the activity requirements) serves as the psychological basis of the reliability of operation in stressful conditions.

A new and important result of this study is an empirical argument (found with the help of structural modeling) in favor of the mediating role of conscious self-regulation in the relationship between the personality dispositions and the rescuers' performance reliability.

A growing interest in the mediating role of self-regulation appears currently. As a mediator, self-regulation is primarily and actively studied in the context of the learning activities and self-regulation problems (Pintrich, 2000; Zimmerman, 2008; Taura, Abdullah, Roslan & Omar, 2014; Morosanova, Fomina & Bondarenko, 2015). As noted Pintrich: “self-regulatory activities are mediators between personal and contextual characteristics and actual achievement or performance” (Pintrich, 2000, p. 453).

On the whole, self-regulation as a mediator is treated in the solution of various practical problems, such as child-parent relationships (Padilla-Walker, Harper & Jensen, 2010), relationship of domestic violence and adolescent mental health (Perkins, Cortina, Smith-Darden & Graham-Bermann, 2012), and intrinsic motivation of teachers (Hanfstingl, Andreitz, Müller & Thomas, 2010).

The data obtained in our studies are important in carrying out professional orientation in accordance with the principles of differentiation and individualization. Applying professionally important psychological resources can positively affect the students' professional choices and their professional self-determination (Chistyakova, 2015).

We consider the perspective of our research in identifying professionally important regulatory resources specific for various kinds of activity and in designing technologies of their development for ensuring the reliability of professional action of people with different personality dispositions.

Conclusion

1. Conscious self-regulation of professional activity is a predictor of the reliability of human action in terms of occupational stress.

2. Conscious self-regulation mediates the influence of personality dispositions (by Eysenck) on the reliability of professional action under stressful conditions.

3. Rescue operation reliability in psychologically stressful emergency situations largely depends on the rescuers' degree of development of professionally significant regulatory features, primarily the stability of conscious self-regulation, the modeling of significant conditions and actions programming.

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