

PSYCHOLOGY IN RUSSIA: STATE OF THE ART

Volume 7 Issue 2 2014

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Editorial

The “Theory and methodology” section deals with the issues of international and trans-disciplinary cooperation in contemporary psychology. The paper by Irina A. Mironenko analyses integrative and isolationist tendencies in contemporary Russian psychological science. Lev A. Zaks thoroughly discusses the ways psychology and cultural studies cooperate and the problems they face; an agenda first proposed by L.S. Vygotsky in his early work.

The “Psychology of education and learning” section includes two articles that investigate important prerequisites for effective learning. The paper by Irina I. Vartanova discusses the role that motivation and having a system of values play in the development of upper secondary school students’ personalities. The article by Irina V. Korotaeva analyses metacognitive reading comprehension strategies in students. The latter work is especially interesting, since it reveals differences between education and psychology students, and thus allows one to understand the impact a psychological education has on students’ cognition.

The “Psychophysiology” section provides articles on developing research methods. Josep Maria Tous Ral and Ludimila Liutsko propose the Proprioceptive Diagnosis of Temperament and Character (DP-TC) as a tool for measuring the psychophysical bases of human errors. Maria S. Kovyazina and Elena I. Roshchina suggest methods of dichotic listening as a research methodology for hemispheric interaction, and provide some experimental evidence to support their claim.

Two articles in the “Clinical psychology” section discuss co-morbidity issues. Anastasia V. Popinako and Olga D. Pugovkina investigated social anxiety, hostility, and Machiavellianism as psychological factors that reflect a propensity for alcoholism in depressed patients. Tatyana S. Buzina outlined several important targets for the prevention and treatment of HIV infections in substance users.

The final section — “Empirical research of contemporary social practices” — appears in the journal for the first time. It includes research papers that could possibly have been placed in some other relevant sections, but the agenda they

have in common seems more important. Vadim A. Emelin, Aleksander Sh. Tkhostov and Elena I. Rasskazova investigate emerging social practices, such as the info-communication society, strategies for adjustment to this new type of society and the tools for measuring them. Natalya V. Razina describes “representations of motherhood” a rapidly changing personal construct in contemporary society — through the lens of three Russian religious traditions: Orthodox Christianity, Islam and Buddhism.

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First published online June 30, 2014

THEORY AND METHODOLOGY

Integrative and isolationist tendencies in contemporary Russian psychological science

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Contemporary Russian psychology faces an uphill battle in joining the international mainstream after decades of isolation. Among Russian psychologists today, we can see traces of the “globalist” (integrative) and “counter-globalist” (isolationist) tendencies that first manifested during the Soviet period. At that time, Russian psychology was shaped as a mono-methodological trend; it addressed fundamental theoretical problems, was based on Marxist philosophy and was oriented to reflect the standards of the natural sciences. In the post-Soviet period, fundamental social changes shifted the development of psychology as a science and different standards were adopted. Contemporary Russian psychology is substantially diversified. When searching for “the optimum level of integration” with global peers, it is necessary to take into account the theoretical and methodological orientations of the scientists, as their motives and constraints with respect to integration can be substantially different. Here we explain in detail how the different theoretical understandings and predilections of Russian psychologists determine their interests, ideals and constraints with respect to integration with the mainstream.

Keywords: Russian psychology, international science, Activity theory, Christian Orthodox psychology, psychology in Russia in Post-soviet period

Introduction

Hardly any of Russian psychologists today can stay indifferent to the question of the place and significance of Russian psychology in the world science and concomitant issues of integration into the global mainstream. The more so that formal evaluations of the work of Russian scientists are more and more determined by the presence or absence of their publications in foreign scientific journals and reference systems. The adequacy of such evaluation criteria and in general of that straightforward focus on the mainstream raise debates among Russian psychologists and demand analysis which is presented in a number of publications (Akser

and Saveljeva, 2010; Mironenko, 2005; Mironenko, 2007b; Sirotkina and Smith, 2008; Yurevich 2008a; 2008b; 2009; 2010a; 2010b; Yurevich and Tzapenko 2010; Yasnitsky, 2011). We particularly note the works of A.V. Yurevich where the problem of the integration of Russian psychology into the mainstream and the applicability of the above-mentioned criteria for the evaluation of the work of Russian scientists are considered in the broad context of social processes in the professional community.

A.V. Yurevich notes, that among Russian psychologists today we can trace both “globalist” (integrative) and “counterglobalist” (isolationist) tendencies: “Straightforward orientation to Western standards, prescribing Russian science erasing national specificity comes along side with the same straightforward denial of the need to adjoin to the world mainstream “ (Yurevich 2010b, p.55).

Moreover, at present “counterglobalist” tendencies in the Russian psychological science are strengthening: “Patriotic wave of the last few years, as it is typical for Russia, brought anti-Western attitudes to the integration of Russian science into the global mainstream. The most radical of these show up, for example, in statements, that we need not seek to join the Western science - on the contrary, the latter should pay more attention to the Russian science; that we should not learn foreign languages to be published in international journals, but on the contrary, foreign scientists should learn Russian to read Russian scientific journals, etc.” (Yurevich 2010b, p.55).

One cannot but agree with the conclusion of A.V. Yurevich that “the obvious inadequacy of both two extreme positions and the need to preserve most prolific national features of Russian science on one hand and on the other hand, the need of integration into the global mainstream, makes feasible the compliance of the principle of *optimum integration*” (Yurevich 2010b, p.55).

But what should be this *optimum*, what issues should be considered in order to define this optimum — these remain debatable, and this I would like to discuss.

What for are Russian psychologists seeking integration into the mainstream? Who and why needs it (or does not need) in the heterogeneous contemporary Russian professional community? What motives bring forth the “globalist” and “counterglobalist” tendencies?

Current tendencies

Let us try to reveal groups in our professional community within which interests and ideals of the participants seem to be more or less the same in concern to integration with the mainstream.

Our assessment we shall base on theoretical grounds and predilections within the groups. To reveal those let us consider the situation in which contemporary psychological community was formed.

Contemporary Russian professional community was formed on the remains of the paradigm of Soviet psychological science. Soviet psychology had been, in a measure forcibly, kept within the framework of a mono methodological trend, oriented to standards of natural sciences and based on Marxist philosophy, with a priority of fundamental research. During the Soviet period psychological practices were restricted and research centers were scarce. There were only few units provid-

ing applied psychological research in big clinical centers, in war industry central institutions, etc. Universities were the main centers providing psychological research and education, and there were only three universities in Russia (eight all together in the USSR), where psychology faculties were: Moscow (MSU), Yaroslavl (YarSU), and Leningrad university (LSU). University faculties were more research centers than educational institutions, say, LSU graduated each year about 50 full-time students, YarSU was smaller, MSU graduated a hundred and smth. All education was free, the entrance on a competitive basis. There were fully equipped laboratories, where all the students got profound training. And these faculties were doing research for the government, very well financed. The faculties and the departments were headed by well-known researchers who maintained the investigations for which the faculties got their money from the state.

When perestroika began financial support of science and education was seized. Researches had to find some new sources for living. Many Russian specialists in mathematics and physics went abroad. For psychologists this appeared to be not so easy because of the language barrier and because of their specific theoretical background. But another powerful source of finance sprang up: the “customer demand” for practical psychology. Three product areas opened where psychologists were called for and very well paid:

- Politics. Elections, gubernatorial and others. Politicians believed that psychologists could help them to exert influence upon the voters.
- Young and wild Russian business. “New Russians” believed that psychologists could help them to sell their products and to raise labor productivity.
- Psychological education. People were interested in psychology. They believed that it could help them to get reed of their stresses and inner conflicts and to be influential. Psychological education became very popular, and it was provided at all levels, from short time courses up to university diplomas.

So, psychology has been boosted in Russia since “Perestroika”. The number of graduated psychologists has increased dramatically. In 2003 there were about 300 institutions of higher education in psychology in Russia from which about 5000 students annually graduate. You can guess that these universities were very different from the old ones. The “farther” University faculties also changed to meet the situation: now they were making money not on fundamental research, but on “educational services”.

Totalitarian government during the Soviet period had treated psychology as a gardener shaping his tree: letting only those branches grow which fit his plan. Any deviation was illegible. With the fall of the Soviet state ideological barriers to the development of Russian psychological science were removed. Many of older psychologists were just tired of sticking to the old theoretical “rules”. The majority of the newly graduated psychologists had little knowledge of what the theoretical basics of Soviet Psychology were and no interest to know about it. Most rapidly developing areas of contemporary Russian psychology were those which had been being virtually abandoned during the Soviet period: counseling psychology, social psychology etc. Naturally, Western psychological theories were generally recog-

nized and widely employed. Lots and lots of textbooks translated into Russian had no references to Russian authors whatsoever.

Thus, the majority of the contemporary Russian psychological community does not at all refer to the paradigm prevailing in Soviet psychology.

What part of the contemporary professional community masters theories of Soviet psychology? A very small one. That knowledge had to be transmitted directly from teachers to students, particularly taking into account the role of oral tradition in psychological education in Soviet Russia. There were no tutorials and classbooks for future psychologists. Their studies were based on monographs and papers, which were written in “Aesopian” language. The texts of our classics require hermeneutics, require reading together with the teacher.

That theory is mastered today by a very small part of the professional community, by those who have been specially trained and educated. Moreover, not all of these people cling to the old theoretical positions, so that this group size gradually decreases.

However, the first group, which we denote is a group of followers of the Soviet psychology traditions, let us call it “Activity theory (AT) trend”, as this is the most frequently used label for Soviet psychology in the mainstream. This group is not numerous, but that does not diminish its significance in the context of the problem being discussed.

What other groups should be singled out?

In the 90’s with the collapse of the Soviet psychology paradigm, against a combination of processes of blurring of boundaries between the national and the global science and those of disintegration of the national professional community, a focus on foreign theories dominated in Russian psychology. Scientists who cling to those we shall call here “Pro-Western Developments” and assign them to a particular group, the second one in our analysis.

As for authentic trends that have developed in Russia in the post-perestroika period, we can denote Christian Orthodox Psychology, or Spiritual-Philosophical psychology, that is developing vigorously now, continuing a tradition that existed in Russia in pre-Soviet period. This research we shall call here “National Authentic Developments” and assign the scientists to a new group.

Of course, our classification is unilateral and symbolic, it does not appeal to the substance of the theories, very different theoretical orientations we put here in the same group (behaviourists, psychoanalytics, humanistic psychologists are all ascribed to “Pro-Western Developments”), because here we take into account only one aspect — how the theoretical approach developed in Russia in Post-Soviet period: continuing the development of the paradigm of Soviet period (AT); following contemporary Western traditions (“Pro-Western Developments”); Authentic developments (“National Authentic Developments”). And of course, very rarely we can see a pure brand in reality. Yet the classification is very easy to use — just look into the reference lists in papers.

Thus, three groups of scientists result:

- “Activity theory” (AT),
- “Pro-Western Developments”,
- “National Authentic Developments”.

Note that the structure of scientific community, to which our analysis has lead, to a large extent resembles the one in Russia in the pre-Soviet period, as described by V.A. Koltzova (Koltzova 1997; 2002):

- “Experimental” psychology, closely linked with Russian physiologists (I.M. Sechenov, I.P. Pavlov.), which became the basis for the development of science through the Soviet period;
- “Empirical” psychology, which is characterized by the orientation to European concepts and methods (followers of V. Vundt);
- Religious and philosophical psychology, based on the ideas of Russian theological, spiritual and philosophical thinkers.

Let us consider the problem of interests, ideals and constrains in concern of integration with the mainstream separately for the groups we denoted in Russian professional community.

Pro-Western developments

“Pro-Western Developments” include those who focus on Western theories: behaviourist, psychoanalytic, humanistic, etc. Globalist tendencies are naturally inherent here. This group accounted for the bulk of the avalanche increment of psychological community in the 90’s, due to massive emissions of translated foreign books on psychological education market, the latter growing rapidly at that time.

The growth of counterglobalist tendencies in modern Russia to certain extent results from the disappointment of many of these people which befell them when they tried to enter the mainstream. Their research is of no interest their, their papers are not published in the journals. The point is not that the West is not interested in the life in Russia they assess, as A.V. Yurevich writes. It is the level of their work which does not meet the requirements of the mainstream. This is not surprising, since a substantial part of this group of scientists studied foreign theories by translations and retellings in textbooks, they do not read contemporary Western journals and therefore can not meet the requirements of the discourse. One can agree with A.V. Yurevich when he states that “hidden” from the West Soviet psychology was more interesting for the international community than contemporary, “wide open to the West”, but the reason for the presence or lack of interest is not in secrecy or openness, it is in the quality of production that we show to the West.

Many of those who were oriented to Western theories in the 90’s today are seeking new ideals.

However, there are many examples of successful integration of “Pro-Western Developments” to the international science, especially those from leading universities, and as for the evaluation of the quality of work of a scientist; in respect to “Pro-Western Developments” publications in international journals seem an appropriate criteria.

National authentic developments

The other part of the professional community, which we have designated here as “National Authentic Developments” is rapidly growing since the beginning of the XXI c. Christian Orthodox, Spiritual or Philosophical psychology develops the tra-

ditions rooted in the pre-Soviet period of Russian psychology. This is an entirely authentic trend, closely related to Russian culture, focused in practices on a vast Russian market, based on Russian authors and appealing to the Russian mentality.

Representatives of this group show no globalist tendencies, counter-globalist tendencies are strong.

Publications in foreign journals, of course, are no adequate indicator of the quality of work of these scientists, and the necessity of a “breakthrough” into the mainstream for them it is far from obvious.

At the same time, in the long term it seems quite possible. It is well known that representatives of Russian spiritual and philosophical thought, who had been expelled from the country in 1922 (N.A. Berdjaev, M.I. Vladislavlev, etc.), had a significant influence on the development of world science, in particular, on the development of existentialism.

Successors of the Activity theory trend

What determines the globalist and counter-globalist tendencies in this group of scientists?

Let us consider their reasons “for” integration.

First of all, it is this trend that meets the expectations of foreign colleagues. It is recognized that for western colleagues Russian psychology is, above all, represented by the works of classics of the Soviet period: “... the representation of Russian / Soviet psychology in the West. ... can be assessed as the idea that Russian psychology is the works of such luminaries as Vygotsky and Luria” (Yurevich, 2009, c. 79).

And it is to this trend that there remains a steady and even growing interest in the international science. The analysis of literature indicates that as time passes, the interest in international psychology to Vygotsky’s work is only growing, as reflected in the growth of index of citations of his work. According to this indicator in recent years Vygotsky moved ahead of many classics of foreign psychology (Yurevich, 2009, Karpov, 2005). The interest in classics of Soviet psychology can promote an interest in the work of successors.

Thus, first, foreign colleagues are willing to hear scientists working in the AT trend. Secondly — the latter have something to say. These Russian psychologists have every reason to be involved in the dialogue with the West.

Behind the iron curtain psychological science was lively developing and many talented scientists contributed to it. The ideas of L.S. Vygotsky and I.P. Pavlov inspired new theoretical reasoning and empirical research alongside with ideas still unknown to the international community. Classical theories of Soviet psychology, known in the West, first of all the theory of L.S. Vygotsky, were developing on the native soil, and this development was different than in the West.

In addition to the development of the theories well-known to foreign colleagues there are other theories, which remain obscure for the West. First of all, I would name here B.G. Ananiev theory (Ananiev, 1961; 1968; 1977). B.G. Ananiev’s theory remains obscure for the foreign scientific community. His name is not mentioned in modern foreign encyclopedias or journals. Few of his works that were translated into foreign languages, were not duly understood and appreciated by the psychologists’ community because of the specific notional and conceptual structure used

by B.G. Ananiev. The conceptual structure of the theory, the issues discussed, do not directly correlate with the categorical structure of the modern international psychology, hence, this theory cannot be understood by Western scientists without special efforts. At the same time, B.G. Ananiev's methodology and theory seem to be fruitful within the intensively developing areas of the world's psychological science provided the categorical system he used would be adequately explicated (Mironenko, 2007a; 2009). Among such areas of research and topical issues may be named personality impact on psycho physiological functions, life-span human development and age dynamics of psycho physiological functions in maturity.

Thus, the AT trend seems to be a welcomed contribution to the mainstream.

Would this integration be useful for Russian science?

I dare say that AT approach can keep on developing only if it is integrated into the mainstream. There is no future for the development of the AT but in the bosom of international science. I believe Russian psychology is now lacking every type of resources and lacking social demand to provide for isolated development of the AT trend in Russia.

Perhaps we are the last generation that has been taught to understand those texts, who masters that language, that conceptual apparatus. After us the layer thins rapidly. Are there many among Russian psychologists wishing to study AT approach today? I do not believe that best students queue to study AT even in the prime universities which have preserved the teaching staff mastering the theory and methodology of the AT approach. This trend was actual in another country with a different culture and a different mentality, in different universities.

If we do not ensure integration of the AT developments into the mainstream, the concepts that have not yet been integrated are likely to share the fate of artifacts of a dead civilization. I believe that the integration it is a matter of professional viability for scientists developing AT approach, and their duty to their teachers.

However, it would not be true to say that in the AT group of scholars integration tendencies are domineering.

The point is that the integration strategy for AT group encounters the maximum constraints and tactical difficulties. The language problem, the problem of translation, turns up a problem of hermeneutics here, bringing forth a necessity to relate the conceptual system of Soviet psychology, conceptual system so complex and sophisticated, with the conceptual system of the mainstream.

Consider for example the difficulties in translation of a key scientific term of AT — *subèkt*. Translation of this word as “subject” (unfortunately, it happens often) immediately renders a text meaningless because of the mismatch of semantic fields, because of the difference of the meaning attributed to the term in the texts of Russian scholars and meaning of the word “subject” in English texts. *Subèkt* means somebody whose activity is generated by his own needs, who is choosing and pursuing his own aims, serving his own purposes: a self-determined and self-actualizing agent. And in English “subject” means the opposite — it is something or somebody who is put under some pressure, exposed to some action, subjected to some impact... This difficulty of translation of the notion of *subèkt* into English could probably account for the fact that AT approach caused more interest in Germany and in Scandinavia than in the English speaking countries.

A special hermeneutics is needed for the integration of AT texts into the mainstream. So, the tactics of the movement towards integration for AT trend should be discussed by itself, but the necessity of the strategy for integration seems obvious.

Conclusion

The question of the place and significance of Russian psychology in the international science is not limited to the formal parameters of evaluation of quality of scientists' work. This is a key point today for professional self-identification for Russian psychologists, who from the very beginning of their professional education are actively assimilating production of foreign science, while at the same time, the vast majority of them are able to speak and write only in Russian.

Let us specify that by "international science" we mean the mainstream of scientific knowledge, which shaped in the West after the World War II, and which is an objective reality of the contemporary world, where psychological practices have become a mass profession with more or less universal standards, where people live, study and work, moving from country to country.

Meanwhile the "Russian psychology" can be understood in different ways. By "Russian psychology" we can mean the psychological theories generated and developed in Russia. At the same time we can mean by "Russian psychology" the contemporary professional community in Russia.

Russian professional community has grown in number thousand times in the 90's. Such rapid quantitative growth naturally was accompanied by decline in the quality of education (in average) and — in average — by change of preferences from complex fundamental theoretical concepts of Soviet science to Western theories, presented in an accessible form in translated textbooks and addressing the demands of psychological practice. For "Westerners" in the Russian professional community this time is a period of growth, accompanied by problems natural for developing countries.

At the same time, Russian psychology as one of the great schools of the twentieth century is going through a dramatic crisis. Speaking about Russian psychology as scientific knowledge, the question of its place in the international science is, first, the question of the impact on the development of the world science of Russian theories that had been integrated into its context, like Vygotskys' and Pavlovs', and secondly, it is the question of the causes and consequences of other Russian theories remaining obscure for the international science, not integrated in the context of the mainstream.

The tendency towards a kind of "partial isolation" from the mainstream, showing itself in "counterglobalist" attitudes, emerging in recent years, withdrawal of participation in the English language mainstream, are dangerous for the AT trend. Can such a science exist in contemporary world outside of mainstream? For how long? Won't a "partial isolation" turn up an ivory tower, cut off from sources of livelihood, from the influx of new blood also from psychological practice and education in Russia?

The answer to the question of the "optimum integration", the optimal combination of national specific and global traits in Russian psychology, cannot be universal and overall, and it cannot be formal. In search of "the optimum integration" it

is necessary to take into account theoretical and methodological orientations of the scientists, as the motives and constraints in concern of the integration can be substantially different. It is hardly reasonable to push those who develop Russian Orthodox Psychology to publish in international journals same way as those who follow Western traditions. I believe it would be a big mistake to evaluate publications in high-rank Russian journals lower than international publications. And my main concern here is the necessity of all possible support to internationalization of the AT trend, which is a highly challenging task. I believe the classification presented here can be a useful tool in determining “the optimum integration” for different types of developments in contemporary Russian psychological science.

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Original manuscript received December 14, 2012

Revised manuscript accepted August 28, 2013

First published online June 30, 2014

Psychology and culturology: A means of cooperating and problems associated with cooperation

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The article discloses the main potential aspects of cooperation between psychology and culturology, which are connected through their mutual determination of the psyche (psychic reality) and culture. The paper acknowledges the key importance of the cultural-historical traditions initiated by Lev Vygotsky and his successors as well as the idea that their potential has yet to be realized by contemporary psychology. A new vision of culture is given to culturology (in comparison with traditional cultural studies) and its significance in conducting modern psychological research: a novel problematization of psychology's subject matter and its methodological support. Different aspects of the psyche's cultural determination, the experience with cultural psychology (historical psychology) in researching historical mental types ("Annals school") are reviewed alongside with the role of culture knowledge in analyzing the psychological results of this determination. The consistency of culture and its components represented and internalized by mental structures is announced as a fundamental cultural basis of psychological research. The return influence of psychological phenomena on culture's various aspects, as well as related cultural and psychological problems, are determined by the fundamental place and role of the psyche in any given cultural system as well as the contradictions that exist between a culture and the psyche. All this requires further examination. One of the most vital contemporary challenges facing psychology is the problem of the mental peculiarities of the consciousness, which can be principally explained in terms of a consistent culturological approach. Interrelationships between the psyche's properties and conscious cultural functions are shown through example of aesthetic attitude.

Keywords: culture, psyche/the psyche, culturology, cultural and historical psychology, cultural psychology, system and consistency approach

For ages, psychology has been fruitfully cooperating with various cultural studies (the name given to the humanities after a well-known book by G. Rikkert), ranged from philosophy to linguistics and ethnology, and from history and anthropology to aesthetics. Modern "cultural-historical psychology" started with L. S. Vygotsky and his school, and the notion and the idea of culture are considered to be the school's basic concepts. The ideas of Vygotsky and his disciples A.N. Le-

ontiev and A.R. Luria were further developed not only in Russian psychology but also worldwide, by American cultural-historical psychologist D. Brunner, M. Cole, S. Scribner, and M. Tomacello. The fledgling influence of psychology on culture studies was first documented in the late 19th century. V. Dilthey's psychology-inspired philosophy and literature studies, G. Zimmel's sociology, A. Potebnya and D. Ovsyaniko-Kulikovsky's psychological aesthetics and literature studies in Russia, and overwhelming Freudian as well as neo-Freudian impacts on all the humanities also testify to these ideas.

In the twentieth century, culturology appeared as a science of culture, where culture means an organized wholeness (system), its general (systemic) properties, as well as its laws and variations. The birth of culturology was historically and genetically related to a whole system of cultural studies, and marked a new level of understanding culture and its components. Further work on this sophisticated phenomenon integrated the characteristic features of both social and individual human existence. Despite the controversial present-day status of culturology, its presence has far-reaching consequences for the entire system of social and anthropological studies, psychology among them. But psychology with its corpus of knowledge and approaches is equally essential for culturological thought.

This article is aimed at analyzing the synergetic relationship between psychology and culturology alongside prospects for using this knowledge to relate Man and society.

Let us start with a fundamental point for our consideration. What objectively binds psychology with culturology? What constitutes the basis for their cooperation?

Culturology and psychology are objective multilateral relationships, the complex *mutual determination* of main system objects (culture and the psychic reality of human beings) builds a foundations for this cooperation. Every macro object is indeed *universal in terms of the human world, albeit in different ways. Culture comprises a wide range of modalities and substrates; it is closely "interlocked" and "fused" with all forms and manifestations of social life and the experience of particular individuals without exception, whereas "the psyche" is a specific, "mono-substrate", it has its own qualitative limitations, which means it is "localized". "The psyche" itself acts as one of culture's substrates and specifies particular ways in which it exists: the ideal and the mental. But these differences in ontological perspective, diversity and quality cannot eliminate the psyche's integrity and "unalienatedness" regarding the universe-continuum of social and cultural existence, and this allows both the psyche and culture to be treated as *attributes* of human society. Thus, the relationship between culture and psyche present the relationship between two attributes which are fundamentally important for Man and his world's realities. Hence, the resulting point is the attribute/fundamental character of "culture-psyche/the psychological relationship, which in itself is the basis for our consideration.

* Richard D. Lewis, an English culture studies and psychology scholar, argues that science finds all the new evidence to the fact that people are similar in their inner, moral and ethical dimensions and differ in external manifestations, rituals, customs, and clothes. That is why the integration of cultural universalism and relativism principals has recently become a more widely debated topic (Lewis, 2001, 9).

The interrelationship between culture and psyche can be expressed in T. Dobzhanskiy's words, though he spoke of man's biology (you may use "psyche" instead): "...trying to understand man's biology while neglecting cultural influences is as useless as attempting to interpret culture's genesis and rise without knowing the biological nature of Man" (Cole, 1997, 191). These words truthfully reflect two sides of culture-psyche interdependence: 1. Culture→Psyche; 2. Psyche→Culture. Both cases imply a promising cooperation between psychology and culturology.

1. Culture→Psyche. In this relationship, culture represents both a system and a force that determines the psyche as a *human functional system* as well as particular aspects of personal or group mental life. Here, in *psychological reality*, the essence of culture is ultimately realized as a starting point for forming specific human existential peculiarities, world adaptation specifics, as well as reproduction and characteristic evolutionary features which are species-typical for Homo Sapiens. L.S. Vygotsky expressed precisely this correlation: "Culture creates special forms of behavior, changes the functioning of mental structures, and writes new scenarios in the progressing system of people's conduct". On this conceptual basis, Vygotsky explained the genesis and specific ontology of mental abilities and processes associated exclusively with people or, according to Vygotsky, "higher mental functions". It should be mentioned that even for this absolutely "culture-oriented" school of psychology, in its continuing historical and genetic research, the culturological approach to culture seems to be very fruitful. It is most vividly seen as something that bridges the gap/contradiction between humans and the higher animals that following J.-M. Shaffer can be called "the end of man's uniqueness". A vision /understanding of culture as a natural historic system that in the unity of its most significant features, is able to predict the specific qualities of man: his distinction from "the wild" is of great importance. Undoubtedly, certain "artificial" (super-biological) aspects of human existence such as artifacts, language and symbolic communications, the transfer of knowledge and experience, etc., are extremely important but each of them taken separately does not ensure a *specifically human existence*. They do not underscore the notion that man is substantially different from animals as, to some extent, they are typical of non-human primates, too. The qualitative leap of mankind; man's transition from the animal kingdom while keeping up the whole kinship with nature and at that, capability of being reversed are ensured only by the unity of all mutually-attributed and conditioned "artificialities". They are *culture* in its onto-functional wholeness, a source, a foundation, an acting part, a system generating and maintaining everything that we call "the human". And this wisdom is exclusively received, understood, theoretically and methodologically accumulated by culturology. Neither cultural anthropology nor meta-psychology (at the level of Freud, Skinner and Vygotsky's theories) or sociology are able to produce this knowledge, and sometimes they are not able to borrow it "ready-made" from culturology.

However, this phylogenetic aspect of culture's impact on the psyche is not the only one. Another view, which has been actively elaborated for a long time, is a historical approach. Here a time factor is introduced into the "culture-psyche" relationship, and we obtain a history of culture with its influence on the psyche,

as well as an understanding of what psychological types are formed by which different historical types of cultures, and what they are. The range of problems is so wide and so important (just think of forty thousand years of human history!), that it is not enough to simply speak of the influence of culturology on psychology. "On the border" where culturology (particularly historical culturology) and history meet, a new, culturological sub-discipline has appeared (which is a part of psychology at the same time). It is called the psychology of culture, historical psychology (Lotman, Uspensky, 1977, another interpretation of historical psychology is suggested by Shkuratov, 1997). This science was initiated by French historians at the School of Annals (M. Bloch, L. Febvre, J. Le Goff, G. Duby, etc.). In Russia, A.Y. Gurevich is studying medieval culture and the psychology of the culture French scholars followed. Due to Annals School's historians, the object of a new scientific area was understood and formulated mainly as a psychological one. *Mentality* became such an object, representing the wholeness of a subject's psychic organization for a certain culture type emerging in the course of natural history. It is a generating matrix/programming structure which determines the specific features of the subjects' world-perception, world-view, world-experience (world-feeling), and world-conception; that is, in general, a way of seeing the world and one's world outlook. The research led to astonishing results which were highly appreciated around the world. However, when introducing the mentality concept as a central point in fact, Annals School historians did not build the whole psychological "construction". Their "theoretical constructions" actually explore the collective consciousness and its individual carriers: medieval people and their descendants. The dominant focus of this approach is the mind content (the same as the super-individual (cultural) content of the epoch, the historical type of culture); consequently, such concepts as a system of values, collective consciousness, and worldview came to the fore. Genuine psychological notions were used much more rarely. For example, J. Le Goff analyzed "imagination" mainly as a specific component of the cultural content, the consequence-realization of the medieval people's world outlook, a synonym for their worldview. Finally, we have very rich, well-justified data concerning medieval people's knowledge and values: their views on nature, society, sacral reality and themselves. However, we cannot acquire proper psychological information, for instance, about *what and how* these people *felt* and desired, in what way, not logical but psychological, they thought; what constituted the intrinsic structure of their intimate psychological world, the correlation of their main psychological forces, psychological energy tension, the psyche's emotional scale, tempo-rhythm, and what "temperature", etc., used to be. Concurrently research issues were extended and involved material parts of culture alongside mental ones: the pattern of civilization, the structure of collective being, as well as systems of production activities and economic relations (in F. Braudel's works). However, the scholars did not see any contradictions in their discourse, they studied the things that excited them, namely, those that were vivid and full of events; a multipronged history connecting culture and the life course of a living man programmed by it, his mentality and conduct, which proved to be more interesting to this research as a socio-cultural rather than a psychological phenomenon. That is why their willful shift from "history of mentalities" to "historical anthropology" (after the 'Conclusions' of the above-

mentioned P.Y. Gurevich book) became logical. This research focus is similar in subject to historical psychology and the psychology of culture but totally different in essence. Nowadays historical anthropology is following the course of researching the history of particular psychological powers and mental phenomena in the context of socio-cultural history.

But the one-sided character of this development is clearly seen from a cultural point of view. First, the cognitivists' specialization still dominates (contemporary variants of socio-cultural psychology in its phylo- and ontogenetic research alike). First of all, *intellectual* history is studied with its focus on historical semantics ("intellectual language of the epoch, history of ideas, history of words", "history of concepts, history of discourse, history of mentality" — these are quotations from latest publications (Buedecker, 2010; Zenkin, 2011).

Generally speaking, even 18th century psychology and anthropology showed a tendency towards rationalism; the mind is great but where are senses and will?

Quite the same can be said about the psychology of culture, which is devoted to explaining the logic and specific results of *psychological forms and spiritual forces* as the phenomena produced by culture and history. The situation is similar to the *will component* in the psychology of culture: the psychology of *wish* and *act*, the essence of the phenomena is well studied by philosophical anthropologists and ethics specialists, but it requires historical and psychological apprehension.

Second, spiritual senses and will (together with reason) only starches the surface of the psyche. In this case, we "stumble" over *the unconscious psychic as a problem of cultural and historical psychology and the psychology of culture*. S. Freud's naturalistic theory can explain many things, but not everything; it has its own limits and restrictions, as epitomized by Eros' and Tanat's dark irrepressible forces, their sublimations and metamorphoses. According to Freud, culture is known to deal with the unconscious, but it is not pertinent to its nature and content. There is a problem of explaining, for example, why mainly the same psychological forces people have (sexual drives, for instance) that have passed through creative sublimation mechanism lead to idea-meaning and image-language results that are different in every respect (say, in art), which at that have undisputable historical and typological similarities/differences. The answer is clear: the unconscious is not alien to culture and mind's cultural forms and mental experience. It is an area of culture; its influence and controls ensure the integration of natural psychological forces (unconscious and actually animal-like) and living practices and consciousness, practical and conscious experience: the "Lacanian" semiotic structures of Symbolic, Imaginary and Real. Psychology and culturology should be united in order to give the socio-cultural explanation of the unconscious and the conscious world's relationships. This process follows the pattern that M.M. Bakhtin (V.N. Voloshinov) suggested early on in "Freudism" (Bakhtin, 1998). It also embodies the spirit of Vygotsky, whose ideas Bakhtin highly valued: the unconscious is treated as a "deferred", "gone-underground-for-a while" consciousness; this occurs due to the impossibility of the unconscious being realized in practice. There must be a "pan-cultural" understanding of the unconscious in polemics, with Freud disregarding culture-nature dialectics. Culture probably acts differently, and it requires further research. But anyway it can find 'links' between consciousness and the unconscious,

‘mediate’ deep natural powers that primarily seem purely natural, and sometimes “cope with them” ...by meeting them - not only repressing and transforming them but also legitimizing them and translating them into a culture’s own language, thus giving them a chance “to come true”. As a result, the unconscious is rendered both history-oriented and manageable (determined) by culture, adapted to the space and norms of conscious culture.

Psychoanalysis, after all, is the cultural psychotherapy practice of adapting and managing unconscious impulses and complexes.

“Psychology today is an example of the increasing differentiation of scientific knowledge. It is marked with “methodological liberalism” and “methodological pluralism”, with an abundance of theoretical and applied lines, approaches, and tendencies” (Zinchenko, Pervichko, 2012, 33).

Third, let us come back to conscious mentality, the process of its formation, and its existence in the spiritual subculture system and try to understand it using a consistent approach to culture and its key subsystems and structures. When dealing with “consistent culturological” patterns, it is helpful to avoid the “automatic” “blind-conformist” position and bear in mind the necessity and the character of a systemic view. The need for cultural inner self-organization, existential optimization, self-preservation and other needs makes it unavoidable, but we should primarily do it for the most important socio-ontological culture function to be realized - victory over nature/chaos/entropy via the creation and maintenance of a strict order. The function of enforcing uniformity and integrating society becomes one of the most important for culture. That is why “culture itself needs some cohesion. It should be a structure which is subjected to unified constructive principles for carrying out its social function” (Lotman, Uspenskiy, 1993, Vol.3, 342). Structuring via common constructive principle should appear, and it does appear at the inner programming core level, which is the level of culture. This purpose dictates that psychology based on culturology should switch from “parts” to “the whole”; from the historical study of separate feelings and other psychic states to learning about mental structures which are integral to certain cultures, such as world-feeling, world-view and world-conception, in the mutuality of their cultural psychological form and their informational content*.

Fourth, since culture and soul-bound culture are not identical, the cultural determination of the psyche should be considered within the cooperation of psychology and culturology and beyond the self-sufficient psychic reality of spiritual culture. For example, it should be considered without any exaggeration, throughout the whole culture field, within and between all its subsystems’ boundaries. Here culture solves various material-practical problems, and the psyche becomes a substrate and a way of existence for different practical mind forms and modifications and turns into a “ministerial”, applied science. It is pragmatically specialized; it supports the solving of problems of this sort. Historically, these practical utilitarian modifications of the psyche appear earlier than self-sufficient (self-governing) spiritual ones. One cannot say that they have not been studied so far.

* One of the authors suggested his own view on the complex psycho-semantic composition and structure: such culture-generating integral phenomena as world feeling and world view, as well as the analysis of their peculiarities and roles in art (Zaks, 1990; Zaks, 2009).

But this research, as a rule, is of a purely empirical and, to some extent, random character because they are “prompted” by the practical needs of the fields where the particular modifications of the ‘pragmatic applied’ psyche were shaped and functioned (it is worth noting that the “culture of communication interaction in a dynamic and complex society acts as a factor which provides limitations on the crises which abound in modern society” (Dontsov, Perelygina, 2011). They were not treated through the lens of the whole cultural “horizon” as its legitimate elements/subsystems, following its regularity, and arranged according to the general logic of culture.

The logic of culture conceived by culturology - which is an undoubtedly non-linear, multidimensional, multi-faceted one - organizes the conceptual space of psychological studies into culture and its phenomena. First and foremost, it entails the macro-regresses, macro-structure of culture: along with spiritual culture, it embraces a huge and complex subsystem of material culture and has expanded recently (late 1990s — early 2000s) to the state and status of a separate subsystem’s information-communication element. This element used to exist in a diffuse form, in ontological cohesion and functional subordination to material and spiritual subsystems*. The very material culture comprises two large subsystems entailing two key dimensions of human practical existence: *nature-reforming* (people’s life in nature, its utilization as a basis for socio-cultural being) and *socio-organizing* (ways and means by which people self-organize into teams, communities and collectives). All these systems not only collectively determine the contents and forms of the mass and individual psychology of modern people that set them apart from their predecessors, but also produce modifications of the psyche for themselves, for, so to say, their own needs. Every time there are specific functional systems of mind and psyche that represent and subjectively interiorize; they ensure that people, who happen to be included into these systems or socio-cultural chronotopes, appropriate their laws, properties, processes and conditions. Culturology-oriented psychology substantiates its studies with regard to the general content, build-up and functioning of these subsystems’ “wholeness” and their separate components’ specifics. For instance, the whole nature-transforming subsystem of material culture compounded of interactions comprising different material activities (producing and consuming), equipment, technology and fragments of the nature being transformed requires a certain corresponding type of mentality/consciousness (professional, productive and consumption-related ones). However, in the framework of this system it is necessary to identify mental man/collective dependences on the technical-technological complexes that are used, which are formed by the latter psychic abilities, attitudes and processes without which technical effective employment is impossible. In the same way, a socio-organizing subsystem of material culture produces the socio-practical mind as a complex of psychological abilities, properties and processes that permit the free

* This, in truth, historic “autonomisation” of information-communication-driven component and its transformation in a separate, and, indeed, *dominating* subsystem of modern culture is dealt with in philosophic, sociological and culturological theories of mass-media (M. McLuhan, N. Luhmann, U. Eco and others) and information society (M. Castells, J. Baudrillard, P. Virilio, etc.).

independent being of people to exist (Zaks, 2012; Zaks, 2013). Within this system, one should inevitably single out functional mental systems determined by people being in the forms offered: social institutions, communication and behavior patterns (social statuses, roles, discourses, behavior styles, integral “life-style” models. “One of the basic elements of social relations is inter-group interaction, based on a set of personality notions concerning his social milieu and relationships as well as a specific ways to perceive and assess them” (Dontsov, Perelygina, 2011, 85). A specific (although not “separate”, as in ontologically or functionally marked out) psycho-complex of *normative consciousness* is in consonance with attributed to all socio-organizing subsystem *normative* element which plays the role of a universal *technology of the social*. In a modern Russia context, its necessity can be convincingly proved “by contradiction”: an array of social norms are worked out and declared in all spheres of life, but ... they do not work, as they stumble across the “immaturity” of obedient mind, which was smartly described by M.E. Saltykov-Schedrin. Evidently, this regrettable tradition must be counter-balanced, not only with some socio-managerial efforts (a special “norm-affirming” policy aimed at establishing a rigorous normative order) but also with psycho-pedagogical energy, which is based on knowledge that entails the peculiarities of the “composition”, formation and activity of normative consciousness in a socio-cultural system.

Let us shift our perspective from the specific to the general — psycho-cultural universals equally defined by the specifics of the culture as a whole (“the fifth” item in my listing). Problematic objects here are presented by concrete psychological phenomena or mental contradictions, or steady subjects’ psycho-types. A culture-generating character unites all these phenomena: derivation from culture itself rather than from life (naturally, with its cultural content and determination). It is clear that the psychological cognition of these objects is based on the modern vision of culture developed by the humanities and culturology. Among the concrete psychic phenomena are, for example, typical modern mental states such as nostalgia, apathy, future shock, culture shock, and optimism/pessimism. All these states can be explained only within the context of the cultural specifics embedded in people’s inner world. For example, nostalgia could not exist as a mass state, culture should not act as collective memory, and, consequently, should not cultivate the value of the past and an active retrospective of the past (“retro-consciousness). Culture shock directly results from mental habit and attachment to one’s own culture (while future shock is caused by attachment to a culture’s “present”, its absolutizations). Culture is used as a construction material for, and is an original source of, psychological systems. Therefore, any more or less important changes trigger psychological evolution: a transformation and rearrangement of the mental world, often unaccountable and unnoticeable at first sight, let alone conceivable changes. *Mental contradictions* present a reflection of the onto-functional problems of culture, as well as the dynamics associated with its activation and the intensification and exposure of the principal internal controversy of culture and social life. An example can be problems dealing with the dialectic between the old and the new, the traditional and the innovative. The degree of a confrontation’s psychological intensity might lead and indeed gives rise to a traumatic outcome: *tradi-*

tion trauma for those with a creative mentality and *novelty/pioneering trauma* for conservatives*. In everyday life, we witness numerous instances of both political and cultural psychic traumas such as freedom trauma, or violence/enforcement/non-freedom trauma; democracy trauma and dictatorship/anti-democratic rule trauma.

Finally, let us consider culture-produced subjects' psycho-types which are solely explainable within a cultural context. In line with its own arrangement's logic and functional, contensive, formal unification/universalization (dominants-universals), culture shapes the same universal psycho-types of subjects: a practitioner/a man of spirit; a practitioner/a theorist; a model creator/an "after the model" worker; physicists vs. lyricists; a conservative-traditionalist/a pioneer; a norm follower/a deviance follower (tends to deviate from norms); a producer/a consumer; a mass culture man/ a man of elite, etc. The vast majority of these psycho-types should be reflected on, both philosophically, anthropologically, culturologically and *psychologically*. "It is important to take into account the principal incompleteness of scientific and practical material as a matter of study by virtue of the constant actualization of an object at individual, group and socio-institutional levels" (Zinchenko, 2011). Psychological (theoretical) models of people with these or other socio-cultural dominants and, as their practical consequence, projective algorithms-recommendations on dealing with people of these types, influencing them, their embedding in micro- and macro groups, institutions, etc., as well as ways to manage and use them fruitfully can be formulated.

It is worth mentioning the results of a study into the relations between the specifics of how Russia residents categorized their social environment and how prone they were to optimism or pessimism. These data are analyzed in an A.I. Dontsov and I.A. Zelenov paper (Dontsov, Zelenov, 2010), based on a survey involving 1,535 respondents from 100 Russian towns. Psychologists emphasize the revealed coherence between the respondents' pessimism and their perception of "few 'us' and a lot of 'them'" (ibid., p. 142).

But, of course, a lot of problems arise at the intersection of psychology and culturology, science and life, theory and its application. One might assume the mentioned socio-cultural psycho-types are hypothetical and ideal (in Weber's terminology); that's all right. The ideal (constructed, probable) in theory often manifests itself (let it be a tendency, or an exception) in the psychology of real people. In this case it would be much better to stay ahead of processes than to be behind them, facing the "uncared-for" reality of mental properties and problems.

2. ***Mentality* → *culture***. This shorthand expression states that this variant of our macro-objects' mutual links relates to the role and the place of the mental in culture. In the light of these sciences' interrelations, it indicates the role of psychology in culturology. It should be admitted that the fundamental role and place of the psychological in culture, the causal dependence of culture on psychology, have not

* Ongoing social changes, the instability of external reference points, and the absence of solid absolute values that define an individual's place in the world besides his own choice can cause discomfort and anxiety, and form a sense of amorphous identity (M. Hogg, A. Giddens, R. Lifton, and others).

been reflected on adequately so far. We see in this link a dependence of anthropological extent and depth: since in all respects the centre of culture is man, his mental characteristics are the genetic and functional cultural core⁶. This is a specific of biological genesis as well, the one that makes a man not only somatically but also mentally a creature of nature with culture cultivated by him and for him being an expression of, addition to and development of his natural psychological forces^{**}. In this sense, culture is defined by “resolving capacities of human material” (Mamardashvili, 1990, 340). If one could perceive, say, a culture of dolphins or bats, it would significantly differ from the human one. But culture is also determined by its own fruitful work with psychology, its organic neuro-psychologically-provided specifics of cultural-historic genesis: from the peculiarities and modifications of practical consciousness to “cerebral functions” (Vygotsky) which already possess a spiritual-mental character and qualitatively special informative contents. Clifford Geertz expressed this ambivalent dependence between mentality and culture as follows: “Man’s nervous system does not only allow him to acquire culture, it must make him do this in order for culture to function. Culture acts through developing, providing and expanding organically, logically and genetically prior to cultural abilities but more likely it is an integral part of these abilities as they are” (quoted in Cole, 1997, 192). It can be easily detected that here the second “item” of cultural-psychological relations alters first. At that, the essence of the second one does not change: the world of culture and its certain ‘lots’ are defined by the specifics of corresponding psycho-and-mind modifications.

Below is just one but a very typical example concerning the mental foundations of spiritual culture, their programming “inbuiltness” in arrangement and the functioning of this culture subsystem: the human aesthetic attitude to the world. The very existence of this spiritual value-based attitude and its specifics are characterized by the combination of the inborn and cultural properties of the human mentality. The basis of aesthetics (underlined by the ancient Greek etymology of the word “aesthesis”, which was actualized by A. Baumgarten) is comprised of immediate sensitive human contacts with the world via such senses as sight and hearing. It is these organs that fill the human mind with a diversity of concrete “sensitive” objects and create a chaotic vortex of things, phenomena, events and images. Alongside with it, there emerge psychological and mental problems. One of them is the necessity to transform the chaos of sensitive data in order to be capable of orienting in the world. The second is even more spirit-mind-functioning-related whole (“*spiritual consciousness and psyche*”): a man’s subjectivity (“self”) starts to endure the pressure of this sensitive world. A human undergoes some sort

* Vygotsky L.S., in particular, developed cultural-historical theory of human mental and personal development, widened the knowledge of conscious rethinking it on the basis of historic, semiotic and social approaches. “Higher mental functions”, one of the basic concepts of modern psychology, was introduced by Vygotsky and further explored by A. N. Leont’ev, A.V. Zaporozhets, D.B. El’konin, P.Y. Galperin.

** The psychological aspect of a man in his relationships with exactly corresponds to the interpretation of culture as a system of artificial “upgrading” — amplifiers of natural human forces culture formulated by M.K. Mamardashvili (1990). He even treated civilization on a whole as “accretion” to mind (Mamardashvili, 1990, 107).

of dependence from it (non-freedom), hence, he feels existential discomfort, an inner imbalance. The main reasons for these particular instances of dependence and discomfort result from the fact that the inner world is discordant and full of conflict, life-threats and loss bearing, catastrophic events (processes). Culture responds to this naturally and with a historically conditioned spirit/psychological dependence on an aesthetic attitude, aesthetic culture creation. The exploratory learning of the world through aesthetic consciousness and its special psychological substrate and “machinery” (in essence, specific aesthetic mentality) with the help of certain phenomena of this and only this consciousness associated with aesthetic value-meanings passing through it, turns chaos into order, imbalance into harmony, subjective dependence, pressure, discomfort - into a joyful sensation of freedom. Aesthetic culture adds aesthetic practices to spiritual cognition (“contemplation”) of the world of sensation; people create “perfect” forms that harmonize their inner world. The general “exploration effect” unites the satisfaction of “natural” mental needs (information certainty, psycho-physiological comfort, emotional satiety and discharge, oblectation of sight and soul) and socio-cultural, soul-related ones (experience of a form, order, meaning, one’s own creativity and inner freedom, self-assertiveness and a high degree of satisfaction with it all). An A. Blok line, “I recognize and accept you, life”, and the idea that then impossible is possible can serve as a generalization of this desirable effect. Other spheres of culture, especially spiritual ones, are built up according to the needs and functional peculiarities of the psychic –spiritual world of humans. Culture provides sort of a complete circuit, the same system character of reproduction in this or that culture area: thus, specific spiritual, psychic structures (conscience, first of all) contribute to morale validity, and the functioning of the latter represents a basis, space and a way for the moral-psychic to exist.

I should state with regret that in spite of L. Vygotsky findings, psychology has not managed to possess a complete understanding of spiritual forms of the psyche so far, it sometimes even ignores them, does not identify or differentiate; there is no specially-designed language to study them and psychology does not make use of insights of the humanities, mainly, philosophy.

Other aspects of fundamental appositions of psychic and culture were originally reflected on by Z. Freud. He was the first to reveal a fundamental controversy between super-human cultural reality (super-ego) and nature-born psychological organization. He treated it as an inconsistency between a culture and someone’s psyche, or its reluctance or inability to take into consideration the mental characteristics of “normal” people which manifests itself as violence to their minds, with a traumatic impact on mentality. Fully realizing the necessity and crucial role of culture, Z. Freud, however, postulated a principal proposition of cultural imperfection (inconveniences), of dissatisfaction with culture (Freud, 2010) and substantiated this with a convincing critique of culture. Freud’s vision and theoretical-methodological “move” highlighted the promising and improperly developed problems that affect mentality/culture relationships. These problems include individual and socio-psychological issues that are generated by the culture itself and its concrete phenomena: their structure and functioning, intensity, imperative character, totality and very “supernaturedness”. This, in combination with the properties mentioned, appears to be in conflict with the natural features of the psyche, which due

to mental tension results in multi-aspect negative phenomena (deviant and criminal behavior, mental and nervous disorders, etc.).

Evidently, culture itself and cultural studies should find solutions to these problems on the way “towards” man and his mentality, enabling a greater adaptation of culture to man’s characteristics and, at the same time, provide assistance to man, his psyche and his mind in their adjustment to culture. It is clear that these and the aforementioned issues, those that have already emerged and those that exist at the intersection of culture and mentality, are challenges for both culturology and psychology. They affect their interdisciplinary relations and symbioses (the psychology of culture is just one of many possible variants). The collaboration of psychology and culturology, the necessity of which is focused on in this article, seems to be very promising.

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Original manuscript received October 27, 2013
Revised manuscript accepted February 10, 2014
First published online June 30, 2014

PSYCHOLOGY OF EDUCATION AND LEARNING

The role of motivation and system of values in the development of upper secondary school pupils' personalities

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The motivation system in adolescent high school pupils/students of was studied (9th and 11th grade students) on the basis of a complex approach and a comparative analysis of emotional attitudes and a deliberate preference of values (general and educational). It was shown that the significance and accessibility of analyzed groups of values are, to a considerable extent, determined by a dominant motivation. Also, a tendency was found towards the contra-positioning of conscious and emotional attitudes with values — values which are highly attractive on the motivation-and-emotional level, but on the level of conscience, are underestimated compared with other ones. This also determines the further trend of development of a personality in the direction of acceptance of socially-approved general and educational values, and leads to the convergence of personality development of schoolchildren at that stage of their life. Also revealed were certain gender-related features of value orientations, which were related to the more advanced development of girls when compared to boys of the same age.

Keywords: motivation, values, personality, upper secondary school children

Introduction

Among key psychological notions, the notion of “motive” occupies a special place, and has an important explanatory function. The difficulty of systematizing any motivation relations which regulate human behavior is caused by the fact that it is a multilevel system. The determination of a motive as a subject of necessity (Leontiev, 1959) allows for the revelation of the special character, strictly speaking, of human motivation and represents it as the regulator of behavior at a certain level, which is reflected in the conscience in various ways — the realization of emotional relations through a system of verbal designations (a symbolic

indirect form of psyche, through personal meaning, and through a secondary appropriation of social norms and values. The motive, as a subject of necessity, presupposes the availability of two dialectically common poles, — subjectivity as the motive power of activity, and partiality, which determines the process of the formation of a meaning. It brings forward special requirements for the construction of diagnostic methods with which motives can be analyzed (Vartanova, 1998, 2000).

The motivational system used by young people and teenagers not only determines the content of their educational activities, but also sets up personal development. The period when teens are in high school is connected to an intensive development of their entire personal structure, and in particular, to the motivation necessity sphere. In that transitional moment, new value orientations arise, as well as new necessities and interests, and on that basis, new personal qualities materialize. A stable hierarchical structure of the motivation sphere appears, which in its developed form, presupposes an assimilation of certain moral values (Bozhovich, 1995). As B. Ananiev (1980) aptly put it, psychological research of the motives which underlie human behavior is impossible without a social and psychological study of the values themselves, since various human psychological characteristics coincide in them alone. The system of value orientations determines the pithy side of a life perspective as a system of adaptations and the means of assimilating the interior world, which assures a higher type of behavioral regulation. The basic process of moral development among adolescents and young people is the construction and revaluation of the value system (Kraig, 2000).

Unlike the motive, which is always individual and isolates the life world of a subject, values are what, on the contrary, accustom the individual to a particular super-individual common character and instill integrity (Vasiliuk, 1984). Three versions of comprehension of the psychological nature of individual values are known (Leontiev, 1996). According to the first version, the values are examined alongside such notions as meaning and ideation. In such cases they do not possess, as they are, an incentive energy and power. In the second case, individual values or value orientations are examined as a variation or a likeness of social aims (relations) or interests. According to this interpretation, they are attributed a leading or structuring function, where the effect of value regulation is being reduced. The third approach draws together the notion of a value with those of necessity and motivation, underlining their real incentive power. The role of values in such an interpretation and their correlation with motivation can be described in a two-level pattern of motivation, suggested by E. Patiaeva (1983). On one level, we have concrete situational motivation formations which are relevant to a single activity and the creation of motives at another level, are extra-situational, stable and generalized. They prompt an activity indirectly, participating in the generation of concrete situational motives. As noted by D.A. Leontiev (1996), regarding their functional place and role in the motivation structure, the personal values refer in a sufficiently obvious way to either the establishment of stable motivation or to the sources of motivation, as described by E. Patiaeva.

With the development of a personality, both values and motives undergo a certain interdependent evolution (Vartanova, 2010). The value orientations of a person which connect his or her interior world to the surrounding reality form

a complex, multilevel hierarchical system. Such a system, as one of the most important personal components, occupies a border position between its motivation necessity sphere and the system of personal meanings. These perform in a way that corresponds to a double function (Janitsky, 2000). It is just the values, as in the basic “primary” features of a personality, that result in various psychological and personal characteristics coming together (Ananiev, 1980). These determine its trend and motivation (Vartanova, 2006); they are the system formation factor of a personality (Bubnova, 2012).

Thus, according to F.E.Vasiliuk (1984), although a value as a certain factor of one’s conscience does not possess any energy from its perception, as the person develops himself or herself, he or she can borrow it from genuine, existing motives, so at the end, the factor is used to establish the content of life and obtains, itself, the power of a real motive. The value is not a known factor which is capable of becoming a motive, but only such a thing, which, when becoming a real motive, leads to the growth and perfection of the personality. At the boundary of development in the transitional period, the value orientations of schoolchildren often come into conflict with their established system of motives and necessities, which lead to their qualitative reconstruction (Psychology..., 1987). During the course of development, the values also undergo a certain evolution, changing not only in their nature, but also in their motivation status in their place and their role in the structure of vital activity (Vasiliuk, 1984). With all that, the main indicator of personal development can be considered the grade of transition of originally-comprehended values from the category of ‘just known’ to regulators of behavior, and the grade of their integration to the common motivation system. The personal development trend, as a certain kind of “trend vector”, can be diagnosed through a comparative analysis of emotional (mainly an unconscious attitude to values) and deliberately assimilated social norms and rules of relationship (Vartanova, 2008a). In this connection, the correlation between already existing motives and assimilated value orientations (which determine how motives will continue to develop) can be examined as one of the mechanisms of personal growth and development (Vartanova, 2010).

It results in the fact that the personal development trends of high school students are determined by two interconnected sets of motives. On one hand, they are affected by a previously-formed individual system of motives (an individual profile, which is also determined by the predominant motives that reflect educational activity, which are specific to each student) on which they depend, the values of which will constitute the leading trend in terms of their personal development. On the other hand, they are affected by socially preset norms, requirements and rules, which determine their system of basic values, which are common to all mankind. A high level of socially significant motives is an indispensable hallmark of a strong-willed person and an indication of his or her maturity, when ideals that reflect potentially preset cultural notions become the driving motives of a well-developed individual (Gippentreiter, 2005). From the point of view of socially-driven education and training, such values should be adopted to an equal extent by all schoolchildren during their normal maturation, and should form a corresponding system of motivation during the remainder of their years studying and during their subsequent adult life. In such a way, the first set of motives should

intensify the individual peculiarities of the student's system of motivation and values and lead to a divergence in the development of secondary school students, while the second set, on the contrary, promotes a unification of systems of motivation and values and should lead to convergence in terms of personal development. However, it is not clear how the development of high school students takes place from the point of view of a correlation between existing motivation and accepted values; which of these motives affect the formation of a personality more strongly? In light of that, the task of practical research requires a complex approach and a comparative analysis of an emotional attitude and a deliberate preference of values, the exposure of their significance and their accessibility in the future. The purpose of this research was to discover the specific features of value orientations (one of the systems of basic human and educational values, the personal growth aspect, from the point of view of these values' significance and accessibility in the future) among high school students, depending on their educational motivation (as per types of a dominant motive).

Methods

The research was conducted with students between the 9th and 11th grade in Moscow from 2009 through 2011. A total of 196 reports were obtained (40% from 9th grade boys and 37.7% from 11th grade boys ; 60% were obtained from 9th grade girls and 62.3% from 11th grade girls).

A student first performed a rating of 22 values by means of one on one comparisons from the point of view of their significance to him/her (parameter "value"), in conformity with the methods used by E.Fantalova (1992). Then he arranged the same values, realizing the choice in the pair of the value, which, in his opinion, can be more easily achieved in the future (parameter "accessibility") (Mukhamatulina, Obidnaya, 1997). A set of 22 values were used: 10 values from school life and 12 values that are common to all mankind (the set partially included the terminal values of M.Rokeach's methods).

Additionally, every student was supposed to evaluate on a scale of -3 to +3 each of 10 values associated with school life (self-perfection in studies, interesting conversations, acknowledgement in the student body, deep and solid knowledge, his/her authority, loyal and good friends, successful studies, the approval of his or her peers, being better than the others, overcoming of obstacles) according to the scale system, preset by a pair of adjectives (25 pairs of adjectives were used), in accordance with the semantic differential methods of Ch. Osgud which were adapted by V.Petrenko (1983). The procedure of analysis was the same, as described in previous research (Vartanova, 2008b, Vartanova, 2008c). As an auxiliary method, the method of using unfinished sentences, developed by A. Andreeva (1989), was used.

Results

The entire set of received evaluations for the semantic differential of values with respect to school life (in total, 250 evaluations per student) was processed using a factor analysis (a method of main components with a subsequent "Varimax" rotation).

As a result, the four most significant factors were singled out which were common among students in the 9th and 11th grades. An interpretation of the received factors was conducted with due regard for the meaningful analysis of the written material obtained which was using the unfinished sentence method, as well as other materials and observations, which allowed for independent verification of the singled out motivation types.

Factor 1 may be characterized as an emotional attitude, which was defined by the affiliation motivation (the necessity of acceptance and self-assertion through communication). The greatest loads on it had the values: “interesting conversation” (cheerful, beloved, good, bright, pleasant), “loyal and good friends” (carefree, strong, good, bright, pleasant, cheerful), “my authority” (bright, kind, strong), “acknowledgement in the student body” (cheerful, good, bright, kind). The students who referred to that type noted that they try to obtain good grades in order to satisfy their parents and teachers, that it is important for them to have “many friends” in school, to participate during their lessons in “discussions”, to go to school not only for studies, but also “to associate with other people”; they suffer in school usually because of “bad attitudes among their peers”.

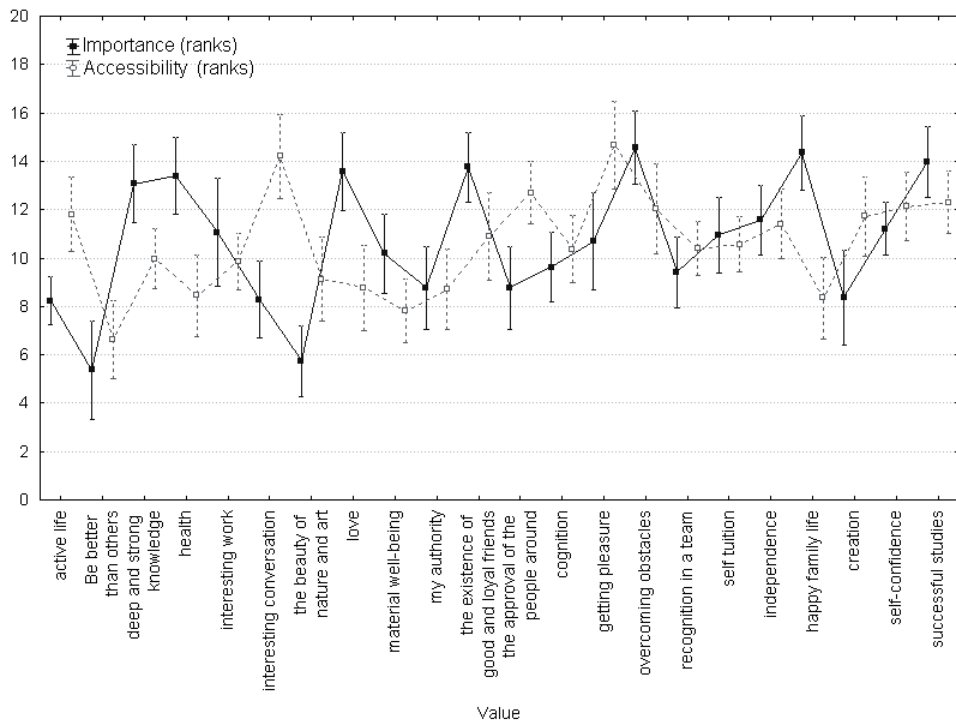
Factor 2 describes an emotional attitude which reflects self-affirmation as a motivation for education. It includes the following values: “self-perfection in studies” (complicated, strenuous, hard), “acknowledgement in the student body” (hard, complicated, strenuous), “overcoming difficulties” (complicated, strenuous, hard), “deep and solid knowledge” (hard, complicated, strenuous, slow), “successful studies” (hard, complicated, strenuous), “to be better than the others” (hard, complicated, strenuous), “approval of peers” (hard, complicated, strenuous). Pupils of that type often noted, that they spent too much time completing their homework, but that they still try to perform it carefully. They noted that the “introduction of education without grades is a bad idea, that the most difficult, but important task for them in their studies was to achieve good grades, to pass exams, and that good marks show the student’s effort”.

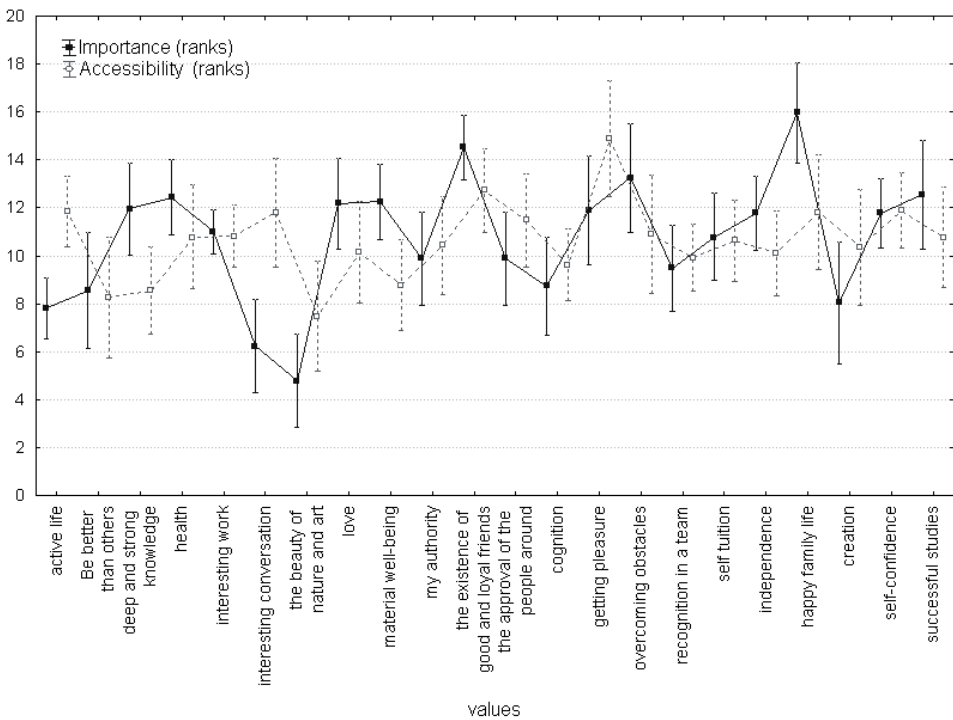
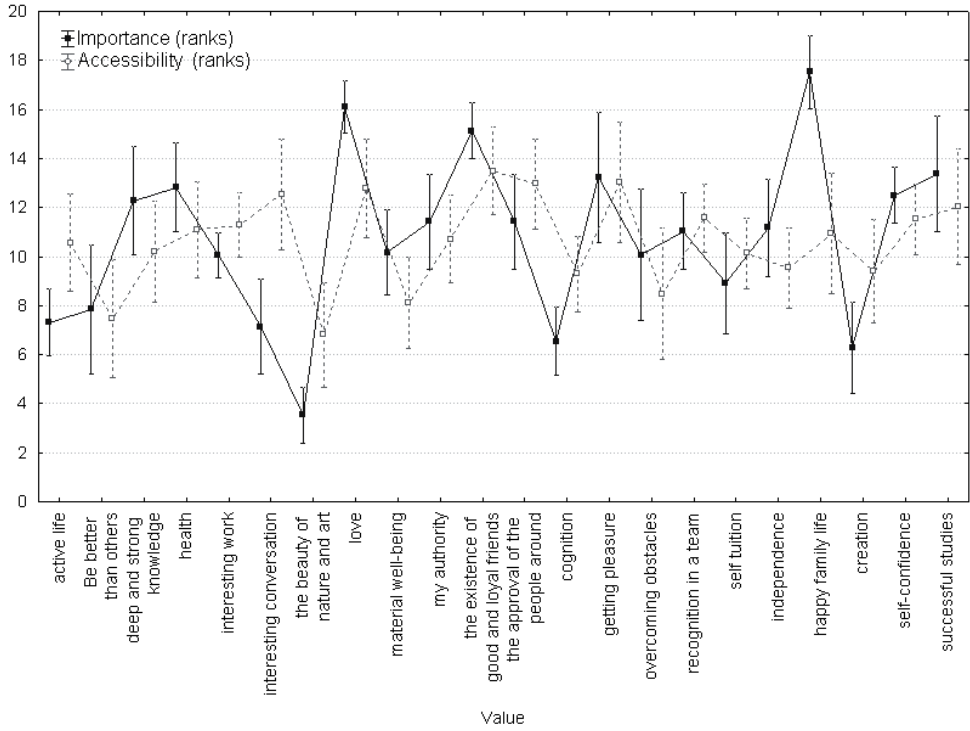
Factor 3 describes an orientation which prioritizes knowledge and successful studies (educational and cognitive motivation). Here the values “successful studies” (happy, strong, good, active, pleasant, hot, cheerful, beloved, clever), “deep and solid knowledge” (happy, strong, good, big, bright, pleasant, cheerful), “self-perfection in studies” (active, beloved, acute, clever, kind) are included. Students of that type noted that they studied in order to “learn new things”, “to get new knowledge”, “to develop and understand the environment”, “to be educated”, “to be a clever and a worthy person”, and “to develop as a person”.

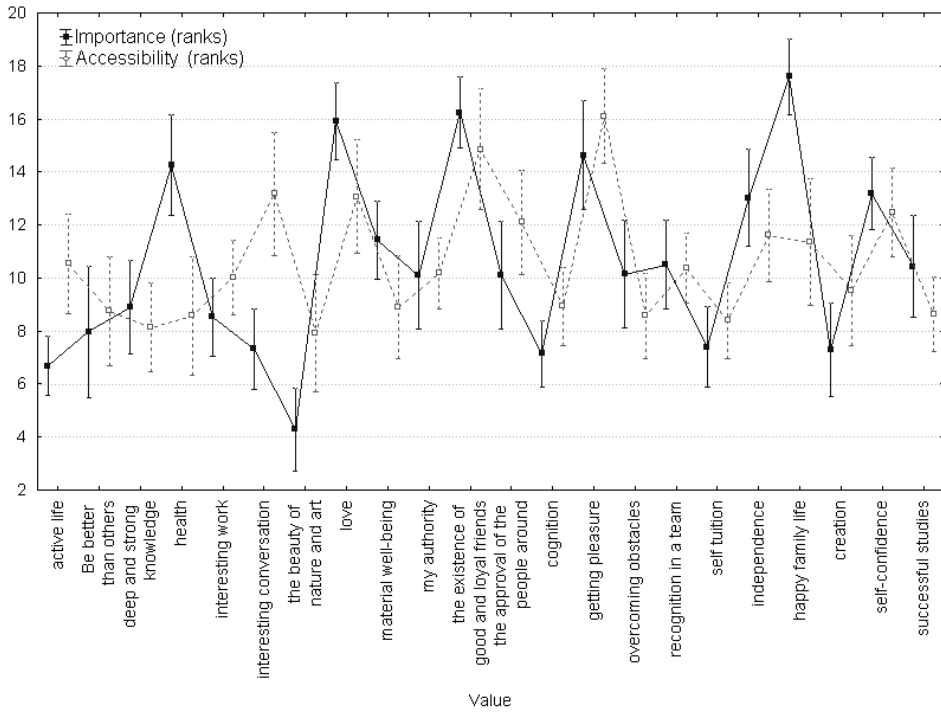
Factor 4 describes an emotional attitude which is determined by prestige and status (status competitive). It includes the values: “my authority” (happy, bright, fresh, beloved, strong, big), “to be better than the others” (cheerful, beloved, independence, acute), “acknowledgement in the student body” (active, hot, dear, fresh, acute). Pupils of that type (prestige motivated) have supplied the following motivations for their studies: “to enter a prestigious university”, “to find a prestigious job in the future”, “to provide a brilliant future for myself”, “to have a happy future” etc., they mainly suffer from ‘school failures’ and “bad grades”. They study to “be successful”, “to be first-rate workers”, “to receive an education and to forge ahead to university”, and “to become an excellent student and to gain the most knowledge”.

As a result of measurement of the significance of the singled out factors, every student obtained a quantitative evaluation of the expressiveness of his or her emotional attitude towards corresponding values, i.e. he was characterized with a corresponding four-factor profile. Thus, it allowed the researchers to determine the leading type of motivation attitude for each student (according to the dominant factor) and to arrange the whole excerpt in 4 groups, to facilitate a future comparison of the results of the revealed semantic content of values (emotional attitude towards them) with the results of a deliberate preference (rating) of values.

For every single value, average intervals and 95% confidence intervals were calculated and the values were rated (in terms of their significance and accessibility in the future), in every singled-out motivation group. The intervals allowed researchers to reveal differences in evaluations, which were conditioned by the types of motivation. Picture 1-4 shows the distribution of evaluations for all values for each singled out motivation group of students. Additionally, it is important to note that in cases when the rate of significance of a certain value considerably exceeds the rate of its accessibility in the future, a psychological conflict takes place which is indicative of interior dissatisfaction. However, at the same time, it indicates an incentive semantic-generating power of that value and the direction of motivation development. In cases where the rate of accessibility of a value exceeds its significance, one may speak of a presence of an interior vacuum, which shows “satiety”: the dying off of an incentive in that sphere. When the rates of significance and availability coincide, they are indicative of a co-ordination of personal orientations.







The obtained data show that the significance of general values (such as “a happy family life”, “love”, “friends” and “health”) for students of that age exceeds the significance of concrete educational and status-based values for all motivation types. However, the value rating reveals certain specifics. Students who are motivated by education and cognition, who are as a whole emotionally mostly attracted by the values “deep and stable knowledge” and “successful studies” when deliberately rating things do not consider these values to be the most significant (as with students of other motivation types), and for the value “self-perfection in studies” demonstrate an even vacuum. For them, first place is occupied (apart from the basic values common for all mankind) by “freedom” and “confidence in oneself” with a small conflict. For them, becoming an adult is determined by that kind of motivational development. However, for boys the values of the acceptance and association sphere are more important than for girls. However, with both sexes in that area, some vacuums are observed: with boys cognitive values and development-oriented values are more correlated than with girls, who value them higher and demonstrate a conflict in that area.

For a student from the group that is motivated by competition, we observe good coordination in the most motivation-oriented spheres, - “my authority”, “to be better than the others”, and “confidence in oneself”, though such values are placed at the bottom part of the rating scale (lower than in the other motivation groups). It is just for status that the values are to the same extent for both boys and girls. Conflicts are revealed with the values “deep and stable knowledge”, “successful studies”, “overcoming difficulties”, and the “presence of good and loyal friends”, which are more significant for them, but less accessible. Evidently, it is indicative of the fact

that for them, the status values are no longer a problem, since they already have had a certain status in the group for a long time and confidence in themselves. Additionally, the presence of a conflict in the ingvalues of maintaining friendly relations with students of their age and the values of receiving knowledge have now become the most important for them. In such situations, the process of becoming an adult is connected with an achievement of results in studies and self-development, as well as with the perfection of inter-personal relations. As a whole, for the sphere of knowledge and self-development, conflicts are more visible among girls, whereas for boys they emerge only in the sphere of acceptance and association (for girls in that area we already observe a vacuum, since, evidently, girls tend to mature faster than boys in that respect).

For students who are driven by education and personal accomplishment (who on the emotional level consider studying to be hard, strenuous and complicated labor) a conflict area is revealed in the values: “deep and stable knowledge”, “my authority”, “successful studies”, and “confidence in oneself”. However, they reveal vacuums in such values as “cognition”, “creation”, as well as “association”, “to be better than the others”, and “approval of peers”. For them, becoming an adult is connected with a growth of proper status and authority, and also through obtaining knowledge through strenuous labor, which leads to successes in studies. However, it is characteristic, that a conflict in the spheres of knowledge and self-development only exists for boys, while for girls such values are well-coordinated. On the other hand, for students that value status, the opposite is true: conflicts emerge among girls who are motivated by status.

Students with the affiliation motivation (who emotionally are oriented to interaction, acknowledgement and authority) deliberately choose, nevertheless, to value rather highly such things as “deep and stable knowledge” and “a well-to-do life”, and experience deep internal conflict. However, on the emotional level, those values are more characteristic of students with another motivation type: — self-affirmative educational motivation. Additionally, with respect to the emotionally significant value “the approval of peers”, those that value interaction and acknowledgement find themselves already on a low level with an expressed vacuum, because they are not more timely for them. This is indicative of the trend of development of the personality of students with such motivation, of their aspiration for realizing themselves already with new, adult qualities (based on their understanding that their future well-to-do life is conditioned by the knowledge they receive). As a whole, for students who are thusly motivated, the specifics of preference of values by boys and girls are not pronounced, though in the status sphere’s values the girls have a more pronounced motivational conflict than boys.

Discussion

The achieved results allow for a return to the initial problem: to clarify how the development of the personality of high school students takes place from the point of view of a connection between motivation and accepted values, which somehow exerts an influence on how their personalities develop. The convergence of personality development was found in comparing deliberately-rated values with types of existing motivation. This is manifested in the fact that, notwithstanding the initially

different types of emotional preference of values, the area of conflicts and vacuums for the analyzed groups of values appeared to be practically the same, while an absolute preference of values in numerous cases appeared to be contrary to the expected one on the basis of emotional preferences. Such a picture, in particular, is characteristic for the values of knowledge and development; - their significance for all types of motivation is higher, than for the educational and cognitive motivation. The significance of values of the sphere of acceptance and association for students with motivation of affiliation appeared not to be higher, than in other motivation groups. The significance of status values appeared for the status-competitive motivation were also not higher, than for students with other forms of motivation. On the other hand, as was previously shown (Vartanova, 2008), the pragmatic motivation is not alien to all schoolchildren either: for instance, out of the values of school life even students with the affiliation motivation chose, in the first run, only those subjects, which will be useful to them in future.

Thus, there was manifested an identical domination of conflicts for all motivation types (and, correspondingly, the areas of the nearest development of personality) in the field of knowledge and self-development (and desire wish to study, which is not surprising for 9th and 11th grade students). Besides, for all schoolchildren of such age, the values of acceptance and association already appear in the area of vacuums. As a whole, those results can be accounted for by the fact that the socially preset norms, requirements and rules, must be accepted to an equal extent by everybody by adulthood, as well as forming a corresponding system of motivation related to real studies and a future adult life. As pointed out by D.A. Leontiev (2007), the regulating action of values is expressed in the presetting of an activity vector, which is directed to infinity. Values are experienced as ideals, — the final references of a desirable state of affairs, and not only as a realization of an individual wish, but as an “objectively” desirable state of affairs, well-grounded from the point of view of social standards. Thus, it favors a unification of systems of motivation and values, which also leads to the convergence of development of personality at this stage of students’ homes.

Corresponding results also have been obtained before (Vartanova, 2010) during a protracted analysis of the development of motivation. It was shown, that dynamics of changes in rating of values are not occasional, but are correlated with variation of motivation, and that the system of choice of a value determines a subsequent change of motivation, as if it “led” it, determining the area of the nearest development. Thus, it is clear that: given the availability of socially approved general values and that the criterion “desirability of the desired” (Leontiev, 2007) is compatible with the strategic aims and the trend of development of social groups and social-and-cultural systems, a convergence of development of the students’ personalities should occur.

Conclusion

The obtained data allowed us to conclude that the significance and accessibility of the analyzed groups of values are, to a considerable extent, determined by genuine, extant (dominant) motivation. Additionally, a tendency has been revealed toward the contraposition of deliberate and emotional attitudes to values with a value,

which is highly attractive in the motivation-and-emotional plane, and that this is underestimated at the conscious level. There are also specific gender differences that suggest that girls tend to develop faster than boys. Thus, the research we conducted permits us to conclude, that from the point of view of the interdependence between high school students' motivation and accepted social values, that these values more strongly influence the direction of development of students' personalities during high school. This promotes the unification of their motivation and value system, which leads to the convergence of personal development at this phase of the student's life.

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Original manuscript received December 22, 2012

Revised manuscript accepted March 28, 2013

First published online June 30, 2014

Metacognitive strategies in reading comprehension of majors in education and psychology

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This study looks at how well students majoring in educational sciences and psychology were able to use spontaneously metacognitive strategies for reading comprehension. Students majoring in education have demonstrated ineffective learning goals and strategies. The results of the study show that only 7 percent of education majors sought to establish logical connections between the text fragments in multiple-choice assessment by contrast with 48 percent of psychology majors. The study showed that the number of education and psychology majors with metacognitive strategy of systematization has increased in the situation of self-formulated answer.

Keywords: metacognition, learning approach, multiple-choice assessment, self-regulated learning, readers' skills

Introduction

According to PISA research, in the last decades the level of the reading skills of Russian pupils has dropped and Russia has moved to the 43d place (OECD, 2010). It is considered that the effectiveness of the material comprehension depends on whether the student uses metacognition and metacognitive strategies of understanding and memorizing as well as the ability to evaluate his own understanding or not (Bransford, 1979, Brown, 1983, Iliasov, 1986).

The theory of "thinking about thinking" was first described by J. Flavell in the 1970s as metacognition. It means knowledge of one's own cognitive processes, i.e. knowledge of how one learns and acts (metacognitive knowledge), as well as control of these processes by the person who learns and acts in various situations (metacognitive regulation). D. Halpern notes that teaching skills of critical thought and strategies which enable to make understanding and memorizing easier as well as to monitor the process of learning play a special part in the refinement of working with material (Halpern, 2000). The research on metacognition has pointed out that it is a significant predictor of academic performance (Dunning et al. 2003, Thiede et al. 2003). Students with a high degree of metacognition

achieve a higher level of academic performance than those with a low level of metacognitive knowledge.

The theory of metacognition is closely connected with the concept of self-regulated learning. It is an internal management process of self-regulation, which can not be seen as a personality trait, nor as a specific skill. The student guided by the knowledge of his personality uses the necessary strategies of learning. Learning in this sense is not something that is aimed at students, but something that comes from students themselves. The components of self-regulated learning are motivation, self-efficacy, metacognition and attribution (Boekaerts, 2002). J. Lennon (2010) summarizes common contents of various definitions of self-regulated learning into the following two points:

1. Students are aware of the self-regulation process and its potential use in improving their performance. This means that the process of self-regulation is a conscious one.
2. Students generate their own feedback on their learning. Students monitor the effectiveness of their methods of learning strategies (Lennon, 2010).

It is necessary to mention that the psychology of self-regulation developed by the Russian school of psychology also pays attention to “cognition about cognition”. A. Karpov, basing on activity paradigm, describes metacognitive level as the highest level of a person’s activity regulation (Karpov, 2011).

The problems of metacognition are also considered by investigators, who distinguish different ways of learning approaches: “superficial” and “deep”. The first (a “superficial” style) is characterized by a desire to remember the material, while the second (a “deep” style) — by a desire to use metacognitive strategies in reading comprehension, to assimilate the knowledge from experiences, to monitor the effectiveness of understanding (Entwistle, 1997). In other words, the generalized idea of what is to learn a certain type of information, determines the settings and the students’ choice of methods of working with educational material, which naturally affects the quality of its mastering.

From our point of view, it is important to take into account how different approaches to learning depend on the requirements to students. An important factor is the knowledge control, which is one of the requirements determining goals and strategies of mastering the material. Let us consider one of such kinds of control.

Recent educational reforms in Russia have introduced multiple-choice tests into teaching practice at every level of elementary, secondary and higher education. This assessment method has become predominant and very popular in our country. Test results are served to measure schools’ and teachers’ efficiency. In terms of preparing students for testing, teachers focus more on drilling students on the right answers rather than working on the content. As a result, students subconsciously begin to orient themselves to memorizing and recognizing the answers. Such concentration on strategies of recognition and random choice is known to be one of the drawbacks of multiple-choice testing (Tuckman, 2002).

There is a description of such phenomenon in the psychology of memory, it is called a “feeling-of-knowing” (Mesheryakov, 2004). It is one of the forms of metamemory, when one can’t give the right answer on his own, but can recognize it in the given list or pick up a plausible answer. In a situation of multiple-choice test

students can be divided into two groups. Having got the question some students try to formulate the answer on their own (which requires a high level of knowledge), and then select one of the options. Other students, who are not able to generate the solution, choose the answer by casual sorting or recognition. The problem, which has appeared after introducing multiple-choice tests, is drilling students on remembering the right answers, but not on thinking about the context.

It is a proved fact that there exist such “trainings” of memory strategies in secondary and higher schools.

In the 1920s the effect of memory set was described in Russia. This effect depends on the requirements of the subsequent testing of remembered information. One of these requirements is the method of testing. L.S. Vygotsky wrote that learning goes in different ways depending on the assessment types: full answer or the identification of information. This problem has been investigated by Russian psychologists A. Smirnov and P. Zinchenko. It has been shown that, firstly, the deliberate memory set prevents from understanding the material, and secondly, the set of the metacognitive strategies of understanding (working with the text, which opens the main ideas in the material, logical connections), on the contrary, mobilizes the resources of incidental memory (Zinchenko, 1961). This effect is known as depth processing effect. F. Craik, B. Chellis, B. Velichkovsky and D. Halpern have proved that metacognitive strategies in encoding information provide the best results in the multiple-choice tests (Velichkovsky, 2006)

For American and European pedagogical system methods like multiple-choice tests are traditional and they have been used for a long time. For example, R. Sternberg, who is interested in different ways of teaching and assessment and style profile, shows that multiple-choice tests can benefit children with such style of thinking and learning as the executive and the conservative ones (Sternberg, 1994). The students with such style try to follow directions, do what they are told, learn assigned information. R. Sternberg analyzed the types of instructional and assessment activities a person prefers and discovered that executive style is connected with such method of instruction as memorization. Thus, we can suppose that the newly established testing practice in Russia provokes an executive style and superficial approach to learning. Aiming at amassing and reproducing knowledge brings about the following results: students working with a text can only see its content as a number of data to memorize without even setting to comprehend and analyze the material in general. Metacognitive reading comprehension strategies, typical for a “deeper” approach, are rarely used.

We have studied the comprehension strategies by students and senior pupils, using the structure of the learning process in the activity paradigm, developed by Ilyasov I. who has examined the problems of mastering the material in detail. He defines activities connected with understanding the material, memorizing and assessment, which ensure the success of the material mastering in different spheres. The structural activity features described by the author, such as the goal, subject and actions, which help to orient, fulfil and control the activity, enable to examine students' strategies (formed spontaneously) and build up a scheme of approximate basis for the formation and correction of activities. Understanding activities, for example, include finding the topic of the information, its systematization that is the determination of logical connections between fragments on

the same topic. The efficiency of these activities is determined to some extent by the students' metacognition — knowledge of logical structure of the explanatory text (Iliasov, 1986).

We have carried out a trial study about what the students of pedagogical department pay attention to in the process of a text comprehension. The examination of the activity aimed at finding the main idea, which most students call the main strategy of working with the text, has been carried out with the use of the methods developed by Malskaya O. and Sidelnikova A. It has shown that only 2% of the students-teachers realize that the main idea is facts and their explanation, which means that they have a standard notion of the structure of an explanatory text. 20% of the students prefer as essential information the sentences in the form of definitions (for instance, "Transplantation is spare-part surgery..."), a historical fact and a statement of the significance of the problem without any facts and explanations (Korotaeva, 2013). The majority of education majors marked out definitions and some facts without explanations. The results show that students do not manage metacognitive knowledge about the characteristics of scientific knowledge and effective strategies for their assimilation.

In our research we evaluated the higher school students' ability to organize the material and to establish meaningful connections between separate fragments.

We have developed a method of individual work with students, which enables to make a quality analysis of how students and senior pupils read explanatory texts, based on the school program material. We have shown some problems with the development of students' and senior pupils' critical thinking and how understanding depends on the use of the strategy of the text systematization. The technique reveals the monitoring of students' understanding and gives an indication of learning approach (Korotaeva, 2000). The technique has been used for many years and has identified a significant change in the quality of metacognitive skills since 90-s (Korotaeva, 2012)

This research is aimed at examining some methods of systematization of explanatory texts by the students of pedagogical and psychological departments. We assume that there are differences in how this understanding strategy functions in various situations of the comprehension assessment: in multiple-choice tests and in the process of formulating students' answers.

Procedure

This study looks at how well students majoring in education and psychology use metacognitive strategies and monitor their comprehension working on the content of the text. The specially constructed expository text (300 words) contained descriptions and explanations of two experiments in growing plants (Korotaeva, 2000). The evaluation of students' reading comprehension strategies based on the contradiction between the first experiment and its explanation.

The description of the fact was at the beginning:

"Plants under green overwrap grow very well and those under the red and blue-violet one grow badly".

The explanation of the fact was in the last paragraph:

“The green overwrap lets green light. Green rays reflected from chlorophyll. Green part of spectrum is not used in photosynthesis. The red and the violet parts of spectrum are the most important”.

The main predictor of systematization is indicated contradiction (mistake), which would become obvious if students could establish meaningful connections between separate text fragments. Another one — logical right answer, when students change fact or explanation (“Plants under red and blue-violet overwrap grow very well”, “Plants under green overwrap grow badly” in the answers about facts or “Green part of spectrum is used in photosynthesis”, “Green rays are not reflected from chlorophyll” in the answers about explanation).

Another indicator — reproduced contradiction in the test and self-formulated answer.

We observe how the students monitor their comprehension while reading the text and answering the questions. Time of operation was not limited. The students can reread the text.

The first question in the given list was about possible problems in evaluating their own comprehension. After reading, we asked students to report whether all clear if not to indicate the fragments, which caused the problem of understanding. The aim was to explore student’s notes about problem of understanding or error in the text.

Then research consists of two parts. At first, we gave students the multiple-choice test. Then we asked students to describe and explain the fact (plants under different overwraps) in their own words (self-formulated answer).

Participants

176 students participated:

- 88 students of the third year of the full-time bachelors program from Moscow City Pedagogical University;
- 88 students of the third year of the Department of Psychology from Moscow State University.

The students-teachers and the students-psychologists entered University according to the results of the unified state examinations on mathematics, biology, Russian language (EGE) (education majors — without traditional examinations, psychology majors — with examination on biology).

Analyses and results

- Results of the educational majors in the situation of multiple-choice test in the first part and in the situation of the self-formulated answer in the second part.

Two groups of the students with metacognitive strategy of systematization:

1. Indicated the contradiction
2. Logical right answer

The group without the strategy of systematization:

3. Reproduced the contradiction.

Table 1. Results of the educational majors in the situations of multiple-choice test and self-formulated answers

	Systematization, %		Reproduced, %
	Indicated	Logical right	
1 multiple-choice	0%	6,8%	93,2%
2 self-formulated	5,2%	25,5%	69,3%

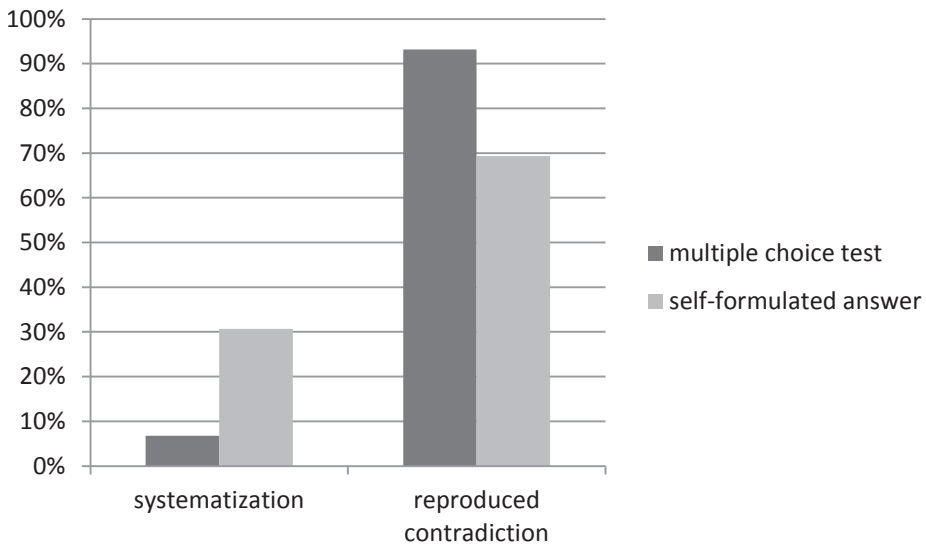


Figure 1. Results of the educational majors in the situations of multiple-choice test and self-formulated answers

We proposed that the number of education majors with metacognitive strategy of systematization would significantly increase in the situation of self-formulated answer.

Differences turn out to be significant ($\varphi^* = 4.291, \varphi^*_c = 2.31 (p \leq 0.01)$).

- Results of psychology majors in the situation of multiple-choice test in the first part and in the situation of the self-formulated answer in the second part.

Two groups of the students with metacognitive strategy of systematization:

1. Indicated the contradiction
2. Logical right answer

The group without the strategy of systematization:

3. Reproduced the contradiction.

Table 2. Results of the psychology majors in the situations of multiple-choice test and self-formulated answers

	Systematization, %		Reproduced, %
	indicated	Logical right	
1 multiple-choice	13,6%	34,1%	52,3%
2 self-formulated	28,1%	45,8%	26,1%

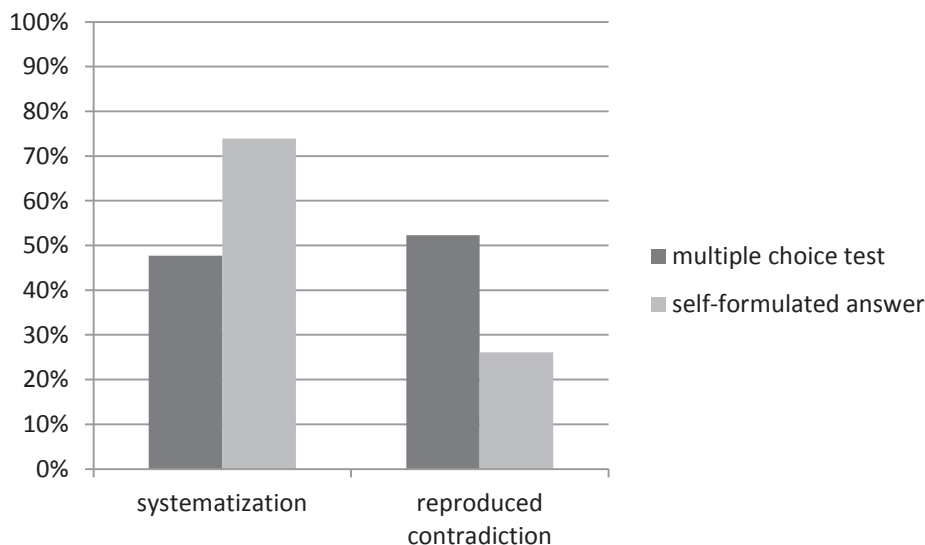


Figure 2. Results of the psychology majors in the situations of multiple-choice test and self-formulated answers

We proposed that the number of psychology majors with metacognitive strategy of systematization would significantly increase in the situation of self-formulated answer.

Differences turn out to be significant ($\varphi^* = 3.608$, $\varphi^*_c = 2.31$ ($p \leq 0.01$)).

The results show that only several education majors sought to establish logical connections between the text fragments when they read a text by contrast with 48% of psychology majors. The majority of students of Moscow Pedagogical University use memory strategies. 93% of them reproduced the contradiction in multiple-choice answers. The reports about comprehension problems are absent. Nobody in the group of education majors indicated the contradiction and realized understanding problems by contrast with 14% of psychology students in the situation of multiple-choice test.

Some students majoring in psychology are able to spontaneously use of some strategies for reading comprehension of an educational text (about 50 percent of the group). The study showed that the number of psychology majors with metacognitive strategy of systematization has increased in the situation of self-formulated

answer. The efficiency of comprehension monitoring is low (the main predictor — about 30 percent of the group indicated the contradiction).

The research has pointed out that students did not demonstrate self-regulation process and its potential use in improving their performance rarely generate feedback on their learning.

Conclusion

We can say that the efficiency of work with expository text is very low. Students majoring in education have demonstrated extremely ineffective learning goals and metacognitive strategies. They do not use comprehension monitoring and control of their own cognitive activity. It can be stated that they demonstrate the “superficial” learning approach, which is characterized by the desire to remember the material and recognize right answer. The generalized idea of what it means to learn determines the settings and the choice of the methods to work with educational material.

Sociological study of the unified state examinations showed that the students of Pedagogical Institutes have the worse results (EGE) in Russia (Sobkin V., 2010). The low level of reading culture, the requirements of teachers, professors, assessing student work and assessment methods, the incorrect use of multiple testing in education in humanities adversely affect the professional development of future teachers.

It is important to emphasize the role of different methods of instruction. They influence students' attitudes and strategies. Learning approaches connect with such instructional methods, as memorization, which determines the skill of recognition, and explanation, which requires comprehension strategies. Our results can illustrate the fact that the way pedagogues and psychologists are taught differ: the former are aimed more at reproduction of knowledge, their skills of critical thinking are less well developed than those of the students who are taught by traditional university methods.

The global introduction of testing in education and its substitution for all other types of control of pre-reform Russian school is one of the factors leading to serious pedagogical and psychological problems of training activities. The use of this method in pedagogical practice requires analysis and correction especially while studying humanities.

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Original manuscript received November 30, 2013

Revised manuscript accepted February 28, 2014

First published online June 30, 2014

PSYCHOPHYSIOLOGY

Human errors: Their psychophysical bases and the Proprioceptive Diagnosis of Temperament and Character (DP-TC) as a tool for measuring

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Human error is commonly differentiated into three different types. These are: errors in perception, errors in decision and errors in sensation. This analysis is based on classical psychophysics (Fechner, 1860) and describes the errors of detection and perception. Decision-making errors are evaluated in terms of the theory of signal detection (McNicholson, 1974), and errors of sensation or sensitivity are evaluated in terms of proprioceptive information (van Beers, 2001).

Each of these stages developed its own method of evaluation that has influenced the development of ergonomics in the event of errors in perception and the verbal assessment of personality (stress, impulsiveness, burnout, etc.) in decision-making errors. Here we represent the method we have developed, the Proprioceptive Diagnosis of Temperament and Character (DP-TC) test, for the specific assessment of errors of perception or expressivity which are based on fine motor precision performance.

Each of the described errors types are interdependent of each other in such a manner that observable stress in behaviour may be caused due to: the inadequate performance of a task due to the perception of the person (i.e. from right to left for a right-handed person); performing a task that requires attentive decision-making to be performed too hastily; undertaking a task that does not correspond to the prevailing disposition of the person.

Keywords: human error detection, Proprioceptive Diagnostic of Temperament and Character (DP-TC), diagnosis, prevention, expressivity, perception

Introduction

The aim of this article is to show the nature of error in human perception from a review of the theoretical work on this topic and of the experimental work and method created in the Laboratory of Mira y López (University of Barcelona) in

order to understand its unintentional or unconscious mechanisms. The trends of specific and individual patterns in perception bias can be measured and assessed in comparison with the average values in populations using Proprioceptive Diagnostics of Temperament and Character, which can be considered an objective tool due to the difficulty of faking the performance (and results). It was developed by Tous (DP-TC, 2008) in the tradition of Mira y López (MKP, 1958) and describes specific trends in shifts from the graphical models that reflect specific characteristics of human dispositional behaviour (Miroshnikov, 1963; Tous J.M., Muiños, Tous, O. & Tous, J., 2012).

Theoretical basis of human errors

Background in security and the prevention of risks

The first reference to human error we can find is in Plateau (1872). When people registered changes in the observation of stellar phenomena, it was found that their observations reflected an error that was intended to be treated by an attempt to create a so called personal equation, which was dubbed the *error law* by Galton (1869). For Galton, the error was associated with personality traits, in such a manner that the dimensions of one's personality manifested in the degree to which there was a probability of committing an error of one or another type. Thus, from its onset, we note the existence of two different explanations for human error. On one hand, there is a personal equation for errors in observation and on the other hand there is a law of error in its appreciation. The importance of proprioception, both in introspection regarding individual life experiences and in perception was also mentioned by Vygotsky (1991):

Only I can observe and collect my secondary reactions, because only for me my reflexes serve again as new excitatory stimuli in the proprioceptive field. The movement of my arm, perceptible by the eye, can be equally an excitatory stimulus, both for my eyes and to stranger's; however the awareness of this movement, the proprioceptive excitations that arise and cause secondary reactions there are just available for me. They have nothing in common with the first excitation of the eye. Here other nerve pathways act, other mechanisms, other completely different excitatory stimuli.

Sherrington, in his studies of animal reflexes, established the competitor principle in the motor field as a basic constituent of one's personality (Vygotsky, 1991). Pavlov (1941) and Sechenov (2013, originally published in 1863) also contributed to this field of knowledge. Mira y López, working with the "detector of lies" that had been created by Luria (1932) noticed that the amplitude of movement was different and did not depend on the context of the questions being asked and reflected the degree to which a person was more excitable or inhibited. In 1940, he presented his myokinetic psychodiagnosis (M.K.P.) at the Royal Medical Academy in London (Mira, 1958) in which he included his observations and the results of related experimental work.

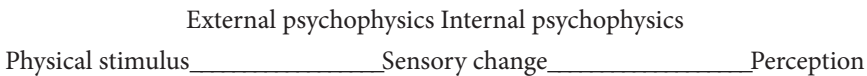
Psychophysical exploration of human error

The objective of classical psychophysics was to describe the relationship between stimulation and perception (Kling & Riggs, 1971). Fechner’s law (1860) states that the intensity of sensation (perception) is proportional to the logarithm of the intensity of stimulation, therefore the stimuli that are more relevant in intensity, quality, rarity, etc. will be best received by individuals and produce fewer errors. In these investigations, response was considered an “automatic reflex” due to the consideration that physical phenomena were only capable of producing mental responses via the sensory system.

By the law of absolute thresholds, Newton (1675) carried out the determination of the visible spectrum. Bouguer (1760) established the differential threshold for capturing luminosity variations. Delezenne (1827) proposed the differential threshold for variations of sounds. Weber (1846) used the concept of differential threshold, based on the concept of Just Noticeable Differences in the stimuli, and established touch-related variations. By comparing different sensory organs, the appreciation by touch was found to be superior to that achieved by vision.

In all these studies, the interest was in detecting the sensory thresholds that would allow someone to determine the discernment of a change in the physical magnitude of stimulation or the minimum variation of a stimulus that would allow the observer to detect it. This led to the distinction of absolute thresholds: the minimum or maximum magnitude of the stimulus to detect it and a differential threshold, the required amount of energy change of a stimulus in order that the observer could detect its change. The study of the differential threshold led to Weber’s Law (1834), which states that detection does not depend on the absolute difference of the magnitude of stimulation, but on the relative difference in the magnitude of it.

Fechner (1860) proposed the so-called psychophysical parallelism, according to which, in order to establish a relationship between the physical magnitudes of stimuli and sensory magnitudes of detection, both of them should be considered separately. He distinguished between external and internal psychophysics, believing that the first would show the engines of physiological changes in response to changes in stimulatory energy, while the second shows the relationship between what is perceived by the senses (physiological engines) and sensations or expressiveness.



Therefore, to Fechner, not only was the direct quantification of the stimuli possible, but that it is also possible to directly quantify bodily sensitivity. The units of sensations proposed by Weber as just-noticeable differences would correspond to the quantification of sensations or bodily sensitivity.

Contribution of the theory of signal detection

The theory of signal detection had a double beginning due to the collaboration between a group of engineers and a group of psychologists. Peterson, Birdsall and Fox (1954) represented the engineers and Tanner and Swets (1954) represented the psychologists. The theory of signal detection was developed in the 1960s and 1970s

(Green & Swets, 1966; McNicholson, 1972). This theory provides a solution to the problem posed by classical psychophysics regarding how to control and specify the criteria that the observer uses for a perceptual judgment.

Detection or perception Decision-making

Physical stimulus _____ Sensory change _____ Judgement

The occurrence of these errors is affected by task-related conditions, the difficulty discerning between two or more stimuli and personal decision-making styles. Errors that are due to task-related conditions are related to detection and perception, whereas errors that are caused by decision making are also related to personality.

By integrating the model of Fechner's psychophysical parallelism to model signal detection, we obtain the following:

Detection Perception Decision

Physical stimulus _____ Sensorial change _____ Perception _____ Judgement

Peripheral process detection consists of the relationship between stimulus energy and a change in energy in the peripheral organ muscle, corresponding to stimulation that was described by Fechner with respect to external psychophysics. However, perception is an internal process which consists of the relation of the sensory organs to the cortex. Through this, muscle energy is transformed into nervous energy, which is attributable to the personal sensitivity which is the basis of Fechner's inner psychophysics. The decision-making process is understood as an interaction between different components which are presented in the cortex, i.e. the relationship between perception, attention, working memory, long term memory, etc. — the *decision* and the subsequent selection of previous response before execution (Massaro, 1975).

From this brief review of the main principles of classical psychophysics (Tous, 2011) and the theory of signal detection (Arnau, 1982) it can be seen that human error can be attributed to errors in detection, to errors in personal sensitivity and errors in decision-making. Two of these concepts were used by Green and Swets (1966) to develop the theory of signal detection. The intention of the theory was to differentiate between perception and decision making.

In all psychophysical methods, a great deal of previous training is required in order that the observer may avoid errors of anticipation, i.e. responding when the stimulus is not present or alternately, failing to respond when the stimulus was present. The theory of signal detection found a way of discerning and evaluating this type of error by determining when a person is likely to increase his/her sensitivity and make more mistakes due to false alarms when the stimulus is not present. These authors believe that an increase in the occurrence of this kind of error is not really due to increased sensitivity, but to an increase in the amount of criterion used in decision-making. This observation should be taken into consideration more frequently during safety training programs.

A false positive occurs when a "yes" answer is given when the correct answer is "no" and a false negative occurs when a "no" answer is given when the correct answer is "yes". When the difference between the stimuli to be compared is very large,

all “yes” answers are correct and when the differences are very small or absent, all “no” answers are correct. The problem appears in the intermediate values, in which it is more difficult to discern between the two stimuli. In these cases, decision-making related criteria take an important role; they become more important than sensitivity.

If the decision-making criterion used is conservative, very few false positives will arise, but few guesses will be right, because the answer will only be correct when you are sure of the difference, i.e. when a “yes” response is given when there is a real difference. However, if the criterion is liberal, many false positives would arise, because it would be easy to consider a difference to be present; however, the number of right guesses will increase (Tous, 2012).

Limitations on risk assessment

In certain real-life activities, it is believed that it's better for false positives to arise since they allow for a greater number of right guesses; however, it is correct is to make few false positives. The proposed examples can be interpreted differently, depending on whether people are more stylistically conservative or liberal. When pardoning a prisoner, the authorities may use either conservative or liberal criteria when they are not completely sure of his/her rehabilitation. When permitting the landing of an aircraft, one may use either conservative or liberal criteria when weather conditions do not allow one to be absolutely sure of the success of the operation; nowadays there are sophisticated landing systems to provide a high probability of safety in such cases, but it is still a good example because airports still exist which lack such systems. However, what we are interested in is the differential effect of taking one or another kind of decision in each given example. In the case of convicted offenders, if we use the liberal approach, we ensure that every prisoner which deserves to be paroled is set free, but some are freed who do not deserve it. In the case of landing, using of the liberal criterion ensures that all aircrafts which are able to land successfully can obtain authorization, including some aircraft that need to manoeuvre more due to the weather. The question is whether the consequences of this liberal decision are the same in one example or another. Obviously people with a conservative approach would consider both liberal approaches equally damaging. However, it is possible to see that in the first case it may be better, for society's sake, to use a conservative approach in order to ensure that dangerous criminals aren't liberated; whereas in the second case it would alarm the passengers less if liberal criteria were used, in order to ensure that all aircraft that are already making the approach can land and that planes which have not yet started to approach the runway can start to do so. This kind of knowledge should be available to all those whose decisions affect the lives or living conditions of others, such as politicians, economists, and pilots among others, since otherwise everything would depend on just their personality: conservative or liberal.

Although the theory of signal detection discusses the relationship between sensitivity and decision-making criteria, in fact they refer to the relationship between detection or perception and decision making. The theory of signal detection denominates sensitivity in terms of what Fechner considered as external psychophysics, namely, the relationship between physical stimuli and changes produced in interac-

tion therewith, in the sensory organs. However, as we have seen already, Fechner's internal psychophysics deals with the relationship between changes produced in the sensory organ and the subsequent confirmation of this in the spinal reflex or cortical bioelectric change. In practice, it is the passage of biophysiological muscle energy in nervous energy that is capable of generating a nerve response which in its turn modifies our muscles to execute the appropriate response. It is possible that the lack of availability of this myokinetic information in the evaluation system has prompted the neglect of the investigation of sensitivity, one of the components that were proposed by Fechner. We conceptualize it as an expressive component that is not studied in behaviour and that undoubtedly also contributes to the realization of errors like the adaptive component. The difference between these components is that the component is easily modified by adaptive learning, since this is a culturally-acquired component, while the expressive component should be considered in another way, since it is not susceptible to change in the same way. It is obvious that people in common situations, having learned and gained more experience, would manifest a larger percentage of their adaptive behaviour when compared to their expressive behaviour; nevertheless, human behaviour is impossible without the expressive component. In contrast, people in unforeseen circumstances, which are new to them, or where they simply haven't had sufficient experience or training, would manifest a higher percentage of expressive conduct of adaptive behaviour.

Contributions

Ergonomics and human risk assessment factors are of the highest help when improving the adaptive component of behaviour, however these hardly affect its expressive component. In a study conducted in the company Empetrol (Tarragona), it was empirically shown that the detection of high-risk factors and generalized rules to achieve greater security had been very useful there; however other factors appeared there, such as lower security for these persons (Tous, 2012).

Proprioceptive Diagnostics of Temperament and Character (DP -TC) as a graphical test based on fine motor precision

Brief description of DP-TC

A Proprioceptive Diagnostic of Temperament and Character (DP -TC) (Tous et al., 2012; Liutsko & Tous-Ral, 2012) is an objective psychological tool where higher limb movements are recorded directly; they performed when the subject is not able to see his/her active hand. This facilitates the indirect assessment of six functional dimensions of one's personality: 1) Mood: Pessimism — Optimism (depression vs. mania); 2) Decision-making: Submission — Dominance (auto- vs. hetero- aggression); 3) Attention Style: Intra- and Extra- attention (open vs. closed); 4) Emotionality: Distant — Affectionate (cold vs. warm); 5) Irritability: Inhibition — Excitability (inhibition vs. irritation), and 6) Impulsivity/Variability: Rigidity/Stiffness — Variability (immutable vs. mutable)

These six dimensions are designed to assess and predict six different dispositions of normal and abnormal behaviour, which are present in every person as properties that are manifested as temperament when executed with the non-dominant hand

(for the majority, it is the left hand and the right hemisphere of the brain) and as character when they are performed with the dominant hand (for the majority, it is the right hand and left hemisphere). The dimensions assessed from the dominant hand's performance are considered to be personal characteristics as a result of the interaction between dispositions in temperament and the concrete environment in which they have been developed (Tous et al., 2012).

Instrument

Nowadays it is widely accepted that temperament and personality may be directly assessed based on verbal evaluation (a personality assessment test). The assessment that we propose refers to a different concept of personality which consists of one or more sets of behaviours. The personality and its elements are behavioural strategies that constitute individual properties or characteristics that are genetically transmitted. The novelty of this system consists in that it assesses indirectly (through movement expressed by the hand in graphical response) the influence of proprioceptive information via posture, the expression of emotions and behaviour. Systematic biases in the direction of the movement in motor behaviour start in the different types of proprioceptive information which exist in each spatial plane. These compose different forms of being (personality) that are observable in every person (in their performances, emotions and cognitions) (Tous, Muiños, Liutsko & Forrero, 2012; Liutsko, 2013).

The DP- TC is formed by two kinds of linear graphical models or stimuli: a) lines (or lineograms) and b) parallels. The participant should trace each line of the presented model precisely and draw parallels that are of equal length and equidistant from one another. There are six line models that represent a line for two hands (dominant and non-dominant) and three movement types (frontal, transversal and sagittal). The parallels are traced and drawn by both hands in ascending and descending order. All tasks are performed while the active hand is in sight and graphical feedback then and afterwards continues; without it we would depend on the effect of proprioceptive information on movement.



Figure 1. The DP-TC test performance (photo by Liutsko, L.)

To administer the DP -TC and interpret it properly, it is recommended that one be familiar with the theory and significance of the functional personality dimensions proposed by this methodology (Tous, Viadé, Chico, & Muiños, 2002; Tous & Viadé, 2002; Tous, Viadé, & Muiños, 2007; Tous et al, 2012; Liutsko & Tous, 2013; Liutsko, 2013a,b). One must also be aware of possible age, sex and cultural differ-

ences that could affect the results (Liutsko & Tous, 2014; Liutsko, Muiños & Tous, 2014; Liutsko, 2013b).

The technician (who applies this test) has to think about a person's body position throughout the test, as well as the way the participant holds the pen and uses it. Those responsible for the testing should also cautiously screen the active hand when the proprioceptive part of the test starts (without vision) in such a manner that it doesn't interfere with correct performance. Moreover he/she should ensure that all instructions are well- understood and followed during the test. It is desirable that the test administrator had his/her own prior training to rely on — who has attended the accreditation course that is part of the skilled training in this psychological evaluation system, which is provided with the test implementation software. The tests should be conducted individually. The computerised and automatic correction of the test is quantitative; however, the expert can make his/her own observations of qualitative individual performance during the testing.

The evaluation is based on the registering of errors, in millimetres, that help to empirically determine precision according to: a) movement direction and b) shape of movement. Displacements from linear models, or errors, are empirical indicators of the trends in each movement.

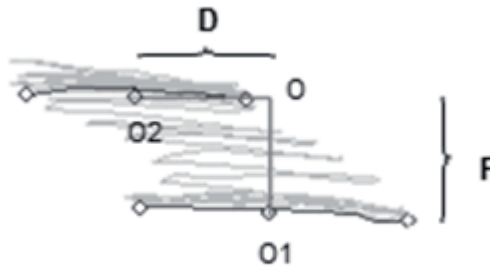


Figure 2. Systematic graphical errors in proprioceptive lineogram performance (without visual guidance): D — directional error (parallel to the model line); F — formal error (perpendicular to the model line)

Method

The sample consisted of $N = 745$ participants from the general population aged between 14 and 68 years with a mean age of 22.0 years and a standard deviation of 5.8; 8.75 % were left-handed; men ($N = 305$; age range: 14÷68, mean age: 23.4 ± 7.3 years; 10.5% left-handed) were slightly more likely to be left-handed than women ($N = 440$; range age: 15÷60; mean age: 20.6 ± 4.1 years; 7.0% left-handed). No sensory/locomotive deficit or lack understanding the task instructions was present in the participants included in the study.

A Kolmogorov — Smirnov test for the entire sample showed that the dimensions of Emotionality and Variability/Impulsivity were significantly different from the normal distribution. Temporal stability was assessed by test-retest within a period of 30 Days (Table 1):

Table 1. Test-retest stability

Dimension		Correlation	p-value
Mood	T	.62	<.001
	C	.67	<.001
Decision-making	T	.40	.034
	C	.53	<.001
Style of Attention	T	.58	.003
	C	.57	<.001
Emotionality	T	.41	.031
	C	.42	.005
Irritability	T	.52	.003
	C	.47	.001
Variability /Impulsivity	T	.50	.003
	C	.49	.001

Legend: T — temperament and C — character

Although these parameters of the test's reliability are not very high, they were significant for all observable variables. The magnitude of correlation does not diminish the instrument, but reflect that on the one hand, human fine motor behaviour (as a form of general behaviour) is a dynamic system and not something fixed or rigid, whereas the DP-TC test is sensible to these changes. As per Raven's words (cited in Silva, 1989), *The correlation coefficient test-retest is a grade in which the psychologist expects the same results when the test is repeated; however, if with time, some changes occurs in the measured activity, a very high correlation would mean that this test was insensitive to these changes.*

Dimensions of the DP-TC test

The DP-TC test has six dichotomous pairs of dimensions which are obtained from biases in graphical movements from the initial model, when they are realized in the proprioceptive condition (without seeing an active arm/hand and tracing/drawing feedback). These dimensions are the following:

Mood: The participant's tendency to move up or down in the frontal plane, depending on greater or lesser intensity, would indicate an optimistic or pessimistic state of mood, vulnerability to anxiety, stress, or a depressive or manic state of the person. Directional movement up: (+) Prevalence of extensor shoulder muscles; the participant can compensate the action for gravity. If the tendency of movement is down: (-) Prevalence of flexor shoulder muscles; the participant cannot compensate the action for gravity.

Decision-making: Sagittal movement in the transversal plane, with a tendency of bias out from the body of the participant would show us a high readiness for decision making, assertiveness, a trend towards dominance, authoritarianism and vulnerability to feelings of aggression towards others. The tendency in sagittal

movement towards the participant's body is interpreted as a disposition towards indecision, submission, dependence and vulnerability to aggressiveness towards his/herself.

Style of attention: Horizontal movement in the transversal plane with a tendency to shift outward would indicate inattention (in higher magnitude), due to being involved in too many different things at the same time, openness to external stimulation and a disposition towards extroversion. The tendency to shift inward in this movement type would denote a lack of attention, an orientation towards one's internal content, to be closed off to external stimulation by putting all of one's attention on the inner world and introverted disposition.

Emotionality: Empirical observation has shown that there are people who, regardless of their precision, make more mistakes by moving from the shape of the model (formal errors that reflect the bias perpendicular to the model). Therefore changes from the shape of the model should be kept as another variable which is different from the directional errors (biases that occur parallel to the line model). They represent formal errors (biases that occurs perpendicular to the line model). Evaluating errors in the formal component of motion, either toward one side of the model or another, will reveal the personality disposition regarding emotionality.

Irritability: The assessment of this dimension is based on line length measuring compared to the model's length (40 mm). The tendency to increase or decrease the motor response to a graphical stimulus will provide information about one's tendency for excitability or inhibition (poles of Irritability).

Variability (Impulsivity): Assessing variability in line length performance (obtained from the parallels) will demonstrate variability or rigidity; these constitute the poles of this dimension.

Main applications of the DP-TC test

The test can be applied to teenagers and adults of both sexes (although it is not limited and can be used in children starting from 5-6 years old) in the general population. It tests peoples' ability to carry out regular or sporadic tasks of personal responsibility, make decisions in difficult times, pay attention to relevant and important aspects of each situation and determine their emotional balance. Also this test permits the evaluator to overcome cultural or educational problems, especially language, detect mental disorders and conditions (especially depression), and provide a quantitative assessment to clinically diagnose motor symptoms.

Different studies were conducted at the Laboratory of Mira y Lopez (University of Barcelona) to develop the methodology: from the scanned (PMK-R, Tous & Viadé, 2002) and digitalised (PMK-RD) versions with its standardization (Tous, Viadé, Pont, & Muiños, 2005) and structural validation (Tous, Viadé, & Muiños, 2007) to DP-TC (Tous et al., 2012) in which a touch screen was implemented for gathering of data. Also, experimental studies which use new technologies were performed to replicate Mira y Lopez ones, for example, the study of violence (Tous, Viadé, Chico, & Muiños, 2002) and other studies related to antibody levels and motor control (Tous, Vidal, Viadé, & Muiños, 2002), motor precision in elite sharpshooters compared to students (Tous, Viadé, & Muiños, 2002), prisoners and policemen

(Tous, Muiños, Chico, Pont, & Viadé), people with personality disorders (Tous, Grau, Viadé, & Muiños, 2005) and the relationship between verbal self-assessment and proprioceptive indicators in people who apply for gun licenses (Tous, Muños, & Liutsko, 2014, *in press*).

Similarly to MKP (Mira y López), the DP-TC can also be used to observe the somatic reaction of mental work (Mira, 1923; Liutsko, Tous, & Muiños, 2012); motor performance in stress adaptation (Ezhov & Krivoshechekov, 2004); psychophysiological markers of tolerance (Draganova, 2007); human behaviour in indigenous populations (Berezin, Varric, & Gorelova, 1976); in the detection of physical and mental health (Efremov, Sluchaevskii, Popov, Rozenfeld, & Dunaevskaia, 1982; Gironell, Liutsko, Muiños, & Tous, 2012; Liutsko, & Tous, 2013), and in sex, age and cultural differences (Liutsko & Tous, 2013; Liutsko, Muiños, & Tous, 2014). Moreover, the DP-TC test can be used to determine if pre-school children are ready for school as well as problems with TDAH (Iglesias, Liutsko, & Tous, 2014 (*in review*); Liutsko, Iglesias, & Tous, 2014). The information, obtained by the graphical performance in the proprioceptive sensory condition, will help to realize therapy, coaching or re-education in a more effective way (Miroshnikov, 1963; Liutsko & Tous, 2013; Malova & Liutsko, 2013; Liutsko, Tous, & Gutiérrez, 2014).

In practice, the DP-TC test is used nowadays as an acceptable neuropsychological revision which is administered to those obtaining gun licenses or driving licenses; in diagnostics (psychological consultation and coaching), personnel selection (especially for professions related to risk or responsibilities over the lives of others) and individual or sport coaching.

Discussion

In the evaluation of the human factor in security, the way to avoid errors related to the expressive component of behaviour has traditionally been made through personnel selection, although sometimes it was done intuitively: it is believed that there are persons who are less adequate than others for certain tasks, especially related to risk. There are two limitations to this type of action. The first is that the specific professional activity feature may not be the optimal social value. The second reflects the fact that the way they evaluate these characteristics in people has little to do with their real behaviour, since it is usually obtained from their opinions of themselves and doesn't reflect what they actually do, or their behaviour.

Human behaviour depends on two different types of information which are different in nature. One's intention is a result of his/her mental content and thus acquired by his/her inculturation. The intention is made manifest in the adaptive component; and therefore there are situations in which it is easier to do what one intends and situations where it is more difficult. The easier situations are those that have served for learning and gaining experience, but even there, in order to carry out our intentions, we need other information if we are to be capable of converting intentions into execution. The other type of information, disposition, is present in the information we obtain internally from our bodily state. Every execution needs the contribution of muscle energy in order to realize it. When a person is planning the implementation of his intention, he doesn't only need the content of the intention, but also adequate muscle power at his disposition to carry it in one or another

form, for example, in a conservative or liberal way, as we have seen before (Tous, 2012).

Rantanen and Rosenbaum (2003), while working on their study on motor control, observed drifts in blind reciprocal aiming movements and they could not explain them then the nature of this drift. However, the results of their observation were clear: the drifts represented a systematic error in performance and this issue was crucial since aviators (with whom they also worked) could make such spatial errors. Mira y Lopez in 1939 worked with pilots and then observed that some of them could change their trajectory of movement (in flight) if visibility had been limited (dense fog) and for this reason he created his axioestereometer (Muiños, 2008) and later M.K.P. (Mira, 1958). From the personal correspondence with Dr. Rantanen and Dr. Rosenbaum, we found out they did not know then anything about the MKP of Mira y Lopez and the role of the human factor or personal and individual differences in perception, due to the scarcity of work available in English on it. Our study on changes in sensorial perception depending on hand use and movement type (frontal, transversal and sagittal) was one of the first works published on Perceptual Motors to start the dissemination of work in this direction (Tous-Ral, Muiños, Liutsko, & Forero, 2012). In Russia, we were put in contact with Prof. Berezin, who not only made use of the Mira y Lopez MKP when conducting research, but is an expert in personality and clinical psychology (Berezin, 2011). Moreover, we found more work that had been completed using the traditional Mira y Lopez method (Miroshnikov 1963; Efremov, Sluchaevskii, Popov, Rozenfeld, & Dunaevskaia, 1982; Ezhov & Krivoshchekov, 2004; Draganova, 2007).

The DP-TC (Tous et al., 2012) is an objective method since observable variables are taken from the part performed in the proprioceptive sensory condition (without visual guidance). The information about dispositional human behaviour can contribute in describing the personality, individual differences and behaviour in more complex ways (Tous et al., 2012; Liutsko, 2013) and this can also help to distinguish between what we pretend to be able to do and what we can do. It is important to know, especially in case of recruitment of persons for job position where the lives of others may be at stake (pilots or school bus drivers) or who are applying for a gun permit— until now, questionnaires have been used to detect violent or pathological behaviour and these results could be faked by those who mimicked social desirable behaviour when completing the self-report and some points cannot be confirmed by the proprioceptive test (Tous, et al, 2014, *in press*). Nevertheless, more studies should be conducted to find the relationship of our proprioceptive state based on fine motor performance to emotional control or other specific states of behaviour or illness. The method itself also deserves future improvement in order to be applied practically in other ways.

Conclusion

Changes in fine motor behaviour, which can only be registered using proprioceptive information, can be considered part of a form of empirical evaluation of conceptual axes that have been established for organizing personality traits, as suggested by Eysenck (1967). The mutable personality would manifest a great reactivity to environmental changes, whereas the immutable one would react very

little. The sensitive personality would manifest greater variability in emotionality to environmental changes, whereas the insensitive one would demonstrate little variability there.

Thus introversion — extraversion would be based on the motion that corresponds to the action to get and transform things. The stability — emotional instability axiom is based on the movement that manifests little or great sensitivity and generates a response of neuroticism. It would be the basis of a protection movement; this would correspond to one's predilection to avoid damage or danger to one's self. This all means a strategy based on avoidance coping for protecting us. This description of some personality models, which have been developed from the time of Wundt until the present, allows us to consider movement generated by our own or an endogenous body that we perceive through proprioceptive organs, which appears to be a good empirical indicator of trends toward action or toward protection that delimit the individual differences in personality.

* * *

Although the original paper-and-pencil method of Mira y López was and is still used in more than 300 scientific works related to the MKP by Mira y López and his followers (Liutsko, 2013b) and in applicative practice; the computerized DP-TC test, created within the tradition of Mira y López, facilitates its application and measurements in the reduced, statistically proved, latest version (Tous, 2008; Tous et al., 2012). The test is administered individually for duration of 20-30 minutes. There are plans to issue English and Russian versions of the tests and the corresponding material.

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Original manuscript received January 29, 2014

Revised manuscript accepted June 01, 2014

First published online June 30, 2014

Methods of dichotic listening as a research methodology for hemispheric interaction

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Experimental data was obtained from a dichotic listening test by patients with unilateral brain lesions and corpus callosum pathology (agenesis, cysts, degenerative changes, etc). Efficiency index analysis shows that interhemispheric interaction in the audioverbal sphere depends to a greater extent on the right hemisphere state. The dichotic listening technique is not an informative means of studying hemispheric interaction, since it does not allow a clear distinction between hemispheric symptoms and symptoms of pathology of the corpus callosum. Thus, violations of hemispheric relations caused by disorders of the corpus callosum and cerebral hemispheres change worth more right hemisphere activity.

Keywords: interhemispheric interaction, brain pathology, dichotic listening

Dichotic listening is one of the most widespread procedures for studying interhemispheric interaction in the audioverbal sphere. Specific peculiarities of interhemispheric interaction during audioverbal information processing distinctly reveal themselves when analyzing the efficiency indices of dichotic stimuli reproduction (Goldberg, 2003; Moskvichute, Golod, 1989). For this reason, special attention is paid to analysis of the efficiency coefficient (the quantity of correctly reproduced words — C_{Ef}). C_{Ef} reflects each hemisphere's contribution to these processes. Total C_{Ef} is estimated in order to evaluate the efficiency of the reproduction of dichotic stimuli originally produced on both ears. C_{Ef} of the right ear and C_{Ef} of the left ear serve to evaluate the reproduction efficiency of words perceived by the right or left auditory canal to determine the quality of participation of the hemisphere that is contralateral to the ear in the audioverbal processes:

$$C_{Ef} = S / tqw \times 100\%,$$

where S is the the sum of correctly reproduced words, and tqw is the total quantity of sample words.

The experiment results and the estimated coefficient of the right ear (CRe), which is calculated by the following formula (Kotik, 1974):

$$CRe = (\Sigma Re - \Sigma Le) / (\Sigma Re + \Sigma Le) \times 100\%,$$

where ΣRe is the total number of correctly reproduced words presented to the right ear, and ΣLe is the total number of correctly reproduced words presented to the left ear.

Method and participants

In this work, the dichotic listening method of D. Kimura (Kimura, 1961), adapted to the Russian language by Kotik B.S. (Kotik, 1974), was employed to study interhemispheric interaction in audioverbal processes. The experimental procedure consisted of 13 productions of verbal stimulus material. During the first series a participant perceived four dichotic pairs of words through headphones. The participant was asked to identify all the words heard before the next production. Then the earphones were switched around, and the procedure was repeated (the second series). Only the first series' results were taken into consideration, as the reproductions in the first and second series differed qualitatively from each other, i.e. during the second series there was a substantial increase in the quantity of words reproduced by the left ear. In some cases the sign of the coefficient changed from the right ear to the opposite side. It was presumed that during the second series of the experiment, the indices of functional asymmetry influenced the learning processes. This fact had already been observed by Russian and international researchers (Moskovichute, Golod, 1989; Golod, 1992). In their studies, V.I. Golod repeatedly noticed that productivity indicators playback dichotic stimuli presented can be used not only to assess hemispheric asymmetry, but also to determine the level and degree of preservation of the functional capabilities of each hemisphere (Golod, 1992, p. 48-49).

Participants. There were four groups of participants formed for examination. All of the participants were dextral. The healthy group consisted of 50 persons — 20 males and 30 females — with ages ranging from 16 to 52 years. The group of patients with pathological process localization in the left hemisphere (later as “left-hemispheric”) consisted of 21 persons — 12 males and 9 females with ages ranging from 21 to 67 years. This group included patients with epilepsy (11 persons) and persons who have suffered strokes (10 persons). In the second experimental group there were patients with right-hand-side localization of a pathological process (later as “right-hemispheric”): 23 persons — 13 males and 10 females with ages ranging from 18 to 72. This group also included patients with epilepsy (15 persons) and persons who have suffered strokes (8 persons). The third experimental group consisted of participants with corpus callosum pathology (later as “CC group”): 18 persons — 12 males and 6 females with ages ranging from 15 to 64 years.

The procedure in this study consisted of 13 presentations (subseries) of verbal stimulus material through headphones. Each subject was brought against sub 4 dichotic word pairs. Before each presentation there was a 20-second pause, in which the subjects were asked to name them all the words they heard, in any order.

Subjects were given a neutral instruction: “Now both your ears will hear different words. You must listen to them carefully and memorize them, and during the pause, tell me everything you remember. Try not to focus on just one ear.” The headphones were then swapped (from left to right and from right to left), and the procedure was repeated (the second series of experiments). A training series to

adapt to the dichotic listening test situation was offered. For analysis, only the first series of indicators of dichotic listening were taken. It is assumed that the second series of experiments on the performance of functional asymmetry affect the learning process (Moskovichute, Golod, 1989; Goldberg, 2003).

Results and discussion

In the healthy group, total C_{Ef} was in the value range of 27.89–52.89% (mean 40.58%). C_{Ef} of the right ear — 15.39–69.23% (mean 45.54%). C_{Ef} of the left ear — 13.46–57.69% (mean 35.62%). In the left-hemispheric group total C_{Ef} was in the value range of 17.31–42.31% (mean 28.16%), C_{Ef} of the right ear — 1.92–67.31% (mean 32.97%), C_{Ef} of the left ear — 1.92–51.92% (mean 23.35%). In the right-hemispheric group total C_{Ef} came to 15.39–50% (mean 34.74%), C_{Ef} of the right ear — 15.39–100% (mean 50.92%), C_{Ef} of the left ear — 0–50% (mean 18.56%). In the CC group the value of total C_{Ef} was in the range of 11.54–53.85% (mean 32.93%), C_{Ef} of the right ear — 3.85–75% (mean 35.82%), C_{Ef} of the left ear — 1.92–61.54% (mean 30.04%). Most of the correctly reproduced words were found in the healthy group, and the lowest number were in the left-hemispheric group, which is clear from the mean values of total C_{Ef} . In other words, reproduction efficiency in the course of task fulfillment saw the worst decrease in case of left hemisphere pathology (prepotent in speech in most cases). At the same time, the functional capabilities of both the left and right hemispheres changed in all the groups of participants with the brain pathology. There were statistically significant differences found in the reproduction of words with the trend of the right ear prevailing over the left one ($U=583.5$; $p<0.001$). The efficiency of each acoustic canal significantly differed from the index of total efficiency (C_{Ef} and C_{Ef} of the right ear: $U=793.5$; $p=0.002$; C_{Ef} and C_{Ef} of the left ear: $U=775.5$; $p=0.001$). In fig. 1 it is clear that more words were produced by means of the right ear than by the left one (the right-ear effect). The greatest number of participants were concentrated in the third interval (40 to 60%) according to the values of C_{Ef} and C_{Ef} of the right ear, in the second interval (20 to 40%) — according to the values of C_{Ef} of the left ear. Let these intervals be considered as normative. One could also see in the picture that the participants were in the range of values from 20 to 60% according to all the efficiency coefficients. In the ultimate intervals, the percentage of participants was approaching or equal to zero. In the left-hemispheric group, in comparison with the healthy group, we observed a statistically significant fall according to all the efficiency coefficients (C_{Ef} : $U=98.5$; $p<0.001$; C_{Ef} of the right ear: $U=292.5$; $p=0.003$; C_{Ef} of the left ear: $U=226.5$; $p<0.001$). There, differences in words reproduction by means of acoustic canals continue to prevail towards the right ear. There was no activity of the right hemisphere, which would have borne a compensatory character owing to the earlier-proven fact of inhibition of the symmetric parts of the safe right hemisphere by the focus in the left hemisphere (Traugott, 1986). One could presume that as a consequence of inhibition, the right hemisphere functioning decreased, and the noise-proof feature was broken (the two acoustic canals play the role of noise to each other), as it was the right hemisphere which played an important role in these processes (Balonov, Deglin, 1976). The efficiency reduction of the both acoustic canals due to the lesion of a dominant-in-speech hemisphere was called

dominance effect. However, the reduction in reproduction efficiency was expressed to a greater extent in the right acoustic canal, which was termed focus effect (fig. 2). Fig. 2 shows that in comparison with the healthy group, curve C_{Ef} of the right ear and C_{Ef} of the left ear remained in the normative range, but the percentage of participants in these intervals decreased especially in the distribution of C_{Ef} values of the right ear. Also, the percentage of participants with a low efficiency substantially increased in the distribution of total C_{Ef} . Consequently, in view of the reproduction efficiency reduction in the both acoustic canals, the total efficiency of method fulfillment also fell, which was reflected in way the C_{Ef} curve shifted towards the lesser interval in fig. 2. Thereby, under the concentration of the participants in one of the intervals (20 to 40%) the left ear's efficiency coincided with the total efficiency of the method's fulfillment.

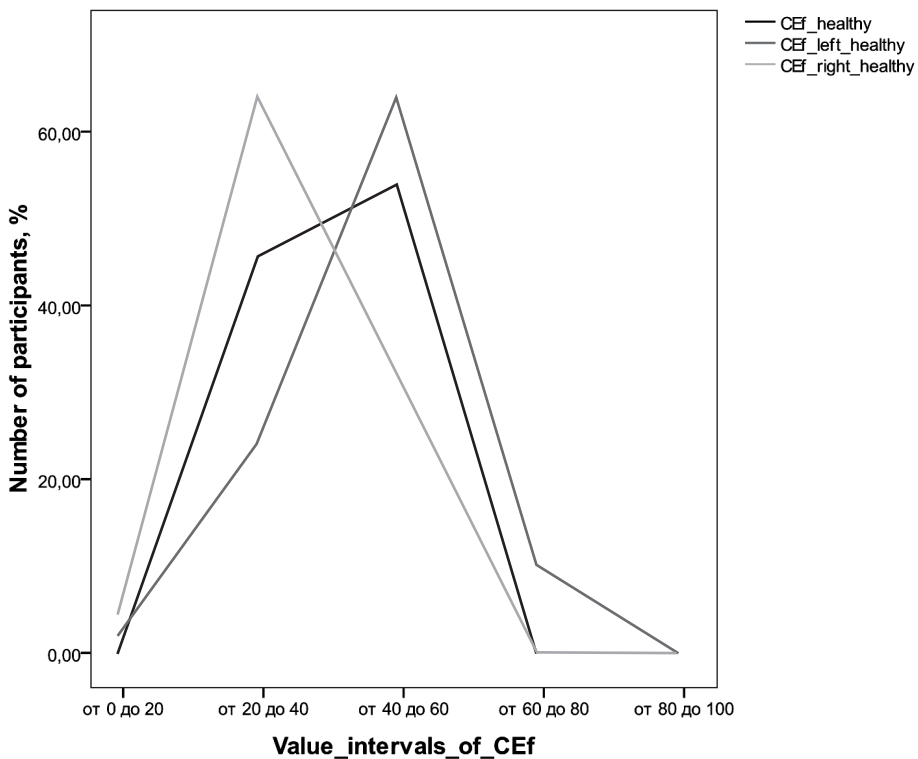


Figure 1. The distribution of the efficiency values among the participants of the healthy group. (Here and later: C_{Ef} right – C_{Ef} of the right ear, C_{Ef} left – C_{Ef} of the left ear)

One could presume that the right hemisphere made more of a contribution to reproduction efficiency. Thus, in the case of the left hemisphere lesion, we watched symptoms which could stand for several cerebri mechanisms. First, the greater efficiency decrease of the right ear in comparison with the left ear was explained by the focus effect. Second, when we faced an efficiency reduction of both acoustic canals simultaneously, the symptoms could be explained by the dominance effect. However, that could not be the consequence of the dominance effect but of interhemispheric relations derangement. It was well-known that with the left hemi-

sphere lesion, the lesion focus exerted an inhibiting influence on the symmetric parts of the intact right hemisphere (Traugott, 1986). Furthermore, Balonov L.Ya. and Deglin V.L. (1976) revealed that the right hemisphere in the normal state could bring down the excitability of the left hemisphere's speech center, but under the condition of impeded activity of these centers (for instance, interference) and could facilitate their activity, providing noise immunity when perceiving speech sounds. That kind of interaction was designated by the authors as decrement. Subsequently, on having had the left hemisphere affected, there was an activity decrease in the right one. However, at the same time there was a reduction of the facilitation function of the left hemisphere's activity under the impeded condition that caused, once again, a decrease in speech centers' activity of the left hemisphere. Thus, symptoms coming from the right hemisphere with the left hemisphere pathology were explained by disturbed interhemispheric relation.

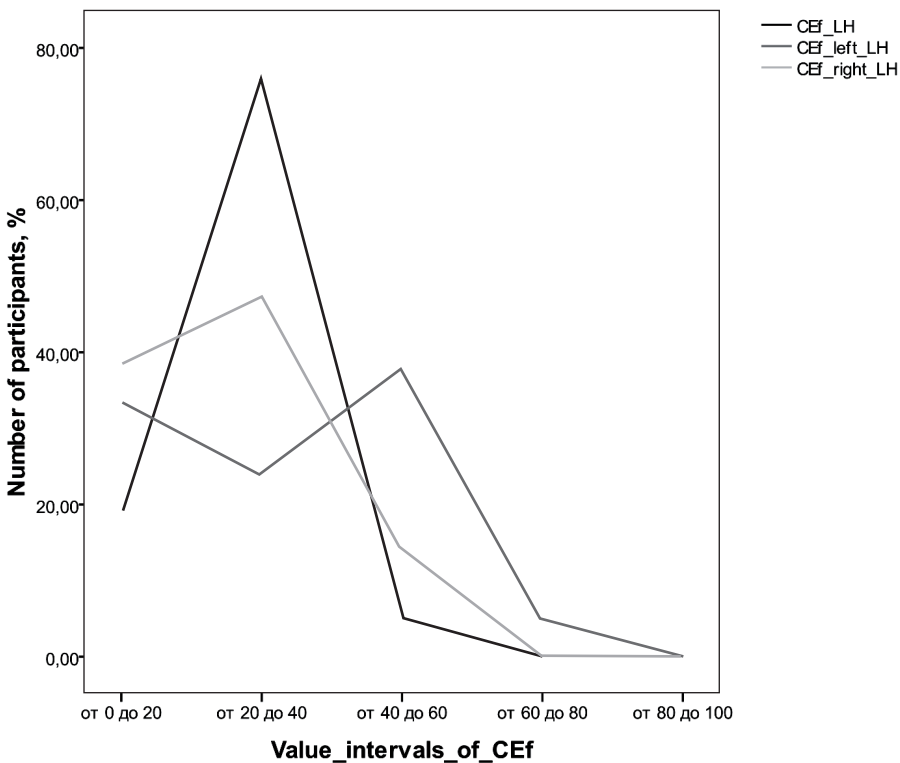


Figure 2. Distribution of the efficiency values among the participants with left hemisphere pathology of the brain

There was an increase in the reproduction efficiency of the right ear and a steep decrease in the reproduction efficiency of the left one in the group with right hemisphere pathology, in comparison with the healthy group (fig. 3). In comparison with the healthy group, C_{Ef} of the right ear remained in the normative interval, nevertheless the percentage of the participants lessened in this range. At the same time, the percentage of the participants with a high efficiency of this acoustic canal rose, up to ignoring the left ear entirely, which was confirmed by the facts of curve C_{Ef} of

the left ear shifting towards the minimal interval (0 through 20%) and a rapid rise in the percentage of participants in this range. As a result, the total efficiency of the method fulfillment decreased as well, and the total C_{Ef} curve shifted towards a lesser interval (20 to 40%). There were no significant differences observed in the values of C_{Ef} of the right ear in comparison with the healthy group, but there were when comparing the values of the right-hemispheric group with the healthy one: C_{Ef} of the left ear ($U=207.5$; $p<0.001$) and total C_{Ef} ($U=345$; $p=0.006$). When comparing efficiency inside the group of right-hemispheric patients, as in the healthy group, all the coefficients significantly differed from one another C_{Ef} and C_{Ef} of the right ear ($U=134$; $p=0.004$; C_{Ef} and C_{Ef} of the left ear: $U=103$; $p<0.001$; C_{Ef} of the right ear and C_{Ef} of the left ear: $U=53$; $p<0.001$). It was noticeable that the efficiency changes of the left ear only were enough for significant differences to also concern the total index of efficiency. This proved the earlier hypothesis about the right hemisphere making a greater contribution to reproduction efficiency.

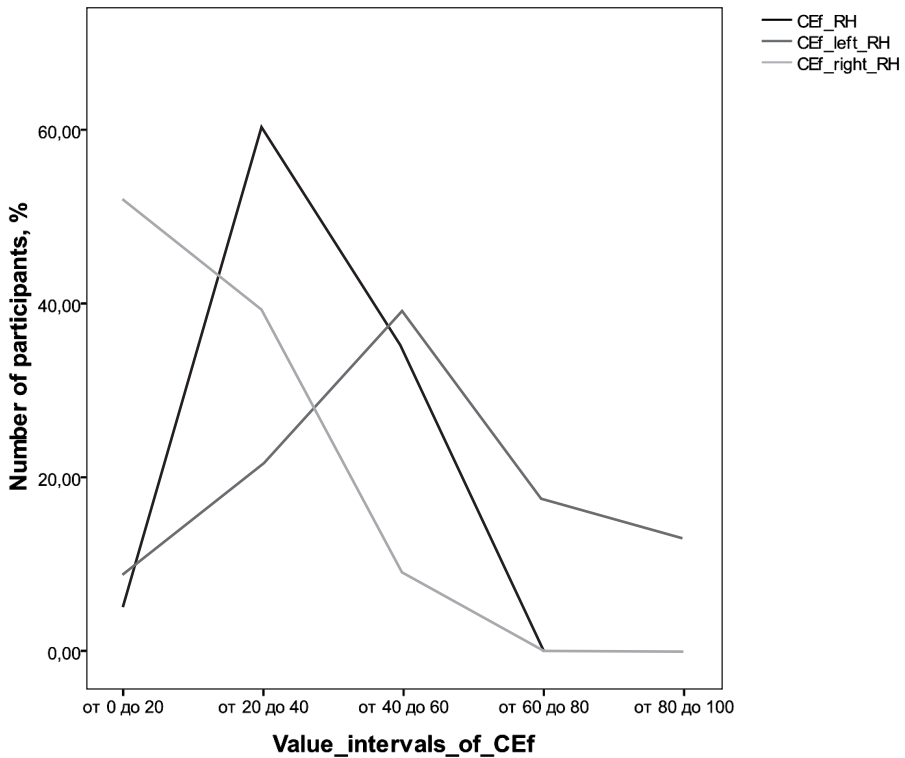


Figure 3. Distribution of efficiency values among participants with right hemisphere pathology of the brain

In this way, in case of a lesion of the right hemisphere, we traced the symptoms coming from the affected hemisphere (focus effect). There was also an increase in the intact left hemisphere’s activity. When having one hemisphere’s acoustic system inactivated, and the activity of the other’s safe acoustic system increased, this kind of interhemispheric interaction was called interaction of the type of reciprocity (Balonov, Deglin, 1976). In the CC group, in comparison with the healthy group,

we had a statistically significant reduction of total C_{Ef} and C_{Ef} of the right ear (C_{Ef} : $U=238.5$; $p=0.003$; C_{Ef} of the right ear: $U=264$; $p=0.01$). The reproduction efficiency of the right ear fell to a greater extent, which resembled the tendencies in the left-hemispheric group. At the same time, differences in word reproduction by means of acoustic canals remained towards the right ear dominating over the left, which didn't achieve the level of statistical significance. Subsequently, acoustic canals became practically level according to reproduction efficiency indices. For the reason of efficiency reduction of both acoustic canals, to a greater extent, of the right ear, there was a decrease in the total reproduction coefficient as well, which once again resembled the picture of reproduction efficiency in the left-hemispheric group in comparison with the healthy group (fig. 4). Fig. 4 showed that in comparison with the healthy group, the curves C_{Ef} of the right ear and C_{Ef} of the left ear remained within the normative intervals (40 to 60% and 20 to 40% accordingly), but the percentage of participants within these intervals decreased, and to a greater extent towards the right ear. The percentage of participants with a low reproduction efficiency increased in both acoustic canals.

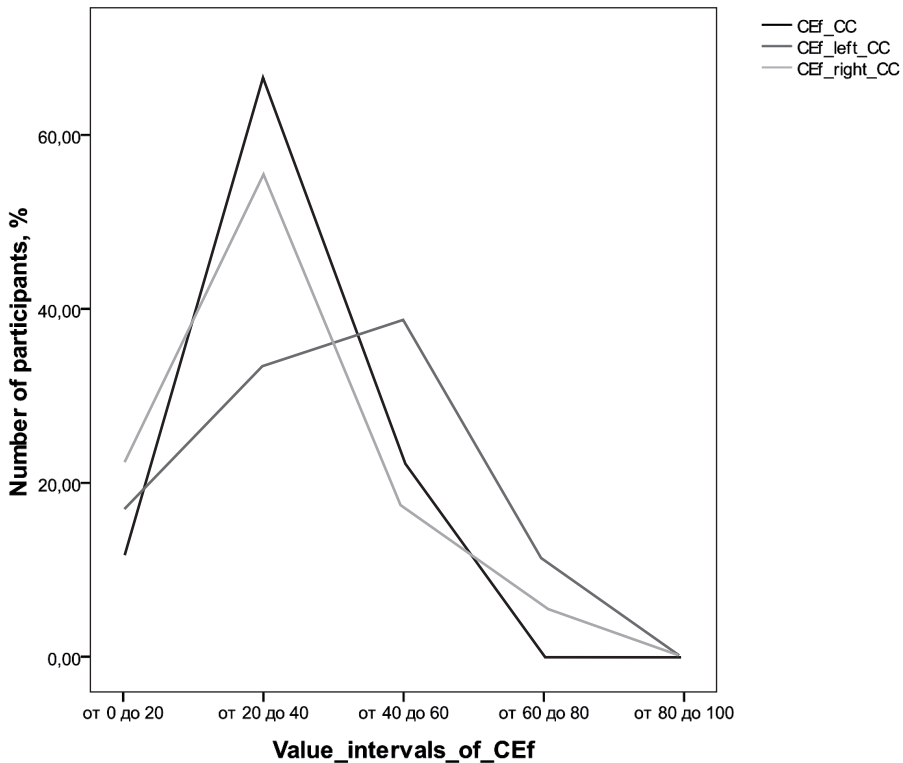


Figure 4. Distribution of the efficiency value among participants with corpus callosum pathology

Thus, in consequence of the reproduction efficiency reduction in the both acoustic canals, the total efficiency of the method fulfillment fell, which is reflected in fig. 4 in the form of the total C_{Ef} curve's shift towards the lesser interval (20 through 40%) in comparison with the healthy group. Thereby, the left ear's effi-

ciency coincided with the total efficiency of the fulfillment of the method of dichotic listening, according to the greatest concentration of the participants in one of the intervals (20 through 40%). In case of corpus callosum pathology there was a derangement of interhemispheric interaction, and a reduction of the right hemisphere's regulation of speech centers, providing facilitation of the right hemisphere's activity under the condition of noise, whereupon we observed the symptoms of the left hemisphere lesion in the CC group. Once again, this proved that the right hemisphere made a greater contribution to reproduction efficiency. So the reproduction efficiency of the right ear in this group of participants did not significantly differ from the corresponding indices in the left-hemispheric group, and the reproduction efficiency of the left ear was to a greater extent drawn to the same in the healthy group, whereupon the total efficiency index decreased to the level of total C_{Ef} in the right-hemispheric group. Thus, we saw that in case of corpus callosum pathology, the left hemisphere suffered in audioverbal processes to a greater extent. All three groups with the brain pathology significantly differed, statistically, from the healthy group according to total C_{Ef} : the left-hemispheric, right-hemispheric and CC groups ($U = 98.5; p < 0.001$; $U = 345; p = 0.006$; $U = 238.5; p = 0.003$). The significant differences in C_{Ef} values were registered between two groups of the patients only: left-hemispheric and right-hemispheric ($U = 138.5; p = 0.015$).

Thus, the CC group didn't differ from the left-hemispheric and right-hemispheric ones according to total efficiency indices. However, according to the mean values, the CC group was drawn to the right-hemispheric group. It is shown in fig. 1,2,3,4 that in comparison with the healthy group (40 through 60%) the total C_{Ef} curves of the three groups of patients shifted towards the preceding interval (20 through 40%). Besides, there was an increase in the percentage of the participants with a low efficiency in all the groups of patients, to a greater extent in the left-hemispheric group, and to a lesser extent in the right-hemispheric group, which coincided with the average values of total C_{Ef} . In this way, in spite of pathology, the efficiency of stimuli reproduction within the dichotic listening method decreased, and that took place most likely at the expense of activity reduction of the right hemisphere.

Values of the *coefficient of the right ear* (CRe) for all groups are in the range of -89.47% to 100%. In the group of healthy subjects, the CRe values range from -44.83% to 67.44%. The average value of the CRe in this group is 11.66%. In most cases, the value of this coefficient is positive. 50 people in 9 subjects CRe negative values (from -44.83% to -7.69%), in 2 subjects the factor is 0%, and for the remaining 39 people the values are in the range of 1.82% to 67.44%.

In the group of subjects with left-sided localization of pathological process, CRe values range from -89.47% to 92.59%. The mean value of CRe in the group is 14.16%. Of 21 people, in 7 subjects values CRe negative sign and are in the range from -89.47% to -4.76%, while for the remaining 14 people the values of the CRe and the positive sign are in the range of 4% to 92.59%.

In the group of subjects with damage to the right hemisphere of the brain, CRe values range from -48.57% to 100%. The mean value of the CRe in the group is 45.54%. Of the 23 people in 3 CRe, test values are negative and range from -48.57% to -11.63%, the remaining 23 people have positive CRe values and are in the range from 2.7% to 100%, with five of them in this ratio at 100%. Thus, in most cases, the CRe is positive.

In the group of patients with pathology corpus callosum, CRe values range from -75% to 83.33%. The mean value of the CRe in the group is -8.9%. Of the 18 persons, values from the CRe 7 subjects are negative and are located in the range from -75% to -12%. The remaining 11 persons are positive in sign, and are in the range of from 2.44% to 83.33%.

Thus, the dichotic listening technique is not an informative technique for studying hemispheric interaction at different etiology pathology corpus callosum. It does not clearly differentiate between symptoms caused by disorders of the cerebral hemispheres. It does not clearly differentiate the symptoms of the disorder hemispheric interaction induced pathology is corpus callosum. The technique clearly demonstrated that hemispheric symptoms included in deficit disorder hemispheric interaction at different etiology pathology corpus callosum are quantitative rather than qualitative differences between the symptoms, syndromes included in the pathology of the cerebral hemispheres.

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Original manuscript received February 25, 2014

Revised manuscript accepted May 19, 2014

First published online June 30, 2014

CLINICAL PSYCHOLOGY

Psychological factors of propensity for alcoholism (social anxiety, hostility, Machiavellianism) in depressive patients

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Based on the analysis of psychosocial models of alcoholism and depression the general and specific factors of occurrence and course of illness are identified in the present study. The authors put forward hypotheses regarding the mechanisms of activation of psychological addiction to alcohol as an ineffective coping strategy. The necessity of empirical research needed to refine the techniques and targets of patient care within the psychiatric and psychological care is justified. The results of the pilot study show that depressed patients who are subject to alcohol dependence feature marked distress in interpersonal relations, coupled with hostility and aim at gaining profit and pleasure by manipulating other people. These patients are hostile to others, while in interpersonal relationships personal safety is important to them, so they may be more likely to resort to manipulation. In their attitudes with respect to health the communication of these patients is characterized by hedonistic tendencies and histrionic traits in interpersonal contacts.

Keywords: depression, alcoholism, hostility, Machiavellianism, social anxiety

One of the most common complications of depression is the abuse of alcohol and the risk of alcohol dependence. Studies show the high comorbidity of alcoholism and depression (Krylov, 2004; Yanushkevich, 2005), and — at the non-clinical level — they show a high correlation of symptoms of emotional distress and alcohol consumption as a dysfunctional way of coping (Vasserman, Ababkov, Trifonova, 2010). These connections were established for various age and population groups: adolescents (Windle, Davies, 1999), students (Dennhardt, Murhy, 2011; Patock-Pecham, Morgan-Lopez, 2007), working adults (Parker et al, 1987).

In most cases the combination of symptoms of affective disorders and alcohol abuse are promptly recognized, and the two issues become the focus and target

of therapeutic work. However, the experience of specialists of the Laboratory of Clinical Psychology and Psychotherapy of the Moscow Research Institute of Psychiatry (doctors, psychologists, psychotherapists) shows that a large proportion of patients seeking psychological or psychiatric help do not always report the problem of alcohol abuse openly and in a timely manner. The reasons for this may be different, ranging from underestimating the severity and consequences of alcohol abuse compared with the severity of depressive symptoms (mostly in men) to self-stigma and perception of alcoholism as a “shameful” symptom (mostly in women). This has a negative effect on the quality of the therapeutic alliance (concealing part of the problem) and on the effectiveness of medical and psychological care. These observations have led to the formulation of the task to conduct a complex clinical psychological study of factors of the tendency to abuse alcohol during depression.

Phenomenology of depression a part of alcohol dependence has been comprehensively studied in Russian psychiatry. Depression is regarded as an etiological factor, as part of the structure of withdrawal symptoms, craving for alcohol, or as appearing at the stage of remission (Gurevich, 2005; Kinkulkina, 2009; Nikiforov, 2007; Rybakova, Yeryshev, 2008). It has been shown that the depth of depressive symptoms in patients with alcohol dependence does not reach deployed depressive syndromes and they are characterized as unstable, polymorphic, partial (Yanushkevich, 2005).

Clinical features of alcohol dependence as a secondary phenomenon in relation to endogenous mood disorders have also been extensively studied in psychiatry (Gofman, Oyfe, 1997; Rybakova, Yeryshev, 2008). The researchers note that alcoholism is usually accompanied by a mild depression and when the affective disorder strengthens the drinking often stops. Authors describe a connection between the dominant affect (depression or anxiety) and an increase or a decrease in tolerance to alcohol, respectively, as well as the connection of alcohol dependence dynamics over the course of an affective disorder.

The mechanism of the relationship between depression and the desire for psychoactive substances, including alcohol, is described in different ways: it is seen as two separate disorders with different pathogenetic mechanisms; or as a single complex of symptoms (Rybakova, Yeryshev, 2008; Pogosov, 2009; Lapin, 2004; Hamdan-Mansour, Halabi, Dawani, 2009; Peirce, Frone, 2000).

The clinical studies described above were conducted on a specific sample of subjects: patients with a diagnosed affective disorder and alcohol dependence. At the same time, as noted above, outpatient psychiatric and psychological care facilities for patients with affective spectrum disorders regularly encounter patients who, for various reasons, do not look for help from psychiatrists and do not report the fact of regular alcohol abuse (anosognosia, self-stigmatization). There is also a special group of patients for whom the use of alcohol does not reach the level of a disorder, but has the characteristics of a strategy to cope with stress and life's difficulties (and, of course, makes a negative contribution to depression). If such a dysfunctional strategy is not detected in a timely manner, its negative impact is felt in the reduction of treatment quality for affective disorders and in the reduction of the accuracy of prognostic estimates.

The authors were not able to find clinical and psychological studies of the inclination to abuse alcohol as an ineffective coping strategy in patients with affective

spectrum disorders as opposed to alcohol abuse as such in Russian literature. At the same time, when research is conducted in this area in other countries various types of alcohol use are identified and studied: — “problem drinking behavior”, “problematic drinking” (Grothues et al., 2005; Bonin, McCreary, Sadava, 2000); “alcohol-related problems” (Yamada et al., 2008).

We have reviewed the literature in order to highlight the psychological factors that can affect the activation of the propensity for alcohol abuse during depression. In our opinion the timely detection of alcohol addiction and the factors of this tendency can improve the treatment of depression. The identified psychological factors may become the basis for the development of targets of psychotherapeutic work. Based on the fact that the combination of alcohol abuse and depression complicates drug therapy (Lapin, 2004) identifying and accounting for alcohol addiction can help avoid the deepening of depression and the development of dependence.

To identify the hypotheses of an empirical study of psychological factors of the tendency to abuse alcohol in patients with depressive disorders the authors conducted an analysis of theoretical multivariate psychosocial models of the relationship between alcohol dependence (Sirota, Yaltonskiy, 2008 and depression (Kholmogorova, Garanian, 1998), as well as a review of empirical studies of psychological factors of depression associated with the risk of alcohol abuse.

A number of general factors that influence the occurrence of alcohol and depression can be noted (a model of a comprehensive complex of symptoms).

Non-specific, general biological factors for the occurrence of depression and alcoholism are genetic predisposition (mental illness and substance abuse in relatives), severe physical illness and injuries. There is also data from studies of the neurophysiological mechanisms of depression and alcohol abuse, according to which the common pathogenetic factor for these disorders is the “failure of the catecholamine and serotonin system” (Lapin, 2004).

Many researchers point out the leading role of stress (both everyday and acute traumatic events) and ineffective coping strategies in the occurrence of alcoholism and mood disorders (Vasserman, Ababkov, Trifonova, 2010; Lapin, 2004; Pogosov, 2009; Sirota, Yaltonskiy, 2008; Kholmogorova, Garanian, 1998).

Among the common psychological factors of alcoholism and depression, attention is immediately drawn to the similarity of personal characteristics such as alexithymia (Kristal, 2000), social anxiety (Ham, Hope, 2003), as well as marked disturbances in interpersonal relations, such as the narrowing of the social network and the reduction of social support (Kholmogorova, Garanian, Petrova, 2003; Brugha, 1995). Greater risk of alcohol abuse is seen in those who have a deficit of social support. However, these disruptions are not identical in alcoholdependence and depression. In dependence there is a convergence of the members of the reference group and social support is very strongly formed within it, while the connections with family, professional society, sober friends is gradually interrupted (Sirota, Yaltonskiy, 2008).

The quality of relationships and relationship satisfaction are significantly affected by strain in social contacts, for example, social anxiety that often accompanies depressive disorders. The study by L.S. Ham and D.A. Hope (2003) shows a pronounced relationship of social anxiety and alcohol abuse: according to this data

social phobia is combined with alcohol abuse even more often than with depression. A stronger connection between social anxiety and alcohol dependence as compared to general anxiety and specific phobias has been revealed (Ham, Hope, 2003).

The following factors can be noted among the somewhat more specific factors of depression onset:

- Personality traits (perfectionism, hostility (Vaksman, 2005; Garanian, 2010)) and a reduced quality of social support (without compensation, as in addictive patients). Studies of the relationship between the severity of depression, hostility, and substance abuse (Hamdan-Mansour, Halabi, Dawani, 2009) suggest that the relationship of substance abuse with hostility may be mediated by the level of symptoms of affective disorders.

The following factors can be noted among the somewhat specific factors of the formation of alcohol dependence:

- Cultural factors (expectations and understanding of the influence of alcohol intoxication), the actual properties of alcohol, certain personality traits (conformist, risk tolerance, protest behavior, antisocial, self-aborted), reduction of social support with a focus on addictive group.
- Inefficiency of social support processes in patients with alcohol and drug abuse is associated with qualitative changes in social networks, since they are primarily communities that abuse alcohol and are often antisocial. Support from the rest of the environment is not perceived in the same positive way. In addition, systematic abuse of alcohol that is supported by peers makes addictive and depressive symptoms stronger (Sirota, Yaltonskiy, 2008).

Of particular interest is the phenomenon of the Machiavellian personality. Recent studies reveal its significant association with alcoholism (Zentsova, 2009). Machiavellianism can be defined as the tendency of a person to use manipulative behavior, often implemented while hiding their true motives. It is assumed that this is a quantitative characteristic inherent in varying degrees to all people. The connections to depression found by foreign researchers are not straightforward, but a definite relationship can be seen (Latorre, McLeod, 1978).

According to research, Machiavellianism personality correlates positively with suspicion, hostility, and externality. It includes a belief that others can not be trusted and that they can be manipulated. It also includes specific skills of manipulation. During communication these people are guided more by themselves and by solving their problems, and not by the other person. But they have a more realistic view of the world and, as studies show, can better understand themselves and others, as well as be persuasive and communicative in interaction (Znakov, 2001).

The phenomenon of Machiavellianism on the cognitive level includes the belief that most people do not have strong will, are not altruistic and are dependent, and that manipulation “could and should be used.” Behaviorally this is manifested in the fact that when communicating with others, people with high scores on the scale of Machiavellianism follow their interests more, and are distanced in evaluating the interlocutor, focusing more on the task rather than on the interlocutor as a person (Znakov, 2001). This component of Machiavellianism can be roughly defined as “asocial.”

The behavioral component of Machiavellianism also includes specific skills of manipulation, such as the ability to persuade others, flattery, deception or intimidation (Znakov, 2001). Motivational scope and values of people with high levels of Machiavellianism are characterized by the absence of such values as responsibility for his/her actions, a rejection of the values of forgiveness, love, and social utility. During communication Machiavellianism is expressed in focusing on own welfare of the subject. The interpersonal aspect of human life of a person who shows high levels of Machiavellianism is usually rich with more frequent shallow contacts with friends than that of a person with a low score on this scale (Znakov, 2001). These features allow to distinguish a component of Machiavellianism that corresponds to histrionic features.

Of interest are studies of R. Lattore and E. McLeod (1978), devoted to the connection of Machiavellianism and depression. Scientists have discovered the relationship of depressive symptoms and Machiavellianism based on gender. In a healthy sample Machiavellianism is more characteristic of men than women. However, with the emergence of depressive symptoms the picture becomes more complicated: if the indicators of Machiavellianism in men decrease, the women show opposite results — their Machiavellian figures are much higher than before depression onset (Latorre, McLeod, 1978). It follows that rising rates of Machiavellianism in depressed women may be a risk factor or a consequence of alcohol abuse.

This analysis of the Machiavellian personality traits and the study described above suggests that in the case of association with alcohol abuse, an “asocial” component of Machiavellianism comes to the foreground, and in the case of combination with depression — the “histrionic” part of it.

Thus, a review of numerous empirical studies of these factors provides grounds to assume the existence of several psychological mechanisms that lead to alcohol abuse in depressive disorders:

1. The mechanism of interpersonal risk of alcohol dependence allegedly linked to a combination of depression with symptoms of social anxiety. In this case, alcohol can act as a facilitator for patient communication, through which they can make up for lack of social support.
2. Alcohol abuse can be the result of the combination of hostile traits (phenomenologically manifested as lack of social and positive attitudes, negative judgments about the events) and Machiavellianism (hedonism and easy deliverance from suffering at any cost, represented more by the «histrionic» component) within the structure of the patients’ personality.

In order to verify these predictions we conducted an empirical study of psychological factors of the tendency for alcohol abuse in patients with depression.

Research methods

Using the AUDIT (Alcohol Use Disorders Identification Test (Saunders, Aasland)), the studied sample was separated into groups of patients subject to (group 1, n = 13) and not subject to (group 2, n = 19) alcohol abuse. This survey is a screening test for the detection of alcohol dependence. It includes 10 questions designed to identify the physiological and psychological phenomena and disorders associated with the

formation of dependence (increased tolerance, craving for alcohol, changes in interaction with others, work efficiency). The questionnaire was translated into Russian and was used on a Russian-speaking sample.

The methodological complex also included A. Bek's anxiety and depression questionnaires (Beck Anxiety Inventory, Beck Depression Inventory, adapted by N.V. Tarabrina (2001)), the scale of social avoidance and distress (SADS, Watson, Friend, 1969), adapted by V.V. Krasnova and A.B. Kholmogorova, the "Mak-IV» questionnaire, adapted by V.V. Znakov (2001), and the projective hostility test (A.B. Kholmogorova, N.G. Garanyan, 1998). A semi-structured interview was designed to assess the life of the subjects, attitudes towards health and alcohol dependence.

Sample description

On the basis of the departments of the Moscow Research Institute of Psychiatry, 32 patients (6 men and 26 women aged 25 to 55 years) with a diagnosis of F 33.1 (recurrent depressive disorder, current episode moderate, ICD-10) were examined. A scientific advisor, professor, Doctor of Medical Science T.V. Dovzhenko guided the clinical analysis of the sample of patients. Using the AUDIT questionnaire (Alcohol Use Disorders Identification Test (Saunders J.B., Aasland O.G.)) the sample was separated into two groups: patients subject to alcohol abuse (n=13) and patients not subjects to alcohol abuse (n=19).

A group of healthy control subjects was formed (those not experiencing symptoms of depression), corresponding in socio-demographic characteristics to the experimental group.

Results

The comparison of groups using the Student criteria (after the verification of the equality of dispersion using the Levene criteria) shows that patients subject to alcohol abuse are characterized by higher scores of social anxiety (tendency to avoid social contact and discomfort in social situations), in comparison to patients who are not inclined to abuse alcohol. In a sample of healthy subjects (those with no depressive symptoms) an inverse relationship can be seen: the subgroup that is subject to alcohol dependence has lower indicators of social anxiety, except for the indicator of social avoidance (Table 1, 2).

Table 1. Severity of depression, social distress and social avoidance in the group of patients with depression

Scales	Depressive patients		P-criteria
	Subject to alcohol abuse (n=13) M(Sd)	Not subject to alcohol abuse (n=19) M(Sd)	
Social distress	7,5(4,5)	5,6(3,7)	p=0,05
Social avoidance	6,3(3,3)	4,9(3,2)	p=0,07(t)
Social anxiety	13,8(7,1)	10,5(6,1)	p=0,03

M — mean, Sd — standard deviation

Table 2. Severity of depression, social distress and social avoidance in the group of subjects without depression

Scales	Subjects with no depression		P-criteria
	Subject to alcohol abuse (n=7) M(Sd)	Not subject to alcohol abuse (n=10) M(Sd)	
Social distress	1,5(1,5)	4,1(4,3)	0,009
Social avoidance	4(2,3)	3,5(2,1)	0,08 (t)
Social anxiety	5,5(2,8)	7,6(6)	0,05

M — mean, Sd — standard deviation

An attempt was made to trace the nature of these differences in the combination of traits of hostility and Machiavellianism in the experimental and control groups. We hypothesized that patients with depression will feature a combination of dysfunctional patterns of hostility and the “histrionic” component of Machiavellianism. This pattern, in turn, causes tension in interpersonal relationships (social anxiety).

Analysis of means, indeed, indicates a greater expression of hostility in subjects who have an inclination for alcohol abuse than those who are not subject to abuse in both study groups (Figure 1). The differences relate to all the three dimensions of negative attitudes towards people: 1) the vision of others as “subject to rising above others by belittling them” (as dominant and jealous), 2) the vision of others as “despising ‘weakness’” 3) viewing others as “cold and indifferent”.



Figure 1. Indicators of hostility in subjects subject to and not subject to alcohol abuse in the experimental and control groups

Severity index of the Machiavellian personality in the group of patients with depression was significantly higher in subjects who are prone to alcoholism ($p < 0.05$) (Table 3). In the control group this pattern has not been found, as well as no difference was found in the expression of Machiavellianism between healthy subjects without depressive symptoms from patients with depression.

Table 3. Index of Machiavellian personality in the groups

Scale	Groups	Depressive patients		Healthy subjects	
		Subject to alcohol abuse (n=13) M(Sd)	Not subject to alcohol abuse (n=19) M(Sd)	Subject to alcohol abuse (n=7) M(Sd)	Not subject to alcohol abuse (n=10) M(Sd)
Machiavellian personality		78,7(11,5)*	69,1 (8,3)*	68,7(12)	68,4(12)

M (mean) — среднее, Sd (Standard deviation)

* — $p < 0.05$ groups of depressive patients, subject to alcohol abuse and not subject to alcohol abuse (Student criteria (after the verification of the equality of dispersion using the Levene criteria))

A qualitative analysis of interviews was conducted using expert evaluations. The analysis included the identification and categorization of repeating themes as well as the characteristics of answer structures (for example, referring to specific life situations or to general perceptions). The panel of experts consisted of S.V. Volikova (Candidate of psychology, senior research assistant of the laboratory of clinical psychology and psychotherapy of FBGU “MRI of Psychiatry” and A.A. Dolnykova (member of the laboratory of clinical psychology and psychotherapy of FBGU “MRI of Psychiatry”).

The qualitative analysis of interviews with respondents identified a number of distinctive features in the responses of the subjects:

1. When trying to describe the relationship between lifestyle and depression respondents who are subject to alcohol abuse often pay attention to their status and mood. Those not subject to alcohol abuse often mentioned the role of stress in causing depressive feelings.
2. When answering a question related to specifying the relationship of depression and lifestyle patients subject to alcohol abuse increasingly turned to specific situations of personal experiences, examples from their own lives. Respondents not subject to alcoholism answered more generally, linking emotional well-being to self-realization.
3. Respondents inclined to abuse alcohol highlighted sports aimed at having fun among daily physical activities. Those not subject to alcohol abuse noted everyday activities more often: housework, travel on public transport, etc.

Discussion

As noted in the introduction, alcohol abuse is a common complication of depression, which has a negative impact on both the quality of the therapeutic alliance and the effectiveness of medical and psychological care.

A review of the literature suggests several mechanisms of activation of inclination to abuse alcoholism, all related to interpersonal dysfunction and a special combination of attitudes towards communication — social anxiety, hostility, Machiavellianism, histrionic personality traits.

- The interpersonal mechanism of the risk of alcohol abuse is presumably linked to the combination of depression with symptoms of social anxiety.

In this case, alcohol can act as a facilitator for patient communication, through which they can make up for lack of social support.

- Alcoholism can be caused by a combination of traits of hostility (phenomenologically manifested as lack of socially positive attitudes, negative judgments about ongoing events) and Machiavellianism (hedonistic outlook on life and easy deliverance from suffering at any cost) in the structure of the patients' personalities.

The current empirical study demonstrates that mechanisms of psychological tolerance to and independence from alcohol are similar among patients with symptoms of depression and subjects with no depressive symptoms. Subjects that were not inclined to abuse alcohol were distinguished by the lowest expression of social distress and dysfunctional perceptions about communication. At the same time, depressed patients who are not subject to alcohol abuse experience some level of distress in interpersonal communication combined with hostility. However, they do not demonstrate an aim to obtain personal gain and pleasure through manipulating other people.

Subjects who were inclined to abuse alcohol (regardless of depressive symptoms) are distinguished by higher social distress in combination with a comparatively higher level of Machiavellianism and an aim to manipulate others for personal gain or pleasure. These patients are hostile to others, while in interpersonal relationships personal safety is important to them, so they are more likely to resort to manipulation. In their attitudes with respect to health and communication these patients are characterized by hedonistic tendencies and histrionic traits in interpersonal contacts.

The results of this study aid in specifying the future vectors of research on factors that activate the propensity for alcohol abuse in depression. However, this study was cross-sectional by design and thus has several limitations. At the present moment it is too early to talk about the demonstration of cause and effect connections between an inclination toward alcohol abuse on the one hand and the studied interpersonal factors on the other hand.

Another limitation is the inability to reduce the entire spectrum of stressful situations that a patient experiences to the interpersonal context only. On one hand, the dysfunction of the interpersonal sphere, such as the contraction of the social network, decline in quality of social support, etc. are among the most important factors of depressive disorders. Alcohol can act as a universal facilitator of communication, lower the feeling of social insecurity and fulfill the deficit in interpersonal competencies (Zavyalov, 1988, Sirota, Yaltonskiy, 2008). On the other hand, according to clinical research one of the main motives for alcohol usage during depression is a somewhat conscious desire to alleviate the subjectively uncomfortable state. Thus, alcohol can be used by patients to directly alleviate their condition and may have no connection with situations that involve interpersonal communication (Gofman, Oyfe, 1997).

Conclusions

Proneness to alcohol abuse in patients with depression is connected with marked distress in interpersonal relationships combined with hostility and the aim to obtain personal gain and pleasure through manipulating other people. These patients

are hostile to others, while in interpersonal relationships personal safety is important to them, so they may be more likely to resort to manipulation. In their attitudes with respect to health the communication of these patients is characterized by hedonistic tendencies and histrionic traits in interpersonal contacts.

The presented results do not allow to make conclusions about the cause and effect relationships between studied phenomena (high social anxiety and hostility can both be factors as well as consequences of long-term depression and alcohol abuse). Result elaboration is possible with a prospective research design. The obtained data allows only to specify the hypotheses about the mechanisms of the activation of the propensity for abusing alcohol during depression. It also specifies the targets of diagnostic interventions and psychological help for this category of patients

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Original manuscript received January 22, 2013

Revised manuscript accepted April 30, 2014

First published online June 30, 2014

Representation of the disease, the motivational sphere and medical communication as an objective for HIV prevention and the treatment of HIV infection in substance users

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The psychological aspect of treating HIV-infected substance users entails changing their behaviour, as their behaviour is what leads to the risk of them transmitting and spreading HIV. Psychological treatment must facilitate their adaptation so that they may be otherwise treated for substance abuse and HIV. We propose establishing the psychological objective of helping patients overcome substance addiction by addressing their internal representation of the disease (IRD), value-sense and motivational sphere, as well as their relationships with their physician, as this is the main person who interacts with the patient in the clinic. An IRD study of patients with an opioid dependency, complicated with infectious diseases, showed that the IPD emotional level of opioid patients, as inter-conditional for other levels, can be an indicator of the status and impact of the main objective. A comparative study of substance users who received psychotherapy with those not receiving psychotherapy showed that the value-sense and motivational sphere is also an important target for preventive action. A study of the physician's image of drug treatment clinics' patients revealed that increases in the communicative competence of drug treatment facilities' personnel represents a third course of preventing the transmission of HIV among substance dependent patients.

Keywords: HIV-infected substance users, internal representation of the disease (IRD), value-sense and motivational sphere, the physician's image

The HIV epidemic is a medical and social ill that has caused great damage to the global community; it has touched every country, and devastated the lives of the people it has directly affected.

According to Russia's Federal AIDS Centre, the evaluation of the epidemiological situation in Russia reflects an ongoing increase in the number of HIV-infected patients. The total number of reported cases of HIV infection among Russian citizens increased by 10.6% in 2011, while the number of identified cases per 100,000 people surveyed increased by 8.4%. By September 2012, Russia had 682,726 registered HIV-infected patients (Pokrovsky, Ladnaya, Sokolova et al., 2012).

The use of drugs continues to be the main risk factor. The number of new cases of infection among drug users has not decreased. In a 2011 study, 56.2% of all HIV-positive individuals who were in at-risk groups indicated that they were drug users.

According to the Russian Ministry of Health's National Centre for Drug Abuse, 15% of the total number of registered drug users in 2011 (those registered represented 71% of the total estimated number of drug users) were infected (Koshkina, Kirzhanova, Sidoryuk et al., 2012).

All epidemiological data indicate that users of psychoactive substances run the highest risk of HIV infection. This underscores the importance of HIV prevention and treatment in this population, because for the duration of the epidemic they have continued to be the main source of infection for other groups (Pokrovsky, Ladnaya, Sokolova et al., 2012).

HIV and substance dependency are socially significant diseases. Providing medical care to patients with a combination of severe disease is a complex and multifaceted problem. Patients that suffer from a severe disease are also commonly afflicted by psychological and social problems (Dolzhanskaya, Buzina, 2002; Maximova, 2008).

The level of prevention for this group of patients corresponds to tertiary prevention. Tertiary prevention is seen as a specialized set of measures for the rehabilitation of HIV patients who have lost their ability to function normally. Tertiary prevention has several rehabilitation objectives which can be described as social (forming confidence in their own social fitness), labour (the ability to recover work skills), psychological (recovery of behavioral activity of the individual) and medical (functional recovery of organs and systems). The most important component of preventive measures is to develop public health facilities and social activities in order to encourage a healthy lifestyle (Sirota, Yaltonsky, 2003).

The chief psychological problem at the tertiary level is altering the behaviour which leads to the risk of HIV transmission; psychological professionals must promote the formation of adaptive behaviour, thereby facilitating the treatment of substance dependence and HIV.

The complexity of the tertiary prevention of socially significant diseases such as drug abuse and HIV infection is due to a number of specific factors.

First of all, in most cases, the treatment of these diseases requires a strict adherence to medical appointments, and by varying from this regimen, the patient faces serious complications. It is therefore very important to maintain the patient's motivation for treatment and to ensure that he or she continues to attend therapy. Unfortunately, in most cases, patients are not motivated enough to treat addiction. If there is no setup for psychological treatment, pharmacological treatment is disrupted at an early stage, after which the patient resumes using drugs. A return to this "drug" lifestyle makes for ineffective HIV treatment. Therefore, in addition to pharmacological treatment, these patients need specific therapeutic and corrective treatment in order to alter their behaviour and allow them to sustainably abstain from substance use. This is possible only if the patient has an adequate understanding of the disease, its consequences and its impact on his or her life activity and quality of life. Taken together, these concepts are referred to as the patient's internal image of the disorder. Also, the rehabilitation process is often complicated by the

patient's need to overcome the social stigma of being HIV positive, which makes it difficult for them to access social support.

Prevention activities should be implemented not only among patients with HIV infections, but among intravenous drug users in general, as they are at a higher risk of infection and are most likely to spread the infection. Substance abuse treatment and commitment to this treatment is one of the most effective methods of preventing HIV infections among drug users.

Thus, the search for a target psychological level of tertiary prevention of HIV infection among substance users defines the following research objectives:

1. A study of the internal presentation of the disorder (IPD) of patients with a substance dependency and HIV.
2. The study of factors that determine the motivation for treatment.
3. The study of the social and psychological factors that affect one's commitment to a treatment programme.

In the study of the IPD of patients with substance dependencies, it seems appropriate to consider the four-level model of the IPD proposed by V. V. Nikolaeva (2009). This model is constructive: the IPD is considered not only as a set of experiences and relationships, but also includes the motivational factors that may be closely related to motivation for treatment and a desire to eliminate risky behaviour. Thus, the IPD is considered at several levels:

1. The level of direct-sense reflection of disease (disease caused by feelings and states),
2. The emotional level (immediate emotional reactions to the experience of illness and the emotional reactions to the illness in a person's life),
3. The intellectual or cognitive level (knowledge of the disease and a rational assessment of the disease),
4. The motivational level (an emergence of new motives and the restructuring of a premorbid motivational structure).

A comparative study of the IPD levels of 60 opioid-dependent patients who were infected with the Hepatitis C virus and HIV showed that the addition of infectious diseases did not introduce significant changes to their IPD (Buzina, Podosinova, 2010).

So, on a sensual level, there is no differentiation with respect to various diseases, patients did not produce specific symptoms of infectious disease, and almost all patients experienced introspective sensations that were attributable to the underlying disease - addiction. On an emotional level, drug abuse and infections are characterized mainly by negative feelings such as guilt, disgust, sorrow and fear, but the intensity of these emotions towards the drug is significantly higher: not only for Hepatitis C, but for HIV as well. In describing their emotional experiences to drug abuse, patients manifested an ambivalent attitude to the disease. So, besides the negative emotions, they observe also positive emotions, such as interest and joy.

Their cognitive level as a whole is characterized by a relatively high awareness of the harmful effects of drug use with respect to the transmission of HIV and Hepatitis C. At the same time, Hepatitis C is not perceived as a genuine health threat by the patients. Also, groups of patients with infectious pathologies had a

lower awareness of the dangers of drug use, as well as regarding the transmission of infectious diseases through drug use. With regard to their motivational IPD level, it can be said of patients with opioid dependence syndrome that it is characterized by reduced motivation among individuals as well as a failure to appreciate the overall comprehension of life. In assessing the temporal perspective, there is an indefinite relation to the “real”, unrelated to the prospect of life and the elements of self-conception. This leads to the fact that their current life situation is static and does not have a vector of further development in the form of a clear purpose and does not provide personal resources that contribute to this goal. Opioid-dependent patients with Hepatitis C revealed an anosognosic attitude to the disease as a whole, which they adequately expressed in their positive evaluation of their self-image in the past, in the future and of their health.

There are controversies with respect to the various levels of IPD.

In the analysis of significant correlations between the variables of different levels of IPD, a positive correlation was found between the total number of introspective descriptors for the term “addiction” and the emotions caused by the disease: “wine” (0.36), “sorrow” (0.38), “anger” (0.42), “surprise” (0.48).

An association was also discovered between the variable levels of patients’ emotional state and cognitive awareness. The variable “awareness of the harmful effects of substance use” has a negative correlation with the experience of “guilt” (-0.35) and a positive correlation with the experience of “aversion” (0.41).

The link between emotional and motivational level is reflected in the negative correlation between indexed negative emotional states experienced and the meaningfulness of life: “guilty” (-0.42), “mad” (-0.38) and “broken” (0.40).

One’s attention is drawn to the lack of correlation between the sensory and cognitive level, between the sensual and the motivational level, and between the cognitive and motivational levels, but these levels have a correlation, both positive and negative, on the emotional level.

Thus, the emotional level has some mediating link between the others. In this case, lack of differentiation at the sensual level is reflected in increasing the vocabulary of introspective sensations and leads to increased feelings of negative emotions in relation to the disease. A positive correlation of negative emotional experiences such as shame, grief, anger and the awareness of the harmful effects of substance use is quite natural, but we can see that the intensity of the experience of the same emotion reduces the motivational potential of the individual in the form of loss of vision and responsibility for their lives.

The study of the IPD of the patients with opioid dependencies complicated by infectious diseases showed that the emotional level the IPD of opioid users, as inter-conditional for other levels, can be an indicator of their condition and the main target for therapeutic activity.

At the same time, a comparative study of the IPD patients who are dependent on opioids and suffer from an infectious disease and uninfected opioid dependent patients showed that the presence of an infection does not introduce significant changes and distortions in the IPD. Therefore, in further studies, we did not distinguish between infected and uninfected patients as separate groups.

The study of the specific features of the motivational sphere in such socially significant diseases as substance dependence may point to the psychological deter-

minants of motivation for treatment. Numerous studies indicate that a prominent feature of the motivational sphere of drug users is “sensation seeking”. There is evidence that the need for the experience of acute and unusual sensations, combined with diffuse and lack of differentiation of bodily experiences, makes it difficult to engage in the signing and symbolic processing of their domestic experiences. There is also evidence that they possess insufficiently developed mechanisms for the voluntary regulation of behaviour and lack the motivation to achieve an overall comprehension of life. All this complicates the implementation of their “sensation-seeking” drive in socially acceptable activities like extreme sports or professions associated with risk (firefighting, the military, law enforcement, etc.), and increases the likelihood that they will directly satisfy their sensational needs through the use of psychoactive substances (Buzina, 2010). The results of these studies show that the combination of a high demand for stimulation, a low degree of willpower, the lack of motivation to achieve and the inability to perceive the overall meaningfulness of life present significant risk factors for drug-related behaviour. They underscore the important psychological impact of the objective of altering behaviour among those in the target at-risk group - intravenous drug users. A comparative study of patients with substance dependencies who receive and do not receive psychotherapy can be also used as proof. This study showed that patients who undergo prolonged psychotherapy and rehabilitation programs experience reduced rates of “sensation-seeking behaviour”, are more motivated to achieve, and have a greater appreciation for the meaning of life (Buzina, 2011).

Also in this cohort of patients, there are changes in the value-sense field. While researching women with alcoholism, a trend was discovered: the women favoured values that ensured comfortable interaction with others, whereas healthy women are more focused on the value of individual self-actualization. A value structure which is dependent on psychoactive substances has a lower motivating force; it is more focused on the internal personality and passive interaction with the surrounding reality, whereas healthy people possess more present values which reflect outside activity and independence from the social assessment of their peers (Buzina, Podosinova, 2010). Another study also showed that the hierarchy of values of patients treated through counselling who had had a long remission period underscored their focus on constructive engagement and results, whereas in patients who did not receive therapy, there is a greater focus on interpersonal interaction and personal comfort. (Buzina, Shatalov, 2011)

Therefore, the process of identifying the formal and substantive features of the dynamic motivational sphere in psychoactive substance dependency suggests that motivation is a key target area of preventive action.

The third area of research in the definition of target preventive activity is associated with the efficiency of a patient’s interaction with medical staff. The patient’s participation in treatment depends on his or her expectations and on his or her representations of the doctor. The effectiveness of health care and rehabilitation depends on the degree of trust between doctor and patient.

Patients almost always evaluate the doctor and his or her activity from two standpoints. They first assess the doctor as a professional. However, they evaluate the doctor as a person at the same time. When dealing the doctor at the human level, the patient compares him or her with an ideal image. The patient’s compari-

son is based on society's cultural beliefs about doctors, their past experience with the medical staff and the expected pattern of care. The coincidence of the image with a particular doctor ideal promotes closer cooperation in the doctor-patient relationship.

The difficulties of communication between a doctor and a patient with a drug addiction are usually caused by the fact that the setting for the treatment is uncomfortable for the patients; they feel the burden of being in a hospital, so the figure of the doctor is often repressive for them.

We have carried out a comparative study of the physician's image in 30 patients who were hospitalized in drug clinics and 30 patients with somatic pathology receiving inpatient treatment in a therapeutic department. All of the participants in the study were male, average age 23.5. The physician's image was studied using T. Leary's "Diagnosis of interpersonal relations" technique, as it was adapted by L. N. Sobchik (1990).

The participants in the study were presented with the same form, with two lists of traits. In one form, they noted the features that, in their opinion, were consistent with the image of a real doctor, and the other form mentioned character traits that corresponded to their image of an ideal physician.

All of the patients who participated in the study gave informed consent with respect to the study and were informed that the results are confidential and would not affect the treatment designee.

The results of the study are given in Table 1.

The overall assessment of the actual image of the patient's physician is within the range of adaptive (range 0-4 points) and moderately adaptive behaviour (range 5-8 points). The image of a real doctor, both among somatic patients and patients with substance dependencies, is characterized by selfishness and obedience. However, substance abuse patients also perceive the doctor as more aggressive and suspicious. The real doctor was thought to have been least likely to communicate in a way that was thought of as manifesting traits such as authoritarianism, friendliness and altruism.

Both groups note friendship and altruism as the main qualities of an ideal physician, although altruistic traits were more important for patients with somatic diseases than among the psychoactive substance-dependent patients.

The assessed features of the real doctor by patients with substance dependencies were on average closer to the zone of moderate adaptive behaviour (4.7), and the average of those of the ideal physician are generally in the range of adaptive behaviour (3.1). The ideal doctor as opposed to the real has expressed enough friendliness and was much less suspicious or subjective when compared to the real doctor. An analysis of the ideal image of the doctor reveals that patients want to see a doctor who manifests a high level of friendliness and selflessness and is less authoritarian and aggressive.

Thus, substance-dependent patients had predominant representations of the doctor as aggressive and suspicious on the one hand, and submissive and dependent on the other. This perception of the doctor prevents the establishment of trust between doctor and patient and connotes a manipulative type of relationship from the standpoint of both parties. Such relationships are a major obstacle to the formation of motivation in treatment and effective compliance.

Table 1. Comparative study of the doctor's image among drug treatment clinic patients and patients with somatic diseases

Group	Image of the doctor	Type of relationship, using the DIR method (average scores)							
		Authoritarian	Egoistic	Aggressive	Suspicious	Submissive	Dependent	Friendly	Altruistic
Drug dependent patients	Real image 1	2.8	7.9	3.2	7.8	7	2.9	2.9	2.8
	Ideal image 2	2.4	2.9	2.8	2.6	2.5	2.5	6.4	3
Patients with somatic diseases	Real image 3	2.3	6.7	2.4	2.5	5.3	3.7	2.6	2.3
	Ideal image 4	2.3	2.4	2.1	2.3	2.6	2.3	6.4	5.5
The level of differences significance p_1-p_2		-	≤ 0.01	≤ 0.01	≤ 0.01	≤ 0.01	≤ 0.01	≤ 0.01	-
The level of differences significance p_3-p_4		-	≤ 0.01	-	-	-	-	≤ 0.01	≤ 0.01
The level of differences significance p_1-p_3		-	≤ 0.01	≤ 0.01	≤ 0.01	≤ 0.01	-	-	-
The level of differences significance p_2-p_4		-		≤ 0.01	-	-	-	-	≤ 0.01

Conclusion

Summarizing this article, it should be noted that it reflects a number of studies of the IPD of HIV patients who were addicted to drugs which emphasized a need for an understanding of their drug dependency. Conducting an emotional assessment mediates the evaluation of the disease at the sensory and cognitive level and affects the motivational potential of the individual. Therefore, attempts to motivate behavioural changes in treatment-dependent patients with infectious complications should primarily reflect a focus on treating the underlying disease - addiction. Their emotional attitude towards disease can be considered as a target for the psychologist's attempt to improve patient activity in understanding their illness and to promote advances in treatment.

A comparative study between drug-addicted patients who received psychotherapeutic and rehabilitative care and those that didn't shows changes in their structure of values, and increases in motivation to achieve and self-control. These

may be on the one hand, indicators of the effectiveness of psychological help, and on the other hand, can be targeted exposure.

The results indicate another area of psychological work in the prevention and treatment of drug addicts. This area is connected with the need to improve the communicative competence of drug treatment facility personnel.

In order to implement this goal, it is necessary to introduce clinical psychology training in providing drug treatment, which will lead not only to a better understanding of individual patients, but also lead to the use of modern psychological technologies which are designed to promote the motivation to abandon self-destructive behaviour and adapt. The implementation of clinical and psychological approaches will not only improve the effectiveness of psychotherapeutic rehabilitation programmes for patients, but will also aid in the development of a client-centred model of health communication; this model is becoming more and more popular in the medical service market.

Limitations

This article is an attempt to summarize the results of three areas of research in the study of HIV-dependent patients in the context of HIV prevention. We have identified three areas of research: 1) the presentation of patients with knowledge about their disease (internal representation of disease - IRD); 2) a study of the motivational and semantic sphere of patients in order to identify effective target effects; 3) the submission of a patient attending physician - the image of a doctor, as an important factor in increasing motivation for treatment. The article provides links to articles detailing the following areas: 1) IRD research on drug dependent patients with an HIV infection and drug addicts without an HIV infection, and 2) a comparative study of patients with drug dependencies who received psychotherapeutic and rehabilitative care with those not receiving psychotherapy and describes in more detail the results of the third area - the study of the physician's image in patients with drug addictions and without them.

Not all studies highlighted a group of HIV-infected patients, but the studied patients are at risk of HIV infection. In addition, patients do not always disclose their HIV-positive status, so there is always the risk of getting mixed groups on this parameter. Perhaps this is why we found no differences between the IRD of HIV-positive and HIV-negative patients. In this regard, we admit the possibility of a study of the psychological targets of HIV in this group and how it does not compare directly to the comparison group on the basis of the presence of infection.

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Original manuscript received June 16, 2013

Revised manuscript accepted April 9, 2014

First published online June 30, 2014

EMPIRICAL RESEARCH OF CONTEMPORARY SOCIAL PRACTICES

Attitudes to motherhood in different cultures

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The study of motherhood is a promising and relevant field of psychology. This article represents the results of a study in which a socio-psychological analysis of reproductive attitudes and demographic behaviour was conducted. The study also shows the relationship between attitudes related to motherhood and women's cultural affiliations.

The factors that contribute to the nature of attitudes towards motherhood and the interaction between these factors were studied. According to the results of this study, we distinguished the most significant characteristics of the attitudes to motherhood that influence the nature of the relationship between a mother and her unborn child.

The model of the development of attitudes to motherhood proposed by R. V. Ovcharova was detailed. We considered the influence of factors on the nature of attitudes to motherhood as well as the influence of factors on each other.

The results of this study allow us to describe the psychological portraits of women with different attitudes to motherhood.

Keywords: motherhood, image of the child, attitude towards motherhood

Introduction

Historically, attitudes toward motherhood have varied depending on one's particular culture. These, however, have been transformed in the public's perception: not only the aspects related to maternity, but also the image of the child. The current demographic crisis in Russia has reduced its birth rate and increased the average interval of time between pregnancies. However, the opposite is taking place among certain ethnicities within Russia. It is safe to assume that this shift has been caused by different attitudes towards motherhood that prevail among different cultures. It presents up-to-date psychological studies of mothers who belong to different cultures within Russia.

In this work, we have applied the detailed approach which was developed by R. V. Ovcharova (2003) that studies motherhood more comprehensively and meticulously: taking into account the influence of individual traits, as well as the influence of the mother's family and social influences on how ideas about motherhood take shape.

R. V. Ovcharova's three-factor model is represented by:

- Macro-level
- Micro-level
- Personal level

Religious affiliation is considered to be an important factor when determining the substance of ideas regarding motherhood. The customs, traditions and rituals (as the basis of religion) of a society or one of its sub-sets, as well as its unique cultural narrative are of interest due to the fact that these form the subjective worldview of an individual within that society. Ideas regarding motherhood constitute part of this subjective worldview.

This work is aimed at identifying the psychological aspects of ideas about motherhood that can be derived from differences in these worldviews.

Methodology

A lot of research on the psychological characteristics of families has been undertaken in the last few years. Many new, more objective diagnostic methods of family life have appeared, as well as new forms of counselling and models of help within a child — parent relationship. At the same time, a distorted relationship often exists between children and parents, and child abandonment is becoming more common. Phenomena such as retracted adoption and child abuse underscore that family research remains essential, and a deeper understanding of the psychological basis of attitudes towards children, their position in the family and their upbringing is needed.

An analysis of the available literature allows one to assume that the root lies with the way motherhood, fatherhood and parenting as a whole are viewed in a society. A general idea of parenting is, to a great extent, determined by the way women view motherhood before they become parents. Before and during pregnancy, parents begin to construct an image of their future child. Depending on how differentiated this image is, a social world of the child is constructed, as are interaction patterns between mother and future child. Consequently, researching these patterns of future mothers' behaviour and attitudes allows one to build a prognosis of how successful a mother will be in general and provides the opportunity to facilitate the establishment of a more concrete relationship between mother and child through pregnancy and after birth.

It is not a secret that family is the first factor that affects a person's development; children perceive culture through their parents. Parents are primary bearers of societal norms and rules (Spivakovskaya, 2000). "Spousal families are in most cases similar to parental families; parental family specifics are unwittingly adapted by children in their own families". The prevailing forms that family relationships

have taken in previous generations may serve as an example for future generations (Chernikov, 2001).

Many psychological approaches such as psychology of personality, child psychology, and pedagogical psychology focus on the study of motherhood.

As V.A. Ramih points out, since very early times human society has actively intervened in the sphere of motherhood, resorting to such regulators as customs, morality and law. This intervention applies to all three periods of maternity: pregnancy, childbirth and the postpartum period. Society always needs labour and a kind of successor. However, such sociocultural factors as concern for future generations, primary socialization, and social experience also play a significant role [5,104].

Due to the numerous cultural and individual approaches to motherhood as well as the complexity of its structure, formation and development, any investigation of motherhood should be integrative.

Currently there is a trend to engage in the complex and interdisciplinary study of motherhood, which results in collective monographs. The most famous of them are: "Different Faces Of Motherhood" (Birns, Hay, 1988), and "The Development of Attachment and Affiliative Systems" (Emde, Harmon, 1982).

Modern, complex research has revealed the necessity of creating an integrative approach to studying motherhood. The relevance of the integrative approach also reflects the following fact: the problems of motherhood and early childhood have not decreased despite the high level of scientific and technical support that exists for mothers and all the modern achievements in the field of medicine, physiology and gynaecology.

In psychological literature (mostly published outside Russia), much attention is paid to the biological basis of motherhood and to the conditions and factors that affect its individual development. In Russian psychology, a number of works have recently appeared that are concerned with the phenomenology, psychophysiology and psychology of motherhood, deviant motherhood, as well as the psychotherapeutic and psycho-pedagogical aspects of pregnancy and early stages of motherhood.

G.G. Filippova (2002) gave the following classification of investigations concerning the phenomenon of motherhood:

1. Motherhood as a providing conditions for child development.
2. Motherhood as part of a woman's personality.

If one assumes that motherhood provides the conditions for child development, we can note the following guidelines:

- The culture-historical aspect of motherhood
- The biological aspect of motherhood (study of physiological aspects of motherhood, comparative-psychological investigations)
- psychological aspects of motherhood

At present, there are three main schools of thought regarding motherhood. *The first school* reflects complex research that attempts to examine the characteristics of the mother that influence the child's development. Different factors are considered — personal characteristics, life story, level of adjustment to marriage, and

level of satisfaction with the relationship between the future mother and her own mother.

This approach allows for the collation of interesting empirical data regarding the influence of different factors that affect a child's development and his or her relationship with his or her mother. At the same time, data collected using this approach is often contradictory. The same factors that negatively affect a child's relationship in one family turn out to be acceptable in others. This is explained by the lack of a basic theoretical model of family relationships that would emphasise fundamental factors that influence parental attitudes towards children and their relationship.

In some ways this flaw is overcome by the representatives of *the second school* of thought. It has a definitively dyadic nature. This approach views a mother and child as part of one unified dyadic system. Only upon entering the system do they gain the status of 'mother' and 'child' and develop correspondingly within it.

The results of research have significantly improved our understanding of the unity of mother and child and the need to view them as a whole. However, this approach skims over how this unity is achieved, which is an important factor when reaching said unity.

Answers to these questions can be found within the culture-historical (cultural narrative) approach where a child is seen as a representative of the human race (L. S. Vigotskiy, N. N. Avdeeva, T. I. Baranovskaya, M. I. Lisina, S. Y. Mescheryakova, E. I. Isenina, E. V. Popcova, E. O. Smirnova), and the child's relationship with adults is a separate research object. A mother's behaviour is seen as the source of her child's development. Hence, the child's evolution as a subject of cognitive activity, interaction and apperception mandates that the mother possess certain characteristics. These characteristics allow her to create the necessary conditions for the child's development. Among these characteristics, the most important roles are given to the attitude towards the child as an independent entity, the encouragement of cognitive activities, and the support of interaction initiatives and so on. These and many other characteristics are derived from the woman's idea of motherhood.

R. V. Ovcharova's model of determining attitudes towards motherhood is the most suitable. It is closely linked to the culture-historical approach and views motherhood as a unified phenomenon. It takes into account the personal qualities of the mother, her own family's influence, and the influence society exerts on ideas about parenting. According to Ovcharova, the following must be noted when examining women's attitudes towards motherhood:

1. The macro-level, representing the general level of society's development, which determines the influence of societal factors on what constitutes an ideal parent;
2. The micro-level, representing the level of a family's development, which determines the influence of familial factors on what motherhood is;
3. The personal level, representing individual factors that determine attitudes towards motherhood (Ovcharova, 2003).

Below we shall consider in more detail each of the determined levels, the degree of their influence on the formation of ideas regarding motherhood and the reciprocal influence of the factors:

Macro-level. A. I. Antonov (1973) considered the influence of social impact on the reproductive behaviour of an individual not only as the social regulation of the birth rate but also as social management — “a system of targeted influence by state authorities on the reproductive motives of a family, an economical and moral incentive to increase the birth rate as a feature of demographical policy” (Antonov, 1973, p. 75).

However, as it was pointed out at the beginning of this work, the motivational factor employed by the state only results in quantitative changes (for instance, a birth rate increase) rather than substantive changes (value of the child, educational settings, value of maternity).

But in society there is also an informal influence, reflected in the system of values and environment of an individual. Such influences include the religious beliefs of a majority of the population in the community, mass media, and works of art and culture. It is this informal influence which is reflected on the substantive side of perceptions of parenthood in general and motherhood in particular.

V. V. Boiko points out that the influence of society on motivating the need for children provides for the orientation of an individual with respect to the feelings and pedagogical settings of the new generation.

A. I. Antonov (1973) mentions the context for reproduction that is imposed by society. The pressure of this social context can be quite intense because it can be very important (within the system of criteria) for the mother's subjective happiness and social prestige. The instructive and evaluative aspects of the society's reproductive standards, accompanied by the relevant emotional tone, represent the “appropriate behavioural model of millions of individuals and families” (Antonov, 1973, p. 80). According to the author, these reproductive standards are not realized by an individual more often than other standards.

The works of E. I. Isenina and Y. I. Baranovskaya (1999), aimed at studies of the influence of socio-economic characteristics on the mother's qualities, should also be mentioned. These studies revealed the high significance of effect of the social functionality of the family on the mother's qualities, with the husband's social functionality being the most significant. The authors came to the conclusion that the social circumstances influence the development of the mother's psychological characteristics, as they result from social conditions at present and in the past.

Society gives individuals an example of motherhood, which gives rise to the development of a sense of motherhood in each individual case; this is affected by a woman's personality, her value and motivation system, and the experience she received living with her own parents in a family setting.

Micro-level. The nuclear family is the primary social environment of an individual, the environment of socialization.

A child's family environment, relations with his or her family, system of values and parental setting are the first factors to affect the development of the child's personality.

Children adopt the norms of community life in a society and perceive culture thorough their parents. It is within the family that an individual gets his or her first social experience and adopts rules and norms of behaviour. The nuclear family is the most readily available context where the establishment of role models is observed. Parents, as a rule, are significant people for an individual; for this reason

they partly consciously and partly unconsciously internalize parenting methods and subsequently copy them when raising their own family: "...what parents we have become to a significant extent depends on what we saw, experienced and perceived in the behaviour of our own parents" (Spivakovskaya, 2000)

"A direct correlation can be observed between the structures of one's parents' family and the family one creates with his spouse — 'spousal' families are in a vast majority of cases similar to 'parental' ones, the characteristics of one's parental family are unconsciously perceived by the children in their families" (T. I. Dymnova, 1998, p.47).

The study of the influence of the micro-level (the level of the mother's family) on the formation of maternal behaviour (mainly, deviant behaviour) was performed by V. I. Brutman, A. Y. Varga, and I. U. Hamitova (2000). Their works are devoted to the study of the malfunctioning of mechanisms for the creation of maternal behavior that can be connected with the dynamics of the family of the future expectant mother (i.e. her relationship with her parents). The results of clinical observations have revealed that the reasons for deviant maternity stem from the dramatic relationship between a woman exhibiting deviant behaviour and her mother. According to the authors, the existing malfunctioning is the consequence of the impossibility of her identifying with the role of the mother (due to maternal deprivation) at the level of psychological gender as well as at the level of her developing her maternal role. Therefore, it's concluded that identifying with one's mother and further emotional separation (on that basis) are two prerequisites for developing normal maternal behaviour.

The study of mother-daughter relations is further considered as a separate direction from the point of view of their influence on the success of the daughter as a mother. Works dedicated to this topic emphasize the influence of a substantive part of the mother-daughter emotional relationship on the daughter's own maternal role. Among the important factors are: the mother's support at the stage of early ontogenesis, continuity of attention of the mother to the daughter's emotional problems in adolescence, responding adequately to the daughter's psychological problems relating to her pregnancy and subsequent role as mother, as well as the dynamics of unconscious complexes in mother-daughter relations.

All of the diversified studies that have been presented on the influence of a woman's parents and family on the maturity of her conception of motherhood are brought together in the works of I. S. Kon (2000). He sets out his opinion of the influence of the micro-level on motherhood in the following manner: "The continuity of generations is always selective: some knowledge, standards and values are adopted and transferred to subsequent generations, while others which are not consistent with the circumstances that have changed are denied or transformed. The continuity is not similar in different fields of activity. In the field of consumer orientation and certain other settings, the difference between the senior and junior member as a rule is greater than in relation to principal social values..." (Kon, 2000).

Personal level. As mentioned above, society and the nuclear family only provide a specific model of parenthood, which is influenced by beliefs, opinions and individual characteristics.

It is important to note that while all the factors emphasized by Ovcharova are significant, they are not equal. In this vein, familial ideas about ideal parenting, etc., and the similar individual propensities the mother has are directly linked to societal factors. Like L. S. Vigotskiy, we are tempted to view the macro-level more as the influence of culture, rather than societal factors, onto communal, familial and individual ideas on motherhood.

Knowledge about the factors influencing the content of attitudes will allow us to distinguish risk groups, carry out diagnostics and appropriate correction, and to apply preventive measures to those women who are in at-risk groups. The latter is extremely important in modern society because of the relevance of the problems of women who end up having abortions or abandoning or abusing their children and the problems connected with the distortions of child-parent relationships. These problems cause emotional trouble and deviations from the optimal development of the child.

We attempted to prove that culture plays a primary role in forming attitudes towards motherhood by examining these attitudes in women with different religious affiliations. We postulated that belonging to a certain religion is tantamount to belonging to a certain culture. Sixty women aged 18 to 22 took part in the research. They were divided into three sample groups — Christians, Muslims, and Buddhists.

The Muslim group was composed of women who were born and reside in Kazan, Tatarstan, who identify as Muslims and belong to the KulShareef Mosque congregation. The Buddhist group was composed of women residing in Elista, Kalmykia who identified themselves as Buddhists. The Christian group was composed of women residing in Podmoskovie who belong to the All Saints Church of Beloozerskoe and identify themselves as Christians.

Based on the results obtained through different methods of research, we attempted to identify the three levels Ovcharova discovered.

The macro-level (societal level) was researched with the help of questionnaires (socio-demographic characteristics). The micro-level (family level) was researched with the help of the “Prologue” technique (Borovikova, 1998). The individual level (personality level) was researched with the help of a free association technique, where women were instructed to complete the sentence “Motherhood is...”. To examine the degree to which favourable/unfavourable ideas affected motherhood, a drawing test, “Me and my future child” (Filippova, 2002), and a composition on the topic of “Ideal motherhood” were used.

The free association method was used to study the substance of the ideas of motherhood, and we also considered acceptance/denial of the public level (macro-level) at the individual level.

The most obvious difference between the public understanding of motherhood and the personal understanding of it was detected in the “Christianity” sample (a large number of poorly-differentiated definitions with a wide range of ranks), these differences are less pronounced in the “Buddhism” and “Islam” samples: individual perceptions had a greater frequency of coincidence with public perception.

Thus, we can speak about the acceptance or denial of a society at the individual level.

A high level of acceptance of one's perception of society regarding positive and negative motherhood was obtained from the "Islam" and "Buddhism" samples. In the sample "Christianity", social norms are accepted to a lesser extent.

Additional results we perceived allowed us to detect qualifying differences among the sample groups on the subjects of the image of the child, the image of mother and the parent-child relationship. Moreover, sample groups differed in their attitudes towards future motherhood.

Favourable and unfavourable ideas of motherhood were analysed through content analysis work. We have emphasised substantial items of analysis, by which we mean the group members' perceptions of motherhood were estimated. To these items we assigned: image of mother (absence of perception, negative attitude, neutral attitude, positive attitude), image of child (absence of perception, negative attitude, neutral attitude, positive attitude), the interaction between mother and child, the expansion of the situation by objects and subjects, and the centration of the spousal relationship.

In the micro-level study, and attitude to the unborn child (as a component of ideas of motherhood), emphasis was placed on the following scales: "attitude to the future of child", "attitude to parental family", and "childhood" (the "Prologue" technique). The specifics of the general state of girls were also analysed: well-being, self-doubt, anxiety, signs of proneness to conflict and hostility, etc.)

Results

Our results allowed the detection of the distinguishing characteristics of attitudes towards motherhood in women from different cultures.

- *Sample group "Muslims"*

As a whole, based on three techniques (the "Ideal motherhood" composition, the "Me and my future child" drawing and "Prologue"), the image of the child is more favourable among the women from the sample group "Muslims". The child is mentioned more often in the composition (as opposed to women from the sample group "Christians") and the mentions are of a positive emotional nature.

"Interaction with child" yielded higher scores as well (joint mother-child activities were researched). The results of the drawing test tend to be more favourable as well. On the individual level, women from this group were more likely to accept the societal level (according to the results of the free association technique "Motherhood is..."). Motives for terminating a pregnancy were vastly different from the other two sample groups. Most women answered that abortion is not acceptable under any circumstances, while a few answered that a threat to the mother's life was the only reason to abort. For the women of this sample group, the value of the life of the future child is very high. These women don't think that "children will stop them from life. Children will be a burden and to have children means to have extra problems. It's far better to live for my own pleasure". The number of children they desired was 2.6, which is higher than in the other sample groups. The ideal age for getting married and having one's first child is slightly lower than in other sample groups.

- *Sample group “Christians”*

Based on the results of the composition “Ideal motherhood”, the image of the mother is mentioned much more often, and has a more positive nature than the image of the child. Often the image of the child is missing, or has a neutral emotional nature (in some cases a negative emotional nature). The same goes for interaction with the child. The drawing test revealed states of anxiety and self-doubt. On an individual level, the societal level is not accepted. This is evidenced by a large number of answers during the first stage of the free association technique and discrepancies during the results ranging stage. Based on questionnaire answers, reasons for terminating a pregnancy are as follows: financial situation (housing problem, low income, etc.), marital status (unmarried, husband doesn’t want to have children, etc.), personal interests (haven’t lived myself yet, don’t want to settle down). The number of children desired averaged 1.27. The ideal marriage age and preferred age for giving birth to one’s first child are higher than in the other sample groups.

- *Sample group “Buddhists”*

The sample group “Buddhists” is similar to the sample group “Christians” in terms of its composition. The only difference is that Buddhist women more often expand motherhood to include other people (husband, parents, other relatives, etc). The drawing test revealed a low level of anxiety. On an individual level, the groups social norms are accepted. Based on the answers to the questionnaire, pregnancy may be terminated for a variety of reasons: marital situation (poor relationship with the husband, unmarried, divorced, illegitimate child, etc.), due to the child having a disability, and issues related to woman’s health. Most of the women questioned do not view abortion as murder unless it is a late term abortion. The average number of children these women wanted to have averaged 2.16. The group’s ideal age for marrying and having one’s first child are marginally higher than in the sample group “Muslims”.

Thus, based on the results of our research, we can conclusively say that culture determines the specifics of attitudes towards motherhood and that the majorly influences state and family attitudes.

Coincidentally, some similarities were observed in all three sample groups. The image of the mother in all three groups yielded level numbers (composition “Ideal motherhood”: Christians — average of 2 points, Muslims — average of 2.1 points, Buddhists — average of 1.8 points).

All three sample groups showed a correlation between the attitude towards the parental family and the attitude towards one’s future child (as seen in the “Prologue” technique). There are differences between the attitude towards the parental family and the attitude towards the future child in the sample groups, but the scale of influence at the familial level on the attitude towards motherhood is similar. This correlation may point to the interdependence of the societal and familial levels: in different cultures, the micro-level (familial level) is be different. In this respect, Ovcharova’s three-tiered model is more complex: there is an inter-determination between the components.

An analysis of similarities and differences between the sample groups allows us to examine the components of attitudes towards motherhood that affect major

influences on the future relationship between mother and child. The creation of the image of the child is a more important component in terms of its differentiation and emotional value. Comparable results were reached by other researchers (O. A. Kopil, O. V. Bazhenova, 1994). They examined the personal characteristics of the mother and discovered the importance of the image of the child for a future relationship with the mother.

Our research allows us to pinpoint the important characteristics of attitudes towards motherhood: the image of child, the mother and the parent-child relationship: their existence and emotional attitudes towards them as well as the types of attitudes to future maternity that can majorly influence the mother-child relationship. The most important role is allotted to the macro-level that deals with the culture in which a woman lives. An important factor is her personal acceptance of cultural and familial ideals.

Ovcharova's levels of attitudes towards motherhood do exist. However, they do not exist in a vacuum but instead determine each other. As was stated above, the most significant level is the macro-level. At the same time it can be accepted or not accepted by a woman. In other words, the individual level can either be a complete derivative of the macro- or micro-level, or there can be a conflict. These interdependence peculiarities of different levels greatly influence the attitude towards motherhood. If there is a conflict between the individual and macro-level, a negative view of motherhood appears; if the mother accepts the macro-level at the individual level, a more favourable view of motherhood appears.

This statement allows us to look at this contradictory situation in science, which is connected with the problem of determination of female reproductive behaviour in a different way: it's important to take into account not only the individual activity of the woman but also the influence society has on the formation of attitudes toward motherhood.

Conclusion

The results of the research made it possible to identify women who are more and less likely to have a favourable future relationship with a child.

Women with a **favourable attitude** towards motherhood tend to have a full-fledged and differentiated image of the mother, her child, and their mother-child relationship. They are all of a positive emotional nature. The image of the child is central. Women construct the image of present and future, and motherhood occupies a leading position in their system of values. There is no conflict between the individual and societal levels. These women imagine themselves as "surrounded by children and giving them love". The number of children desired is two or more. They are prepared to adopt or foster-parent and/or volunteer for children's charities. Their physical, emotional and psychological capabilities allow them to do it. They have a negative view of abortion and see no reason for it or would only endorse it if the mother's safety and health were in danger.

Women with a **fair attitude** towards motherhood tend to include images of mother and child, but they are of a neutral or faintly positive emotional nature. There is no negative emotional connotation in this group. The mother-child relationship is missing or not differentiated. As well as in the previous group, in this

group there is no conflict between individual and societal levels. They desire two children. Women from this group point out that they have limitations in the sphere of motherhood. Abortion is not embraced, but the circle of acceptable reasons is larger. Reasons such as one's marital situation, a malformed or disabled fetus, and woman's health occupy the leading positions in their hierarchy of reasons.

For women with an **unfavourable attitude** towards motherhood, the image of the child tends to have a negative emotional connotation (connected with difficulties, resentment) or not exist at all. Women do not want to include the child in joint activities, which they find it burdensome and/or unnecessary. Their relationship with a child is not presented. The image of the mother is central. In contrast to other groups of women, there may be a conflict between the individual and societal levels. These women only desire one child. Their motives for abortion are widespread and include physical, economic and psychological aspects. They may abort due to an unsatisfactory financial situation, their marital status, or due to personal interests.

The highlighted characteristics of women with different attitudes towards motherhood open up possibilities for testing and correcting attitudes that are of a less than favourable nature. This would help pre-emptively improve the relationship between the mother and her future child.

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Original manuscript received January 15, 2013

Revised manuscript accepted June 1, 2014

First published online June 30, 2014

Psychological adaptation in the info-communication society: The revised version of the Technology-Related Psychological Consequences Questionnaire

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The aim of the study is to consider technology-related changes in psychological needs and boundaries that affect one's personal adaptation to the info-communication society, as well as how they relate to problematic or excessive technology use. Based on the psychological model of the consequences of technology use, we've picked two forms of technology use (one related to mobile phones and the other related to the Internet) from a revised version of our Technology-Related Psychological Consequences Questionnaire. The new version includes nine questions: two assessing the excessive use of technology (the inability to resist using technology and subjective dependence), four assessing changes in psychological boundaries (boundaries extension and violation, easiness-related and opportunity-related preference for technology) and the other three measuring technology-related needs (functionality, convenience and image making). In the normative sample (N=132), appropriate reliability, factor validity and convergent validity were demonstrated in comparisons to the picture measure of the technology-related boundaries change. Based on hierarchical regression and moderator analysis, it was shown that changes in psychological boundaries affect the excessive use of technology (explaining an additional 17-27% of the variance) after adjusting for frequency of use and age group. The extension of boundaries and ease-of-use-related preference for mobile phones versus the Internet predicted satisfaction with life after adjusting for frequency of use, age group, inability to resist and subjective dependency respectively; however, the figures were not statistically significant. Thus, our data supports the hypothesis that there are different kinds of technology-related changes in psychological boundaries that manifest themselves in the subjective feeling of dependence on technology and the feeling that it is impossible to do without technology, which might in some cases be important for personal satisfaction with life.

Keywords: psychological consequences of technology, adaptation in the info-communication society, the revised version of the Technology-Related Psychological Consequences Questionnaire, the psychology of Internet use, the psychology of mobile phone use, excessive use of technology

The traditional focus of psychological studies of adaptation in the info-communication society is on problematic use or misuse (e.g., Bianchi, Phillips, 2005) and technology addiction (Griffiths, 2000, 2005). However even in the addiction studies, it remains clear that there are a plenty of technology-related psychological and social changes (e.g., in beliefs, expectations, personality, communication) that should be taken into account (How technology..., 2009, Larkin et al., 2006, Byun et al., 2009, Tian et al., 2009). The behavioral consequences are sometimes too ambiguous to allow one to distinguish between adaptation disorder and benign or beneficial adaptation, which raises questions with respect to the qualitative analysis of the psychological experience (Griffiths, 2010, Madell, Muncher, 2004). Population studies of Internet use in the EU (Livingstone, Haddon, 2009, Livingstone, Helsper, 2008) and in Russia (Soldatova et al., 2013, Soldatova, Zotova, 2012) have demonstrated a clear need for a shift in attention from the likelihood of risks connected with Internet use to the psychological (e.g., emotions, coping etc.) and social (e.g., parental mediation) factors underlying reactions, feelings and behavior.

The aim of this paper is to consider technology-related changes in psychological needs and boundaries that could affect personal adaptation to the info-communication society beyond and in interaction with problematic or “addictive” use. Based on the psychological model of the consequences of technology use (Emelin et al., 2012a), we have developed a revised version of the Technology-Related Psychological Consequences Questionnaire (Emelin et al., 2012b) and suggest some ways in which it may be applied to the psychological aspects of difficulty adapting to new technology.

Psychological model of consequences of technology use: a framework for empirical studies

According to the model (Emelin et al., 2012a) there are technology-related psychological transformations that are typical for a population which can mediate subjective well-being, technology use and technology-related emotional and behavioral problems. One possible transformation is the perception that gadgets or a new technology are necessary or even “too necessary” for a person. This hypothesis is in concordance with the data (Walsh, White, 2007) that technology use is closely related to subjective appraisals of its controllability and the development of a technology-related identity (self-identity, similarity with the prototype, emotional appraisal of the prototype). A similar idea was suggested by L. Srivastava (2005) in the concept of personalization. One criteria of excessive use is when people allow themselves to develop a mindset where personal gadgets (e.g., mobile phones) are indispensable and perceived as “always necessary”. Another technology-related change involves one’s perceived sphere of needs (e.g., Srivastava, 2005). Both technology and gadgets obtain some additional meaning for a person (e.g., “to have an expensive mobile phone” means “to look decent”), and the transformation of existing or creation of new needs (e.g., the need to own an impressive mobile phone). The third transformation was described by Marshall McLuhan (McLuhan, 1964) as a subjective extension of human boundaries. In the previous study, we suggested that a distinction be made between two aspects of this component. Due to a new technology, a person may reach and control many more objects and people than

earlier (boundaries extension) but has far more potential to be reachable by others (boundaries violation).

Measurement of technology-related changes in needs and psychological boundaries

In accordance with the theoretical paradigm, methodological studies either focus on the measurement of the epidemiology of technology use, technology-related risks and factors that decrease them (Livingstone, Haddon, 2009) or on problematic use or technology addiction (Griffiths, 2000, Bianchi, Phillips, 2005, Rutland et al., 2007, Widyanto et al., 2008). While totally sharing the understanding of the importance of such studies, here we would concentrate on the topic of other technology-related psychological consequences, using some components of excessive use as dependent and control variables.

In accordance with this framework, we developed a Technology-Related Psychological Consequences Questionnaire (Emelin et al., 2012b). This is a screening instrument which measures three variants of technology dependency (for the internet, for mobile phones and for computers) and consisting of seven scales. Each scale uses a 4-rating Likert scale to appraise attitudes towards three items. Two of the questions pertain to excessive use: inability to refuse (“I can’t imagine my life without a mobile phone”) and subjective dependence (“I spend more time on the Internet than I would like to”). Two questions focus on changes in psychological boundaries: boundaries extension (“If a person with whom I talk via the Internet isn’t online for a long time, I worry”) and boundaries violation (“I’m concerned that my personal information may be available to anyone on the Internet”). Three more questions are about technology-related needs: functionality (“I like that I can use the Internet at any time to send a message to anyone I need to contact, wherever I am and wherever they are”), convenience (“All I need in a computer is for it to be reliable and easy to use”) and image making (“I prefer to buy expensive, stylish mobile phones”).

In the normative Russian sample (Emelin et al., 2012b) Cronbach’s alpha for all the scales except convenience varied across scales and test versions from .61 to .80, except for the convenience scale. Analysis revealed the expected factor structure for the questionnaire, and differences between age groups in technology-related psychological changes as well as a pattern of correlation with respect to frequency of technology use.

However, there were major limitations which motivated us to continue work on the questionnaire:

1. First, despite clear content validity and well-reproduction in factor analysis, the responses to the question dealing with technology-related changes in needs (convenience) had a rather low consistency (.46-.54 for different forms). With respect to Internet use, the consistency of the responses to the question regarding boundaries violation was even lower (.38). In the revised version, these items were reformulated.
2. Second, technology-related changes in psychological boundaries were assessed via two items – one dealing with the extension of boundaries and the

other dealing with boundary violations. The boundaries extension scale included expectations that the use of technology makes other people always available and results in worry and anger when they are not. The boundaries violation item characterized conscious concerns about the loss of privacy due to technology and social demands to always stay in touch. However, the phenomenon of extended boundaries reflects expectations regarding the controllability of the whole world. It reflects the attitude that not only other people but also information is perceived as always being available, while more conventional “off-line” ways of achieving the same goals (paper letters, libraries etc.) are appraised as difficult and unnecessary. Another important component of boundaries extension is a belief in the indispensability of technology due to new opportunities for activity. There are data that one possible factor reflecting the subjective importance of mobile phones is that they offer a unique opportunity for personalization (Srivastava, 2005, Tian et al., 2009). Personalized gadgets are perceived as being a part of person’s identity and the loss of them becomes especially traumatic. In studies using youth focus groups (Madell, Muncer, 2007), it was demonstrated that the main subjective reason for the frequent use of Internet and mobiles is that they allow users to control their social interactions. In particular, young people don’t feel that a difference exists between on-line, mobile and personal communication and prefer text messages to calls and personal meetings because it allows them to hide their emotions, to resolve conflicts, and to keep messages and reread them later. Thus, we have divided the boundaries extension scale into three scales: a communication-related extension of boundaries, a preference for technology related to ease of use (e.g., “lots of hobbies and real-life activity can be replaced with Internet use”, “For me it’s easier to text someone than to talk in person”) and an opportunity-related preference for technology (e.g., “It’s important that mobile phones make it easy for me to distract myself from unpleasant conversations or events”, and “the main feature of the Internet is the universal availability of information”).

3. Another concern was related to the question of convergent validity. Most of the existing instruments measure different aspects of problem use, the misuse of technology and technology addictions. Moreover, most of them only address the effects of the Internet. To our knowledge, there is no instrument measuring technology-related changes in needs and psychological boundaries that could be used to assess the convergent validity of the questionnaire. As an indirect support for it, we found expected patterns of relationships between frequency of use, age and technology-related changes. Nevertheless, there is a clear need for other conceptually-related instruments that we intended to overcome in this study.
4. Finally, the original version of the Technology-Related Psychological Consequences Questionnaire suggested that all of the items are correlated but equally important in terms of their impact on the distant psychological and behavioral consequences of technology use. However, the model implicitly suggests that changes in needs and psychological boundaries could be an explanatory mechanism leading to the development of dependence beyond the frequency of tech-

nology use and - moreover - leading to changes in well-being beyond subjective dependency. A hierarchical regression analysis supports the first hypothesis; it demonstrated that subjective dependency on mobile phones and the Internet can be predicted by an increase in boundaries extension and image-making, while subjective dependency from computers is predicted by the feeling that one's boundaries are being violated (Emelin et al., in press). Further analysis revealed that a subjective inability to resist technology and gadgets is predicted by boundaries extension and the subjective importance of technology-related convenience and image making. All of the effects remained significant after adjusting for age, gender and frequency of technology use. In partial support of the second hypothesis, preliminary data (Emelin et al., 2013) demonstrate that changes in needs and psychological boundaries are predictors of a worsening quality of life, worsening health and emotions, and a downturn in communications. Thus preliminary data support the idea that the psychological consequences of technology are hierarchically organized.

Our study was focused on the following tasks:

1. To test the psychometric properties of the revised version of the Technology-Related Psychological Consequences Questionnaire in two main spheres (Internet and mobile phone use) and to compare them to the original version. Specifically, we concentrated on the problem of the validity of the questionnaire. Due to an absence of conceptually close methods (see below) convergent validity could not be tested directly. Theoretically, there are two possible ways to test the validity of the instrument. First, we could use non-standardized (e.g., qualitative) instruments. Second, some empirical criteria could be tested (we could not provide experimental studies in Russia because Internet and mobile phone use are wide-spread, but we could use age or frequency of technology use as criteria for hypothesized differences). As in the earlier study (Emelin et al., 2012b) both age and frequency of use were found to correspond to empirical criteria, helping to differentiate between people whose use of technology had resulted in different psychological consequences; in this study we implemented the first approach. For this, a new picture method for the assessment of technology perception was developed (see below) that operationalized the problem of psychological boundaries in terms of physical distance.
2. To reveal the role of young age in determining the psychological consequences of technology use. It was hypothesized that youth could have a direct impact on the characteristics of excessive technology use (subjective dependence and inability to resist technology) but also moderate the impact of technology-related psychological changes on excessive use and subjective well-being (satisfaction with life).
3. To study the possible hierarchical structure of technology-related psychological changes. According to the framework, we suggested that changes in psychological boundaries have an effect on the excessive use of technology beyond age, gender and actual frequency of use. Also, we expected that changes in psychological boundaries would predict satisfaction with life beyond the effects of excessive technology use.

Participants

132 people (29 males, 103 females) 17-70 years old (mean age 25.8 ± 11.8) participated in the study. 46 (34.8%) had a higher grade education, others (86, 65.2%) had completed school educations and were either students or worked. 38 (29.3%) were married or lived with partner, 84 (64.6%) were not married and 8 (6.2%) were divorced; 25 (19.2%) had children.

Based on the earlier study (Emelin et al., 2012b), we expected age-based differences in the psychological consequences of technology, so it was crucial to divide participants into their age groups. The most widely used theory in the classification of ages is generation theory (Howe, Strauss, 1991, 1993). According to this theory, people under 70 may be divided into generational groups: Baby-boomers (50-70 years old), Generation X (29-49 years old), Generation Y (13-28 years old, sometimes called millennials), and Generation Z (under 13 years old). We didn't base our analysis on this classification system for three main reasons. First, generation theory is based on an analysis of the culture and history of the USA. Boundaries between groups are blurred and authors of different papers suggest different age cohorts. On one hand, technological progress is only one of several factors taken into account in the theory. This fact leads to uncertainty as to whether this sociological and cultural theory may be applicable to the psychological study of technology. On the other hand, it seems doubtful that US history has the same criteria for generations as Russian history, and even the fruits of technological progress have become available at different times (for example, unlimited high-speed internet access first became available in select American cities in 1998, and was not widely available in Russia outside Moscow and St. Petersburg until 2008). Second, our aim was to reveal differences between younger people and adults, so it seemed reasonable to use social criteria to determine who was "young": university students and people at the beginning of their careers (18-22 years old). Third, we could not study older adults in detail because of our sample structure - and this is an important dimension for further studies.

As a result, we set up our typical social criteria to differentiate between younger and older participants in Russia. There were young people: university undergraduate-aged participants (18-22 years old, students, $N=82$); and older adults (23-70 years old, older adults, $N=50$). Due to the small subsample sizes, we could not further differentiate among the group of older adults in this study. Further research is needed to clarify the role of age in adults when measuring the psychological consequences of technology.

Methods

The study had a cross-sectional design. Participants completed:

1. **The revised version of the Technology-Related Psychological Consequences Questionnaire***. This is a screening instrument that exists in two forms (one applies to the Internet and the other to mobile phones). Items in different forms

* The revised version of the Technology-Related Psychological Consequences Questionnaire and further details on its structure and items are available from corresponding author.

include minor reformulations (e.g., “I can’t imagine my life without Internet access” or “I can’t imagine my life without a mobile phone”). There are nine questions (items) in each form: seven from the earlier version (Emelin et al., 2012b) and two new items. Earlier scales included the inability to refuse access to technology, subjective dependence, the extension of boundaries, the violation of boundaries, functionality, convenience, image making (see examples for each question earlier in the text). Comparing to the original version, the questions which referred to the convenience boundaries and violation of boundaries (only in the Internet form) were slightly reformulated in order to achieve better consistency.

Two more items were added to the revised version which characterized easiness-related (item examples: “lots of hobbies and real-life activity can be replaced with Internet use”, “For me it’s easier to text someone than to talk in person”) and opportunity-related preferences for technology (item examples: “It’s important that mobile phones make it easy for me to distract myself from unpleasant conversations or events”, “the main feature of the Internet is the universal availability of information”).

Each scale is tested using three items, which are appraised using a 4-point Likert scale.

- 2. Picture method for the assessment of technology perception.** To study the convergent validity of the questionnaire, the picture method for the assessment of technology perception was developed. Participants were given a sheet of paper with a circle 5 cm in diameter in the center and a list of different objects. Three of the objects were technology-related (Internet, mobile phone, TV) and the others were distracters (family, friends, work / learning, personality traits, interests, values). The instructions were: “Imagine that this sheet of paper is your life and whatever is around you. The circle in the center represents you. There is a list of objects below — please draw a circle for each of them (with a number) on this sheet where you want. Try to draw the first thing that comes to your mind. The quality of the picture and what kind of circles you draw doesn’t matter”. For each circle, the distance from the center (“Self” circle) and the diameter were calculated.

Comparing the existing technology questionnaires using the picture method allows participants to concentrate: not on problem use or dependency but on the change in boundaries. Consequently, it is preferable for testing the convergent validity of our questionnaire. Although there are no studies using this method for technology perception, it is widely used in identification (Swann et al., 2009, Gomez et al., 2011) and illness representation (Buchi, Senski, 1998, 1999) research.

In our sample, Cronbach’s alpha for the distance of the six distracters was .79; for diameters, it was .83. The consistency of the distances for three technology-related objects was .66 and .89 for their diameters. Thus, primary data supports the hypothesis that the picture method could be reliably used in studies of technology-related psychological changes.

3. **Actual frequency of technology use** was measured by one item related to Mobile phones and one item for the Internet form assessed on the 4-point Likert scale (never / almost never, rarely, sometimes, frequently / almost always).
4. **Satisfaction with life scale.** This screening instrument was developed by E. Diener et al. (1985) and is widely used in studies of the cognitive component of subjective well-being.

Results

Item reliability

According to item reliability analysis (Table 1), Cronbach's alphas are rather close to the alphas in the original version of the validation sample (Emelin et al., 2012b). However, the Internet subjective dependence, Internet image making and Mobile phone functionality scales were less reliable than in the previous study. While there were no changes in these items, the decrease in reliability could be explained by occasional variations in the samples. The Alpha for the Internet boundaries violation question increased, reaching the appropriate level for the 3-item question. For convenience, the scale results were inconsistent: item reformulation led to an increase in consistency for the Internet form but a decrease for the Mobile phone form.

Consistencies for the easiness-related preference for technologies were appropriate, while consistencies for the opportunities-related preference for technology was low for the Internet question and appropriate for the Mobile phone form.

Table 1. Consistency (Cronbach's alphas) of the scales for the Mobile phone and Internet versions of the questionnaire

Technology-related changes	Mobile phone form	Internet form
<i>Psychological dependence</i>		
Inability to resist	.81 (.80)	.75 (.61)
Subjective dependence	.66 (.68)	.57 (.71)
<i>Change of psychological boundaries</i>		
Communication-related boundaries extension	.77 (.75)	.74 (.71)
Easiness-related preference of technologies	.67 (N/A)	.67 (N/A)
Opportunities-related preference of technologies	.61 (N/A)	.54 (N/A)
Boundaries violation	.62 (.64)	.62 (.38)
<i>Change in needs</i>		
Functionality	.58 (.65)	.73 (.78)
Convenience	.33 (.54)	.67 (.46)
Image making	.76 (.80)	.49 (.72)

Note: There are alphas for the original version in the brackets (Emelin et al., 2012b).

Inter-scale correlations and factor structure of the questionnaire

None of the inter-scale correlations were higher than .60, proving that scales represent different constructs. In the next section, we present correlations of new scales with others. From a theoretical perspective, we suggested that any kind preference for technology could be related to subjective dependence and boundaries extension.

As shown in Table 2, an easiness-related preference for the Internet is related to both components of psychological dependence as well as communication-related boundaries extension and the image-making function of the Internet. However, it is negatively correlated with the boundaries violation scale. Surprisingly, an easiness-related preference for mobile phones was only positively related with the boundaries violation query. What this means is that people are more likely to appraise mobile telephony as easier for them than meeting in person because they have more worries about compromising their privacy via mobile phone.

Opportunity-related preferences for technology correlate positively with most of the other query answers except violation of boundaries, as well as subjective dependency on the Internet and the convenience query in the Mobile version. It's important to mention that both latter scales have rather low reliability in our sample, which explains the lack of correlation.

Table 2. Correlations between the easiness-related and opportunities-related preferences for technology query answers, with the questions from the original version of the questionnaire

Scales	Mobile phone form		Internet form	
	Easiness-related preference for technology	Opportunities-related preference for technology	Easiness-related preference for technology	Opportunities-related preference for technology
Inability to resist	-.03	.40**	.43**	.33**
Subjective dependence	.04	.42**	.25**	.15
Communication-related boundaries extension	-.09	.23**	.36**	.21*
Boundaries violation	.27**	.12	-.22*	-.06
Functionality	-.02	.25**	.17	.36**
Convenience	.08	.12	.11	.40**
Image making	.06	.41**	.30**	.29**

Note: * — p<.05, ** — p<.01

The factor structure of the revised Technology-Related Psychological Consequences Questionnaire was tested using a confirmatory factor analysis. In consistency with the theoretical framework (Emelin et al., 2012a), different types of technology-related psychological changes could be related to each other and the whole structure of changes could not be well-differentiated, while different types of

changes are not fully mentioned and distinguished by participants. So we allowed in the model for between-factors covariance as well as covariance between some conceptually flawed items. A decision about the conceptual relationship between items loading on different factors was made by a panel of experts in cases where their content was clearly explained. For instance, the item “It’s important for me than the access to the Internet was easy and quick” refers to the convenience scale, while the item “If the person whom I sent the e-mail don’t answer, I think that he doesn’t want to speak with me” refers to communication-related boundaries extension. However, both items are also about the inability and reluctance to wait for some time and the drive to achieve goals quickly.

Typical criteria suggested for the model’s goodness of fit are: comparative fit index, CFI is higher than .90 (some authors consider as appropriate range of .85 - .90), root mean-square error of approximation, RMSEA is less than .05 (with the appropriate range of 0.06 - 0.08) and χ^2/df is around 2 (Brown, 2006).

Both forms have shown good fit with the framework with CFI = .96, RMSEA = .04 (90% CI = .01 - .05) and $\chi^2/df = 307/263 = 1.17$ for Mobile phone form and CFI = .94, RMSEA = .04 (90% CI = .02 - .05) and $\chi^2/df = 325/272 = 1.19$ for the Internet form. Thus our data support the factor validity of the revised Technology-Related Psychological Consequences Questionnaire Mobile form and Internet form.

Table 3. Correlations of picture method for technology use and the revised Technology-Related Psychological Consequences Questionnaire

Scales	Mobile phone form		Internet form	
	Distance from the “Self” circle	Diameter of the circle	Distance from the “Self” circle	Diameter of the circle
Inability to resist	-.33**	.00	-.23**	-.11
Subjective dependence	-.09	-.02	-.19*	-.01
Communication-related boundaries extension	-.28**	.08	-.19*	-.01
Boundaries violation	.25**	-.07	.05	-.11
Easiness-related preference of technologies	.01	-.09	-.30**	.03
Opportunities-related preference of technologies	-.15	.04	.03	-.12
Functionality	-.21*	-.02	.00	-.08
Convenience	-.02	.09	-.08	.00
Image making	-.16	.02	-.15	-.15

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

Psychological consequences of technology and the picture method for technology use

Measures of the distance from Self, but not the diameter of the circles, correlated significantly with some scales of the revised Technology-Related Psychological Consequences Questionnaire (Table 3). First, a higher distance of the Internet and mobile phones was related to a higher subjective possibility of refusing to use

technologies and a lower communication-related boundaries extension. For mobile phones, distance from the Self correlated with boundaries violation and lower change in the need of the functionality of the phone while in the Internet version it was related to lower praise for the Internet's ease of use. As expected, there were no or low correlations between the distances and subjective dependence scales.

Changes in psychological boundaries as a predictor of subjective dependency and well-being

To reveal the impact of technology-related changes in psychological boundaries on subjective dependence and quality of life, a series of hierarchical regression and moderator analysis was used (Chaplin, 2007). There were three hypothesis. First, we suggested that technology-related changes in psychological boundaries would have an impact on subjective dependence and inability to resist after adjusting for age group and frequency of technology use. Gender was excluded from all models; in our sample it had no impact on dependent variables. Second, it was hypothesized that age could function as a moderator of the relationship between changes in psychological boundaries and different aspects of excessive use. For instance, boundaries extension could have a prominent link to subjective dependence, but only in young participants and not in older adults. Third, we supposed that changes in psychological boundaries would have their main interaction (with age group), impact on satisfaction with life, beyond frequency of use and subjective dependence.

Hierarchical regression was repeated for both the Mobile phone and Internet forms of the questionnaire, for three dependent variables: subjective dependence on technology, inability to resist technology, and satisfaction with life. There were three steps of regression for subjective dependence and inability to resist, and four steps - for satisfaction with life. For all the models at the first step, age group and frequency of use were included in the model. For subjective dependence and inability to resist, on step 2 we added changes in psychological boundaries variables to the model. Only variables that significantly correlated with dependent variables were included. At step 3, products of the group and each of the changes in psychological boundaries were added. Thus the significant change of the R^2 at step 2 means that changes in psychological boundaries explain some of the parameters of excessive use of technology beyond frequency of use and age. A significant change of the R^2 at step 3 evidences that there is a significant interaction effect modifying the impact of changes in psychological boundaries in different age groups. For satisfaction with life, step 2 included subjective dependency and inability to resist, while step 3 added changes of psychological boundaries variables. Step 4 was similar to the step 3 of two previous models.

As shown in Table 4, data supports the hypothesis about the main effects of changes in psychological boundaries on the excessive use of technologies after adjusting for frequency of use and age group (explaining additional 17-27% of variance) from the inability to resist technology is predicted by boundaries extension and opportunities-related preference for technology (both for mobile phones and Internet) and by easiness-related preference (for Internet only). A feeling of subjective independence from mobile phones is related to boundaries violation and

opportunities-related preference. Subjective dependence from the Internet correlates to boundaries extension, violation and easiness-related preference.

The hypothesis of the moderator effect of the age was partly confirmed only for the Inability to resist the internet: it was dependent on the interaction between age group and opportunity-related preference for the internet. In youth, an opportunities-related preference for the internet is a stronger predictor of inability to resist than in older adults ($r=.39, p<.01$ and $r=.27, p<.10$ respectively).

Table 4. Technology-related changes in psychological boundaries as predictors of excessive technology use: results of hierarchical regression and moderator analyses

Variables in the model	Mobile phones from		Internet form	
	β	R ²	β	R ²
<i>Dependent variable: inability to resist technology</i>				
<i>Step 1</i>				
Frequency of use	.42**	.22**	.37**	.16**
Age group	-.14 ^T		-.09	
<i>Step 2</i>				
Frequency of use	.36**		.27**	
Age group	-.08		-.09	
Boundaries extension	.26**	.40**	.26**	.43**
Easiness-related preference	n.s. ¹		.25**	
Opportunities-related preference	.29**		.22**	
<i>Step 3</i>				
Frequency of use			.27**	
Age group			.80*	
Boundaries extension		n.s. ¹	.27**	.45**
Easiness-related preference			.26**	
Opportunities-related preference			.34**	
Age*Opportunities-related preference			-.93*	
<i>R² change</i>				
Step 2	.18**		.27**	
Step 3	n.s. ¹		.02*	
<i>Dependent variable: subjective dependence</i>				
<i>Step 1</i>				
Frequency of use	.23*	.06*	.14	.11**
Age group	-.03		-.28**	
<i>Step 2</i>				
Frequency of use	.22*		.07	
Age group	-.01		-.19*	
Boundaries extension	n.s. ¹	.26**	.18*	.28**
Boundaries violation	.21*		.28**	
Easiness-related preference	n.s. ¹		.23*	
Opportunities-related preference	.38**		n.s. ¹	
<i>R² change</i>				
Step 2	.20**		.17**	
Step 3	n.s. ¹		n.s. ¹	

Note: 1 — the effect of the variable was not statistically significant ($p>0,1, n.s.$) so either variable or the last step of regression were excluded from further analysis; T - the effect was marginally significant ($p<0,1$); * — $p<0,05$; ** — $p<0,01$.

Subjective dependence and inability to resist mobile phones in our sample were not related to a decrease in satisfaction with life. However, after adding boundaries extension to the model and easiness-related preference, the scales did improve the model ($\Delta R^2=.07$, $p<.05$; $\beta=-.19$ and $-.15$ boundaries extension and easiness-related preference scales respectively, $p<0.10$) adjusting for the frequency of use, age group, inability to resist and subjective dependency. However the whole model failed to reach statistical significance ($F=1.93$, $p<.10$). Neither of the scales in the Internet form of the questionnaire correlated with the satisfaction with life scale, so for the Internet the last hypothesis was not proved.

Discussion

According to L. Tian et al. (2009), any technology makes information quickly and easy achievable, reducing feelings of uncertainty and increasing feelings of safety. Our data supports the idea that the experiences of controllability and indispensability could make an important contribution in the explanation of technology's use and technology-related adaptation. First, we found that there are different changes in psychological boundaries (communication-related boundaries extension, easiness-related and opportunities-related preferences for technologies, as well as boundaries violations) that are conceptually and empirically distinct and could be reliably measured in the questionnaire. Interestingly, by using the picture measure of technology-related boundaries changes, we found that psychological distance or "incorporation" of technology into Self could be interpreted in the measurement as a perceived distance between technology and Self. Our data supplement the theory of the transformation of human boundaries (McLuhan, 1964) by suggesting that boundaries extension is only one possible variant of technology-related boundaries changes. In the contemporary world, technology should not be considered a "virtual world" that augments the "real world" but as a world changing the structure of all human activities (Soldatova et al., 2013). In this context, an understanding of human activity (Soldatova et al., 2013), needs (Tian et al., 2009), beliefs and expectations (How technology..., 2009), communication in this world and with this world (Larkin et al., 2006) and even "digital citizenship" (Mossberger et al., 2008, Soldatova et al., 2013) become a prominent focus for psychology. We believe that in further analyses, it could be helpful to distinguish between actual boundaries changes and reflections on these changes. The latter could have a buffer effect on the relationship between boundaries changes and maladjustment, allowing for conscious control over the negative psychological effects of technology use. We have suggested a boundaries violation scale as a measure of emotional reaction to the awareness of technology-related privacy loss and illusory boundaries extensions. In line with the buffer hypothesis of reflection, this scale predicted a feeling of subjective dependency (that is based on reflection) but not the inability to resist technology.

Second, we found support for the hypothesis that changes in psychological boundaries predict some components of the excessive use of technology beyond frequency of use, gender and age. Further studies could test this hypothesis using other instruments developed to measure technological addictions. However even for two aspects of excessive use - subjective dependency and the inability to resist technology - we found results that are in agreement with psychological discussion of what

in technologies and people make them potentially “addictive”. M. Griffiths (2005) in his bio-psychosocial model of addictions suggests that any activity is potentially “addictive” if it provides short-term benefits and long-term negative consequences. Thus, if there is a dispositional or situational deficit of self-regulatory and reflective capacities (Hall, Fong, 2007), technology-related psychological changes are either perceived as an opportunity (as it was formulated in the boundaries extension, easiness-related and opportunity-related preference scales of the questionnaire) or as a failure (leading to distress because of loss of control). Further research could study this suggestion by designing an experiment, for instance, of the self-control paradigm (Baumeister et al., 2007).

It should be noted that the easiness-related preference of technology scale had different patterns of correlations with the other scales and the picture measure of a change in boundaries boundaries in the Mobile phone and Internet forms. The reason is that based on qualitative data (for instance, Madell, Numcher, 2007) for the mobile phones, the concept was operationalized as a preference (because of its easiness) of mobile communication while for Internet form it captured a preference of Internet as a source of information and place to share the information.

Third, we aimed to study the age-related moderator effect on the relationship between psychological boundaries changes and the excessive use of technology but found only partial confirmation for inability to resist the internet, which was strongly predicted by an opportunity-related preference for the internet in youth but not in older adults. It could be that the “digital” gap between people of different ages is not as wide as is commonly discussed. However, final conclusions demand that this hypothesis be tested on samples that are more representative in terms of the age. Finally, the hypothesis about prediction of satisfaction with life based on boundaries changed was only marginally supported for mobile phone use but not for the internet. These data are inconsistent with our previous study (Emelin et al., 2013) that used a Quality of life and Enjoyment scale and could be explained by the use of overly generalized characteristics of well-being, and not allowing to study satisfaction in different spheres (health, emotions, communication etc.).

From a methodological point of view, the new contribution of our study is in the revision of the instrument for measuring different aspects of technology-related psychological changes that is brief (three items per scale) and could be used across several technologies. The revised version of Technology-Related Psychological Consequences Questionnaire was found to be a reliable and valid research instrument in terms of factor, convergent validity and empirical relationships with age and frequency of use. Further population studies are needed to reveal the instrument’s properties in psychodiagnostics.

Acknowledgements

This study was supported by the Russian Foundation for Humanitarian Sciences, project 11-06-00733a.

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