

# PSYCHOLOGY IN RUSSIA: STATE OF THE ART

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## METHODOLOGY OF PSYCHOLOGY

### Prerequisites of Sociality: Historical and Evolutionary Analysis

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**Background.** Discussion of the social origins of personality formation, based on the biological individual, is a characteristic feature of modern interdisciplinary researches at the junction of natural science and the humanities. At the same time, evolutionary aspects of the relationship between the biological (innate) and the social (acquired) — i.e., the problem of the origin of sociality — come to the forefront.

**Objective.** This article presents and discusses the hypothesis that the evolutionary origins of sociality are processes of evolutionary divergence (increasing individual diversity) and convergence (symbiosis) that define two oppositely directed vectors of the development of life from its simplest forms.

**Method and Results.** The theoretical and experimental data used to discuss the hypothesis are considered here from the standpoint of *the historical evolutionary approach* to the processes of formation (evolution) of the uniqueness of the personality and of social interpersonal relations. The approach is based on an understanding of these processes as a special case of the evolution of interacting systems on the basis of two opposing trends — towards preserving and towards changing the system. The hypothesis allows us to answer two questions about the ambivalence of human existence in society: (a) Why do all people, regardless of their social status, find it so difficult to endure loneliness, which is incompatible with both the mental and even physical health of each of us? (b) Why at the same time do all of us involuntarily protect the “boundaries” of our own physical, mental, and social “Me”, the violation of which is as destructive (unacceptable) to us as is loneliness?

**Conclusion.** Systematic historical-evolutionary analysis of the sciences of nature, society, and humankind allows us to isolate general patterns of development of complex systems, leading to a more accurate understanding of the phenomenon of personality. Such an interdisciplinary approach was used in this work on the biological roots of sociality and the particular features of individual existence in the external and to some extent social environment that generates unique individuals.

**Keywords:** systems, social communities, evolution of societies, sociality, symbiosis, individual diversity, person, historical and evolutionary approach.

## Introduction: Problem Statement

Discussions of the social origin of personality formation based on the “biological individual” is a characteristic feature of modern interdisciplinary research at the junction of natural science and the humanities (Asmolov, 2002; De Waal, 2014; Kandel, 2016; Palmer & Palmer, 2002; Markov, 2010; Pinker, 1994; Ramachandran, 2006; Ridley, 2014; Wilson, 2015). At the same time, evolutionary aspects of the relationship between the biological (innate) and the social (acquired) — i.e., the problem of “*the origin of sociality*” — come to the forefront.

In psychology, the correlation of the biological and the social in a person is of special interest (Asmolov, 2002). Different psychological schools propose different solutions to this problem. However, despite the wide range of points of view, all psychological theories (explicitly or implicitly) agree that biological and social processes are interrelated but independent factors in human evolution. The socio-genetic theory of the famous American psychologist A. Gesell (1932) is a classic example.

At the same time, it is possible that *the phenomenon of sociality* itself (but not its form) is a *product of biological evolution* and that its roots are closely associated with the phenomenon of symbiosis — the mutually beneficial coexistence of genetically diverse organisms. In other words, as a product of evolution, sociality may be deeply rooted in human biological nature, and it is one of necessary conditions of life not only as a personality (a social being) but also as an individual (a biological being).

Sociobiology was established as a separate field of knowledge by Edward Wilson — an American biologist, author of the fundamental work *Sociobiology: The new synthesis*, in which sociobiology is defined as the systematic study of the biological foundations of the social behavior of all types of organisms, including humans (Wilson, 1975, 2015). As a result of systemic (sociobiological) processes, social relations are characterized by their specific features and variety of forms. The specificity of social relations is determined by the fact that a *necessary condition of sociality is communication between unique personalities* (Luhman, 1995), *with an obligatory combination of similarities and differences between their meaning spaces*, since complete similarity makes interaction meaningless and absolute difference makes it impossible (Lotman, 2015).

This article presents and discusses the hypothesis that the evolutionary origins of sociality are processes of evolutionary divergence (increasing individual diversity) and convergence (symbiosis) that define two oppositely directed vectors of the development of life from its simplest forms. The theoretical and experimental data used to discuss the hypothesis are considered here from the standpoint of *the historical evolutionary approach* to the processes of formation (evolution) of the uniqueness of the personality and of social interpersonal relations. The approach is based on an understanding of these processes as a special case of the evolution of interacting systems on the basis of two opposing trends — towards preserving and towards changing the system (Asmolov, 1986, 1996, 2002, 2007, 2008, 2012,

2013). Analysis of the embodiment and meaning of these trends in the activity of the organism, the brain, and the psyche, of their contribution to personal diversity, is a continuation of the research program “Historical and evolutionary synthesis: Paradigm of diversity development in biological, social and mental systems” (Asmolov, Schekhter, & Chernorizov, 2013), which is being developed based on the Russian scientific schools founded by A.N. Severzev and I.I. Schmalgauzen; L.S. Vygotsky, A.N. Leontiev, and A.R. Luria; A.A. Ukhtomsky, N.A. Bernstein, and E.N. Sokolov (Asmolov, 2013; Asmolov et al., 2013; Asmolov, Schekhter, & Chernorizov, 2014; Asmolov, Schekhter, & Chernorizov, 2016; Chernorizov, Asmolov, & Schekhter, 2015).

The hypothesis allows us to answer two questions about the ambivalence of human existence in society: (a) Why do all people, regardless of their social status, find it so difficult to endure loneliness, which is incompatible with both the mental and even physical health of each of us? (b) Why at the same time do all of us involuntarily protect the “boundaries” of our own physical, mental, and social “Me”, the violation of which is as destructive (unacceptable) to us as is loneliness?

### Man Is a Social Animal

“Man is a social animal”. This statement by Aristotle, referenced in the title of a book by American social psychologist Elliot Aronson, means that everyone strives to live in community with other people (Aronson, 1998). This “predisposition” to social contact is not exclusive to humans, because cooperative existence is a universal way of life for all living beings, regardless of their level of development. This idea was postulated in the nineteenth century by French philosopher and sociologist Alfred Espinas (2016). Later it was illustrated by P. Kropotkin (2007) and by modern researchers with an analysis of the facts of cooperation that are characteristic of different species, from invertebrates to humans (Grechenko et al., 2014, 2015).

*Symbiosis* — i.e., mutually beneficial coexistence — is a feature of life from the very beginning, starting from its basic, bacterial, forms that created conditions for the circulation of substances on the Earth through the interactions of various types of protozoa. The great Russian microbiologist and evolutionist G.A. Zavarzin (1993) has formulated a rule according to which energy cycles’ insularity, which determines biospheric stability, can only be achieved by a community of several different types of microorganisms that share biogeochemical functions. It is Zavarzin to whom belongs the phrase, shocking at first glance, “In the beginning was the community” (cited by Markov, 2010, p. 86). The meaning of the phrase is that *life is impossible outside of communities of diverse organisms*. Microorganisms are important for the origin and evolution of social life for the following reasons. As the base of the trophic pyramid, they largely determined the fate of all other organisms that “fit” into the already formed bacterial biosphere, as their habitat (Zavarzin, 2003). Moreover, bacteria are largely responsible for not only the existence but also the lines of development of all other organisms, because each evolutionary stage follows from the previous one, and *the overall direction* of the process from initial forms of life to humans is an expression of life’s common strategy. This conclusion (though with caution and a disclaimer about the limitations of our knowledge)

was drawn by Clifford Grobstein, a well-known American biologist who considered the variety and consistently increasing complexity of the organization of living things as the natural path of progress (Grobstein, 1968). Grobstein was supported by the leading geochemist E.M. Galimov (a disciple of A.I. Oparin), who wrote that “nature prefers to adapt already existing structural and functional possibilities to neoformations, rather than to take a path again or to turn to alternative solutions” (Galimov, 2001, p. 70).

If the coexistence of individuals has the force of an immutable biological law, then in relation to the evolution of various species (primarily the biogenesis and anthrosociogenesis of *Homo sapiens*), we can delineate three rules of the evolution of “social nature”:

1. Human individuality, as one of the phenomena of the progressive evolution of living systems, is generated and transformed in the “flow of activities” with other people.
2. “The flow of activities” acts as the driving force of the historical-evolutionary process and causes the generation of diverse living systems through different but concurrently implemented forms of selection (a directing selection, a stabilizing selection, a disruptive selection, a balancing selection).
3. The unit of development of the individual, of personality and individuality, is a “co-action” with other people, a phenomenon of symbiotic evolution. It should be particularly noted that the idea of “co-action” as a unit of human species development was most clearly formulated by P.A. Kropotkin in his consideration of mutual aid in the world of people and animals, as a factor of evolution. In the context of developmental psychology, the hypothesis of “co-action” as the unit of the individual development of a child and as a special unit of socialization was developed by the classic author of Russian child psychology A.V. Zaporozhets, who was a student and follower of L.S. Vygotsky (Asmolov, 2007; Zaporozhets, 1986).

So, individuality is formed in social interactions. As it was figuratively expressed by the famous researcher of primate behavior Robert Yerkes, “One chimpanzee is not a chimpanzee at all” (cited by Lorenz, 1998, p. 198). To an even greater extent this can be applied to humans. For psychologists, this truth has become trivial, but because of its importance, it is also emphasized in psychological research. For example, here is the statement of S. Averintsev, a famous cultural historian and philosopher, whose contribution to the rapprochement of nations and cultures received worldwide recognition: “No writer can become himself, he can’t *become* at all, without somehow distancing himself from his ‘neighborhood’ ” (Averintsev, 2004, p. 227).

Each of us aspires from birth to communicate with others. This need often exceeds that for food and warmth. A newborn baby’s first “meaningful” smile is always a social smile, and the natural stimulus is visual contact with another person; however, the motor functions of the smile are innate, as it is stereotypical and appears spontaneously on the face of not only sighted infants, but also of the blind, during the first hours of life. Thus, it can be stated the social smile, which facilitates the formation of connections between people, has an innate basis (Izard, 2011).

This, in turn, is evidence that the predisposition to cooperative existence is genetically determined and a species-specific human characteristic.

It is possible to illustrate the genetic predisposition to a social way of life by starting from its opposite, namely by analysis of the selective loss of this predisposition with certain pathologies. An example is autism (from the Greek word *autos* — “self”) — a morbid state that results in avoiding social contact and in unnatural self-absorption. Symptoms of this disorder were described and singled out as a syndrome independently by two researchers, Leo Kanner (1943) and Hans Asperger (1944). Asperger gave it the name “autistic psychopathy”. One of its forms was called “early” or “classic” autism (Kanner, 1943). The word “early” refers to its appearance in newborns and particularly in children under six years of age. People with a severe form of classic autism do not react to the human face; in infancy they do not reach for the mother; in the first years of life they hardly ever enter into interaction and do not like being touched or held. They look “through” people or walk past them as if they do not see them. At the age of three to five, these children often remain silent for very long periods, and if they occasionally speak to someone, they look away. Not being interested in other people and avoiding them, they prefer inanimate objects and have a poor understanding of the emotional state of others (Nikolskaya, 2000) and of spoken language (Ferrari, 2006).

Impairment in autism is selective: The ability to grasp the meaning of speech and to use it for communicative purposes is lost, without affecting the subject’s perceptual domain. Indeed, numerous studies of autism, which can be considered as a model of social disadaptation, suggest that the precondition for socialization is an independent psychophysiological function (Bettelheim, 2004; Lebedinskiy, 1985; Wing, 1981) of an organic nature (Coleman & Gillberg, 1985; Sirota et al., 2011; Steffenburg, 1991).

Full realization of the preconditions for socialization requires not only a genetic predisposition, but also the experience of communication with other people at early (sensitive) ontogenetic periods, when a general law is observed that is valid for all quantitative traits: Genotype functioning is determined by its interaction with the external environment in which development takes place<sup>1</sup> (Davidenkov, 1947). Thus, at least in the case of socialization, the question of “What comes first, the chicken (environment) or the egg (heredity)?” is not relevant, because a positive result requires both. Therefore, a child’s lack of contact with parents or close interaction with other people, especially when the child is under the age of three, as well as impairment of the predisposition for socialization, leads to irreversible mental and behavioral disorders (Fries et al., 2005). These disorders are so characteristic that they were given the name “hospital syndrome”, the symptoms of which are a yearning face, a pose “against the wall”, and/or monotonous, repetitive rocking.

Chronic loneliness is disastrous not only in childhood. Lack of social support causes severe stress in adults, disrupting their brains as well as the immune and

<sup>1</sup> Inherited characteristics are divided into two categories. The first includes characteristics defined by a limited number of genes that are inaccessible to environmental influence; they are manifested in a discrete form and correspond to Mendel’s laws (inherited disease is an example). The second category — quantitative characteristics — are polygenic; they are always influenced by environment, are manifested not discretely, but with continuous values. Mendel’s laws are not applicable (Davidenkov, 1947).



biochemical status of the organism as a whole (Cacioppo & Patrick, 2008). The consequences are low resistance to illnesses, emotional disorders, and general lethargy (hypodynamia) with elements of abulia (Adolphs, 2009, 2010; Aleksandrovs-kiy, 1996).

### Individuality in Community

So, each of us has a predisposition to socialization, including the desire to live with other people. But why is the constant presence of even those closest to us, especially uninvited interference in our internal world, so hard to endure? Where does the force of involuntary “repulsion” come, which limits our accessibility to others?

To understand the origin of the need to preserve “individual distance”, we can compare human society with other biological communities, in which some individuals with an irresistible herd mentality do not distance themselves from each other. For example, inside the hive, bees feel comfortable just from physically feeling each other (Fabre, 2005). Fishes also have no fear of touching one another, although the school of fish forms a dense mass. The same is observed in giant families of rats, in which the animals are always ready for close contact and are always friendly to members of their family (Lorenz, 2003). What is characteristic of such associations? Firstly, it is high degree of genetic similarity (all members are related by kinship), and in this regard the associations resemble genetically equipotential individual organs of a single organism. Like an organism, units of such communities are significant insofar as their function satisfies the interests of the system as a whole (Asmolov et al., 2016; Dawkins, 1993). Personality is neutralized, and the animals recognize each other on the basis of a characteristic that is common to all members of the association — the “friend or foe” principle. Therefore, communities of this type are called “anonymous” (Lorenz, 1998; Zorina et al., 1999).

An “anonymous” shoal, flock, or herd is a mode of existence of fish, birds, and herd animals, which is common for certain periods of life. An extreme expression of anonymity in the human world is a crowd that acts as a kind of monolithic whole. In social psychology, this phenomenon is explained by the special situation of a person in a crowd when he temporarily loses the psychological traits that characterize him as a unique individual. This situational disappearance of the conscious personality is called depersonalization. It is more probable when the crowd is anonymous, and excitement associated with emotional contagion is high (Lebon, 1998). But still, for humans such behavior is not typical and is a (temporary) manifestation of evolutionary regression.

Compared to anonymous animal communities, a highly developed human community is always personalized and is characterized by the combination of the individual uniqueness of all its members, with their capacity for interpersonal relations based on interactions of “asymmetric meaning spaces” (Lotman, 2015).

These characteristics have biological origins. The universal significance of the differences among the elements that form a living system of any level of complexity was assessed by Gregory Bateson, an outstanding theorist of systems who made significant contributions to anthropology, psychiatry, and communications theory. He came to the conclusion that “*integrity*” *are created only by the interaction of differentiated “parts”* (Bateson, 2007). Social systems are subjected to this general law,

the fulfillment of which is guaranteed by biological mechanisms specifically aimed at maintaining individual diversity. Let us recall some of them.

Sexual reproduction is the starting apparatus that systematically “works” on the uniqueness of the members of the community; it is an evolutionarily advantageous acquisition of multicellular organisms. It allows genome changes to happen not from time to time (as in mutations and horizontal gene transfer), but inevitably in the life of each individual. The effect is achieved by the interaction of two partners who are divergent by a set of different properties<sup>1</sup>, and whose descendants inherit not exact copies of the parental genomes, but a mixture of them. The randomness of the combinations is of fundamental significance, because it makes the number of genetic combinations almost unlimited, and so individuals never duplicate each other exactly. The essence of this phenomenon is that randomness is a law, guaranteeing individual uniqueness. And it is uniqueness that defines the unconditional evolutionary success of sexual reproduction, because polymorphic populations cope better with the environment and more successfully avoid catastrophe (Altukhov, 2003; Grobstein, 1968).

But the matter is not limited to the initially (genetically) given diversity of organisms: Personal life experience is added to that and transforms the conceptual world of the individual, because the individual’s conceptual world is a point of growth of our species. Development of conceptual world moves social interactions to a depth that is characteristic only of human beings (Asmolov, 2008). In other words, personification is associated not with diversity in general, but with dominance of the variability of personal meaning spaces in which the environment plays a primary role. However, the genome also contributes here, as it forms the anthropological prerequisite for the development of human individuality. Let’s further analyze this statement.

The characteristic of individual features associated with brain activity is their incomplete genetic determination. In the development in a social community, the hereditary basis of these features manifests itself not in the original form, but in a form corrected by experience, because it is always “fitted” to specific conditions of existence<sup>2</sup> (Davidenkov, 1947). For example, the physiologically determined ability to experience pleasure is inherent in all people from birth, but our preferences in relation to sources of pleasure depend on how this precondition affects the choice of a particular activity in the life of an individual.

Individual inclinations are dynamic because of the unprecedented plasticity of the human brain, its ability to rebuild its structure and function in accordance with changing environmental conditions. But the predisposition itself is genetically specified. It is implemented with regulatory gene complexes and with information-neutral so-called “meaningless” nucleotide sequences (the analogs of individual

<sup>1</sup> For some primitive multicellular organisms, the differentiated germ cells coexisting within one body can participate in pairing. But with an increase in development, sex differences become more substantial. In humans, sexual differentiation is characterized by divergence of: (a) chromosomal difference between sexes; (b) difference at the level of organs responsible for production of germ cells; (c) difference at the level of secondary sexual characteristics; (d) psychological differences between the sexes; (e) differences in the social roles of heterosexual individuals. Only levels a, b, and c are strictly determined biologically (Gilbert, 1995).

<sup>2</sup> With the exception of hereditary diseases.



letters in a text), the activation of which (under certain conditions) can provide unlimited possibilities for creating new genetic programs and for increasing the complexity of existing ones, without a significant increase in the size of the genomes (Golubovskiy, 1985; Klug & Cummings, 2009). The genetic predisposition of the brain to form multiple functional modes substantially extends its information potential, which reaches its maximum in humans (Allis, Jenuwein, & Reinberg, 2013). Thus, to acquire a highly individual experience, an even greater genetic apparatus is required than for inherited forms of behavior. The results of lifetime changes due to brain plasticity are not transmitted to offspring, because they take place not in reproductive cells, but mainly in nerve cells (Anokhin, 1968). But precisely because of this plasticity, everyone is able to assimilate a specific environment through his own experience, including cultural experience, which determines the originality of his personality.

The uniqueness of each person is not accidental: It is a result of the evolutionary process, demonstrating the ascent of life to greater diversity (Asmolov, 2012). The expediency of this pattern is determined by the relationship between the genetic diversity of a population and its adaptability. This relationship was formalized by the outstanding mathematician and geneticist Ronald Fisher in a famous theorem which is often called “the fundamental theorem of natural selection” (Fisher, 2011): “The rate of increase in fitness of any organism at any time is equal to its genetic variance in fitness at that time”. In other words, with growth in the variety of individuals that form a population, the range of influences to which the whole population is adapted expands. Thus, the uniqueness of each person is an important driving factor of evolution and is subject to pressure from natural selection, as the viability of the community as a whole depends on the diversity of its individuals. To avoid degeneration, we have to be different.

So, we emphasize the following. The biological nature of the human individual is distinguished by initial (inborn) genetic uniqueness, but the most significant contribution to the inexhaustible variety of people is made by personal life experience. However, the ability to change during the course of life also has genetic preconditions. Thus, the essence of the human personality is not compatible with uniformity (monotony). Nature “stands” here on the side of each person’s identity.

Individual uniqueness is a necessary but not sufficient condition for the personification of society. Another necessary requirement is the attitude to other people as independent persons who have not only their own external appearance, but also their unique inner world, *a priori* different from our own. This is the source of our being equipped with mechanisms of “social cognition”, which become more specialized during evolution, while becoming gradually separated from other information streams. Specialized mechanisms of social perception are the source of knowledge about “the Other” (Andreeva, 2000; Chernorizov et al., 2015).

After language, the most important means of social contact is the face; therefore, it is not surprising that facial recognition has a specialized brain module, located in the temporal-occipital region (Chernorizov, Zong-qing, Petrakova, & Zinchenko, 2016; De Renzi, 1997). Damage to this region leads to the inability to recognize faces — facial agnosia (prosopagnosia) — which can be selective, not accompanied by loss of other mental functions. Described in the mid-nineteenth

century, this pathology is well known today to a wide audience, thanks to the popular book by Oliver Sacks, *The Man Who Mistook His Wife for a Hat* (Sacks, 1985).

Face perception allows us not only to identify partners in dialogue, but also opens up access to their inner world, as facial expression is one of the most visible and easily distinguishable expressions of a subject's emotional state. However, facial expression has a special place among things with a similar function (notably vocal intonation, posture, gestures), because the relationship between basic emotions and the corresponding patterns of activity of the facial muscles is specified *a priori* and is universal in all people (Bruce & Young, 2012; Ekman & Friesen, 1978).

In accordance with different tasks — perceptual and conceptual — within the “facial” brain region, there is a subtle specialization of cells, some of which are focused on face recognition, while others are focused on different facial expressions transmitting emotional state in symbolic form (patterns of facial muscle activity) (Perrett, Rolls, & Caan, 1982). Such specialization is consistent with clinical observations according to which the loss of ability to recognize certain faces does not prevent patients from adequately perceiving emotional expressions, but they do so impersonally, i.e., as “someone is sad”, “someone is happy”, “someone is surprised”. The inverse also holds: The ability to “read” emotional facial expressions can be lost selectively (Eirner & McCarthy, 1999). Such separation of functions corresponds to the general strategy of the brain, according to which perceptual (identification) and conceptual (interpretation) information channels are neurophysiologically independent (Izmailov, Korshunova, & Sokolov, 2003; Sokolov, 2010).

Face detectors (“gnostic neurons”) are part of a specific cortical visual system of the human brain, integrating information about the stationary and dynamic properties of objects in the external environment — the so-called “Who? System” (Kanwisher & Dilks, 2013). In this system there are two functionally and anatomically distinct areas associated separately with the analysis of information about living organisms and nonliving objects. Such separation of brain functions (in relation to living and nonliving systems) relates to the increasing role of social interactions in communities that are becoming increasingly complex during the course of evolution. Whereas, according to comparative anatomy, the first evolutionary stages of brain development relate to improvement of sensory systems (focus on identification of external environment objects), in the later evolutionary stages, brain development begins to be influenced by sociocultural factors (Adolphs, 2009, 2010; Chernorizov et al., 2015, 2016; Falikman & Cole, 2014). Animals are able to evaluate (identify) each other solely by their appearance, the effectiveness of their actions, and the externally expressed readiness to perform actions. Only humans show not only narrow and practical interest in an interlocutor, but also accentuated attention to the inner content of that individual's personality, the uniqueness of which is valuable in itself, regardless of its utilitarian usage (Buber, 1995; Von Hildebrandt, 1998). We not only cognize the personality of the “Other”; we “feel” it. And the first step in this direction is interpretation of the Other's emotional state through a “reading” of external symbols (speech, posture, gestures, facial expressions).

Thus, humans have innate predispositions, which, as these evolve, make it possible to precisely judge the psychological state of another person and to distinguish

it from their own. Such estimation is a necessary foundation for any individual personalized communication, but this communication is productive only when both sides agree that the mental world of the “Other” is unique and therefore equivalent to one’s own. The ability to recognize individual identity and the equality of the “Other” is a manifestation of culture, which indicates a high level of social development of civilization.

Existence in a personified community is inevitably ambivalent — necessarily together, but with obligatory acceptance of the identity of each “Me”. This predetermined contradiction leads to a combination of prosocial behavioral forms with the mechanisms of protection of each “Me” from infringement by other community members.

Protective mechanisms have their own evolutionary history and become more sophisticated and subtle as a characteristic of individuality becomes not only physically, but also mentally, distinctive. Animals also have a rudimentary “I”, which includes their own bodies, their own territories, and sometimes their close relatives (carriers of common genes). The instinctive need to preserve all of this manifests itself in an innate “freedom reflex”, a term introduced by I.P. Pavlov. Some of the dogs he observed were unable to develop new skills because of strong excitation: They were constantly straining against the leash, because they absolutely could not stand captivity (Pavlov, 1951). Both in animals and in human populations, the need for freedom is represented quantitatively, i.e., by the entire set of values that range from complete intolerance of any violence to a propensity to complete submission. According to the law of normal distribution of quantitative traits, extremes are rare. Most people have an instinctive desire for freedom, expressed to a medium degree (Hedrick, 2003).

Violation of the desire for freedom is always accompanied by a strong experience — anger, which is one of the basic human emotions. Physical limitation is the universal, genetically programmed, activator of this emotion. In newborns, anger, clearly expressed in facial expressions, occurs when an adult restricts the movement of the child’s hands. As the person matures and his mental “I” develops, physical limitation ceases to be the sole cause of anger. Older children, especially teenagers, react to psychological restrictions even more intensively than to physical ones. The main causes of anger among adults are actions imposed by other people and committed against their will, and the feeling of being treated unfairly, being betrayed, or used.

The biological significance of anger that accompanies an assault on the “Me” is that it mobilizes the energy the person needs for self-defense. Subjectively it is experienced as a sense of confidence and strength, and it creates a readiness for action. But the action may be of different sorts. The most primitive, literally “animal” way of protecting oneself is an aggressive action. It can be called “animal” because healthy, socially useful aggressiveness of animals and humans has a common evolutionary basis. It is rooted in the territoriality that is inherent to animals and the need to maintain individual distance (Lorenz, 1998; Rizzolatti & Sinigaglia, 2012). The measure of individual distance is the distance between individuals at which the probabilities that they will tolerate or attack each other are equal. Territoriality is partially preserved in humans. The proof of this is, for example, the involuntary irritation we feel in a tightly packed queue, or the discomfort of not having “a place of our own”.

Having common evolutionary roots, the aggressiveness of animals and humans also has a common evolutionary meaning, which consists of the need to resist infringement by other individuals or communities. Proof of the fact that aggression serves individuality, is that individuals in anonymous communities are not aggressive (Lorenz, 1998, 2003).

Aggression needs to be limited, since it is potentially dangerous due to the tendency to transition into socially unacceptable forms. It is like a poison that heals in microdoses, but kills in larger quantities. Therefore, not only culture, but nature itself has provided means to limit aggression. One of these is fear. The sensitivity of aggression and fear to the same biochemical agents shows them to be genetically related. In particular, the injection of cholecystokinin protein simultaneously provokes fear and conflict behavior (Ashmarin, 1999).

Fortunately, aggression is not the only way to preserve our individual “Me”. Another method of self-expression and self-reward is creative activity. Germs of creativity are observed in chimpanzees. When the apes were given sheets of blank paper and a set of paints and brushes and allowed to do whatever they wanted, each of them, with great effort, made unique pictures. Characteristically, all attempts to stimulate the apes to imitate drawings of others were unsuccessful. The only condition of creative activity in this case was self-reward. In order to test this, the researchers tried to bribe one of the chimpanzees with food. The ape quickly learned to associate drawing with getting the reward, but once that connection was made, the animal became less and less interested in the drawings. The chimp drew a couple of strokes and then immediately reached for a handout (Morris, 1962).

Not only artistic creation, but also perception of it, is an active expression of individuality. Joseph Brodsky wrote: “Aesthetic choice is always individual, and aesthetic experience is always private experience. Every aesthetic reality makes the person who experiences it more private, and this privacy, taking sometimes the form of literary (or some other) taste, can be if not a guarantee, then a form of defense against enslavement” (Brodsky, 1998, p. 9).

Unlike aggression, creativity is not a biologically regulated means of protecting the “Me” because, being originally a personal matter, it contributes to the development of both the creator and social reality. To explain this, it is necessary to clarify the difference between the physical space and the meaning space of the human individual.

By definition, personal meaning is an individualized reflection of reality, expressing a person’s relation to the objects to which he directs his activity and communication. The system of personal meanings is a “deep” characteristic of each individual (Asmolov, 2007). Due to the uniqueness of each individual, personal meaning spaces are “asymmetrical”, i.e., they always include areas that do not have one-to-one correspondence with those of other people. Completely non-overlapping personal meaning spaces, like constants of the human body, are discrete, and thus separated by boundaries. However, unlike physical boundaries that preserve the balance of a physiological system, a person’s conceptual boundaries are not limited and are “an eternally unfinished painting”, constantly being transformed under the influence of the meaning spaces of “Others”. This flexibility is conducive to general improvement of knowledge and forms a reserve for social development, because it is at an open boundary that new meanings are produced, in the compet-

ing semiotic interaction of asymmetric structures (Lotman, 2015). Thus, in contrast to a physical boundary, *a conceptual boundary is always moving* and is a region of generation of new (social) knowledge. But novelty is what prevents stagnation and promotes development of both the individual and his environment (Asmolov et al., 2014; Schrödinger, 2005).

## Conclusion

In psychology and pedagogy it is often said that people are formed by conditions of life and upbringing. While agreeing with this in principle, we specify only that despite the priority of life experience, the influence of socio-cultural factors is not a monopoly. In searching for additional roots of personality, we must take a closer look at the natural foundation that is connected with the often hidden but natural biological context of human social existence.

Systematic historical-evolutionary analysis of the sciences of nature, society, and humankind allows us to isolate general patterns of development of complex systems, leading to a more accurate understanding of the phenomenon of personality. Such an interdisciplinary approach was used in this work on the biological roots of sociality and the particular features of individual existence in the external and to some extent social environment that generates unique individuals. If one goes back to the beginning of this article and repeats the question about the origins of the contradictory nature of human mutual “attraction” and mutual “repulsion”, we have to admit that the ambivalence of their co-existence is deeply rooted in the properties of living matter, because only non-identical organisms come together, striving for self-preservation.

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## SOCIAL PSYCHOLOGY

### National Identity Management Strategies: Do They Help or Hinder Adoption of Multiculturalism in Russia?

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**Background.** We use Social Identity Theory as a theoretical framework, specifically focusing on strategies of identity management. The study is based on the following theoretical assumptions. First, identity management strategies might serve as mediators between different identity threats and behavioral patterns in intergroup relations. Second, identity management strategies help to make the shift from the individual to the group level of analysis, allowing us to take the consequences of intergroup behavior for a group entitativity into consideration. Third, identity management strategies strongly depend on the social context of intergroup relations.

**Objective.** In the current study, we look into the relationships between identity management strategies of the ethnic Russian majority and their attitudes towards multiculturalism to identify whether certain strategies are helpful or harmful for the acceptance of multiculturalism in Russia.

**Design.** We use Russia vs. the West comparison to evoke the perception of identity threat. We measure strategies of identity management based on this comparison, as well as attitudes towards multiculturalism in a survey of 307 Russian participants.

**Results.** The findings suggest that identity management strategies are indeed related to attitudes towards cultural diversity and equality in Russia, as well as to acculturation expectations of whether minorities should adopt the mainstream Russian culture or keep their own. We find that strategies of individualization, individual mobility and assimilation have mostly negative consequences for acculturation expectations, as they all show patterns that support assimilation of minorities instead of integration. We also find support for the “scapegoat” hypothesis, showing that choosing the strategy of changing the comparison group results in more negative attitudes toward cultural diversity and equal-

ity for all in Russia. The strategies of social creativity (change of the categorization dimension, temporal comparison, comparison with a standard, etc.) seem to be irrelevant for attitudes towards multiculturalism.

**Conclusion.** Our findings suggest that none of the strategies of identity management promote acceptance of multiculturalism. However, strategies of social creativity are the only ones that do not have negative consequences for support of multiculturalism. Theoretical and practical implications for multiculturalism policy adoption in Russia are discussed.

**Keywords:** identity management strategies, national identity, multiculturalism, Russia

## Introduction

Multiculturalism policy<sup>1</sup> (MCP) has been actively discussed in social sciences for the last 30 years (Arasaratnam, 2013; Banting & Kymlicka, 2006; Berry, 2013; Leong & Liu, 2013). Researchers have investigated whether MCP has a positive or negative impact on the welfare state (Banting & Kymlicka, 2006; Miller, 2006), intergroup processes (Arasaratnam, 2013; Berry, 2013; Leong & Liu, 2013), national security (Vertovec & Wessendorf, 2010), human rights (Kymlicka, 2015), and more. Most of these studies arrived at the conclusion that MCP is beneficial for societal development. However, we know very little about what can help or hinder support for a multiculturalism policy among majority group members, especially in non-Western countries.

Analysis of the studies conducted in this area indicates that many of the predictors of the adoption of MCP are related to the security of (or threat to) the identity of the groups involved (Kotova, 2017). Security (or confidence) in one's identity is also a key variable of the multiculturalism hypothesis, which states that security of cultural identities will result in positive intergroup attitudes and a threat to identity will result in mutual hostility (Berry, 2013). This hypothesis has received overwhelming support from samples in different countries (Arasaratnam, 2013; Berry, 2013; Berry, Phinney, Sam, & Vedder, 2006; Lebedeva & Tarko, 2013).

In some cases, MCP itself can be perceived as a threat to the national identity of majority group members, a group that might feel that they have no other choice but to participate in the acculturation process (Kymlicka, 2015). From this point of view, difficulties in the construction of superordinate group identity (Brewer, 2010), and the effects of ingroup projection should be taken into account (Bianchi, Mummendey, Steffens, & Yzerbyt, 2010; Verkuyten & Martinovic, 2016). However, in studies on multiculturalism, identity confidence is often treated as a given, a variable that is associated with intergroup attitudes, whereas little attention is given to what underlies this association. Today this lack of attention is becoming

<sup>1</sup> Multiculturalism and the policy of multiculturalism are differently understood in the literature. In this work, we understand multiculturalism as an ideology that combines three principles: (a) emphasis on a positive view of society's cultural diversity; (b) an active effort to recognize the equal rights of different cultural groups; and, (c) support of the different cultural groups residing in the state, of their identity and cultural practices (Banting & Kymlicka, 2006; Koopmans, 2013). The policy of multiculturalism, in this case, is the set of political measures and solutions that makes it possible to implement the ideology of multiculturalism.

a focus of scientific discussion. For example, a similar idea is articulated by Sam & Berry (2010), who indicated that despite the tradition of studying different groups' mutual acculturation processes, little is known about the antecedents of acculturation.

We find that the Social Identity Theory (SIT) proposed by Tajfel (1981a) can clarify the mechanism behind the processes mentioned above. The original theory introduces the idea of management strategies to deal with various threats to positive social identity<sup>1</sup> or to the group's status quo in general (Tajfel, 1981a, 1982; see Blanz, Mummendey, Mielke, & Klink, 1998 for a review). Although initially it was considered that a threat to positive identity emerges in a situation of unfavorable intergroup comparison (Tajfel, 1981a, 1982), current literature on the formation of superordinate group identity (see Brewer, 2010, for a review), the permeability of group boundaries (Verkuyten & Reijerse, 2008), and Intergroup Threat Theory (Riek, Mania, & Gaertner, 2006) suggests that intergroup relations themselves — e.g. the geographical closeness of the groups and the interchange occurring between them — are sufficient to evoke a perceived threat and to activate identity management strategies. Accordingly, these strategies serve as a bridge between various threats to identity and the subsequent behavioral and cognitive reactions that can be observed in intergroup relations. We argue that studying the relationships between identity management strategies and attitudes towards multiculturalism will shed light on the mechanisms linking identity threat with intergroup attitudes.

### ***Identity Management Strategies and Intergroup Relations***

The SIT proposes three types of strategies that an individual or group could adopt to maintain a positive social identity: individual mobility, social creativity, and social competition (Tajfel, 1982). From Tajfel's point of view, individual mobility strategies, such as assimilation, are usually used when group boundaries are permeable and people can move from a lower-status to a higher-status group or simply pretend to be a member of a higher-status group. This can be achieved, for example, by getting a better education, moving to a different country, studying a foreign language, or changing one's name. Collective strategies are used when there is no possibility to change group membership, or the social and psychological costs of the change are too high (e.g., when identification with the ingroup is very strong and one cannot reject it). In this case, the strategies of social creativity and social competition can be used.

Various strategies that were described over the three decades of SIT research were systematized in a taxonomy proposed by Blanz et al. (1998). After a series of empirical studies, they identified 12 strategies that form six types of strategies located along two dimensions (depending upon whether the in- and/or outgroups are changed in the process of comparison, and the nature of the strategy: cognitive or behavioral). The taxonomy is presented in Figure 1. A detailed description of each strategy can be found in Blanz et al. (1998) and a short description of each strategy is presented in Table A1 of the Appendix.

<sup>1</sup> See Kotova (2016) for a more detailed discussion.



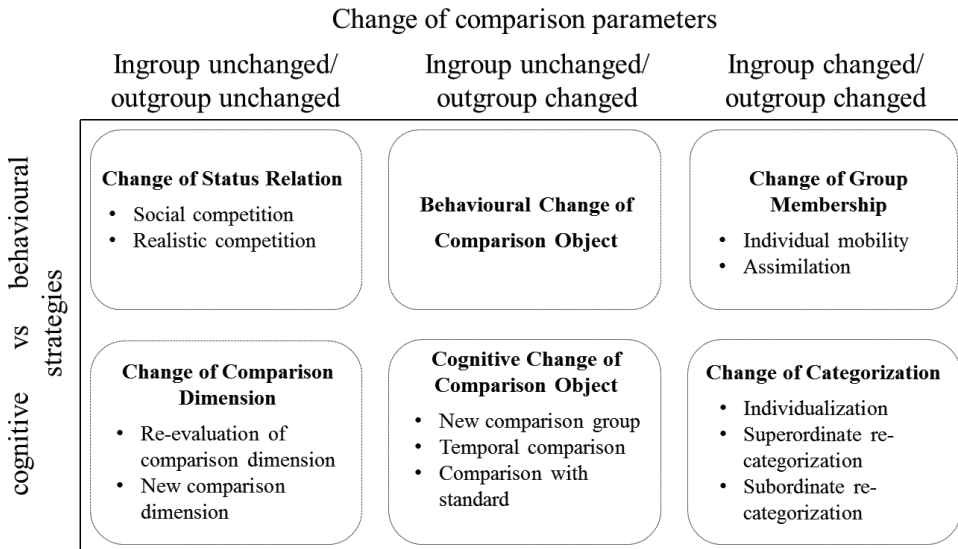


Figure 1. Taxonomy of identity management strategies (adopted from Blanz et al., 1998)

The vast majority of studies on identity management strategies focus on the antecedents of adopting a particular strategy (Brown, 2000; Ellemers, Wilke, & van Knippenberg, 1993; Ellemers & Van Rijswijk, 1997; Verkuyten & Reijerse, 2008). The most robust finding is close to the reasoning of Tajfel: The weaker one's identification with the group is, the more likely it is that an individual will use one of the strategies of individual mobility (Brown, 2000). In addition, individual strategies show more predictable relationships with other variables. For example, the greater an individual's abilities (Boen & Vanbeselaere, 2000; Taylor & McKirnan, 1984) and the more permeable the group boundaries (Stott & Drury, 2004; Mummendey, Klink, Mielke, Wenzel, & Blanz, 1999), the greater the probability of adopting individual strategies. However, people do not always use individual strategies when there is an opportunity to do so (Ellemers et al., 1993; Moghaddam & Perreault, 1992; Shinnar, 2008). In other words, sometimes a person voluntarily stays in the group with a lower status. Of course, this is more typical for high identifiers; however, the mechanism that could explain maintenance of a high level of identification with a low-status group with permeable boundaries is still unclear.

The preference for individual strategies can be very costly for the groups people want to leave or to join. Given that the boundaries of human groups are basically open and socially constructed (Barth, 1969; Semenov, 2003; Stefanenko, 1999), groups and social structures, in order to survive, need a set of tools to maintain a perception that existing borders are only relatively permeable. This set of tools, most likely, includes social stereotypes (Tajfel, 1981b), prejudices (Kotova, 2010), and social identity (Kotova, 2016). Identity management strategies can either contribute to the maintenance of the existing social structure or promote its change. In line with this idea, the existing literature provides evidence that collective strategies are not selected by groups and their members at random,

but depend on the existing social structure. For example, there are differences between majority and minority groups (Ellemers & Van Rijswijk, 1997; Verkuyten & Reijerse, 2008), groups with different statuses (Ellemers & Van Rijswijk, 1997; Mummendey et al., 1999), and with different histories of intergroup relations (Dumont & Waldzus, 2015).

When looking into consequences of various identity management strategies, it is crucial to differentiate individuals' needs from the needs of the groups to which they belong. From the outset of SIT, researchers focused primarily on individual needs, which is peculiar to the tradition of studying intergroup relations<sup>1</sup>. But a focus on individual needs does not contribute to our understanding of mass behavior (e.g., collective strategies) and its consequences for groups and intergroup relations. Taking into account the needs of groups (which includes the preservation of the existing social structure) highlights the possibility of a conflict between individual and group needs. For example, if a choice to leave the group becomes increasingly popular among certain of a group's members, this will result in the group closing its boundaries, which can be harmful for the well-being of its members (Barth, 1969). A focus on the needs of social groups makes possible the reinterpretation of some of the existing data. For instance, Becker (2012) finds that social creativity strategies decrease the desire to participate in protests for equal rights, and, therefore, she claims that these strategies could be unproductive and contribute to the preservation of inequalities in societies. However, the positive role of social creativity strategies is left out of the discussion: By allowing the maintenance of a positive identity in an alternative way (rather than by direct conflict), they contribute to the preservation of the existing social structure, the destruction of which could lead to unpredictable consequences for both group(s) and individuals.

Another aspect of the productivity or counter-productivity of identity management strategies is associated with the question of "on whose account" the group maintains its positive self-image. On the one hand, the attractiveness of the group can be supported through internal resources: cultural, political, and other achievements. On the other hand, it can also be supported by diminishing or derogating the outgroup(s). These two sources of positive image of the ingroup have been well captured in studies of national identity. The national identity literature describes two ways of identifying with the nation: patriotism ("internal resources" for national pride) and nationalism (comparison with others). Although nationalism and patriotism usually correlate positively, their consequences for intergroup attitudes are very different: Patriotism is usually associated with more positive, and nationalism with more negative attitudes towards outgroups (Grigoryan, 2016; Kosterman & Feshbach, 1989).

The implementation of MCP leads to social changes that might pose various identity threats for both majority and minority group members, which, in turn, may lead to the activation of identity management strategies. With the increasing instability of the social structure associated with MCP, groups and individuals will be motivated to find new arrangements to either maintain the status quo or change it to their benefit. Therefore, understanding the implications of choosing certain identity management strategies in the context of MCP has great societal significance.

<sup>1</sup> See Ellemers, Spears, & Doosje (2002) for a detailed discussion.

### ***Identity Management Strategies and Adoption of Multicultural Policy in the Russian Context: The Case of the Majority***

Tajfel (1981a) and Turner (1987) emphasize that the content of identity and self-definitions are influenced by the context of intergroup interactions, specifically by the group(s) that individuals compare themselves to at a specific point in time. Recently a similar idea was expressed by MCP researchers who came to the conclusion that the successful implementation of MCP depends to a great extent on the intergroup relations prevailing in a particular state (Leong & Liu, 2013). Below we briefly describe this context for Russia, where this study was conducted.

Russia is a multi-ethnic country, where ethnic Russians constitute about 80% of the population. The majority group is an obligatory participant in the acculturation processes and is usually considered a group that constrains these processes (Arasaratnam, 2013). At the same time, the majority group receives little attention in studies of identity management strategies, is often not included in acculturation studies, and is generally regarded as a group unwilling to share its privileges with others. Nonetheless, one can assume that positive identity and positive distinctiveness of the majority group are systematically threatened in intergroup interactions. Russia is not an exception: There is some evidence that intergroup relations in Russia are accompanied by lack of identity confidence among the majority Russians (Kotova, 2017). At the same time, majorities have a limited number of strategies available to them under MCP, as they are expected to be “hospitable hosts”. Therefore, the majority group tends to explore covert strategies (such as “ingroup projection”, discussed below) that, in turn, affect other groups living in the state.

One of the key threats to positive identity is multiculturalism policy itself. The policy of multiculturalism is perceived by the majority group as a threat to its status, because it proposes a different structure of society than one that gives exclusive priority to the majority group. Explicit or implicit resistance to the changes can take many forms, including those concerning identity. Researchers observe that the majority group (or a group with high status) sees itself as the most prototypical in a superordinate category (“ingroup projection”); for example, Germans see themselves as the most typical Europeans (Wenzel, Mummendey, Weber, & Waldzus, 2003). Representatives of other groups who are also included in the superordinate category, but differ from this prototype, are perceived as “internal enemies”. As a result, ingroup projection leads to more biased and less favorable attitudes toward outgroup members, who are ingroup members on the level of the superordinate category (Wenzel, Mummendey, & Waldzus, 2007).

There are no studies of ingroup projection based on Russian samples yet; however, we can expect that ingroup projection, or high relative ingroup prototypicality (RIP), is typical of ethnic Russians. This expectation is based on some recent findings from Russian samples. First, the ethnic and civic identities of ethnic Russians are very closely related, which is not the case for other ethnic groups living in Russia (*Mezhnatsional'nye otnosheniya: monitoring FOM*, 2014). Second, the awareness of belonging to an ethnic group is substantially increasing among ethnic Russians in recent years (Pain, 2005), which is unusual for majority groups. Finally, there is strong support among the population for the slogan “Russia is for [ethnic] Russians”, which has remained stable over time (Pain, 2005).

Ingroup projection can also be associated with another source of identity threat for the majority group. Considering itself a key representative of the state, majority group identity positivity is highly sensitive to the state's successes or failures in the context of international comparisons. In the case of Russia, the most relevant comparison groups are Western European countries, since the late 17th century, and the United States of America since the 20th century. There are different opinions regarding Russia's position in the world's political arena; however, in terms of economic development, Russia substantially and consistently falls behind the countries mentioned above. Public perceptions reflect this fact: In our study, 84% of the sample agreed with the statement that in terms of economic development, Russia falls behind Western countries (Kotova & Grigoryan, 2018).

The unfavorable interstate comparison triggers identity management strategies, some of which involve a search for weaker groups "in the neighborhood", in order to restore a positive self-image in comparison to them (Tajfel, 1982). The use of such strategies may result in negative stereotypes and attitudes, the social function of which is to explain and justify existing intergroup relations (Tajfel, 1981b), as well as to maintain and preserve these relations (Stefanenko, 2014). Migrants are likely to be the scapegoat group in the Russian context (Galyapina, 2015; Mukomel', 2005; Pain, 2005; Poletaev, 2014; Tyuryukanova, 2006). Studies have shown that although cultural diversity is commonly viewed as beneficial by majority Russians, they also support the idea of limiting the rights of non-indigenous people (migrants), as well as the idea that the number of immigrants should be reduced (*Mezhnatsional'nye otnosheniya: monitoring FOM*, 2014). Several studies provide evidence that in the Russian context, support for multiculturalism is stronger when questions are asked about indigenous minority groups compared to migrant groups (Galyapina & Lebedeva, 2016; Lebedeva & Tatarko, 2013; Ryabichenko & Lebedeva, 2016).

In this study, we explore the consequences of different identity management strategies among ethnic Russians, the majority group. Specifically, we focus on the relationships between identity management strategies and attitudes towards multiculturalism. This study is exploratory in nature and aims to address the following research questions: (a) Do identity management strategies based on a "Russia vs. the West" comparison predict attitudes towards multiculturalism in Russia? and (b) Are certain strategies of identity management productive or counter-productive for acceptance of multiculturalism in Russia?

## Methods

### *Participants*

Three hundred and twenty three respondents completed the questionnaire. Sixteen questionnaires were not used, as the answers to open ended questions in these questionnaires were not valid. The final sample size was 307 respondents, 61.9% female. Age distribution was from 14 to 55 years old, with  $M = 23.27$ ,  $SD = 6.37$ .

### *Procedure*

The data was collected online, via the platform Virtualexs.ru. The link was distributed through social networks. The average questionnaire completion time was 22

minutes. An informed consent form was provided in the beginning of the questionnaire. After the questionnaire was completed, the participants received researchers' contact details.

### **Measures**

The questionnaire included measures of identity management strategies, attitudes towards multiculturalism, attitudes towards immigrants and "Westerners", national and ethnic identity, collective and individual self-esteem, subjective well-being, and religiosity. In the present study we use only some of these measures, which are described in more detail below.

*Strategies of identity management.* We adapted the measurement developed by Blanz and colleagues (1998) for 12 strategies of identity management; see Kotova & Grigoryan (2018) for a more detailed description.

*Attitudes towards multiculturalism.* We used the Multicultural Attitude Scale (MAS; Breugelmans, van de Vijver, 2004), which consists of two subscales: attitudes towards cultural diversity (four items) and attitudes towards equal rights for all (three items).

*Acculturation expectations.* We used the Adopt and Keep Scale (Alkharaji, Gardner III, Martin, & Paolillo, 1997; Swaidan, Vitell, Rose, & Gilbert, 2006), which measures the majority's expectations of minority groups' acculturation strategies. The "Adopt" scale measures the expectation that minorities should adopt the majority's culture (four items), and the "Keep" scale measures the expectation that minorities should keep their own culture (four items).

*Socio-demographic characteristics.* We asked respondents to indicate their gender, age, occupation, place of residence, nationality, and ethnicity.

All measures were adapted for the Russian context: The items were translated to Russian and some items were reworded to be applicable for Russians. The adaptation also included seven cognitive interviews that helped to make the items clearer. All items (except for socio-demographic ones) were measured on a 5-point Likert-type scale, with 1 indicating "Strongly disagree" and 5 indicating "Strongly agree".

### **Data Analysis**

First, we tested the reliability of all the scales using confirmatory factor analysis. Only one change was made in the scales that we used in this study: The fourth item of the attitudes towards cultural diversity subscale of the MAS scale ("I think all ethnic groups living in Russia should cooperate more to solve occurring problems") was removed, as it did not reflect the underlying latent factor well enough. We do not report the results of these tests in the paper, but the detailed description of measurement adaptation can be obtained from the authors. The relationships between identity management strategies and attitudes towards multiculturalism were tested using structural equation modelling (SEM). Two models were tested: Both models included all strategies, combined in higher-order factors, as in Blanz et al. (1998), as predictors or exogenous factors. Only the dependent variables differed in the models: The first model tested the effects of the strategies on the two subscales of the Multicultural Attitude Scale, and the second model tested their effects on the two subscales of the Adopt and Keep Scale. Considering the exploratory nature of

the study, we use an alpha level of .10 instead of the traditionally used level of .05, to reduce the risk of accepting the null hypothesis when it is not true (Cohen, 1992).

## Results

The first model, predicting attitudes towards cultural diversity and attitudes towards equal rights for all, showed a good fit to the data with  $\chi^2 = 693.45$ ,  $df = 402$ ,  $\chi^2/df = 1.72$ ,  $CFI = .925$ ,  $RMSEA = .049$ . The standardized regression weights, showing the relationships between identity management strategies and the two MAS subscales, are presented in Table 1.

Table 1

*Standardized regression coefficients of the relationships between the higher-order strategies of identity management and the subscales of the Multicultural Attitude Scale*

	$\beta$	<i>p</i> -value
Change of status relations → Diversity	.185	.117
Change of categorization → Diversity	-.098	.429
Change of group membership → Diversity	-.078	.571
Cognitive change of comparison object → Diversity	-.091	.293
New comparison dimension → Diversity	.003	.965
Re-evaluation of comparison dimension → Diversity	.049	.459
Change of status relations → Equality	.001	.994
Change of categorization → Equality	-.109	.400
Change of group membership → Equality	.022	.877
Cognitive change of comparison object → Equality	-.198	.030
New comparison dimension → Equality	.068	.322
Re-evaluation of comparison dimension → Equality	-.004	.954

*Notes.* → Direction of the regression path. Diversity = Attitude towards cultural diversity. Equality = Attitude towards equal rights for all.

As Table 1 shows, only the higher-order strategy of cognitive change of comparison object is significantly ( $p < .05$ ) related to attitudes towards equal rights for all ethnic groups in Russia, and this relationship is negative ( $\beta = -.20$ ). As this higher-order strategy incorporates three specific strategies — temporal comparison, comparison with a standard, and new comparison group — we further explored which of these three strategies is responsible for the association found. The analysis revealed that only new comparison group strategy is related to the components of MAS. The links between this strategy and both the diversity and equality components of MAS were significant and negative ( $\beta = -.17$ ,  $p < .05$ ; and  $\beta = -.18$ ,  $p < .05$ , respectively).

The second model, predicting the acculturation expectations of the host society, also showed a good fit, with  $\chi^2 = 943.53$ ,  $df = 519$ ,  $\chi^2/df = 1.82$ ,  $CFI = .925$ ,  $RMSEA = .052$ . The associations found in this model are shown in Table 2.



Table 2

*The standardized regression coefficients of the relationships between the higher-order strategies of identity management and the subscales of Adopt and Keep Scale*

	$\beta$	<i>p</i> -value
Change of status relations → Adopt	.181	.107
Change of categorization → Adopt	.365	.026
Change of group membership → Adopt	-.312	.039
Cognitive change of comparison object → Adopt	-.055	.460
New comparison dimension → Adopt	-.066	.263
Re-evaluation of comparison dimension → Adopt	-.014	.802
Change of status relations → Keep	.083	.434
Change of categorization → Keep	.053	.661
Change of group membership → Keep	-.253	.061
Cognitive change of comparison object → Keep	-.041	.606
New comparison dimension → Keep	-.058	.342
Re-evaluation of comparison dimension → Keep	-.006	.926

*Note.* → Direction of the regression path

Two higher-order strategies, change of categorization and change of group membership, predicted the acculturation expectation of adoption of Russian culture by minorities. Change of categorization was positively associated with this expectation and negatively with change of group membership. Change of group membership also negatively predicted the acculturation expectation of minorities to keep their own culture.

As in the case of the MAS, we looked at specific strategies that are part of the higher-order strategies that were found to have significant effects on acculturation expectations. Change of categorization strategy incorporates such strategies of identity management as individualization, superordinate re-categorization, and subordinate re-categorization. Of these three strategies, only individualization predicted significantly ( $\beta = .29, p < .05$ ) the acculturation expectation of adopting Russian culture. In case of change of group membership strategy, both of its components, assimilation and individual mobility, had negative effects. Individual mobility was negatively related to expectation of adoption ( $\beta = -.24, p = .053$ ) and assimilation was negatively related to expectation of keeping one's own culture ( $\beta = -.21, p = .07$ ).

## Discussion

This study was aimed at exploring the relationships between identity management strategies that are used by the ethnic Russian majority to cope with the identity threat associated with unfavorable comparison to the "West", and their attitudes towards multiculturalism in Russia. The research questions were: (a)

whether identity management strategies can predict attitudes towards multiculturalism, and (b) whether certain strategies are more beneficial than others for the acceptance of multiculturalism in Russia. We measured attitudes towards cultural diversity and towards equal rights for all ethnic groups in the country, as well as the majority's acculturation expectations, as indicators of attitudes towards multiculturalism.

Our findings suggest that identity management strategies are indeed connected with attitudes towards multiculturalism. The associations found between various strategies and attitudes are summarized in Figure 2. One of the most striking results is that none of the strategies can be considered beneficial for the acceptance of multiculturalism in Russia. The only positive association found was between the strategy of individualization (giving lower importance to the membership group) and the acculturation expectation of adoption of Russian culture by minorities. However, considering that the same strategy was associated negatively with the expectation for minorities to preserve their own culture, this strategy indicates a preference for minorities to assimilate into Russian culture and give up their own cultural identities, which contradicts the core idea of multiculturalism (Berry, 2013).

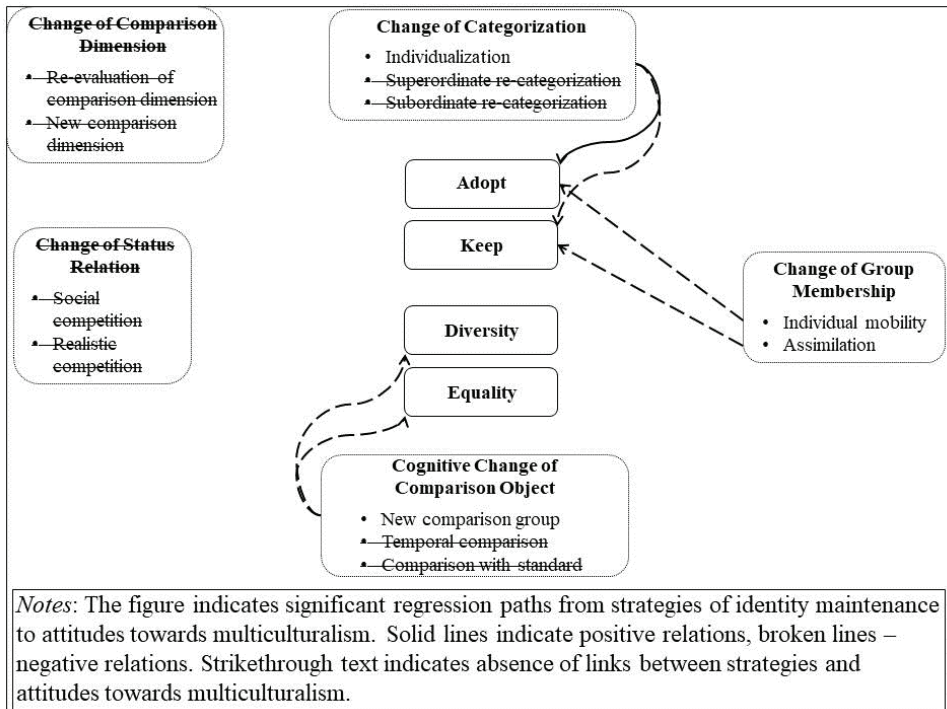


Figure 2. Relationships between strategies of identity management and attitudes towards multiculturalism in Russia

The higher-order strategy of change of group membership, which includes assimilation with the outgroup (in this case, with Western countries) and individual mobility, had mixed consequences for acceptance of multiculturalism. Spe-

cifically, those who scored high on individual mobility (e.g., a desire to move to a Western country) agreed less that minority groups should adopt Russian culture. If an individual does not like their ingroup and wants to move to a different one, then there is no reason to want others to become more like the ingroup members. However, as the same strategy is not associated with greater preference for minorities to keep their own culture, we cannot conclude that this strategy is productive for multiculturalism. It rather reflects low identification with the ingroup and low concern for it.

At the same time, those who preferred a strategy of assimilation (becoming more like the “Westerners”), agreed less that minority groups should keep their own culture. This is a curious finding, considering that multiculturalism is more welcomed in Western countries than in Russia, and we would expect that “Western-oriented” people should support multiculturalism more. However, the results for assimilation show the opposite. The strategy of assimilation is likely to be adopted by people who do not see their own or other cultures as unique and valuable, but rather see various groups as organized in a certain hierarchy. The hierarchy of ethnic groups in Russia is found to be quite stable across time, with Russians on the top (Hagendoorn, Drogendijk, Tumanov, & Hraba, 1998). A belief that Russians should be more like the Westerners is based on an implicit assumption that Westerners are better than Russians in some ways. Consequently, if Russians are better than other minorities in their country, then the minorities should become more like Russians, and Russians overall should become more like Westerners. We cannot test whether this speculation is accurate with the existing data, but the conclusion in any case is the same: The strategy of assimilation does not promote acceptance of multiculturalism.

The only strategy that was directly related to attitudes towards diversity and equality for all was the strategy of choosing a new comparison group. This strategy predicted both components of the Multiculturalism Attitude Scale negatively. This finding is in line with the “scapegoat” hypothesis that originated in the frustration–aggression theory (Dollard et al., 1939; Hovland & Sears, 1940) and then became part of a more formalized theory of relative deprivation (Gurr, 1970). The idea is simple: Feelings of deprivation that occur on the group level (in comparison with other groups that are more well off) can lead to hostility towards weaker groups instead of higher-status outgroups. This hypothesis summarizes our reasoning regarding “at whose expense” the group restores its positive identity. This finding can explain the mixed evidence for the “scapegoat” hypothesis (Brown, 2010): Although most of our participants believed that, in terms of economic development, Russia falls behind Western countries, it seems that the choice of changing the comparison group as an identity management strategy was what linked this threat to negative intergroup attitudes. This interpretation suggests that identity management strategies are important mediators between the structural reality of intergroup relations and its consequences.

We did not find any connections between the higher-order strategies of change of comparison dimension and change of status relations, or the specific strategies of re-categorization, temporal comparison, and comparison with a standard and attitudes towards multiculturalism. It is plausible that the absence of effects in some cases was a statistical artifact. For example, we found that respondents hardly

ever used the strategy of comparison with a standard (Kotova & Grigoryan, 2018), which would produce a floor effect. In addition, some of the specific strategies might have had unique associations with the attitudes that we did not test because the higher-order strategies were unrelated to these attitudes. However, some strategies are simply irrelevant to the intergroup behavior. Mummendey et al. (1999) report the absence of links between the strategies of temporal comparison and the re-evaluation of comparison dimension and parameters of social structure, which is in line with our findings.

### **Limitations**

The current study has several limitations that can be resolved in future studies. First of all, our focus here was at a rather abstract level: We studied the perceptions of majority Russians in general and measured their general attitudes towards diversity and equality, without differentiating attitudes towards specific outgroups. More precision might have produced stronger (or even different) effects. Second, several strategies of identity management, such as change of the comparison dimension, change of status relations, superordinate re-categorization, and subordinate re-categorization, did not show any associations with the outcome variables. Although it is possible that this reflects an actual absence of such effects in the population, it is also possible that the measures used in this study did not capture the nature of these strategies well enough. More work should be done in order to ensure the quality of the measurement instruments for identity management strategies. Third, the sample characteristics could have had an effect on the outcomes of the study. Our sample was quite young (mean age was 23 years old). Young people in general might have a preference for strategies of individual mobility, whereas strategies of change of categorization or different “re-evaluations” might be more popular and have stronger effects in older people.

### **Conclusion**

This study explored the links between identity management strategies and different outcomes related to acceptance of multiculturalism policy. We showed that certain identity management strategies are indeed associated with attitudes towards cultural diversity and equality in Russia and the acculturation expectation of minorities to keep their own culture or adopt mainstream Russian culture. We found that none of the strategies had positive consequences for the acceptance of multiculturalism. This is probably not that surprising, considering that all these strategies are used to cope with an unfavorable comparison that triggers identity threat. However, there seems to be a set of strategies that are at least neutral and do not result in hostility towards lower-status outgroups. These are mainly the strategies of social creativity: change of comparison dimension, comparison with a standard or a temporal comparison, and strategies of re-categorization.

There are several directions that future research on strategies of identity management could take. First, it is clear that majority members' identity can also be threatened, but most of the work on identity management based on SIT (Tajfel,

1982; Blanz et al., 1998) was developed to explain strategies of minority or lower-status groups. Thus, more research is needed to understand the strategies of identity management that are used by majority or higher-status group members. Second, strategies of identity management of majority members could be studied not in relation to other countries, but in relation to other groups within the country. As each region in Russia has its specific ethnic composition, specific context of intergroup relations and, consequently, specific attitudes towards MCP, the productivity of different strategies of identity management might also differ. Third, it is important to take into account other characteristics of identity (such as identity security) and test more complex models that reflect more accurately the processes underlying intergroup relations.

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## Appendix A. Identity management strategies

**Table A.1.** Brief descriptions of identity management strategies measured in the study

Strategy name	Description
Realistic competition	Competition for resources
Social competition	Competition for a positive evaluation
Individualization	Distancing from the group; view of oneself as an individual rather than a member of a group
Subordinate re-categorization	Re-categorization to a smaller group: professional group, age group, etc.
Superordinate re-categorization	Re-categorization to a larger group: national group, unions, etc.
Individual mobility	Change of group membership (usually from lower-status to higher-status)
Assimilation	A view that the lower-status ingroup should become more similar to the higher-status outgroup
Re-evaluation of comparison dimension	Devaluation of the comparison dimension
New comparison dimension	Finding a new comparison dimension (or several), on which the ingroup can be more highly esteemed
Comparison with a standard	Comparison of the group with moral and ethical standards, rather than with an outgroup
Temporal comparison	Comparison with past times (e.g., the Golden Age of a group) or expected high status in the future
New comparison group	Change of comparison group to a (usually) weaker one

## Basic Values in Russia: Their Dynamics, Ethnocultural Differences, and Relation to Economic Attitudes

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**Background.** This study was carried out using the framework of S. Schwartz's theory of basic human values.

**Objective.** This article examines the dynamics of the basic values of Russians (2008–2016) and the relationship between value orientations and economic attitudes among Christians and Muslims in Russia.

**Design.** The dynamics of values of Russians were analyzed based on the five waves rounds of ESS (2006, 2008, 2010, 2012, 2016), each of which included around 2,000 respondents. The 2010 sample included ethnic Russians as well as respondents from the North Caucasus (N = 278).

**Results.** We found that the most preferred value among Russians is Security. However, the importance of this value decreased over 10 years (2006–2016). Such values as Achievement, Tradition, and Power were relatively stable among Russians during this period. In addition, between 2006 and 2016 we observed the increasing priority of the values of Hedonism and Stimulation. Using our own data set, we examined the relations between values and attitudes toward different types of economic behavior.

**Conclusion.** We found that the patterns of the relations between values and attitudes toward different types of economic behavior had similarities as well as differences among Christians (in the Central Federal District and the North Caucasus Federal District) and Muslims (in the North Caucasus Federal District) in Russia.

**Keywords:** culture, values, economic behavior, economic attitudes, cross-cultural comparison

## Introduction

Values are widely used in applied research in social psychology (Bardi & Schwartz, 2003; Knafo, Roccas, & Sagiv, 2011). Schwartz (1992) defined values as motivational, trans-situational goals that serve as guiding principles in people's lives. Values

affect the evaluation of events and people (Kluckhohn, 1951; Rokeach, 1973; Rohan, 2000), as well as attitudes, choices, and decisions (Knafo, Daniel, & Khoury-Kassabri, 2008; Maio, Pakizeh, Cheung, & Rees, 2009; Feather, 1995; Schwartz, 2006; Verplanken & Holland, 2002).

In this study, we regard values as personal constructs that can shed light on the motives for economic behavior. As shown in several studies, values motivate people's behavior (Rokeach, 1973). Nevertheless, there are other approaches stating that human behavior is not driven by values only (Kristiansen & Hotte, 1996; McClelland, 1985). For example, McClelland argues that values are likely to influence behavior only when it stems from conscious decisions (McClelland, 1985).

To increase the predictability of value measurements for behavior, it is important to examine the mechanisms that link values and behavior. First, a certain value might be actualized in a specific situation (for example, a report about a major accident or terrorist attack is likely to activate the value of Security). A study by Verplanken and Holland showed that the priming of a certain value intensifies the behavior aimed at finding information relevant to the given value and affects coordination of behavioral choices with this value (Verplanken & Holland, 2002). The relation between values and behavior is based on the fact that elements of the situation (which activate the relation) relevant to certain values become the focus of human attention. In this case, the situation is understood and interpreted, based on the value priorities of an individual (Karp, 1996; Bond & Chi, 1997). More importantly, behavior that aims to realize the activated value becomes significant. Action planning is also facilitated in situations that rely on an important human value. In addition, planning increases resistance in the face of any obstacle that may arise during the implementation of actions aimed at the realization of the value (Goodwin et. al., 2002; Goodwin & Tinker, 2002).

Currently, one of the most popular value theories is the theory of basic human values proposed by Schwartz. In his approach, Schwartz argues that the crucial aspect that distinguishes among values is the type of motivation in which they are reflected (Schwartz, 1992; 2006). Therefore, he grouped the individual values into sets of values (types of motivation) sharing a common goal. He argues that basic human values, which are recognized in all cultures, are those that represent universal human needs (biological needs, requisites of coordinated social interaction, and demands of group functioning) in the form of conscious goals. Based on the values selected by previous investigators, found in religious and philosophical works in different cultures, he has defined 10 distinct motivational types of values. These values are as follows: Self-Direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Benevolence, and Universalism. According to Schwartz, they determine the specific actions of an individual and his or her activity as a whole (Schwartz, 1990, 1995).

Schwartz and Bilsky developed a theory of dynamic relations among the major types of human motivation (Schwartz & Bilsky, 1990). According to this theory, each motivation type has a goal that leads the desires of an individual; these desires, in turn, lead to compatible or contradictory actions. Thus, conflict or compatibility among the values determines, in the final analysis, the strategy of the individual's behavior. The authors proposed the following typology of contradictions between the values:

1) Conservation values (Security, Conformity, and Tradition), as opposed to Openness to Change values (Stimulation, Self-Direction, and Hedonism). Here, there is an obvious conflict between values emphasizing independence of thought and action and values of preserving traditions and maintaining social stability.

2) Self-Transcendence values (Universalism and Benevolence), in contrast with Self-Enhancement values (Power, Achievement, and Hedonism). Here also, there is an apparent conflict between concern for the welfare of others and the pursuit of one's dominance over others.

Existing empirical studies have shown that basic values are related to different kinds of human behavior, including economic and political behavior. Caprara et al. (2006) showed that the values of Security and Power predicted a preference for right-wing, conservative parties, whereas the value of Universalism predicted a preference for left-wing, liberal parties (Caprara et al. 2006, 2008). The logic behind these relations, according to the researchers, is that people who value Security and Power expect that voting for the right will help to protect or realize their goals and serve to reaffirm their values. In the same way, voting for the left, with its policies promoting the objectives of Universalism, is considered by people to whom these values are important as a way to achieve their goals.

Later, Caprara, Vecchione, and Schwartz (2012) hypothesized that, in addition to the above-mentioned relations, there are some more complex mechanisms of influence of individual values on voting. The authors analyzed values as a means of predicting whether people will vote in elections. To explain the phenomenon of not voting using individual values, the authors used the following assumption: Since people who voted for the left or the right in the previous election gave preference to values of either Universalism or Security and Power, people who don't vote do not attach great importance to these values (therefore, voting for them is not a means of increasing the likelihood of achieving motivational goals important to them). As a result, it was found (in an Italian sample) that while those who voted for left-wing parties attributed more importance to Universalism, and right-wing supporters valued Security and Power, people who didn't vote attached significantly less importance to these three values (Caprara, Vecchione, & Schwartz, 2012).

Thus, there are studies showing that values can explain or predict voting behavior. Accordingly, we can assume that there may be a relationship between value orientations and predispositions to economic behavior (Harrison, 1992; Harrison & Huntington, 2000; Hofstede, 2001; Inglehart, 1997; Inglehart & Baker, 2000).

Inglehart and Baker showed that Self-Expression values correlated with such indices as a country's GDP, human development index (HDI), share of service sector employment, social solidarity index, and internet use (Inglehart & Baker, 2000). Schwartz showed that economic development indices were related positively to the values of Autonomy and Egalitarianism and negatively to Embeddedness and Hierarchy. Higher indices of democracy correlated positively with Autonomy, Egalitarianism, Mastery, and national prosperity levels. The values of Autonomy, Equality, and Harmony were related to lower levels of corruption, whereas those



of Embeddedness, Hierarchy, and Mastery correlated positively with higher corruption levels (Schwartz, 2004; Lebedeva & Tatarko, 2009).

However, the issue of the relationship between values and socioeconomic attitudes and behavior in Russia has not been studied enough; our study aims to fill in this gap.

The second question, closely related to the previous one, concerns the degree of stability and homogeneity of the value structure of Russians. If a relationship between values and predispositions to economic behavior is found, knowledge about the features of the temporal dynamics of the values of Russians and the differences in values of different groups of Russia's population will allow for more accurate analyses of relevant differences and changes in economic behavior.

Studies on values demonstrated that in different cultures, Schwartz's individual values are distributed unequally (Magun & Rudnev, 2010). This tendency becomes even stronger when the analysis is at the level of value oppositions. Since Russia is a multicultural state, we can also expect an uneven distribution of values among Russian citizens. In particular, previous studies have shown that the values of respondents from the North Caucasus differ from the values of Russians living in Moscow and Novokuznetsk (Lebedeva & Grigoryan, 2013).

There are few systematic studies of the dynamics of Russian values. Previous studies conducted by the authors of this paper have shown that from 1999 to 2005, the values of young Russians have shifted to a greater preference for Autonomy (affective and intellectual) and Mastery (Lebedeva & Tatarko, 2007). However, these studies were performed using a different methodology, which considered values at the cultural level. In the current study, we decided to analyze the dynamics of individual values of Russians, based on the latest data of systematic reviews (in particular, the data of the European Social Survey from 2006 to 2016) containing the short version of the Schwarz questionnaire.

### ***Research objectives:***

1. To reveal the dynamics of the value priorities of Russians from 2006 to 2016.
2. To identify the relationship between values and predispositions to economic behavior in various religious groups.

These tasks were performed in two studies.

## **Method**

### ***Study 1.***

*Participants.* The first study was devoted to the analysis of the dynamics of values of Russians during the period from 2006 to 2016. In this part of the study, we used data from the European Social Survey (ESS, <http://www.europeansocialsurvey.org/>). We used only those ESS waves that included Russian data sets: 2006, 2008, 2010, 2012, and 2016. Each wave included a representative sample of about 2,500 respondents (Table 1).

Table 1

*The characteristics of the Russian samples in the ESS*

Year	N	Gender (M/F)	Age (Mean)
2006	2,437	983/1,454	46
2008	2,512	989/1,523	47
2010	2,595	1,064/1,531	46
2012	2,484	951/1,533	45
2016	2,430	1,037/1,393	45

*Measures.* The ESS questionnaire contained a shortened version of the Schwartz PVQ questionnaire, which includes 21 items for 10 values. The procedures for computing the scores for each value and centering them in sake of the proceeding analysis were performed according to Schwartz's instructions. In accordance with the key, an average rating was calculated for the 10 items, corresponding to the 10 types of motivation (or individual-level values) marked out by Schwartz: Power, Conformity, Benevolence, Security, Tradition, Universalism, Self-Direction, Stimulation, Hedonism, and Achievement (Schwartz, 1992). Additionally, the arithmetic means were calculated of four value oppositions (including 10 blocks of values)—which, according to the theory of Schwartz, are located along two axes: Conservation–Openness to change and Self-Transcendence–Self-Enhancement.

*Analysis.* The multivariate analysis of variance (MANOVA) test was used to measure the significance of value changes across several years, controlling for age and gender. Before performing the MANOVA, it was necessary to check the multivariate normality, linearity, and multivariate homogeneity of variance between groups, which were tested using QQ plots and histograms, Pearson's  $r$  test, and Levene's test. Tukey's HSD was performed for those variables that were significant in the MANOVA.

## **Study 2.**

*Participants.* Table 2 shows the characteristics of the second study sample. The sociopsychological survey was conducted in three regions of Russia. By ethnic composition, the sample included Russians (from Moscow and the North Caucasus Federal District) and representatives of the North and South Caucasus (Chechens, Ossetians, Balkars, Dagestanis, Armenians, and Georgians). The Russians, Armenians, and Ossetians identified themselves as Christians, whereas the Chechens and Balkars identified themselves as Muslims. A comparison was made between the Russians and the representatives of the Caucasian peoples as well as between Christians and Muslims. We used a "snowball" sampling strategy in five regions of Russia. The questionnaire took approximately 40 minutes to complete. This part of the study was conducted in 2010.

Table 2

*The characteristics of the Study 2 sample*

Region	Ethnic Group	N	Gender M/F	Age (Mean)
Moscow and	Russians	221	92/129	22
Moscow region	Peoples of the South Caucasus	13	5/8	20
Stavropol region	Russians	56	20/36	20
	Peoples of the North Caucasus	40	13/27	20
North Ossetia-Alania	Ossetians	45	17/28	31
Chechnya	Chechens	37	16/21	30
Kabardino-Balkaria	Balkars	100	48/52	29

*Measures.*

1. Schwartz's survey (SVS) included 57 value items (see Lebedeva & Tatarko, 2011). In accordance with the key, an average rating was calculated for the 10 types of individual-level values.

2. Attitudes toward economic behavior (Lebedeva & Tatarko, 2011): When creating a methodology for evaluating models of economic behavior, 10 bipolar dimensions of economic behavior were developed (see below) according to which we constructed specific situational scenarios. Each situation represents a model in which a person might choose one of two opposite types of behavior, depending on his or her predispositions. The following types (dimensions) of economic behavior were evaluated in this study:

1. "Economic paternalism - Economic independence"
2. "Time saving - Money saving"
3. "Short-term - Long-term prospects in economic behavior"
4. "Wastefulness - Economy"
5. "Economic interest - Economic indifference"
6. "Priority of profit over the law - Priority of the law over profit"
7. "Economic activity - Economic inactivity"
8. "Acceptability of using loans in daily life - Unacceptability of using loans in daily life"
9. "Equal distribution of financial rewards - Fair distribution of financial rewards"
10. "Priority of the size of the financial reward - Priority of the creative aspect of work"

*Analysis.* The methods of the data processing were as follows: a t-test for independent samples and a multiple regression analysis. To control the sample size effect, we used Cohen's d coefficient (Cohen, 1988).

## Results and Discussion

### Study 1. Dynamics of values

First, let us answer the following question: Have the individual values of Russians and their structure changed in 10 years? Having centered and separated the scores across rounds, we get the following results (Fig. 1):

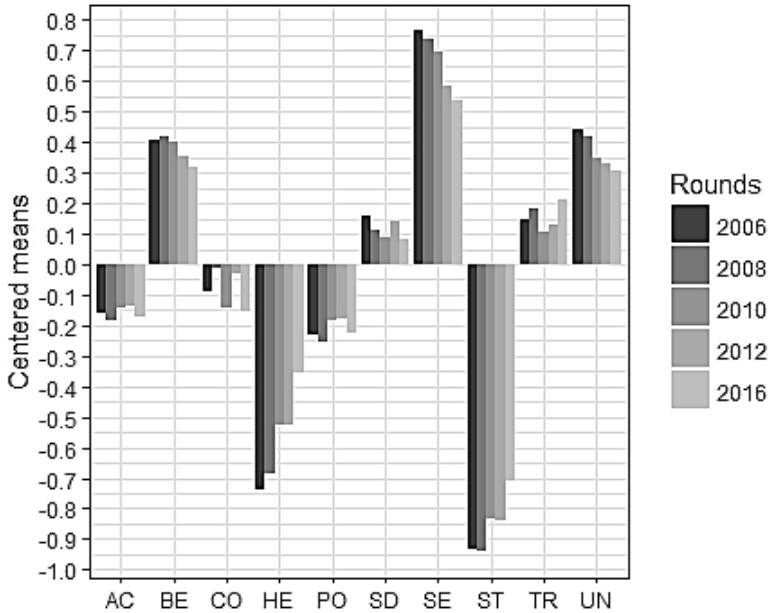


Figure. 1. Value priorities of Russians, 2006–2016.

Note: SE – “Security,” CO – “Conformity,” TR – “Tradition,” BE – “Benevolence,” UN – “Universalism,” SD – “Self-Direction,” ST – “Stimulation,” HE – “Hedonism,” AC – “Achievement,” PO – “Power.”

The higher the score in the histogram, the higher the manifestation of a certain value. It can be seen that the main priority among Russians is Security. Universalism and Benevolence have noticeably high scores in Russia as well. Tradition, Self-Direction, Conformity, Achievement, and Power, which score from 0.16 (more expressed) to -0.21 (less expressed) in Russia, form the next group of values. Hedonism and Stimulation are the least typical values among Russians.

The most visible trend of changes over years is that Russians seem to prefer such values as Hedonism and Stimulation more strongly year after year. Also we can see a tendency to gradually reducing scores of Benevolence, Security and Universalism, but at different rates. Upward trends for Achievement and Power, as well as downward changes for Conformity and Self-Direction, are less visible.

**The MANOVA test for individual values.** Since the MANOVA assumes *multivariate normality*, each group was checked for normal distribution using QQ plots and histograms, all of which gave satisfactory results.

*Linearity* (tested with Pearson’s  $r$ ) was true for the values across rounds, except for Tradition, Achievement, and Power, which showed p-values above the threshold of 0.05.

Table 3  
The effect of the time variable (ESS rounds) on ten human values in Russia

Values	ESS rounds					F(4,12453)
	2006	2008	2010	2012	2016	
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	
Conformity	-0.089 (0.985) <sub>ab</sub>	-0.014 (0.936) <sub>c</sub>	-0.142 (0.884) <sub>a</sub>	-0.027 (0.887) <sub>bc</sub>	-0.153 (0.922) <sub>a</sub>	11.967
Tradition	0.148 (1.024) <sub>abc</sub>	0.184 (0.968) <sub>bc</sub>	0.107 (0.895) <sub>a</sub>	0.131 (0.88) <sub>ab</sub>	0.211 (0.9) <sub>c</sub>	4.863
Benevolence	0.407 (0.689) <sub>bc</sub>	0.418 (0.702) <sub>c</sub>	0.402 (0.66) <sub>bc</sub>	0.356 (0.7) <sub>ab</sub>	0.317 (0.739) <sub>a</sub>	9.143
Universalism	0.444 (0.653) <sub>b</sub>	0.417 (0.66) <sub>b</sub>	0.351 (0.602) <sub>a</sub>	0.331 (0.618) <sub>a</sub>	0.308 (0.658) <sub>a</sub>	20.318
Self-Direction	0.16 (0.806) <sub>b</sub>	0.115 (0.787) <sub>ab</sub>	0.088 (0.752) <sub>a</sub>	0.143 (0.701) <sub>ab</sub>	0.083 (0.781) <sub>a</sub>	4.659
Stimulation	-0.931 (1.107) <sub>a</sub>	-0.94 (1.106) <sub>a</sub>	-0.833 (1.053) <sub>b</sub>	-0.839 (1.063) <sub>b</sub>	-0.707 (1.074) <sub>c</sub>	18.671
Hedonism	-0.735 (1.119) <sub>a</sub>	-0.687 (1.123) <sub>a</sub>	-0.525 (0.985) <sub>b</sub>	-0.527 (1.019) <sub>b</sub>	-0.355 (1.014) <sub>c</sub>	50.378
Achievement	-0.161 (0.901)	-0.182 (0.888)	-0.139 (0.847)	-0.137 (0.853)	-0.17 (0.897)	1.2224
Power	-0.23 (0.827) <sub>ab</sub>	-0.255 (0.799) <sub>a</sub>	-0.182 (0.791) <sub>b</sub>	-0.178 (0.799) <sub>b</sub>	-0.223 (0.836) <sub>ab</sub>	4.184
Security	0.766 (0.832) <sub>c</sub>	0.737 (0.838) <sub>bc</sub>	0.697 (0.762) <sub>b</sub>	0.583 (0.809) <sub>a</sub>	0.535 (0.84) <sub>a</sub>	36.766

*Homoscedasticity* was tested with Levene's test, and low p-values led to the conclusion that variances could not be assumed to be equal, so heteroscedasticity was indicated. However, the number of observations in each group was approximately the same, and the MANOVA was robust against heteroscedasticity, which means that it was still appropriate to conduct further analysis.

Having tested the data for necessary conditions for performing the multivariate analysis of variance, we moved to the main tests. A one-way MANOVA was conducted to compare the effect of rounds (years) on the expression of the ten human values.

The differences between the rounds of measurement were tested by pairwise comparisons using Tukey's HSD test. Values in rows with different indexes were statistically significantly different ( $p < .05$ ).

A MANOVA for ESS rounds as an independent group and human values as dependent variables showed significant multivariate effects: Wilk's  $\Lambda = 0.963$ ,  $F(4, 12453) = 13.136$ ,  $p < 0.001$ . There was a significant effect of the time variable at the  $p < .05$  level on Conformity [ $F(4, 12453) = 11.967$ ,  $p < 0.001$ ], Tradition [ $F(4, 12453) = 4.863$ ,  $p = 0.0006$ ], Benevolence [ $F(4, 12453) = 9.143$ ,  $p < 0.001$ ], Universalism [ $F(4, 12453) = 20.318$ ,  $p < 0.001$ ], Self-Direction [ $F(4, 12453) = 4.658$ ,  $p = 0.0009$ ], Stimulation [ $F(4, 12453) = 18.671$ ,  $p < 0.001$ ], Hedonism [ $F(4, 12453) = 50.378$ ,  $p < 0.001$ ], Power [ $F(4, 12453) = 4.184$ ,  $p = 0.002$ ], and Security [ $F(4, 12453) = 36.766$ ,  $p < 0.001$ ]. The effects on Achievement [ $F(4, 12453) = 1.222$ ,  $p = 0.299$ ] appeared to be insignificant.

Generally, changes towards less similarity were significant for Benevolence, with the most difference between 2006 and 2016; for Conformity, there was a significant fluctuation between each year, but it was not significant between the first and the last years; and for Self-Direction, there was a noticeable change between 2006 and 2016, but each year did not significantly differ from the previous one. Security showed the greatest difference between 2010 and 2012, and the first round showed significantly more similarity than the last one; Universalism demonstrated a difference between 2008 and 2010, separating two periods that were similar to each other, but the general trend was toward less similarity.

For Hedonism, the most visible difference was revealed between the two last rounds; for Power, there was a difference between 2008 and 2010, but none between the first and the last years; and for Stimulation, there was a change between 2008 and 2010, as well as between 2012 and 2016, and also there was an overall change toward more similarity.

For Tradition, the changes were significant, but the first two rounds did not differ from the last two; only 2008 and 2010 demonstrated a difference from following rounds.

## ***Study 2. Relations between basic values and economic attitudes***

Furthermore, we examined the relationships between values and predisposition toward models of economic behavior. To demonstrate intercultural distinctions of values' impact on economic behavior, the two groups of respondents were divided by religion (instead of their ethnic identity). Because the respondents from the North Caucasian region included representatives of six ethnic groups, sam-



ple crushing of these small groups would distance us from the overall objective, a cross-cultural comparison of values as a predictor of economic behavior. Besides, according to our previous research, the religious aspect played a significant differentiating role in choosing models of economic behavior (Lebedeva & Tatarko, 2011).

First, we compared the value means of the groups based on religion. Table 4 shows the means and their differences between representatives of the Christian and Muslim faiths:

Table 4

*Interfaith comparison of means of values (Christians and Muslims)*

Individual values	M/SD Christians (N=393)	M/SD Muslims (N=165)	t	Cohen's d
Security	4.39/.64	4.55/.54	-3.25**	.31
Conformity	4.17/.67	4.45/.57	-4.58***	.58
Tradition	3.15/.87	3.86/.77	-9.20***	.62
Benevolence	4.35/.58	4.42/.53	-1.71	-
Universalism	3.74/.61	3.88/.55	-2.48*	.33
Self-Direction	4.29/.67	4.05/.57	3.97***	.51
Stimulation	3.49/1.06	2.96/1.19	5.75***	.61
Hedonism	3.82/1.06	3.57/1.17	2.39*	.28
Achievement	3.99/.64	3.85/.68	2.32*	.23
Power	3.33/.94	3.26/1.05	.92	-

Note. \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

The interfaith comparison revealed significant differences: Christians attributed more importance to the values of Openness to Change (Self-Direction, Stimulation) and the values of Hedonism and Achievement, which contribute to the realization of individual goals; Muslims gave higher priority to the values of Conservation (Security, Conformity, Tradition) and Self-Transcendence (Universalism), which contribute to group survival and maintenance of group harmony. The measure of effect size (Cohen's d) showed that differences in the values of Conformity, Tradition, Stimulation, and Self-Direction were not accidental; these values reflected the differences in the conflicting values of Conservation (higher for Muslims) and Openness to Change (higher for Christians).

Second, we carried out an analysis of the differences in the relationships of values and models of economic behavior in the samples of Christians and Muslims separately. Multiple regression analysis was used for the data processing.

A regression analysis showed the relationships between Schwartz's individual values and individual choices in situations of economic behavior for Christians (see Table 5). The value of Tradition was related positively to the attitude for saving

Table 5  
Regression analysis between the ratings of situations and Schwartz's individual-level values (Christians)

Explanatory Variables		Predictors							R <sup>2</sup>
Dimension	Scale	SE β	TR β	BE β	UN β	SD β	ST β	HE β	AC β
Time saving	Typicality		.15*						
Short-term prospects in economic behavior	Willingness								-.13*
Wastefulness in economic behavior	Emotional preference							.17*	
	Willingness							.19*	
Economic indifference	Emotional preference			-.15*	-.21*	-.15*	-.14*		
	Typicality	-.17*			-.24**		-.16*		
Economic inactivity	Emotional preference		.15*						
	Willingness		.22**					.17*	
Not accepting loans	Emotional preference					.20*			
	Willingness					.23**			
Equal distribution of financial rewards	Emotional preference			.15*				-.17*	
	Willingness	.14*							
Priority of the size of financial rewards over the creative aspect of work	Typicality		-.19*						
									.04

Note. \* $p < 0.05$ ; \*\* $p < 0.01$

time. At the same time, the value of Tradition was positively associated with low economic activity of Christians. Such patterns of relationships among values and economic attitudes tells us that that money is not an important goal for Orthodox Christians in their lives.

Short-term economic prospects related negatively to the value of Achievement. That is to say, the value of Achievement in Christians called forth a long-term orientation of economic behavior.

Emotional preference for wastefulness in economic behavior and willingness to behave in this way related positively to the value of Hedonism, whereas the typicality of such behavior correlated negatively with the value of Security. The desire to enjoy one's life was the factor that contributed to the "recklessness" with which money was spent; the desire for security allowed for rating such behavior as less typical among Christians.

An emotional preference for economic indifference was negatively associated with the values of Benevolence, Universalism, and Stimulation. The ratings of the typicality of economic indifference correlated negatively with the values of Security, Universalism, and Stimulation. The same values of Stimulation and Universalism also elicited great interest in economic processes and phenomena; here, the influence of valuing Security also played a role. Apparently, the more the Christians appreciate Stimulation, Universalism, Benevolence, and Security, the more interested they are in economic development.

An emotional preference for economic inactivity was associated with the priority of Conformity, whereas at the behavioral level, correlations with values of Tradition and Hedonism were observed. Economic activity was associated with risks, stress, and changes, which do not correspond with the values of Conservation (Tradition and Conformity) or with the desire to enjoy life to the maximum (Hedonism).

The emotional unacceptability of loans in the sample of Christians correlated with the value of Self-Direction, and this is the value associated with reluctance to borrow; the more pronounced the value of Self-Direction, the more negative the person's attitude to loans was and the less he or she was willing to borrow.

The value of Hedonism was negatively associated with the emotional preference for fair distribution of financial rewards (instead of the principle of equal distribution), whereas the value of Security correlated positively with the willingness for such behavior. That is to say, the emotional component was associated with the desire to enjoy life; such desire correlated better with preference for equal distribution than with preference for fair distribution. That is, the desire for pleasure (the value of Hedonism) can lead to the acceptability of inequality, but the value of Security can reduce the willingness to distribute financial rewards unequally, because people understand that the situation of inequality is potentially dangerous for them. The priority of preferring money over creative work related negatively to the value of Tradition. Thus, we can assume that traditionally, money for Christians has less value than the possibility of creative work.

Next, we will consider the relationship between values and predisposition to models of economic behavior in the respondents who considered themselves Muslims (see Table 6).

Table 6

*Regression analysis between the ratings of situations and Schwartz's individual-level values (Muslims)*

Explanatory Variables		Predictors					R <sup>2</sup>
Dimension	Scale	CO β	BE β	UN β	SD β	ST β	
Economic paternalism	Willingness Typicality	-.23*			.21*		.11 .07
Time saving	Emotional preference Willingness	-.34** -.26*		-.47** -.31**			.16 .12
Short-term prospects in economic behavior	Willingness Typicality		-.39** -.18*				.10 .11
Economic indifference	Willingness Typicality		-.26* -.40***				.05 .12
Economic inactivity	Typicality	-.27*					.07
Equal distribution of financial rewards	Emotional preference Willingness Typicality					-.24* -.30*	.10 .08 .05
Disinclination to spontaneous purchases	Willingness					-.21*	.10

*Note.* \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

TIIn Muslims, tolerance for economic paternalism correlated negatively with the value of Conformity; ratings for the typicality of economic paternalism correlated positively with the value of Self-Direction. A low value for Conformity predicted a higher level of economic paternalism, the desire to rely on the state to obtain their wealth. A high value for Self-Direction related to the typicality of such a pattern of behavior among Muslims. An emotional preference and willingness to spend money in order to save time negatively correlate with the values of Conformity, Universalism, and Hedonism. It can be concluded that for Muslims, it is preferable to save money rather than time, since the value of Conformity determines this choice. The relationships with Universalism and Hedonism are of particular interest here. Apparently, prioritizing money saving, in general, is typical for Muslim culture and is rated positively; therefore, such diverse values are associated with this choice.

The values of Benevolence and Hedonism relate negatively to willingness to take economic decisions based on short-term prospects. We can assume that Muslims are quite reasonable in planning, and therefore the desire to enjoy and care for loved ones does not correlate with quick and short-term income but rather with greater planning in economic behavior. The ratings of typicality of short-term prospects correlated negatively only with the value of Hedonism.

The value of Benevolence was associated negatively with the ratings of willingness and typicality of economic indifference of the person. It is important to understand that taking care of loved ones is a crucial component of Muslim culture, and therefore the value of Benevolence promotes interest in the economic side of life, reflecting the desire to create a favorable environment for relatives. This same feature is also reflected by the negative correlation between the values of Benevolence and the ratings of typicality of economic inactivity among Muslims. An emotional preference for the fair distribution of finances related negatively to the value of Stimulation; the willingness for such behavior correlated negatively with the value of Stimulation; and ratings of its typicality correlated negatively with the value of Conformity. It can be assumed that Muslims find fair distribution to be more secure; those appreciating Stimulation (risk, novelty) are not ready for such distribution, whereas those valuing Conformity do not consider this typical for their surroundings.

The value of Stimulation correlated negatively with a disinclination for emotional (spontaneous) purchases, which can be easily explained by the meaning of the value of Stimulation as a desire for a brighter and more eventful life, full of spontaneity and unexpected actions that bring joy. Thus, first of all, our data confirm the results of existing studies, demonstrating that values of people are of great importance for predicting their behavior (Kwang et al., 2005; Lönnqvist et al., 2006; Torelli & Kaikati, 2009).

We can find empirical studies demonstrating that belonging to certain religious denominations could be associated with economic attitudes. A relationship was found between religious denominations and economic attitudes (Guiso, Sapienza, & Zingales, 2003). Economic attitudes in their study included the following: people's attitudes toward cooperation, trust in the government and other government institutions, and attitudes toward law, the market economy, thrift, and competition. In the study by Guiso and colleagues, religiosity was positively associated with favorable attitudes toward the development of a free market and corresponding institutions. Religious people trusted other people and the government more, were less

likely to break the law, and were more likely to believe in market justice. At the end of the paper, the authors concluded that Christians, in comparison with Muslims, were more inclined to support the values that promote economic growth (Guiso, Sapienza, & Zingales, 2003).

How does religion influence economic attitudes? Susokolov (2006) described one of the possible mechanisms as the influence of religion on economic attitudes through basic values. Religion affects values, and values in turn affect economic attitudes.

In our study, we found that the basic values of Christians and Muslims related to their economic attitudes. However, our study showed that there are more differences in these relationships than similarities. The economic attitudes of Muslims and Christians related to different values. Thus, particular values may not always be considered universal predictors of the same economic attitudes across different cultural or religious groups. It is also important to take into account the socio-cultural characteristics of the groups when considering the relationship between values and economic attitudes and behavior.

## Conclusion

1. The main value that has been a priority for Russians is Security. However, the importance of this value decreased significantly during the period of 2006–2016. Such values as Achievement, Tradition, and Power are relatively stable among Russians. Such contrary values as Hedonism and Stimulation increased significantly from 2006 to 2016.

2. A relationship between values and attitudes toward different types of economic behavior was discovered. The patterns of these relationships are both similar and dissimilar in the samples of Christians (from the Central Federal District) and Muslims (from the North Caucasus Federal District) in Russia.

Summarizing the results of the study, we can say that the values of Christians and Muslims demonstrated different outcomes in terms of economic attitudes. The values of Christians indicate the low importance of money in comparison with other resources—creativity, time, etc. The values of Muslims, on the other hand, encourage them to favor economic activity, independence, and rationality in financial behavior.

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## Personal Sovereignty in Adolescents and Youth from Armenia, China, and Russia

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**Background.** In today's hectic civilization, it is very important for a person to maintain personal boundaries which help him or her keep his/her identity. Personal sovereignty (PS) is a trait that demonstrates the extent to which a person's empirical Self is respected by his/her social environment. Whereas the genesis and correlations system of personal sovereignty in proximal relationships have been investigated widely, little is known about whether they are culturally sensitive or not.

**Objective.** In this study, we aimed to investigate the patterns and genesis of personal sovereignty in relation to age and gender, by comparing individuals from Armenian, Chinese, and Russian cultures. Our sample consisted of 780 respondents, of whom 223 were from Armenia, 277 from China, and 280 from Russia; 367 were adolescents ( $M_{\text{age}} = 13$ ) and 413 were youth ( $M_{\text{age}} = 21$ ); there were 361 males and 419 females.

**Method.** The "Personal Sovereignty Questionnaire-2010" was used.

**Results.** The results suggest that culture, age, and gender all impact on the sense of personal sovereignty. Although there were no differences between cultures on the main PS score, we did find different PS patterns within all three cultures and when comparing males versus females. The PS scores in youth were higher than in adolescents, except in Armenia where the results were inverted. All age trends in PS were found in females, but not in males. Gender differences in PS within each culture were found in youth but not in adolescents.

**Conclusion.** We discussed and explained the outcomes with reference to the specificity of the way each culture endorses traditional or secular-rational values, which values determine the prevalent attitudes towards gender roles and demands on adolescents and youth.

**Keywords:** personal sovereignty, empirical Self, psychological space, culture, personal boundaries, values, gender roles

In its widest possible sense, however, a man's Self is the sum total of all that he CAN call his, not only his body and his psychic powers, but his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and horses, and yacht and bank-account. All these things give him the same emotions.

William James, *The Principles of Psychology*

## Introduction

Overpopulation and a very hectic environment represent some of the strongest challenges of contemporary society; thus, most people, especially those living in big cities, have to constantly share or distribute their resources, life spaces, and time. Hence, they try to take other people into account, and to protect their own identities and authenticity. This is why personal features and traits are required to help people defend their empirical Selves (James, 2013; Ingold, 2000; Schraube & Højholt, 2015).

Previous research has emphasized different aspects of the empirical Self: personal space<sup>1</sup>; authenticity<sup>2</sup>; secrecy and self-concealment<sup>3</sup>, personal things (Csikszentmihalyi & Rochberg-Halton, 1981); and privacy (Altman, 1975; Westin, 1967; Wolfe, 1975). According to Westin, "privacy is the claim of individuals, groups or institutions to determine when, how, and to what extent the information about them is communicated to others" (1967, p. 7). Objects to be protected by privacy include territory, social contacts, and information. All of them contribute to the individual's sense of psychological well-being and social adaptation.

*The concept of personal sovereignty.* In the current study, we used the concept of personal sovereignty (PS) as the quality which links together all the parts of the empirical Self. In the authors' opinion, personal sovereignty (*souverain* (French)–the carrier of the supreme authority) is the most crucial concept of both contemporary civilization and modern psychology.

As PS is a relatively new term, it is necessary to make some preliminary remarks on this topic. We consider a person to be a physical-territorial-existential integrity (Nartova-Bochaver, 2006, 2017). So, according to the modern non-Cartesian paradigm, every person not only reflects an "objective" reality, but also projects him/herself onto this reality, owns this being, and creates his own personalized sense of being in the world, "Dasein" (Lang, 1993). Mutual relationships between a person and his/her environment reflect the fact that a person constantly adopts things from the outside world, and alienates something from himself into his environment. Thus every individual has his/her own visible or invisible environmental "bubble" which can be described in terms of reality. Only the connection to his/her personal environment provides a person with a feeling of integrity and "ontological security" (Laing, 1960), and prevents self-alienation (Wood et al., 2008).

<sup>1</sup> Gosling, Ko, Mannarelli, & Morris, 2002; Sommer, 1959.

<sup>2</sup> Robinson, Lopez, Ramos, & Nartova-Bochaver, 2013; Wood, Linley, Maltby, Baliousis, & Joseph, 2008.

<sup>3</sup> Finkenauer, Engels, Branje, & Meeus, 2004; Wismeijer, 2008.

Contemporary psychologists inevitably use metaphorical concepts traditionally applied to the description of objective being. What's more, concepts that originally had purely topological content, such as "space" (inner, psycho-semantic, social), "distance", "above-below", "nearer-further", and "boundaries" find practical use in psychology (Bateson, 1972; Dorfman, 1976; Federn, 1929). The term "attachment" is also being used more broadly than previously; researchers talk about attachment to things and belongings, to place, home, and animals (Fine, 2010; Kleine & Baker, 2004; Reznichenko, Nartova-Bochaver, & Kusnetcova, 2016).

Thus we can conclude that personality has a complex mixed nature, and man can identify himself with different parts of reality. This allows psychologists, on the one hand, to study a personality by means of its environmental expressions and "behavioral residues" (Gosling et al., 2002), but, on the other hand, to research the personal boundaries defining where the personality is located in its multidimensional reality. In addition, this approach to personality as an empirical phenomenon is in line with the trend in contemporary psychology to maintain the ecological validity of research; as Lang (1993) stated, psychology should not investigate objects in artificial labor conditions but rather people with their possessions in their rooms. That is why it is very important to investigate the personal characteristics which participate in preserving the empirical Self. One of them is the sense of personal sovereignty.

There are several definitions of this phenomenon: 1) a person's ability to protect his/her psychological space; 2) a balance between a person's needs and the needs of other people; 3) the condition of personal boundaries; and 4) a system of explicit and implicit rules regulating relationships between people (Nartova-Bochaver, 2017). To sum up, personal sovereignty is a low-order trait demonstrating the extent to which a person can control his/her empirical Self.

*Genesis of personal sovereignty.* In accordance with the theory of personal sovereignty, its evolutionary and social aim is the maintenance of self-control by means of incorporating specific influences from outside. Initially sovereignty appears as a single person's answers to the situations he/she faces, as a result of coping with everyday deprivations, challenges, and stress. Later, it becomes a habit, and is transformed into a low-order trait by adolescence. After adolescence, personal sovereignty becomes a very important trait, which strongly contributes to a person's well-being and achievements. Thus, it is a generalization of the usual activities the person adopted against non-favorable influences which he/she faced (Silina, 2016a, 2016b). Moreover, every person aspires to keep or increase his/her level of personal sovereignty.

*Structure of personal sovereignty.* Based on theoretical analysis and psychotherapeutic cases, we identify six sovereignty domains: 1) body (BS); 2) territory (TS); 3) things (belongings) (TBS); 4) routine habits (RHS); 5) social contacts (SCS); and 6) tastes and values (TVS) (Nartova-Bochaver, 2008). Hence, every person has his/her own preferences in these dimensions of psychological space, and can develop his/her own specific sovereignty pattern, or profile. In accordance with our theory, personal sovereignty depends on the person's real environment; it goes back to the territorial instinct and is a social form of a biological program. The family is a source of both invasions into one's personal space and a strengthening of personal

boundaries. If a child is developing in a friendly family atmosphere, and his/her wishes are respected and satisfied, the child has no need for extra defense, and her/his personal boundaries are kept whole and inviolate. To sum up, the level of personal sovereignty reflects the extent to which a family is ready to respect the growing child's needs.

*Adaptive functions of personal sovereignty.* A lot of empirical studies confirm that PS performs many adaptive functions in adolescence and youth. It contributes positively to self-esteem and self-representation, and is positively connected with authenticity and resilience, effective coping skills, and humanistic attitudes (Buravtsova, 2009; Kopteva, 2009; Panjukova, & Panina, 2006). It also predicts negatively non-chemical addictions, and prevents symptomatic depression and criminal behavior (Astania, 2011; Bardadymov, 2012). Furthermore, sovereign people can more effectively communicate with others: sovereignty is positively connected with trust in the world, and negatively with avoidance and anxiety in close relationships (Nartova-Bochaver, 2014b). It has been found that sovereignty levels are higher in males than in females, and in youth as compared with adolescents (Nartova-Bochaver, 2017).

Finally, it has been shown that the protective function of sovereignty is strongest in youth and decreases in adults (Nartova-Bochaver, 2015). These dynamics are to be expected: by the time of their youth, people have adopted resources from outside, and sovereignty helps in doing that; but in adulthood, mature people undertake other developmental tasks and start giving resources back (Havighurst, 1972). At this developmental stage, they do not need the sovereignty trait as much as they did earlier. What's more, to become mature adults, they first need to be sovereign youth.

*An eco-psychological approach to personal sovereignty.* Although the previous data were very impressive, they were collected in Russian culture only, and this serious limitation damages their representativeness. Cross-cultural research on personal sovereignty is in its infancy now, and there are few studies demonstrating its cultural specificity as relates to its content and dynamics (Martirosyan, 2014; Telegina, 2016). Why do we expect to find any cultural differences in personal sovereignty as a trait?

According to Bronfenbrenner (1986), a child grows up in a complex system of sub-environments, and the family, in turn, is influenced by the community and culture. Thus, the child's sovereignty level may also indirectly depend on his/her culture: as Kağıtçıbaşı stated (2013), the proximal environment (family) is always determined by a distal one (culture). It is culture which determines which parts of the empirical Self (and personal needs hidden behind them) are to be acknowledged and supported. Thus, cross-cultural study may uncover specific opinions about more or less important realities inherent in a culture.

As noted earlier, little is known about personal sovereignty in other cultures. To fill this gap, the current study investigates personal sovereignty profiles and dynamics during the transition from adolescence to youth depending on culture and gender. We have put forward the following hypothesis: Sovereignty patterns differ depending on culture, age, and gender.

To verify this hypothesis, we conducted an empirical study.



## Methods

Our survey was carried out in Armenia, China, and Russia. These cultures were chosen for the following reasons. First, they all have a socialistic past and are collectivistic, which allows us to compare them. Secondly, they all have a long history of very tight business relationships, and there are many international families. At the same time, they have some features in common and some that diverge.<sup>1</sup> According to the World Values Survey (World Values Survey, n.d.), all endorse survival (not self-expression) values, which means they emphasize economic and physical security, a relatively ethnocentric outlook, and low levels of trust and tolerance. Armenia tends to maintain traditional values (stressing the importance of religion, parent-child ties, traditional gender roles and family values); China and Russia endorse secular-rational values (less emphasis on religion, traditional family values, and authority; acknowledgement of gender equality). Moreover, as gender roles and phenomena depend on the culture (Schmitt, Long, McPhearson, O'Brien, Remmert, & Shah, 2016), we predicted that there might be gender variance in the sovereignty level and patterns in Armenia, China, and Russia as well.

*Measure.* To measure the sovereignty level, the Personal Sovereignty Questionnaire-2010 (PSQ-2010) was used. It consists of six subscales and 67 items (Nartova-Bochaver, 2017).

The PSQ-2010 has some specific features: most items were taken from real psychotherapeutic clients' stories describing traumatic life situations. Several statements were added into the pool by colleagues experienced in counseling, and by students studying environmental psychology and psychological counseling. According to the genesis of the sense of personal sovereignty, each item included a description of a real situation in the past and the person's feelings about it. Hence, the outcome (i.e. increasing or decreasing sovereignty) is a result of the interaction between some provocative event and the person's reflection on it.

For example, the statement "Even as a child I was sure nobody touched my toys when I was absent" can be evaluated by the respondent in several ways. First, he/she can agree to it, saying "Yes." Second, he/she could recall that he/she was sure somebody had touched the toys; in this case the answer was "No." Third, the situation might not be relevant in his or her life at all; for example, if he had few toys and always kept them with him. In that case, there was no provocative situation, and the answer was "No." The number of "Yes" responses to direct statements showed an increase in the sovereignty level; "No" responses showed a decreased level. "Yes" responses to direct items were marked "1"; "Yes" responses to reversed ones were marked "-1". The more provocative the situations experienced by a person who cannot cope with this challenge (and which arouse his/her negative feelings), the less the person's sovereignty level. Thus, both the absence of such situations in the life experience, and personal resistance against them, ensure psychological sovereignty.

The initial pool of these statements collected over the period of eight years initially included 102 items, and was divided into six subscales according to the six dimensions of the empirical Self ("Psychological space of the person") listed above. After validation of the questionnaire, its six-factor structure was confirmed (Nartova-Bochaver, 2017).

<sup>1</sup> Robinson, Dunn, Nartova-Bochaver, Bochaver, Asadi, Khosravi, Jafari, Zhang, & Yang, 2016; Wu, Schmitt, Nartova-Bochaver, Astanina, Khachatryan, Zhou, & Han, 2014.

### Examples of PSQ items

1. I often felt offended when adults punished me with slapping and cuffing (BS).
2. I always had a place (table, chest, box), where I could hide my favorite things (TS).
3. It annoyed me when my mother shook my things out of the pockets before laundering (TBS).
4. I often became sad when I didn't finish my play because I was called by my parents (THS).
5. My parents accepted that they didn't know all of my friends (SCS).
6. I usually succeeded in having a children's celebration as I liked (TVS).

Thus, by virtue of this questionnaire, we expected to assess the general sovereignty level and partial sub-scale scores in three cultures.

*Sample.* In total, 780 respondents participated in this survey: 223 from Armenia, 277 from China, and 280 from Russia; there were 367 adolescents ( $M_{age} = 13$ ) and 413 youth ( $M_{age} = 21$ ); there were 361 males and 419 females (see Fig. 1). The adolescents were recruited in Yerevan, Beijing, and Moscow; the youth (students) were recruited in Yerevan, Xiamen, and Moscow. The data were collected in class, partly via on-line services, and partly using the "pencil-paper" procedure. Participation was voluntary, and participants were granted academic credits.

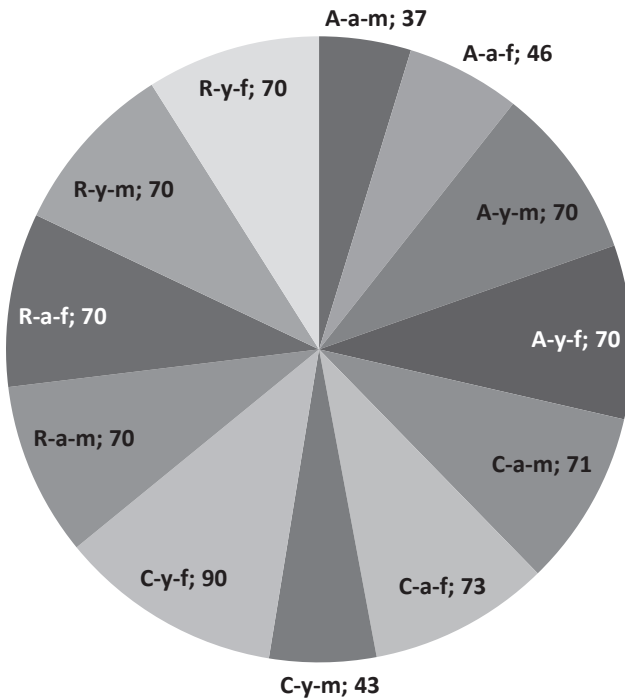


Figure 1. Structure of the sample.

Note. A=Armenia, C=China, R=Russia; a=adolescents, y=youth; m=males, f=females.

We have performed multifactorial multivariate analysis of variance (ANOVA) by means of Statistica 8, which was relevant to the correlational cross-sectional design of the study.

## Results

First of all, it was shown that all of the supposedly independent variables (culture, age, and gender) significantly differentiated respondents by sovereignty level (see Table 1). Moreover, we found interesting interaction effects (for instance, Culture x Age and Gender x Age), although other effects were not significant.

Table 1  
*Multivariate Tests of Significance*

Effect	Test	Value	F	Effect	Error	p
Intercept	Wilks	0.49	133.15	6	763	0.000
Culture	Wilks	0.96	2.95	12	1526	0.000
Gender	Wilks	0.96	5.46	6	763	0.000
Age	Wilks	0.96	5.82	6	763	0.000
Culture x Gender	Wilks	0.99	1.10	12	1526	0.352
Culture x Age	Wilks	0.96	2.83	12	1526	0.001
Gender x Age	Wilks	0.97	3.60	6	763	0.002
Culture x Gender x Age	Wilks	0.98	1.52	12	1526	0.111

Table 2  
*Means and Standard Deviations of the PS Scores in Three Cultures*

		PS_main	BS	TS	TBS	RHS	SCS	TVS*
Armenia	M	1.32	.13	.22	.14	.19	.32	.33
	SD	1.41	.38	.41	.33	.29	.41	.30
China	M	1.50	.16	.24	.20	.22	.29	.40
	SD	1.61	.36	.40	.37	.37	.36	.40
Russia	M	1.59	.22	.28	.22	.25	.33	.30
	SD	1.83	.44	.42	.40	.38	.42	.39

Note. \*=differences are significant at  $p < .05$ .  
 PS\_main=the main score of personal sovereignty; BS=body sovereignty; TS=territory sovereignty;  
 TBS=things and belongings sovereignty; RHS=routine habits sovereignty; SCS=social contacts sovereignty; TVS=tastes and values sovereignty

**Culture.** A comparison of the three cultures showed that, despite the absence of differences in the main sovereignty scores, there were differences in tastes and values sovereignty (the highest in China,  $F(2, 768) = 3.69$ ,  $p = .025$ ) as well as two ten-

dencies: in body sovereignty (the highest in Russia,  $F(2, 768) = 2.80$ ,  $p = .061$ ), and in the things and belongings sovereignty (the lowest in Armenia,  $F(2, 768) = 2.75$ ,  $p = .064$ ) (see Table 2).

*Age.* In line with the results from Russia, the main sovereignty score was higher among youth ( $F(1, 768) = 6.68$ ,  $p = .009$ ) due to the territory sovereignty ( $F(1, 768) = 17.64$ ,  $p = .000$ ), and time habits sovereignty ( $F(1, 768) = 20.03$ ,  $p = .000$ ) (see Table 3).

Table 3

*Means and Standard Deviations of the PS Scores in Adolescents and Youth*

		PS_main*	BS	TS*	TBS	RHS*	SCS	TVS
Adolescents	<i>M</i>	1.30	.15	.18	.18	.16	.30	.32
	<i>SD</i>	1.66	.42	.42	.38	.34	.40	.38
Youth	<i>M</i>	1.65	.19	.30	.20	.28	.32	.36
	<i>SD</i>	1.61	.38	.39	.37	.35	.40	.37

Note. \*=differences are significant at  $p < .01$ .

*Gender.* In the whole sample, we found no differences in the main sovereignty scores, but the territory sovereignty was higher in males ( $F(1, 766) = 6.12$ ,  $p = .013$ ), whereas the time habits and value sovereignty scores were higher in females (respectively,  $F(1, 766) = 5.22$ ,  $p = .023$ ;  $F(1, 766) = 6.43$ ,  $p = .011$ ) (see Table 4).

Table 4

*Means and Standard Deviations of the PS Scores in Males and Females*

		PS_main	BS	TS*	TBS	RHS*	SCS	TVS*
Males	<i>M</i>	1.50	.20	.28	.21	.19	.33	.30
	<i>SD</i>	1.62	.39	.41	.37	.36	.41	.35
Females	<i>M</i>	1.47	.15	.22	.18	.25	.29	.38
	<i>SD</i>	1.67	.40	.41	.37	.35	.39	.38

Note. \*=differences are significant at  $p < .05$

Then, as we have significant interaction effects of factors, we performed an analysis of variance for each of the variable complexes in order to study how stable the sovereignty differences were.

*Culture  $\times$  Gender.* Despite the fact that the general model did not show any effects, we uncovered one partial difference: whereas in Armenia and Russia the social contacts sovereignty score was higher in males, in China this composition was reversed, and female respondents had higher scores ( $F(2, 768) = 3.41$ ,  $p = .033$ ) (see Fig. 2).

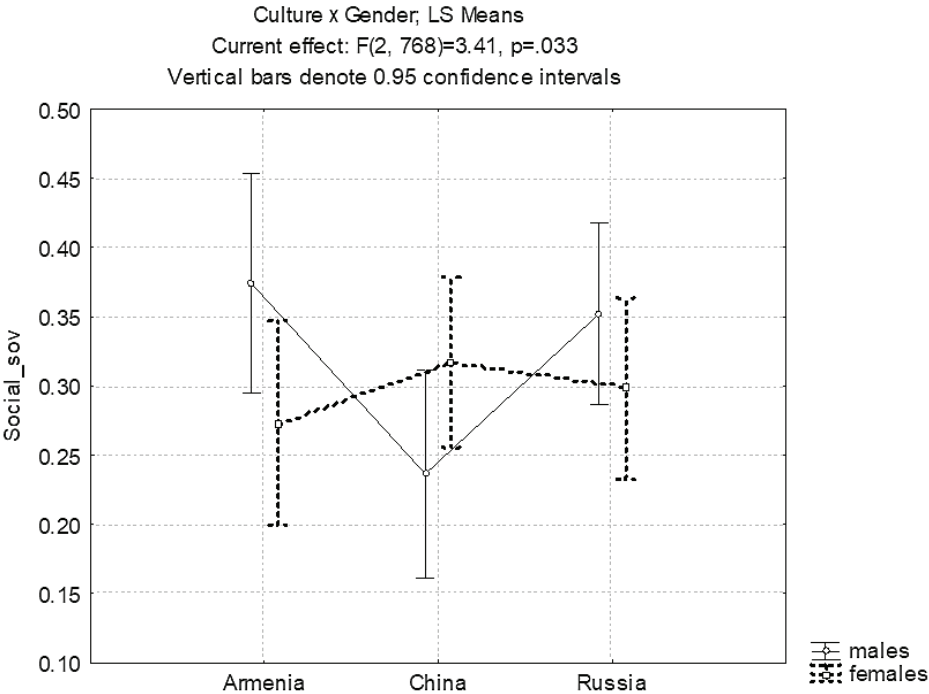


Figure 2. The social contacts sovereignty in three cultures.

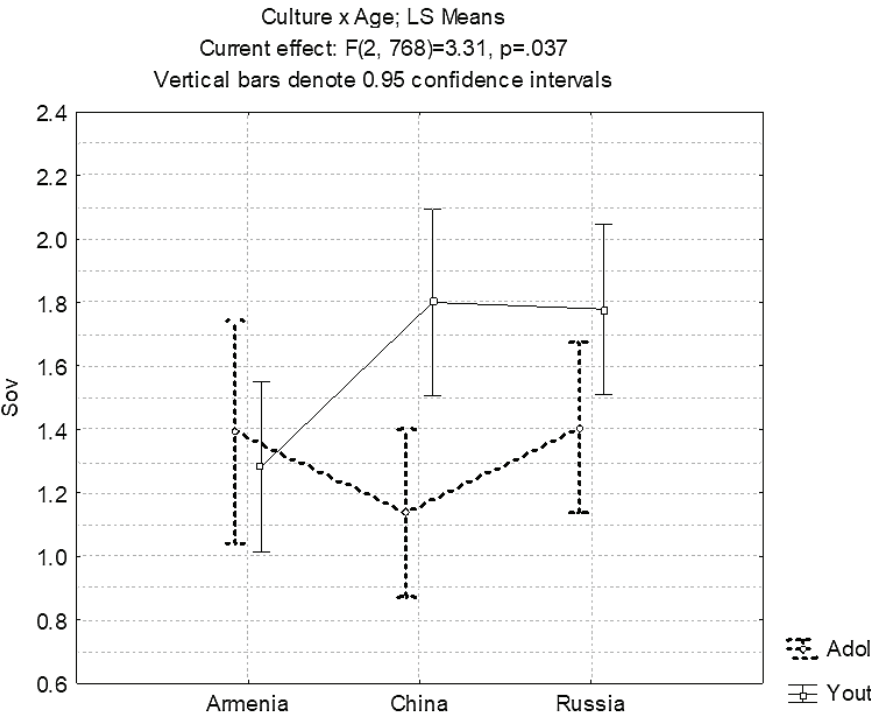


Figure 3. The main sovereignty scores in three cultures.

*Culture x Age.* As the general model showed significant interaction effects, they were analyzed in detail. We found that the sovereignty level increased with age in China and Russia, but not in Armenia ( $F(2, 768)=3.31, p=.037$ ) (see Fig. 3). This trend was due to the impacts of body sovereignty ( $F(2, 768)=4.64, p=.009$ ) and time habits sovereignty ( $F(2, 768)=6.97, p=.001$ ).

*Gender x Age.* Our analysis showed that gender differences in the sovereignty scores don't show up in adolescents, but are very salient in youth, due to a critical increase in thing and belonging sovereignty among females, and a simultaneous decrease among males ( $F(2, 768)=10.19, p=.001$ ). In addition, values sovereignty didn't differ between male and female respondents in adolescence, but in youth, it was higher in young women ( $F(2, 768)=4.31, p=.038$ ).

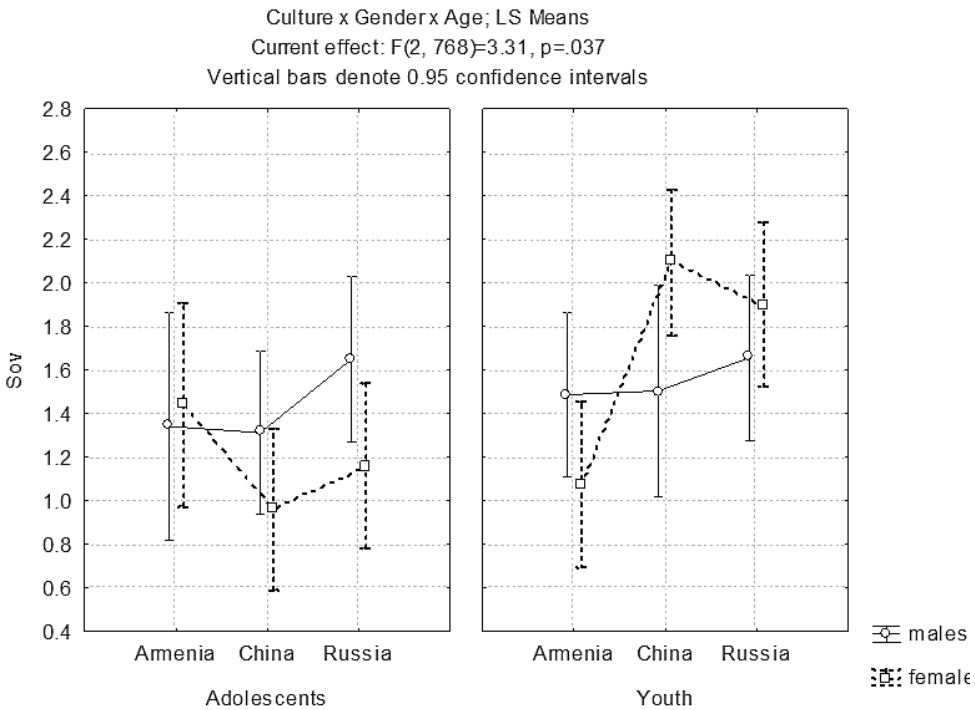


Figure 4. The main sovereignty scores in groups “Culture x Gender x Age”.

*Culture x Gender x Age.* Finally, since the main factors of culture, age, and gender often “extinguished” each other, we analyzed the effects of interaction between all three variables. The lowest main sovereignty scores were found in female adolescents from China and female youth from Armenia, and the highest ones were revealed in female youth from China and Russia ( $F(2, 768)=3.30, p=.037$ ) (see Fig. 4). This trend resulted from the impact of the social sovereignty: whereas in adolescence it didn't differentiate groups, in youth there is a divergence between males and females: the lowest score was in female respondents, and the highest one in males ( $F(2, 768)=3.74, p=.024$ ) (see Table 5).



Table 5

*Means and Standard Deviations of the PS Scores in 12 groups "Culture x Gender x Age"*

		PS_main*	BS	TS	TBS	RHS	SCS*	TVS
A-a-m	M	1.34	.16	.18	.15	.18	.34	.33
	SD	1.29	.46	.40	.28	.27	.38	.25
A-a-f	M	1.44	.22	.12	.13	.23	.38	.36
	SD	1.24	.34	.35	.32	.27	.43	.31
A-y-m	M	1.49	.17	.30	.15	.15	.41	.31
	SD	1.61	.38	.40	.39	.37	.34	.38
A-y-f	M	1.07	.03	.21	.13	.21	.17	.33
	SD	1.80	.37	.43	.39	.35	.40	.45
C-a-m	M	1.31	.13	.20	.28	.14	.26	.29
	SD	1.65	.45	.46	.36	.35	.41	.35
C-a-f	M	.96	.05	.08	.10	.07	.29	.36
	SD	1.92	.47	.44	.42	.36	.42	.41
C-y-m	M	1.50	.20	.34	.17	.24	.21	.35
	SD	1.46	.34	.41	.36	.32	.40	.30
C-y-f	M	2.10	.25	.34	.24	.39	.34	.53
	SD	1.51	.39	.42	.34	.28	.40	.33
R-a-m	M	1.65	.24	.31	.27	.16	.32	.34
	SD	1.42	.32	.36	.37	.34	.41	.36
R-a-f	M	1.16	.15	.17	.12	.21	.25	.26
	SD	1.35	.32	.36	.33	.32	.32	.35
R-y-m	M	1.65	.26	.33	.18	.28	.38	.22
	SD	1.99	.41	.41	.42	.42	.47	.40
R-y-f	M	1.90	.23	.30	.30	.36	.34	.37
	SD	1.69	.43	.38	.38	.36	.38	.38

*Note. See legends to Fig. 1 and Table 1.*

## Discussion

Our results show that, as expected, culture, age, and gender predict sovereignty level, patterns, and dynamics, but these connections are not linear: these variables interplay. That is why it is necessary to describe each culture separately.

Contrary to our prediction, the sovereignty level did not differ among the three cultures. This impressive result confirms the evolutionary and adaptive function of the sovereignty trait in everyday lives. It is no surprise that all cultures need and support its development; however, the sovereignty patterns and dynamics differed widely. In Russia, body sovereignty (natural needs for comfort, denial of asceticism, keeping preferred dietary identity) is a very important value which is passed from the society to the family. In Armenia, there is a denial of private possessions, shown by the things and belongings sovereignty scores being lower than in China and Russia. This reflects the fact that an obligation to share one's belongings with other people is common in this culture. Finally, in China the sovereignty profile reflects the importance of defending one's tastes, values, and worldview in general.

While analyzing the highest scores in the sovereignty profile, we identified the typical resources of empirical Self (for each culture). In Armenia these were social contacts and the values. Indeed, Armenian people appreciate social relationships, friendship, family, and hospitality very much, and, at the same time, are proud of their sense of beauty, faith in Christianity, and long history. All these values are equally inherent in Armenian identity. In China, we found the highest scores in the same areas, but more in tastes and values sovereignty than in social contacts. This means that preferences, opinions, and worldview in general are the most important values. Along with social contacts (in full accordance with the Confucian philosophy now popular in China), they form the very base of Chinese cultural identity. Finally, in Russia the leading position was in social contacts sovereignty rather than in tastes and values. In addition, the third most important PS area in all three cultures was taken up by territory sovereignty. Thus, Armenians, Chinese, and Russians present themselves as hospitable and spiritual, but at the same time are strongly attached to their (large or small) land; all of these aspects form their sense of identity.

Furthermore, we found interesting ambiguous differences concerning age. Youth are on average more sovereign than adolescents: they get their private territory and opportunity to arrange their time. Naturally, society respects youth more than adolescents, and provides them with more freedom.

On the other hand, this finding concerned only the female group, and only in China and Russia. As these cultures endorse secular-rational values, including an acknowledgement of gender equality, it is no surprise that young women get more sovereignty. This increase is especially strong in China, in contrast to the very low sovereignty level of girls. As for Armenia, which endorses traditional values, the decrease in the sovereignty level seems to be related to traditional attitudes toward women: whereas Armenians are fond of their children, they are very demanding of young women whose everyday lives are accompanied by many restrictions. These restrictions are connected with limitations on social contacts sovereignty, which, in turn, may be influenced by Armenian traditions of match-making and marriage.

As for the stability of PS scores in male groups in all three cultures, it seems to be connected, first, with the variation by gender of many personal features (according to Geodakyan (1989), females are more varied in their phenomena), and, secondly, with the variety of social demands and restrictions on males, including conscription. Boys and young men accept these demands from early childhood and become ready to answer them, even at the cost of their freedom.

The gender differences in the sovereignty profiles demonstrate that girls and young women (on average) have much more freedom than boys and young men in arranging their daily schedule and expressing their own tastes and preferences. But boys and men are freer to have their own private territories, space, and places. Society and culture permit and support these forms of personal sovereignty. At the same time, gender differences in sovereignty are, in turn, influenced by age. In adolescence, social demands on both girls and boys are similar, and there are no significant differences in their sovereignty features. These results are also in full agreement with the outcomes of David Schmitt, who discovered that in traditional cultures, gender roles contrast greatly, but psychological phenomena do not (Buss & Schmitt, 2011). In youth, social expectations become more varied, taking into account social representations of gender roles; maturing youth accept these expectations and adapt to them, which is reflected in their personal sovereignty levels and patterns. In addition, our sample was drawn from students, who, as the most progressive group of youth, no doubt endorse Western values of universalism and globalization. That is why gender differences in sovereignty increase with age.

Finally, when comparing culture x age x gender groups, we found the lowest sense of personal sovereignty in Chinese girls and Armenian young women. This gives evidence of the unequal value of a child (depending on his/her gender) in China: boys have more freedom, and their personalities and wishes are more respected than girls. In Armenia, young women are subject to control and restrictions from society, in line with traditional attitudes toward gender roles. As for the highest levels in sovereignty, they were found in Chinese and Russian young women. This result could be interpreted in the following way. First, young Chinese female students are a special group of youth who demonstrate a very high level of resilience and competitiveness, because entering university is a very difficult social and intellectual task requiring a lot of personal sovereignty. As for Russian young women, their high scores may be, first, a result of Russian history, as Russia has a culture where women have had a lot of social rights for many years; secondly, women in Russia do have not as many social restrictions as men do.

## **Limitations**

We would like to point out some limitations of this study. First, the youth sample consisted of students, and was not randomized by SES and region. This should be corrected in future surveys. Second, our work did not use tools other than the PSQ-2010. In the future, the sense of personal sovereignty in these three cultures should be investigated together with other measures of well-being parameters. Finally, it might be very promising to include other cultures.

## Conclusion

To sum up, our hypothesis was confirmed. As expected, the sovereignty patterns differed depending upon the culture: in addition, age and gender contributed to these differences. In general, the sovereignty level increased with age, mainly thanks to the female groups. In Armenia, on the contrary, in female groups, the sovereignty level decreased.

Why have we received these outcomes? Culture determines attitudes toward individual sovereignty. In Armenia, family values and an empathic style of parenting stimulate sovereignty in adolescents, but in China and Russia gender non-equality prevents personal sovereignty at this age. Furthermore, winning in social competition (because our youth were students at prestigious universities) stimulates the sense of personal sovereignty in youth from China and Russia, whereas social demands (e.g., conscription) inhibit personal sovereignty in young men from Armenia, China, and Russia.

These outcomes may be useful in setting up personal growth programs, ethno-psychological and educational research, and in social practice.

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## ORGANIZATIONAL PSYCHOLOGY

### **The Impact of Organizational and Personal Factors on Procrastination in Employees of a Modern Russian Industrial Enterprise**

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**Background.** This article addresses the influence of personal, professional, and organizational factors on procrastination in employees of a modern Russian industrial enterprise. Procrastination has been studied extensively since the 1970s, producing great research material and diagnostic tools that remain relevant to this day. Yet despite the large number of studies, no single point of view has emerged on the causes of this phenomenon.

**Aim.** To investigate how personal, professional, and organizational factors influence procrastination in employees of a modern Russian industrial enterprise.

**Design.** 120 employees of a Russian industrial enterprise participated in the study, including 70 women and 50 men, mean age 35 years, mean work experience in this enterprise 4.3 years. We used four diagnostic methods to characterize work activity and organizational culture, personal characteristics, and specificity of an occupational stress syndrome. We used correlation and regression analysis to analyze the results.

**Results.** The data identified significant personal, professional, and organizational predictors of procrastination in the modern professional, such as being outgoing (the quality of sociability), innovative, detail-conscious, and conscientious. Equally significant are characteristics of the work situation such as its content and the significance of tasks. A significant weight in the predictive value of the regression model lies in the robust consequences of professional stress (anxiety and depression), openness toward change in the organization, and social desirability.

**Conclusion.** The level of procrastination among the employees of this enterprise predicts typical behavior patterns in performing professional tasks, subjective appraisal of the job situation, the experience of stress and its consequences, and perception of the organizational culture.

**Keywords:** procrastination, predictors of procrastination, typical behavior patterns in occupational situations, occupational stress syndrome, stress consequences, work environment, organizational culture.

## Introduction

“Never put off ‘till tomorrow what can be done today” – this statement by Benjamin Franklin has become a proverb, reflecting one of the characteristics of human nature – “to put away for later” seemingly urgent matters. Everyone is familiar with the urge to postpone doing a responsible task or making an important decision, but there are people for whom such procrastination becomes a lifetime habit. In psychology this phenomenon is called “procrastination” and people who have such tendency, are called “procrastinators” (Kovylin, 2013; Mohova, & Nevryueev, 2013; Varvaricheva, 2013). The word “procrastination” has a Latin origin and consists of the prefix “*pro*”, which means moving forward, and “*crastinus*”, which means tomorrow. In Russian, the term is frequently used in its English form, but there are separate scientists insist on using a Russian phrase, e.g., “putting something away for later” (Tarasevich, 2014).

The word “procrastination” has a rich history of use in Latin and English. The Romans used the word to describe putting off a battle decision in order to demonstrate restraint in a military conflict. The *Oxford English Dictionary* cites the use of this word in a manuscript from 1548, in the meaning of an “informed delay”, “wisely chosen restraint” (Ferrari, Johnson, & McCown, 1995, p. 4). Starting with the Industrial Revolution in the 19th century, the term began to appear in the literature with the stress more frequently on the negative connotation. Some scientists, for example, Milgram, Gehrman, and Keinan (1992), maintain that a negative attitude towards procrastination appeared in industrially developed countries at the same time as the emergence of new social values such as orientation to results, speed of reaction to change, and the importance of being accurate and punctual, along with the increasing tempo of life, when the synonym of success in life became the urge to keep up with constantly accelerating technical progress, even at the cost of one’s own health (Kuper & Marshall, 2009). This point of view is controversial, because some scientists acknowledge that procrastination has existed since the emergence of human society, finding confirmation of this in the works of ancient Greek and Egyptian philosophers (Steel, 2007).

One of the first uses of the term procrastination in a scientific context was thought to be in a book written by P. Ringenbach in 1971, but, according to Aitken (1982), the work was actually never written (Steel, 2007). The term began to occur in scientific studies, peaking in the 1980s, when the first studies were conducted and a number of measurement instruments were created. The best-known are the Tel-Aviv Procrastination Inventory by Milgram (TAP), the Procrastination Assessment Scale for Students by L. Solomon and E. Rothblum (PASS), the General Procrastination Scale by C. Lay (GP), the Aitken Procrastination Inventory (API), and the Tuckman General Procrastination Scale (TGPS). Some of the methods developed at that time are still being used by scientists.

One of the first scientists to systematically study procrastination was N. Milgram (Milgram et al., 1992). He identified four essential components of procrastination: (a) a behavioral sequence of postponement, resulting in (b) a substandard behavioral product, involving (c) a task that is perceived by the procrastinator as being important to perform, and resulting in (d) a deteriorating emotional state (Ferrari, Johnson, & McCown, 1995). Since the first publication of Milgram’s

works, procrastination has been quite a popular topic of Western studies; on the other hand, there are still many controversial points of view about the phenomenon, which fuels the interest in its further exploration.

Ferrari summarizes a number of studies and proposes to separate the concepts of functional and dysfunctional procrastination (Ferrari, Johnson, & McCown, 1995), dividing all of the studies into two groups. The first group explores procrastination in its constructive aspect, e.g., as a conscious delay in performing the task to a more optimal time, in order to increase the probability of success; as a kind of productive coping strategy (Krjukova, 2010; Shemjakina, 2013); as a conscious putting off “for later” in order to evoke intense feelings, which partly corresponds to the concept of “agitated” procrastinators. From this perspective, procrastination is considered a deliberate strategy, which often does not have a negative impact on the result, but, on contrary, allows a person to concentrate for the final plunge, and is accompanied by positive emotions. A second group of researchers consider procrastination as a dysfunctional phenomenon, a self-destructive behavior (Burka & Yuen, 2008) and protective mechanism (Steel, 2007), which corresponds to the concept of “avoiding” procrastinators. Both approaches are legitimate and have a number of scientific confirmations, but there is a certain doubt about whether these works are addressing the same phenomenon. Currently there is an opinion that various scientists are studying somewhat different constructs, which are generalized in one term “procrastination” (Barabanshchikova, 2016). Many studies in the field of procrastination address the effort to establish why people, while being aware of the urgency, importance, and necessity of doing a task, postpone it, often with a negative impact on the final result.

Mokhova and Nevryuev (2013) propose to divide all studies on this topic into two groups: those that study internal reasons for procrastination and those that study external ones. Internal psychological reasons or individual personality factors (Varvaricheva, 2013) in procrastination are a person’s predispositions, which are based on a number of personality traits, characteristics, and states. A number of studies have confirmed a connection between procrastination and perfectionism, anxiety, the Big Five factors, motivation characteristics (including the skill of self-motivation), stress, etc. (Barabanshchikova, 2016; Dementij & Karlovskaja, 2013; Ferrari & Emmons, 1995; Garanjan, Andrusenko, & Hlomov, 2009; Karlovskaja, 2008; Milgram & Tenne, 2000; Shemjakina, 2013; Steel, 2007; Vindeker & Ostani-na, 2014; Zvereva, 2015; Zvereva, Enikolopov, & Olejchik, 2015). External or situational predictors of procrastination (Varvaricheva, 2013) are mainly considered to be the characteristics of the tasks themselves. There are studies that have explored the influence of the type of task, the extent of the task’s aversiveness, the timeliness of rewards and punishments, etc., on procrastination (Milgram & Tenne, 2000; Steel, 2007). In our opinion, such a division is relative, because external conditions are always assessed through the subject’s individual characteristics and states, so the connection is more complex and indirect.

Milgram spoke about four types of procrastination: life routine procrastination, which manifests itself in putting off routine responsibilities; decisional procrastination; compulsive procrastination, which combines decisional procrastination with putting off doing tasks; and academic procrastination (Milgram & Tenne, 2000).

Currently most studies of procrastination are about learning activity, due to both the unquestionable significance of this topic for improving the educational process, as well as the greater availability of subjects for research (students). The results obtained from student samples became a major contribution to understanding procrastination, but this issue is significant not only for the educational, but also for the professional environment, which sets high requirements for personal effectiveness, mediated by the need to keep up with changes, to meet deadlines ("time is money"), to have irregular working hours, to excel in a highly competitive environment, and so on (Barabanshchikova & Marusanova, 2016; Ivanenko, 2012; Syrkova, 2011). It should not be overlooked that procrastination not only prevents the professional's self-actualization, but it also has a negative impact on organizations' work, under the enormous pressure of market economy conditions.

Of great interest are the studies conducted on various samples of professionals, including virtual project team members (Barabanshchikova & Kaminskaja, 2013), professional athletes (Barabanshchikova, Ostanina, & Klimova, 2015), as well as in organizations of various types, including innovative ones (Barabanshchikova, 2016; Barabanshchikova & Ivanova, 2016; Barabanshchikova & Ivanova, 2017).

The main goal of the present study is to identify and analyze the impact of personal, professional, and organizational factors on the procrastination of employees of a modern Russian industrial organization.

On the level of the single personality, we studied as the possible procrastination predictors the most common behavior patterns in professional situations in three aspects: communications, task management, and self-management (Bartram, Brown, Fleck, Inceoglu, & Ward, 2006).

On the level of the professional, we studied the subjective perception of various aspects of the work environment, occupational stress syndrome, and persistent professional deformation (Leonova, 2004).

In our study we use the following definition of procrastination: Procrastination is a systematic delay in performing urgent and important tasks or making decisions, which are perceived as such, accompanied by a complex of negative emotions and obviously leading to a worsening of the situation or the result (Kovylin, 2013; Milgram et al., 1992).

During the preparation of the study we posed the following general conjectures:

1. The level of procrastination among employees of the enterprise we studied defines the typical behavior patterns in performing professional tasks, the subjective appraisal of job difficulties, the experience of stress and its consequences, and perception of the organizational culture.
2. There are significant personal, professional, and organizational predictors of procrastination in modern professionals.

## Study Design

Participants in the study were 120 employees of a Russian industrial enterprise that produces electric buses. The study involved engineers and office workers, including design engineers, process engineers, production managers, supply service employees, quality service employees, etc. The sample included 70 women and 50 men, 20

to 63 years of age (mean age 35 years), work experience in this company 1 to 431 months (mean work experience 51 months).

The study procedure included computerized testing and individual feedback upon the results; the data were analyzed with IBM SPSS Statistics v. 22.

We used the following diagnostic methods:

1. The Tuckman General Procrastination Scale, adapted by T.L. Kryukova, was used to define the level of procrastination (Kryukova, 2009). This questionnaire contains 35 statements that the subject has to agree or disagree with. There are 25 direct and 10 reverse questions. This method makes it possible to assess the subject's general level of procrastination.
2. The OPQ 32 Questionnaire by SHL Group was used to assess typical behavior patterns in the work environment during performance of professional tasks (Bartram et al., 2006). The result of this method is a profile that includes a score on 33 scales divided into three main blocks: communications, task management, and self-management.
3. The Managerial Stress Survey (MSS) by A.B. Leonova was used to obtain overall characteristics of occupational stress syndrome, from the psychological reasons for its development to robust forms of personal and behavioral disadaptation (Leonova, 2006).
4. The Organization Paradigms Inventory (OPI) by L. Constantine was used to assess specific characteristics of the organizational culture of the industrial enterprise (Lipatov, 2005).

## **Results**

All the employees were divided into three groups, based on their level of procrastination as shown by the results of the study:

*The first group:* employees whose subjective assessment of their level of procrastination is in the range of 1 to 4 stens and who do not consider themselves to be prone to delaying important and urgent matters "for later". This group included 25 people, or 21% of the subject sample.

*The second group:* employees whose level of procrastination lies in the high range (7–10 stens) and who admit to having pronounced symptoms of procrastination. This group included 42 people, or 35% of the subject sample.

*The third group:* employees whose level of procrastination is in the medium range and whose habit of delaying important tasks and decisions "for later" is not chronic, but rather occurs occasionally. This group included 53 people, or 44% of the subject sample.

The first and second groups are especially interesting for our study. In order to understand the specific characteristics of the group data, we created profiles that reflect the four main aspects that we studied: typical behavior patterns of a specialist in occupational situations, subjective appraisal of job difficulties, aspects of occupational stress syndrome, and evaluations of the company's organizational culture. The four resulting profiles are presented below as histograms, the first column of which is the mean score of the first group and the second column is the mean score of the second group.



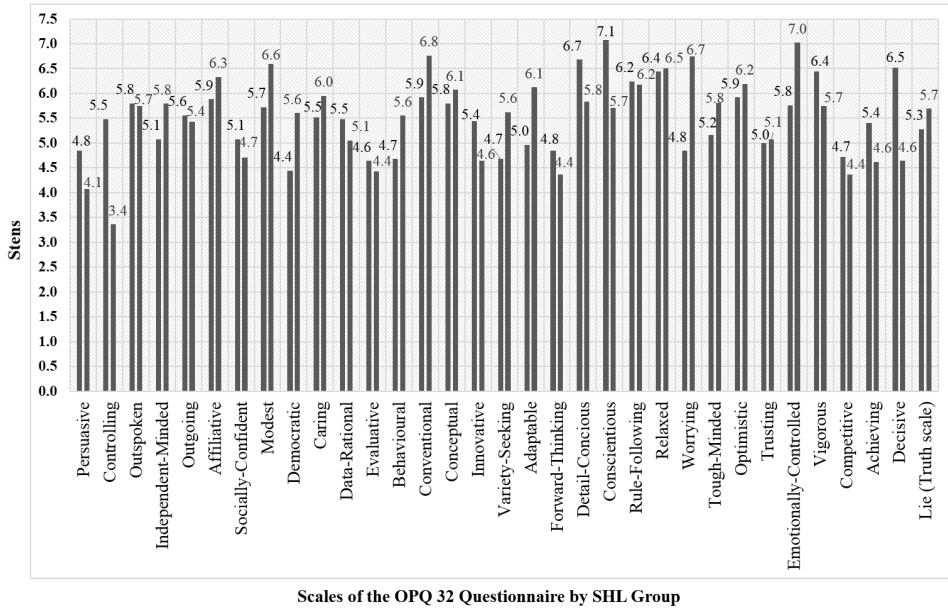


Figure 1. Mean profiles of typical behavior patterns in occupational situations (OPQ 32 Questionnaire) for groups of employees with different levels of procrastination.

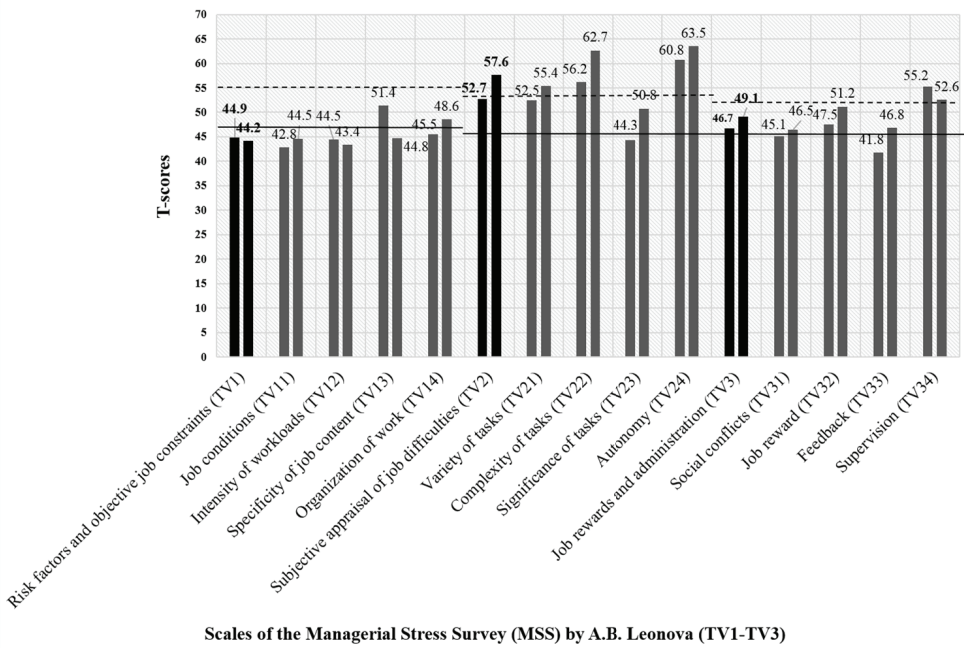


Figure 2. Perception of the occupational environment (MSS) in groups with different procrastination levels: — pronounced symptoms, - - - high scores.



Analyzing the resulting profile (Figure 1), it can be suggested that the majority of assessed characteristics (typical behavior patterns in an occupational situation) — the scores on 25 of 33 scales — are in the range of medium scores (5, 6 stens), which are insufficient to identify the specific characteristics of the studied groups. We focus on analyzing the scales, the mean scores of which are either on the lower or higher end of the scale. The employees from a group with a high level of procrastination present such characteristics as greater emotional control, worrying, conventionality, and modesty; low scores were obtained for them on the scale for control. The group with low procrastination is detail-conscious, conscientious, and decisive.

Figure 2 shows the perception of various aspects of the occupational environment in two employee groups, from the perspective of their influence on the development of occupational stress syndrome. The group with a high procrastination level demonstrates dissatisfaction with such aspects of their occupational activity as its organizational characteristics, high variety, the complexity and significance of professional tasks, insufficient independence during the work process, and excessive control by management. Employees with a low procrastination level, on the other hand, are dissatisfied with the content of their work, the high variety and complexity of their professional tasks, and a lack of independence and excessive control.

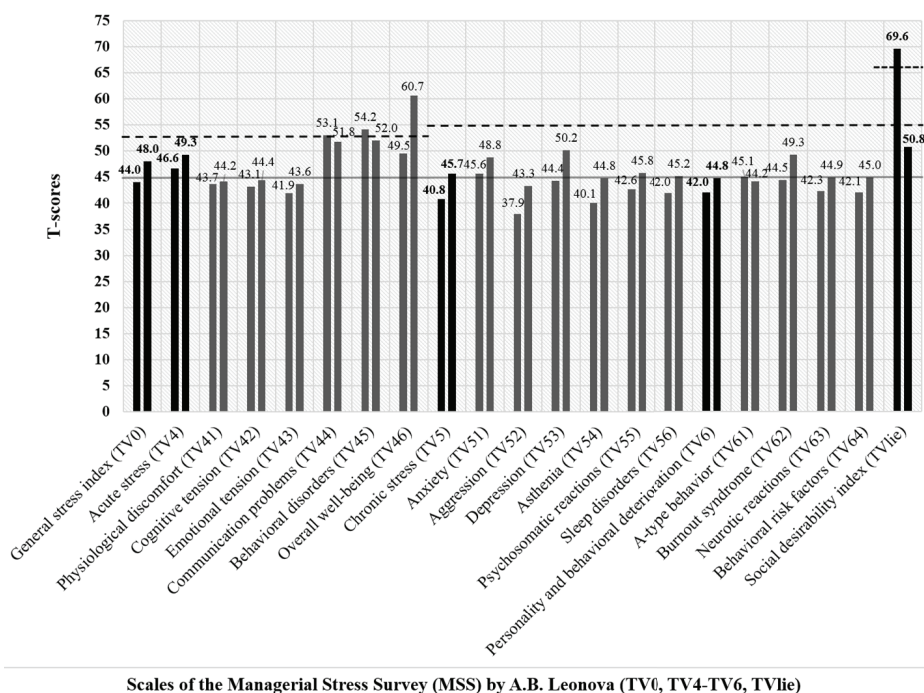


Figure 3. Characteristics of acute and chronic stress and the consequences of experiencing stress (MSS) in groups with different levels of procrastination: — pronounced symptoms, - - - - high scores, - - - - extremely high scores.

Figure 3, reflecting the specific aspects of acute and chronic stress, as well as the consequences of experiencing them, shows that the group with high procrastination is much more prone to occupational stress. This group has high acute and chronic stress, high anxiety, depression, and psychosomatic reactions, along with a number of persistent negative consequences, such as signs of emotional burnout syndrome, neurotic reactions, and behavioral risk factors. The group with low procrastination also has some of the symptoms of acute stress, but the chronic forms and persistent deformations are much less often expressed. It is worth noticing the social desirability of the answers, which reaches extremely high scores in the group with low procrastination, meaning that we have to account for this scale when analyzing the results. It shows the desire of this subject group to guess the expectations of their social milieu and to sugarcoat their image and the real state of affairs in the eyes of others.

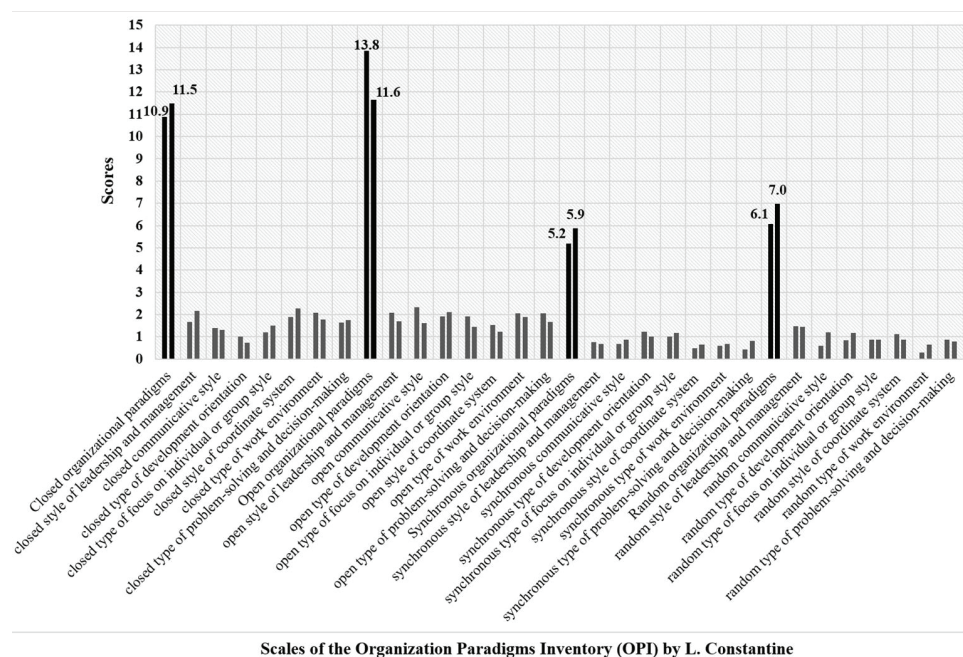


Figure 4. Perception of organizational culture (OPI) in groups with different levels of procrastination.

Analyzing the employees' perception of their industrial enterprise's organizational culture (Figure 4), it can be suggested that representatives from both groups agree that the main aspects of their organization's activity are of the open or closed types of organizational paradigms. For a more detailed analysis of the perception of organizational characteristics, it is necessary to identify group differences in the evaluation of their affiliation with the proposed models.

In order to assess group differences for employees with high and low procrastination scores, we compared the mean scores of two independent samples with Stu-

dent's t-test, identifying a number of differences that highlight the groups' specific aspects (Table 1).

Table 1

*Comparison of Two Employee Groups with High and Low Procrastination Scores (Student's t-test).*

Variable scales	Group 1 (N=25)		Group 2 (N=42)		Student t-test	p
	M	SD	M	SD		
Controlling	5.5	2.3	3.4	2.1	3.887	0.000
Democratic	4.4	1.4	5.6	2.1	-2.430	0.018
Variety-seeking	4.7	1.6	5.6	1.7	-2.201	0.031
Adaptable	5.0	1.5	6.1	2.1	-2.401	0.019
Conscientious	7.1	1.9	5.7	1.9	2.788	0.007
Worrying	4.8	2.0	6.7	2.3	-3.466	0.001
Emotionally controlled	5.8	2.0	7.0	2.1	-2.448	0.017
Decisive	6.5	1.3	4.6	2.1	4.004	0.000
Work content (TV13)	51.4	9.8	44.8	9.9	2.657	0.010
Subjective appraisal of job difficulties (TV2)	52.7	7.5	57.6	6.9	-2.752	0.008
Complexity of tasks (TV22)	56.2	9.5	62.7	10.8	-2.477	0.016
Significance of tasks (TV23)	44.3	7.9	50.8	7.5	-3.357	0.001
General stress index (TV0)	44.0	4.0	48.0	3.8	-4.082	0.000
Acute stress (TV4)	46.6	3.4	49.3	4.0	-2.751	0.008
Overall well-being (TV46)	49.5	9.4	60.7	11.0	-4.240	0.000
Chronic stress (TV5)	40.8	3.5	45.7	4.6	-4.601	0.000
Aggression (TV52)	37.9	4.8	43.3	7.1	-3.318	0.001
Depression (TV53)	44.4	3.2	50.2	6.5	-4.166	0.000
Asthenia (TV54)	40.1	2.9	44.8	5.2	-4.177	0.000
Psychosomatic reactions (TV55)	42.6	4.3	45.8	5.0	-2.658	0.010
Sleep disorders (TV56)	42.0	3.2	45.2	5.0	-2.912	0.005
Burnout syndrome (TV62)	44.5	4.8	49.3	7.1	-3.043	0.003
Behavioral risk factors (TV64)	42.1	4.6	45.0	6.2	-2.011	0.048
Social desirability index (TVlie)	69.6	13.8	50.8	11.6	5.975	0.000
Open communicative style	2.3	1.1	1.6	1.1	2.612	0.011
Random communicative style	0.6	0.8	1.2	0.9	-2.764	0.007

Note. M = mean, SD = standard deviation.

Thus, in the block of variables describing typical behavior patterns in occupational environments, the most significant ( $p < 0.001$ ) were the differences in such characteristics as control (the urge to take responsibility, to control the work situation and the people there), worrying, and decisiveness. Slightly less significant ( $p < 0.05$ ) were the group differences concerning democracy, variety seeking, adaptability, conscientiousness, and emotional control.

Analyzing the mean scores for the abovementioned scales in the two groups, we found that in the group with a high level of procrastination, the employees are less prone to seek control of the surrounding situation, taking responsibility for other people and tasks; they worry more, are prone to postponing decisions, but they also have high scores for emotional control, which reflects the tendency to hide their true emotions from their colleagues. On the other hand, among the employees from the group with low procrastination scores, we observed relatively high decisiveness, high conscientiousness, but lower variety-seeking scores, as well as lower scores on the democracy scale, which points to a tendency to make decisions unilaterally.

The group differences in the occupational environment assessment mainly concern such characteristics as work content, subjective appraisal of job difficulties, and the complexity and significance of occupational tasks. The group with a high level of procrastination assesses professional tasks as highly significant and highly complex, and a negative evaluation of the occupational situation generally prevails. In the group with a low level of procrastination, concern with task significance is less pronounced, tasks are considered more routine; on the other hand, work content and the professional situation in general have significantly negative scores.

Group differences were found for many characteristics of acute and chronic stress syndrome and the consequences of experiencing them. The group with a high level of procrastination showed a significantly high level of occupational stress in its acute and chronic types. This group also has high and pronounced signs of the consequences of stress, in the form of various personal and behavioral deformations, whereas the group with a low level of procrastination presents only minor symptoms of acute stress, without its transformation into the chronic type and the consequences thereof. The second group demonstrates such deformations as aggression, depression, asthenia, psychosomatic reactions, decline of overall well-being, sleep disorders, signs of burnout syndrome, and behavioral risk factors.

Describing the group differences in perception of organizational culture, we can point out that representatives of the group with a low level of procrastination note the signs of an open-type culture in their organization, along with expressed, active, even sometimes excessive communications among employees. Representatives of the group with a high level of procrastination concentrate on random, non-systemic, and uncontrolled information exchange in the organization.

Thus, the results of the comparison allow us to accept the possibility of dividing the groups on the basis of the level of procrastinations of their representatives, while obtaining a multi-aspect picture of the special characteristics of each group.

Although this analysis reveals certain specific characteristics of "procrastinators", it does not allow us to define which of the parameters described above might be procrastination predictors and which should draw special attention and be corrected, in order to lower the possibility of their occurrence and to lower the procrastination tendencies in professional activity.

Table 2

*Correlations Between Level of Procrastination and Four Groups of Characteristics*

Variable scales	R	p
General stress index (TV0)	0.427	0.000
Cognitive tension (TV42)	0.194	0.034
Emotional tension (TV43)	0.266	0.003
Overall well-being (TV46)	0.398	0.000
Anxiety (TV51)	0.252	0.005
Aggression (TV52)	0.412	0.000
Depression (TV53)	0.382	0.000
Asthenia (TV54)	0.427	0.000
Psychosomatic reactions (TV55)	0.200	0.029
Sleep disorders (TV56)	0.259	0.004
Personal and behavioral disadaptation (TV6)	0.235	0.010
Burnout syndrome (TV62)	0.374	0.000
Neurotic reactions (TV63)	0.193	0.035
Work content (TV13)	-0.323	0.000
Variety of tasks (TV21)	0.188	0.039
Complexity of tasks (TV22)	0.243	0.008
Significance (TV23)	0.328	0.000
Job remuneration and administration (TV3)	0.242	0.008
Job compensation/remuneration (TV32)	0.209	0.022
Controlling	-0.290	0.001
Innovative	-0.185	0.043
Adaptable	0.220	0.016
Detail-conscious	-0.188	0.039
Conscientious	-0.357	0.000
Decisive	-0.358	0.000
Random type of communication	0.237	0.009
Random type of work environment	0.207	0.023
Open organizational paradigm	-0.222	0.015
Open style of leadership and management	-0.156	0.090
Open communicative style	-0.251	0.006
Open focus on individual or group style	-0.194	0.034
Open problem-solving and decision-making	-0.173	0.059
Social desirability index (TVlie)	-0.539	0.000

*Note. R = Pearson correlation coefficient.*

For this task we created a regression model, which allows us to define the main predictors of procrastination in the employees of the enterprise.

We assigned the level of procrastination as a dependent variable.

The selection of independent variables for the regression model was based on the results of correlation analysis of the relation between level of procrastinations and the four groups of characteristics described above (typical behavior patterns in occupational situations, occupational stress syndrome and its consequences, perception of organizational culture). It was also extended by a number of characteristics, which in our view might have a significant impact on procrastination (Table 2).

Thus, the regression model includes the following characteristic groups as independent variables:

1. Typical behavior patterns in the occupational environment, including: control, independent-mindedness, outgoingness, group affiliation, tendency to evaluate, innovativeness, adaptability, detail-consciousness, conscientiousness, and decisiveness.
2. Subjective perception of the occupational environment: occupational content (TV13), variety of tasks (TV21), complexity of tasks (TV22), significance of tasks (TV23), job remuneration and administration (TV3), and job compensation/remuneration (TV32).
3. Characteristics of occupational stress syndrome and its consequences: general stress index (TV10), cognitive tension (TV42), emotional tension (TV43), overall well-being (TV46), anxiety (TV51), aggression (TV52), depression (TV53), asthenia (TV54), psychosomatic reactions (TV55), sleep disorders (TV56), personal and behavioral deformation (TV6), signs of burnout syndrome (TV62), and neurotic reactions (TV63).
4. Perception of organizational culture: random type of organizational culture, random type of leadership and management, random type of communication, random type of development orientation, random type of focus on individual or group style, random style of coordinate system, random type of work environment, random type of problem-solving and decision-making, open organizational paradigm, open style of leadership and management, open communicative style, open type of development orientation, open type of focus on individual or group style, open style of coordinate system, open type of work environment, open type of problem-solving and decision-making.
5. Social desirability index and the scale of coherence.

Table 3

*Statistical Parameters of the Regression Model*

R	R <sup>2</sup>	Adjusted R <sup>2</sup>	p
0.853	0.728	0.569	0.000

Note. R = Pearson correlation coefficient; R<sup>2</sup> = regression coefficient.



As a result of the analysis we obtained a regression model, the statistical parameters of which are presented in Table 3.

Based on the obtained regression model, we can state that the chosen variables influence the level of procrastination among employees and explain 56.9% of the variance of the studied variable – the level of procrastination.

The most significant variables are presented in Table 4.

Table 4

*Significance of the Regression Model's Components*

Variable scales	p
Outgoingness	0.040
Innovative	0.005
Detail-consciousness	0.017
Conscientiousness	0.030
Work content (TV13)	0.023
Significance of tasks (TV23)	0.020
Anxiety (TV51)	0.000
Depression (TV53)	0.048
Open type of development orientation	0.037
Social desirability index (TVlie)	0.014

Thus, the most significant characteristics in predicting the level of procrastination are outgoingness (the urge to be the center of attention and, in the most severe cases, excessive talkativeness), innovative thinking, detail-consciousness, and conscientiousness. Other significant factors include work content and significance of tasks. Moreover, significant contributions to the model's predictive value are the robust consequences of occupational stress syndrome, such as anxiety and depression, along with aspects of organizational culture such as the open type of development orientation and the social desirability of responses.

## Discussion and Conclusions

The results allowed us to identify specific characteristics of professionals who have a high level of procrastination and who acknowledge their tendency to delay important and urgent tasks and decisions “for later”, in comparison with employees who deny that they have such symptoms. In the procrastinators group, the prevailing characteristics of behavior in occupational situations are a low level of control (i.e., a lack of desire to control the work situation), unwillingness to take extra responsibility, less decisiveness, high anxiety, and emotional control, which manifests itself in avoidance of real emotional expression during work. The interrelationship of these personal features with the level of procrastination is confirmed by a number of studies (Kovylin, 2013; Steel, 2007; Varvaricheva, 2013). It is worth noting that none of the aforementioned characteristics were included in the regression

model; these characteristics might be the consequences and not the predictors of procrastination. In other words, people who consciously put off urgent matters “for later” experience anxiety and a number of negative emotions that they try to hide; this is accompanied by avoidance of unnecessary responsibility and a decrease in decisiveness on a wide range of professional questions. This result is confirmed by a number of studies that show the relationship between procrastination and a tendency for an avoidance-oriented coping strategy, manifested in a person’s desire to escape from a stressful situation (Bykova, 2013; Kornilova, 2013; Krjukova, 2010). Furthermore, our study identified the following characteristics as procrastination predictors: low conscientiousness; high outgoingness, which manifests itself in excessive sociability; high innovativeness, which is characterized by an increased interest in creative tasks and avoidance of executive tasks; and increased interest in variability, which manifests itself in an urge to frequently change one’s activity and a negative attitude towards routine matters.

Additional significant procrastination predictors are work content and high significance of the tasks performed, which can lead to a kind of closed loop, whereby people who are constantly under the pressure of high responsibility for their work attempt to ease this pressure by putting off the most “pressing” matters for later, thereby only increasing the urgency of the situation.

This is probably why the procrastinators group has more pronounced symptoms of occupational stress syndrome, particularly the chronic type, along with persistent personal and behavioral deformations. The question of whether the stress is the cause or the consequence of the procrastination tendency remains controversial (Kovylin, 2013). At the same time, the relationship between procrastination and stress has been confirmed by recent studies (Barabanshchikova & Ivanova 2017; Barabanshchikova & Kaminskaja, 2013; Barabanshchikova et al., 2015). The regression model we obtained allows us to define at least two consequences of stress, namely anxiety and depression, which are the significant procrastination predictors. Hence, people who remain under the influence of stressful factors for a long time and who discover symptoms of anxiety and depression in themselves are more prone to put off complex and important tasks and decisions.

It is worth noting such components of the regression model as the social desirability index, which is one of the most significant procrastination predictors. In the present study, we found a negative correlation between the social desirability index and the level of procrastination, which demonstrates the wish of some of the participants (particularly those from the low-procrastination group) to sugarcoat their image in the eyes of others.

In conclusion, our study established that characteristics related to procrastination can have different types of correlations. Some of them are reasons and predictors that make it possible to predict the level of procrastination; some accompany procrastination, being its consequences or side effects. Furthermore, while studying the possible reasons for procrastination in the occupational environment, it is necessary to proceed at different levels of analysis — from personal and behavioral characteristics to organizational components of the occupational environment. This approach makes possible a systematic description of risk factors for procrastination and will help to find appropriate methods to stop its negative impact on a professional’s life and on the effectiveness of the company’s work.

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## Tolerance and Intolerance for Uncertainty as Predictors of Decision Making and Risk Acceptance in Gaming Strategies of The Iowa Gambling Task

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**Background.** This article reports on the results of an empirical study of interrelationships between indicators of decision-making strategies (indexed by the Iowa Gambling Task, IGT) and traits of tolerance and intolerance for uncertainty that capture the unity of cognitive and personality components of situational representations.

**Objective.** Our study tested the hypothesis that overcoming uncertainty in decision making goes beyond cognitive representations of the task but instead is rooted in the construction of the amodal image of an uncertain situation that captures the meaning regulation of perception and action. We hypothesized that when a person is faced with multi-stage decisions, their strategies reflect the contribution of individual differences in attitudes towards uncertainty.

**Design.** Using data obtained from  $n=60$  typically developing adults (68% men;  $M_{\text{age}}=30.58$ ), we examined the contribution of tolerance/intolerance for uncertainty to a variety of IGT dependent variables at five different stages of the game.

**Results.** The data was analyzed using the mixed linear model method as implemented in the lme4 package for R. The results indicated that tolerance for uncertainty significantly contributes to the initial level of behavioral risk, ensuring readiness for decision making under uncertainty.

**Conclusion.** Tolerance for uncertainty plays an important role in early stages of orientation in an uncertain modeled game situation, and contributes to the productive development of probabilistic expectations. Intolerance for uncertainty, on the other hand, was shown to contribute to risk in decision making after trial failure, potentially limiting learning in uncertain conditions through risk aversion.

**Keywords:** decision making, Iowa Gambling Task (IGT), tolerance for uncertainty, tolerance for ambiguity, intolerance for uncertainty, risk acceptance



## Introduction

Despite significant advances in research on decision making (DM) in the recent decades, the sources of individual differences in cognitive strategies and personal choices under uncertain conditions remain largely understudied, with a particular lack of studies conducted in the individual differences paradigm — i.e., studies that would examine and characterize the inter-individual variation in decision making and associated traits and abilities. One of the reasons for this gap in the literature is historical. Decision-making research was previously studied mainly within the framework of cognitive psychology and organizational decision research, and neglected the individual's prognostic anticipatory activity as a source of meaningful variation. Prognostic activity is manifested in active anticipation and forecasting during decision making, as well as processes of goal setting and thinking that underlie the constructions of “neoformations” — mental products that are used both to achieve the decision-making goal but also to monitor the individual ability vs. task demand fit and resource requirements.

Decision making was fairly recently reconceptualized in psychological studies to encompass dynamic control of uncertainty, replacing traditional dichotomies of rational-irrational, cognitive-emotional and other oppositions in decision-making regulatory processes (Gigerenzer, 2015; Hastie & Dawes, 2010; Osman, 2010). This is in part driven by the acquisition of studies of decision-making regulation of a new social meaning, reflecting the notion of modern man as living in highly complex, uncertain conditions in the vast majority of life domains. This shift brings with it a new understanding of the insufficiency of generally reductionist claims that postulate a general link between personality and decision making, and highlights the need for systematic, rigorous studies of decision making in the individual differences framework that would adequately consider decision making as being realized by a person with certain attributes — abilities, traits, and acquired behavioral and decision-making strategies — that govern the actual process of decision making as it unfolds under conditions of uncertainty.

Such traits can be classified into stable (dispositional) personality traits that are fairly independent from situational choice preferences, and dynamic traits that capture attitudes towards uncertainty as an overarching construct. Whereas a person's global “character” reflects a combination of established traits and patterns of behavior, attitudes towards uncertainty capture the complementary spectrum of decision-making regulation in situations when established strategies no longer apply — for example, under new, unusual, atypical, internally contradictory, or ambiguous conditions. Tolerance and intolerance for uncertainty are two such traits, and previous research (including by the authors of this article) unequivocally points to the their important role in a wide array of decision-making situations characterized by uncertainty.

***Cognitive versus emotional regulation of decision making in the Iowa Gambling Task.*** In psychology, the conceptualization of personal regulation of decision making is tied to the early studies of emotional regulation of choice. Studies of prediction processes have tended to lean towards the primacy of the emotional domain since Damasio put forward the “somatic markers” hypothesis (Damasio, Everitt, & Bishop, 1996). The somatic markers themselves are viewed as a special

type of reaction, with an associated host of experienced signals that are formed on the basis of previous individual experience, and are subjectively experienced as suspicions, anticipations, and “gut feelings”. Popularization of this concept was promoted by the fact that it serves as a theoretical support for the neurophysiological basis of feedback and for the specificity of prognostic activity in different clinical groups. Notably, these patterns are revealed on the basis of a single experimental model of the Iowa Gambling Task (IGT; Bechara, Damasio, Damasio, & Tranel, 2005) — a model situation that presents the participant with a problem where they are asked (without any prior knowledge) to win as much game money as possible by drawing cards from “bad” and “good” decks that contain cards with a particular gain-loss probabilistic and monetary structure. To date, only a small portion of IGT studies have been conducted with typically developing participants. Some recent research suggests that in typical samples, decision making in the IGT is linked with cognitive traits such as emotional and analytical intelligence (Webb, DelDonno, & Killgore, 2014).

The goal of this article is not only to present empirical data broadening our understanding of decision making, but also to provide a tentative theoretical account of the sources of intellectual activity of a person, which could be manifest in different types of prognostic tasks. In Russian psychology, the concept of the “world image”<sup>1</sup>, proposed by Leontiev (1975) and further developed by his colleagues, is well established. It focuses on a different aspect of anticipation the feedback from primary representations of a situation under uncertainty, namely, the prognostic activity directed by the amodal deep structures afforded by the amodal “world image”. These structures include, in particular, individual representations of meanings and the processes of hypothesis development and testing. Since the development of anticipatory activity encompasses its objective content as well as the guiding role of the “world image”, studying the dynamic regulation of decisions under uncertain and risky conditions (Smirnov, Chumakova, & Kornilova, 2016) poses a diagnostic problem (in terms of which processes reach the leading level of regulation), and related theoretical accounts necessitate the transition to higher-level concepts, indexing prognostic activity that is not reducible to the visceral somatic feedback loop.

***Tolerance for uncertainty as a key index of attitude towards uncertainty.*** Tolerance and intolerance for uncertainty are key variables in the overarching system of personal regulation of choice and decision making under conditions of uncertainty. Although the concept of tolerance for uncertainty introduced by Frenkel-Brunswick (1948, 1949) is subject to substantial definitional heterogeneity, it should be noted that the term itself was originally introduced as characteristic of both cognitive and personality domains. Importantly, over time tolerance and intolerance for uncertainty shifted from being viewed as two poles of the same concept continuum to being viewed as partially independent constructs and dimensions of personality (Kornilova, 2010). Furthermore, intolerance for uncertainty has been differentiated

<sup>1</sup> “World image” — system of multilevel and coherent hypotheses continuously generated by the subject to meet the stimuli of the surrounding world

from intolerance for ambiguity (Buhr & Dugas, 2006), and within the concept of intolerance for uncertainty, intolerance for uncertainty and intolerance for subjective uncertainty also diverged on conceptual as well as empirical grounds (Grenier, Barrette, & Ladoucer, 2005). Intolerance for uncertainty is primarily tapping into uncertainty as a stressful factor that disrupts one's ability to act, with the uncertain situations generally portrayed and perceived as fundamentally negative (something to be avoided), and uncertainty itself being perceived as assuming certain degrees of "unfairness" or "wrongfulness".

Some recent approaches suggest that terminological differences can be circumvented by ascribing specific terms to subfields that study the relevant construct — e.g., tolerance for ambiguity would fall under the category of general psychology concepts, whereas tolerance for uncertainty would fall under the category of clinical psychology concepts (Rosen, Ivanova, & Knäuper, 2014). Such artificial separations are in conflict with the observations that both general and cognitive psychology utilize the term "tolerance for uncertainty" with a frequency that is similar to that in clinical psychology (Tobin, Loxton, & Neighbors, 2014). Additional considerations were put forward proposing that tolerance for ambiguity is more proximal to the dimension of stimulus properties, whereas tolerance for uncertainty is more proximal to the dimension of emotional responses of the person who experiences uncertainty towards it. Notably, the two concepts also appear to differ along the temporal dimension, with tolerance for ambiguity reflecting responses to uncertainty here and now, whereas tolerance for uncertainty reflects the orientation towards an undetermined future (Furnham & Marks, 2013). Furnham and Marks (2013) came to the conclusion that tolerance for uncertainty should be regarded as a factor of the second or third order in relation to the primary Big Five personality traits (Extraversion, Openness, Agreeableness, Conscientiousness, and Neuroticism), as it refers to the entire spectrum of the Big Five.

So far, we have provided the reader with an overview of the concepts that link overcoming uncertainty and task-based prognostic activity in decision making. This activity is realized through the development and implementation of individual decision-making strategies. We believe that the Iowa Gambling Task is an underutilized measure of individual differences in decision making, with an untapped potential for revealing the nature and the sources of individual differences in decision making, through the examination of prognostic strategies involved in the cognitive orientation in an uncertain situation. These strategies have the potential to resolve the traditional conflict between viewing emotional vs. intellectual components of decision-making regulation as being primary (Bechara, Damasio, Damasio, & Anderson, 1994). As mentioned above, individual correlates of IGT performance are understudied in non-clinical samples (Buelow & Suhr, 2009), and the present article aims to bridge this gap in the literature by explicitly addressing it in an empirical study of IGT performance correlates, while focusing on tolerance-intolerance for uncertainty as overarching traits contributing to decision making.

***The role of tolerance for uncertainty in regulation of decision making: a hypothesis.*** In the empirical study reported below, we aimed to identify the rela-

tionships between decision-making strategies in the IGT and individual differences in traits of tolerance/intolerance for uncertainty. Acceptance of challenges of uncertainty requires not only readiness for change, uncertainty, and associated complexity and novelty, but also readiness for a particular cognitive attitude towards a situation characterized by multiple dynamic changes, since these attitudes allow for a flexible orientation towards pragmatic and information-seeking strategies (e.g., hypothesis-testing or research-like behavior throughout the game).

The IGT is frequently analyzed through the lens of the behavioral index of the preference for “safe” or “advantageous” decks of cards. Webb and colleagues (2014) previously suggested that deck preference rises sharply in the first 20 (out of 100) IGT trials, and reaches a plateau around the 40<sup>th</sup> trial. As an alternative, we examined the contribution of tolerance and intolerance for uncertainty to participants’ performance in the IGT by explicitly modeling the dynamic nature of this task through a longitudinal data analysis approach both to establishing the time course of decision making in the IGT and to quantifying the contribution of these traits to IGT performance parameters (e.g., the intercepts and slopes for overall gain of game money, preference for bad vs. good decks, and number of deck switches after a monetary in-game loss). We specifically hypothesized that at the initial stages of the IGT the choices will be significantly associated with a positive attitude toward uncertainty.

## **Method**

### ***Participants***

A total of 60 individuals in the age range from 18 to 52 years ( $M = 30.58$ ,  $SD = 10.61$ ; 68% males, 32% females) participated in this study. Participants were Moscow State University undergraduate students (approximately 1/3 of the sample) or typically developing adults recruited for the study externally.

### ***The Iowa Gambling Task***

We utilized the adapted Russian version of the computerized (HTML) IGT developed by Grasmann and Wagnermakers (2005). In the computerized procedure of this task, the participants make 100 consecutive choices of one card from any of the four decks on the screen. The goal is to win as much game money as possible. For each choice, the card represents a particular reward structure operationalized in the gain and loss amounts, with a particular probability of long-term losses and gains being a property of each deck. Two decks contain high-risk cards: They give relatively high wins (\$100), but also rare yet significant losses (up to \$1,250), and therefore a long-term preference of these decks leads to an overall loss. Two other decks allow for a gradual accumulation of small gains (\$50) with small penalties, and in the long run lead to a larger net gain of game money.

Procedurally, the task can be regarded as learning to solve a prognostic task under conditions of uncertainty, where participants face the need to create and process probabilistic hypotheses about possible gains or losses engrained in the

structure of the decision-making environment (decks and cards). Since decision making in the IGT unfolds over time (in a sequence of 100 trials), decisional strategies reflected in behavioral performance in the IGT have temporal characteristics, and can be appropriately modeled by hierarchical linear modeling (or mixed linear modeling), capturing the dynamics of choices depending on the reduction in uncertainty levels of the situation.

We analyzed the IGT data by splitting it into five blocks (20 trials each), consistent with previous research (Brevers, Bechara, Cleermans, & Noël, 2013). While the first block performance effectively indexes cognitive orientation under uncertainty, the fifth block performance can be viewed as indexing full-fledged decision-making processes under conditions where the probabilities of gains and losses have been already established.

### ***New Questionnaire of Tolerance/Intolerance for Uncertainty***

We used the New Questionnaire of Tolerance/Intolerance for Uncertainty (Kornilova, 2010) to measure attitudes towards uncertainty. This was a self-report questionnaire constructed based on the re-analysis of Furnham's (1994) tolerance for uncertainty questionnaire, which itself included several measures. We previously showed that the questionnaire has a three-factor structure in typically developing Russian samples, and can be used to obtain reliable indices of tolerance for uncertainty (TU), intolerance for uncertainty (ITU), and interpersonal intolerance for uncertainty (IITU).

## **Results**

The data were analyzed using the mixed linear model method (Baayen, 2008) as implemented in the lme4 package for R. Block number (1 to 5), squared term for the block number (allowing for nonlinearity of learning), demographic variables (age and sex), and tolerance/intolerance for uncertainty variables were entered into the model as fixed effects. The model also included random effects of participants on the initial starting point (intercept) and slope.

In the conditional growth model, demographic variables and tolerance/intolerance for uncertainty were allowed to influence both intercept and slope. The model parameters are summarized in Table 1. Of note is that demographic variables did not significantly predict either of the three dependent variables or their slope parameters.

The analyses revealed a complex pattern of results. First, we found that participants tended to earn more money as they progressed through the experiment, with a pattern of change consistent with that previously reported for the task (slowing down growth). Moreover, initial gains in the IGT were predicted positively by tolerance for uncertainty ( $B = 5.68$ ,  $SE = 2.93$ ,  $t = 1.94$ ).

Second, we found that the preference for disadvantageous IGT decks decreased linearly over the course of the experiment ( $B = -.04$ ,  $SE = .02$ ,  $t = -2.03$ ). At the same time, the initial preference for "bad" decks was positively predicted by tolerance for uncertainty ( $B = 0.006$ ,  $SE = 0.003$ ,  $t = 2.13$ ).

Table 1

*Summary of Fixed Effects for the Mixed Models with IGT Performance as Dependent Variables*

Parameter	Net Gain			Bad Decks			Loss Switches		
	B	SE	t	B	SE	t	B	SE	t
Intercept	1,514.06	52.70	28.73*	.53	.05	10.39	3.85	.50	7.72
Block	1,557.07	78.10	19.94*	-.04	.02	-2.03*	-.32	.55	-.58
Sex	104.97	70.63	1.49	.07	.07	1.09	.85	.67	1.27
Age	-3.46	2.86	-1.21	-.002	.003	-.90	-.03	.03	-1.22
TU	5.68	2.93	1.94 <sup>t</sup>	.006	.003	2.13*	-.04	.03	-1.51
ITU	1.25	2.23	.56	.002	.002	.90	-.05	.02	-2.32*
Block	-26.13	12.45	-2.10*	n/a	n/a	n/a	.05	.13	.38
Block:Sex	-8.01	104.68	-.08	.02	.03	.93	-.40	.73	-.55
Block:Age	.42	4.24	.10	-.001	.001	-.60	.02	.03	.52
Block:TU	6.18	4.34	1.42	-.002	.001	-1.42	.03	.03	1.12
Block:ITU	3.59	3.30	1.09	-.001	.001	-.71	.05	.02	2.14*
Block:Sex	23.09	16.69	1.38	n/a	n/a	n/a	-.02	.17	-.10
Block:Age	-.63	.68	-.94	n/a	n/a	n/a	-.0002	.007	-.02
Block:TU	-.93	.69	-1.34	n/a	n/a	n/a	-.008	.007	-1.17
Block:ITU	-.56	.52	-1.07	n/a	n/a	n/a	-.01	.005	-1.86 <sup>t</sup>

Notes: \*  $p < 0.05$ ; <sup>t</sup>  $p < 0.10$ . TU — tolerance for uncertainty. ITU — intolerance for uncertainty. B — mixed model regression coefficient with its standard error (SE).

Third, we found that switching to other decks after facing a loss was relatively constant throughout the course of the experiment for the “average” participant. However, intolerance for uncertainty predicted the intercept negatively ( $B = -0.05$ ,  $SE = 0.02$ ,  $t = -2.32$ ). For participants with higher intolerance for uncertainty, fewer deck changes were observed after a loss at this stage of the IGT. At the same time, intolerance for uncertainty positively predicted the slope parameter for this index ( $B = 0.05$ ,  $SE = 0.02$ ,  $t = 2.14$ ), thereby suggesting that for individuals with high intolerance for uncertainty, the proportion of deck switches increases over time to a larger extent than for individuals with low tolerance for uncertainty.

## Discussion

We examined tolerance/intolerance for uncertainty as potential sources of individual differences in the dynamic parameters of decision making in the Iowa Gambling Task. We found that tolerance and intolerance for uncertainty acted as significant predictors of IGT performance, although they predicted different indices.



These findings suggest that tolerance/intolerance for uncertainty modulate decision-making strategies under conditions of uncertainty. Tolerance for uncertainty, for example, predicted the baseline level of monetary IGT performance; although participants who had higher tolerance for uncertainty were more likely to choose disadvantageous decks in the IGT at the beginning of the experiment, they also showed higher overall profit, compared to participants with lower tolerance for uncertainty. This finding suggests that tolerance for uncertainty plays a pivotal role in determining the initial level of risk readiness under conditions of uncertainty, consistent with prior findings that linked tolerance for uncertainty and risk readiness using behavioral measures of risk readiness (Kornilova, 2016) and choice processes in the IGT with sensation seeking (Suhr & Tsandis, 2007).

Tolerance for uncertainty played an important role in orientation to the dynamic changes in the decision-making environment and the productive development of probabilistic anticipations. At the same time, the results of the study suggest that higher intolerance to uncertainty was associated with a decrease in “research activity” (risk aversion) after exposure to an in-game loss of money. This finding is concordant with the accounts of intolerance for uncertainty as an index of risk aversion and rejection of uncertainty as well as with the empirical evidence that this personality trait is related to avoidance coping strategies when decisions are made under conditions of uncertainty (Kornilova, 2013).

The modeling approach to the analysis of IGT parameters allowed us to go beyond simple correlation analysis and revealed a complex picture of the regulatory processes behind the measured indicators of gaming (and decision-making) strategies. Overall, decision making under uncertain conditions is partially modulated, therefore regulated by tolerance and intolerance for uncertainty. Interestingly, tolerance for uncertainty appears to regulate basic risk readiness that underlies cognitive learning in the initial stages of decision making, while intolerance for uncertainty regulates risk propensity after failure/loss, potentially limiting learning under conditions of uncertainty, through risk aversion and increased sensitivity to negative outcomes. These findings are noteworthy because they shape an alternative methodological approach to studying the functional relationships between cognitive and personality traits and processes that are involved in decision making and choice regulation.

The study has several limitations. First and foremost, the findings should be replicated in samples of larger size and characterized by prominent variation in the studied traits and processes. Second, it is possible that our analytical approach did not adequately capture qualitative decision-making strategies that characterize different participants. Third, this analysis did not include a measure of intelligence, a possible baseline performance predictor of the IGT (Smirnov, Chumakova, Kornilov, Krasnov, & Kornilova, 2017).

Our study provides general support for the notion of the amodal world image that focuses on a different aspect of individual regulation of anticipatory decision-making strategies than the hypothesis of “somatic markers”: i.e., on higher levels of a person’s prognostic activity regulation by overarching traits of attitudes towards uncertainty. This does not negate the importance of somatic markers that signal success or failure, but instead highlights the irreducibility of decision making to

somatic markers that are placed at the “vertex” levels of anticipatory activity regulation and that are instead modulated by personality traits. These “vertex” levels are: (a) positive acceptance of uncertain conditions (as a challenge to one’s abilities) and (b) uncertainty aversion combined with reliance on known facts (already defined components of a situation) in one’s search for clarity.

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## CLINICAL PSYCHOLOGY

### From Fundamental Principles of Memory Organization Towards Neurorehabilitation: A Literature Review and Case Report

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**Background.** Contemporary rehabilitation of memory impairments relies on the use of external compensatory strategies. In Russian neuropsychological tradition, rehabilitation is understood as a transformation of a higher mental function, based on intact elements of that function and on use of external and internal means. Such a restructuration approach may be applied to memory.

**Objective.** This article describes the basic principles underlying memory rehabilitation and gives an example of their successful implementation in a clinical case.

**Design.** A 62-year-old patient was admitted 6 months after severe traumatic brain injury with primary damage to his left frontal and temporal lobes. He faced difficulties in social living and activities of daily life, mainly due to memory impairment. Neuropsychological assessment revealed moderate impairment of different memory types: modal nonspecific impairment with mild but persistent impairments in autobiographic and semantic memories. During a 3-week rehabilitation program, an algorithm involving the use of text was developed in consideration of the structure of memory impairment (impaired selectiveness, excessive inhibition and pathologic inertness of memory traces).

**Results.** After multiple trials and modifications, the resulting algorithm (written retelling with the use of keywords, self-correction with writing correct variants instead of errors), allowed reproduction of the presented text with 100% recall of significant information and no false memories. The use of the developed memorization technique in everyday life allowed the patient to effectively memorize relevant information.

**Conclusion.** The described approach—restructuration of memory on the basis of preserved chains—is a feasible strategy of memory rehabilitation.

**Keywords:** neuropsychological rehabilitation, neurorehabilitation, memory, traumatic brain injury

## **Introduction**

Due to the low potential for restoration of memory after brain injury, contemporary rehabilitation of higher cortical function mostly involves external compensation (Dubourg, Silva, Fitamen, Moulin, & Souchay, 2016; Evald, 2017; Jamieson, Cullen, McGee-Lennon, Brewster, & Evans, 2014; Wilson, Gracey, & Evans, 2009). According to multiple studies, memory training has poor efficacy (das Nair, Cogger, Worthington, & Lincoln, 2016; Hamalainen & Rosti-Otajarvi, 2016). Russian neuropsychological tradition, which is based on the work of L.S. Vygotsky and A.R. Luria, offers another approach to rehabilitation of memory impairments — restructuration of impaired higher cortical function on the basis of preserved chains with the use of internal and external aids. This includes either the reconstruction of an existing functional system or the formation of a new one, relevant both to the patient's individual needs and to his/her brain abilities.

L.S. Vygotsky believed that memory is a higher mental function which, better than other functions, reveals the individual's interaction with him/herself. A productive and efficient interaction with him/herself in everyday goal fulfilment is probably a key objective of neuropsychological rehabilitation.

In Russian neuropsychological tradition, based on L.S. Vygotsky and A.R. Luria's works, rehabilitation (or impaired functions' recovery) is understood as a transformation of a higher mental function, based on intact elements of that function and on use of external and internal means (of mediation) (Luria, 1976; Vygotsky, 1997). Often that process is based not only on rehabilitation of a partly or completely damaged function, but also on a modification of how that function is realized. Concerning memory, it is “working with memory” or developing a new way of an individual's interaction with himself/herself, rather than just “memory rehabilitation”.

## ***Principles of Memory Organization***

The transformation of primitive (biological) forms of memory to higher (specific for humans) forms is a result of a long and complex process of cultural and historical development. Memory of modern humans, as a higher mental function, is also a product of their cultural and social development (Leont'ev, 1964; Vygotsky, 1997). That is why means and mechanisms of memorization (used by an individual during his/her lifespan) act as products of interaction of a person with him/herself through the development process. In the case of abnormalities, especially related to brain injuries, many of these well-developed and established means of interaction became inefficient. As a result, there is a need to “repair” such means or to search for new means which, on one hand, will correspond to the capacities, individual characteristics and patient's requests, and on the other hand, correspond to the abilities of his/her damaged brain functions.

The above-described principles are related to the theory of metacognitive functions developed in modern psychology (Ackerman & Thompson, 2017; Al Banna, Abdulla Redha, Abdulla, Nair, & Donnellan, 2015). The development of metacognitive functions begins in the earliest periods of ontogenesis and continues until the later youth period and, in some cases, continues during the whole lifespan. Usually two elements of metacognitive functions are damaged in the case of brain

injuries: difficulties of awareness of the existing deficit (which includes poor self-monitoring) and absence of the flexibility and behavior change which is important when external conditions are changed (Kennedy & Turkstra, 2006). As a result, these patients need special training of metacognitive functions (Kovyazina et al., 2017; Varako, Dobrushina, Zinchenko, Martynov, & Kovyazina, 2016).

Most often, training of metacognitive functions is used in rehabilitation in three cognitive domains: attention, executive functions and memory. The authors divide all metacognitive strategies into two categories (Sohlberg & Turkstra, 2011): task-specific strategies (for example, for understanding and remembering the information) and general strategies (for a wider range of tasks).

### ***Mechanisms of Memory Impairment***

The excitation-inhibition processes of balance (neurodynamic balance) and an optimal energy level (remaining active long enough to memorize and retrieve information) are important conditions of memory processes. If the level of optimal energy is low, neurodynamic balance is disturbed: the inhibitory processes predominate as an abnormally increased retroactive inhibition. As a result, if after the act of memorization some new action appears, the subject has difficulty retrieving recently memorized information (forgetting). This action causes an inhibitory (interfering) effect on retrieval efficiency. Thus, ***increased inhibition*** of memory traces due to the impact of interference is one of the main mechanisms of abnormal forgetting (Luria, 1976).

It is important to note that increased inhibition of memory traces due to the impact of interference can, in one case, appear in all modalities (in memorization of visual, motor and auditory stimuli), while in other cases it may appear only in one modality. Moreover, the intensity of polymodal and unimodal memory impairments, diagnosed during clinical and neuropsychological assessment, depends on interference type (inter- or intra-stimuli interference), level of semantic organization of stimuli and combination of numerous conditions of memory task (Korsakova & Moskovichute, 2003).

If we consider that memory retrieval presumes guidance towards a memory trace relevant to the task, it is clear that an ability to control the selective memorization is another condition of memorization's efficiency. In the case of damage of cerebral structures, the selective memorization of memory traces relevant to the task is troubled; together with the stimuli relevant to the task, some irrelevant stimuli are also memorized in an involuntary and automatic manner. Thus, ***difficulties of selectivity of memory traces*** (related to present and past experience) can be another mechanism of memory impairment.

Optimal *flexibility* of neural processes, which allows one to switch from one element (or association) of memory trace to another, is one of the neurodynamic parameters of mental activity. In the case of flexibility impairment, the ***abnormal inertia*** (which manifests itself in perseverative retrieval of some elements of memorization task and details of past experience, as well as in proactive inhibition, when the action which appeared before the memorization act has a negative impact on the result) might be a mechanism of memory impairment.

Human memory is, first of all, an active memorization activity. It means the individual transforms the information he/she perceives in an active manner, not



just imprinting the traces of stimuli, but encoding the information, selecting its relevant and irrelevant characteristics and encoding the stimuli in a specific system — a semantic and subjective organization (Leont'ev, 1964; Luria, 1976). Moreover, the active manner of information transformation manifests itself when a person addresses a special task to remember information in a particular condition or situation. Such an activity, directed towards a goal, induces a selective character of the memorization process (the use of specific means and development of relevant motivations and attitudes), as well as the retrieval process (the access of relevant information at a proper time).

### ***Principles of Rehabilitation of Memory Impairments***

In the Russian neuropsychological approach, based on L.S. Vygotsky's ideas, the higher mental functions have specific characteristics or processes which enable learning something new, as well as recovery after impairments during neurorehabilitation (Vygotsky, 1997): *exteriorization* and *interiorization*. What do these terms mean? The studies of higher mental functions among children revealed that any complex mental activity is *exteriorized* in the beginning (carried and expended on the outside). For example, when children learn to solve arithmetic problems, they rely on external means — means which are well known and understood by the child (for example, arithmetic tasks using apples). Gradually, these external means are replaced by more abstract algorithms, such as rules how to solve arithmetic tasks, which are exteriorized as notes, schemas, etc. Eventually a child does not even use these exteriorized means. It happens because logical operations become automatic and are transformed into “mental skills”. Thus, *interiorization* of some particular logical operation develops, being transformed from an external to internal form (Furth, 1968).

A similar process develops during phylogenesis: the transformation of primitive, biological forms of memory to higher, specifically human, forms of memory. This is a result of a long and complex process of cultural and historical development: being exteriorized and based on external means in the beginning, gradually memory becomes the one we can now observe in modern humans.

The first steps towards intentional memory regulation appear among primitive tribes. These are the first attempts to regulate one's memories, to retrieve memory traces by means of a special stimulus which act as *means of memorization*. Janet said: “The first memories are the memories of things by means of the things themselves. A person who wants to retrieve a memory takes a special object in hand; for example, some tie a string on a foulard or put a small stone in a pocket, a piece of a paper or a leaf from a tree. This is what we still call *souvenirs*” (Janet, 1928). Mechanically retained memory traces need to have an essential connection with a stimulus existing in a novel situation to reappear in mind in that novel situation. This mediating element, which connects the trace of memory with a novel situation, must be created beforehand in the memorization process.

It is important that the studies of compensation mechanisms (in the case of some functional system impairment) revealed that there are no principal differences between the reorganization of the function in abnormal and normal conditions (Anohin, 1958). That means that reorganization mechanisms are universal.

Thus, the principal objective of the rehabilitation process is to look for individually intact abilities, which can maintain the development of that universal mechanism.

After brain injury, key elements of the comprehensive interiorized memory system can be destroyed. During neuropsychological assessment, impaired and preserved chains of the system are identified along with resources which may be used to create a new system. Subsequent rehabilitation is a highly exteriorized elemental process, aimed to find an effective strategy to work with memory. Once such a technique is found, it is trained to promote consolidation.

## Design

### *Case Report Description*

Patient L., 62 years old, had a severe traumatic brain injury along with thoracic trauma (fracture of the right III-VII ribs and left IV rib, pulmonary contusion, secondary pneumonia) and traumatic shock as a result of an automobile accident which happened 6 months before rehabilitation. Brain CT and MRI revealed multiple abnormalities, including sites of traumatic injury in the left anterior-lateral frontal area (2 cm<sup>3</sup>) and left temporal area (2 cm<sup>3</sup>), multiple “vascular” lesions in the white matter of the frontal and temporal lobes and moderate hydrocephalus. During the first month after the trauma, the patient had disordered consciousness, starting from stupor (GCS 11), with gradual restoration. He received intravenous fluid therapy, antibacterial therapy and sedation with benzodiazepines due to delirium. One month after the trauma, he was discharged.

The patient has an engineering degree. Before the injury, he worked as an electrician and helped his son in apartment renovation work. Because of memory difficulties after the traumatic brain injury, the patient left his job and stopped participating in his family life. He could not internalize the contents of books and web pages he read. In his daily routines, the patient often forgot where he put objects and what he planned to do.

Six months after the trauma, the patient was admitted for rehabilitation. The diagnostics of higher mental functions (e.g., memory) was based on classic neuropsychological assessment in A.R. Luria’s approach. The results of neuropsychological assessment are presented below.

### *Neuropsychological Assessment*

During assessment, the patient was communicative, sociable and emotionally adequate. The anxiety which appeared in the beginning of the assessment was transformed into a calm mood. The patient made jokes, showed his interest in task performance and was an active participant in the discussion. He was not particularly aware of errors he made during the assessment.

### *Objective Results*

Difficulties in kinetic praxis were revealed. These difficulties were manifest in difficulties of motor stereotype development, organization of series of movements, propulsions, perseverations and dominance on the left side. Also, there was a tremor in both hands (but mostly in the left hand).

The second complex of symptoms includes different memory impairments. Firstly, impairments of elements of neurodynamic conditions of memorization: impairment of selectivity of memory traces of past experiences (the patient had contaminations and confabulations), increased inhibition of memory traces due to the impact of interference (also appeared in semantic information memorization), abnormal inertia of memory traces (appeared in inert memorization of relevant and, at the same time, irrelevant answers in memory tasks). Secondly, there were memory impairments of different severity levels which appeared in retrieval of memories from past experience and autobiographic memory:

- The productivity of correct memorization and retrieval of short stories was approximately 90%; the quantity of errors of “false memorizations” was 4-5, gaps in significant details — 4-5. Indirect (unmediated) memorization-delayed retrieval was less than 30% of the whole text amount with loss of its meaning; in mediated memorization, 70% without any loss of its meaning; however, a loss of significant details occurred.
- There was low efficacy in a memorization task (remembering a series of words). During five attempts to remember a series of words, the increase of memorized and retrieved words was two words and reached a maximum of only eight words.
- The increased inhibition of memory traces (with heterogeneous as well as homogenous interference) appeared in significant reduction of the amount of retrieved information (50% in a 10-word memorization task, 60-70% in a short stories memorization task and 30% in memorization of two groups of three-word tasks).
- Visual memory was impaired less; however, there was a reduced amount of retrieval (four out of six figures retrieved) together with intact ability to memorize images after copying.
- Remembering experiences: there was a mild impairment in autobiographic memory, as well as in semantic memory (retelling of book plots is practically impossible for the patient).
- Abnormal inertia of memory traces appeared in perseverations of already memorized information (relevant as well as irrelevant or mistaken information).

We also identified difficulties in understanding metaphorical and hidden meanings of proverbs and series of image narratives.

Gnosis, formal thinking, programming, behavioral regulation and process of categorization were intact. The results of the neuropsychological assessment are presented in tables 1 and 2.

Thus, central neuropsychological impairment was shown in moderate impairment of different memory types: modal nonspecific impairment with mild but persistent impairments in autobiographic and semantic memories. Memory impairments appeared on the level of separate operational elements of the memorization task, as well as on the level of memorization activity as a whole. The principal mechanisms of memory impairment were (a) increased inhibition of memory tracers due to the impact of interference, (b) difficulties of selectivity of memory

Table 1

*Neuropsychological Assessment (Luria Battery)*

Test	Results
Sequential motor task (Luria's Fist-Edge-Palm Test)	Right hand: normal Left hand: delayed formation of movement sequence; verbal regulation is necessary
Asymmetrical movements	Difficulties in program modification
Head spatial orientation and movements	Normal
Conflict solving	Normal
Visual gnosis	Normal
"Blinded clock" (visual-spatial analysis)	5 of 5 tasks are correct
Elementary arithmetic tasks	Needs help
Acoustic gnosis	Normal
Shultz tables, 3 tables	40 sec; 47 sec; 41 sec
Serial 100-7s subtraction	5 correct subtractions
Memory: two short stories 1st story. Involuntary memorization Immediate recall Delayed recall	4 of 8 significant details (1 false memorization) 3 of 8 significant details (2 false memorizations)
2nd story. Voluntary memorization Immediate recall Delayed recall	11 of 16 significant details 11 of 16 significant details (2 false memorizations)
Visual memory, 5 figures	Correctly recalled 4 figures of 5 immediately and after interference
Memory: 2 groups of words, 6 words total Immediate recall Delayed recall	6 of 6 words 4 of 6 words (normal)
Autobiographical memory	Had some difficulties recalling dates of birth of his two sons and wife
Categorization test (5 tasks)	5 of 5 are correct
Verbal fluency (1 min)	11 words
Picture arrangement task	Is unable to find the correct order of pictures

Table 2  
Memorization of Ten Words

Repetition	“ball”	“cry”	“sleep”	“shadow”	“flag”	“light”	“caviar”	“axe”	“hammer”	“brother”	False memo- rizations
1 <sup>st</sup>	1*	2	3.**			6	4	5			
2 <sup>nd</sup>	1	5			8	2.	3	4	7	6	
3 <sup>rd</sup>	1	2				3.	5.	4	6	7	
4 <sup>th</sup>	1	2	3			4.	5	6	7	8	
5 <sup>th</sup>	1	2	3		8		4	5	6	7	“color”
Delayed recall (40 min)					1.	2			4	3	“cinema”, “bush”, “branch”

Note. \* — order of recall is indicated by numbers. \*\* — dots indicate repetitive recalls, which are interpreted as perseverations

traces related to past experience and (c) abnormal inertia of memory processes. Moreover, the elementary level of memory processes, which is not mediated by semantic organization of information, was more severely impaired. The semantic organization of information improved the retrieval but only in the case of small amounts of information.

Results

Considering the above information and the patient and his family’s requests, we discussed the rehabilitation procedures to ameliorate the efficiency and accuracy of memorization. The patient had some resources for memory rehabilitation. These resources appeared in his capacity to rely on intact elements of the memorization process: semantic organization of information and relative efficacy in remembering small amounts of information.

Rehabilitation

With L. and his wife, we discussed possible goals and objectives of rehabilitation with a neuropsychologist. To summarize, the request was to ameliorate cognitive functioning — in particular the memory process, with the goal of returning to professional activity and family life in the future. Apparently, this patient will not be able to return to his previous professional responsibilities (i.e., working with high voltage), since they were related to significant life and health risks for himself and others. At the same time, he can perform more less risky jobs with less responsibility. As L. and his wife discussed the rehabilitation process, they came up with the idea of working as a storekeeper in the same organization where L. worked before

the traumatic brain injury. This job requires an ability to work with texts of different lengths, and analysis and memorization of information without pressure to work quickly with the documents. However, neither he nor his family members expressed strong motivation towards L's return to professional activity. Mostly they wished L. could be more independent and engaged in family routines. In this context, memory rehabilitation remained one of the key requests.

From an organization point of view, time limit was important for the rehabilitation process: L. came to Moscow only for 3 weeks. Thus, we had an opportunity to conduct nine rehabilitation sessions. We formulated the following rehabilitation goal: *in 3 weeks L. will master the algorithm and rules of working with texts.*

The first three sessions were dedicated to selection of optimal (considering the time limit) amounts of text and optimal algorithms for working with text. As a result, the optimal text amount was 20 phrases so the patient could perform all the work with the text during one session (since L. worked rather slowly, longer texts took longer and increased the session time).

Table 3

*Various Methods of Text Memorization*

	Amount of retrieval	Number of errors	
#1 Writing down pieces of text which come to mind on separate pieces of paper. The order of these pieces can be random. After that, the text pieces are put in correct order. Thus, the patient manipulates pieces of text which are all visible and in front of him.	–	–	
#2 Narrating the text from different perspectives or roles (reading the text, L. should have paid attention to the storylines of all characters to be able to narrate the storyline of each personage).	–	–	
#3 Writing the key thoughts on each piece of text (“What is it about?”) and then making a plan of narration. The narration of the text was done three times: after the first reading, after writing down the key ideas and after making a narration plan.	+	–	
#4 Narrating the text and answering the psychologist's questions. In parallel to correcting the errors (gaps, mistakes of facts, false memorizations), the patient performed the “correction of the errors” task. On a piece of paper, he wrote down the errors he made, each in one of three columns (1 — gaps, 2 — mistakes of facts, 3 - false memorizations) and corrected them: inserted the missing elements in the gaps, he wrote down the false-memorization errors and mistakes of facts.	+	–	–
#5 Finding keywords and writing them down on a separate piece of paper.	++	–	
#6 #5 plus error correction: including the correct answers in the narration of the text (in written form)	++	+	



During neuropsychological rehabilitation, we selected the optimal algorithm for working with text (see Table 3), which we found only on the fourth session. It consisted of searching the keywords and copying them on a separate piece of paper. At first, independent search of keywords caused significant difficulties (L. even announced that to the psychologist). However, step-by-step, the process of learning evolved and L. became more and more successful and independent at performing that task. This method was the most effective and significantly increased the amount of retrieved information (see Table 4).

Table 4  
*Efficacy of Different Methods of Text Memorization: Amount of Information Recall*

Session	1	2	3	4	5	6	7	8	9
Method	#1, #2	#3	#4	#5	#5	#6	#6	#6	#6
1 <sup>st</sup> narration (not using the method)	40%	37%	45%	37%	46%	53%	75%	50%	59%
2 <sup>nd</sup> narration	40%	41%	50%	84%	85%	88%	100%	100%	100%
3 <sup>rd</sup> narration	30%	61%	55%	–	–	82%	100%	–	–
4 <sup>th</sup> narration	50%	–	–	–	–	–	–	–	–
5 <sup>th</sup> narration	30%	–	–	–	–	–	–	–	–
6 <sup>th</sup> narration	61%	–	–	–	–	–	–	–	–

Table 5  
*Efficacy of Different Methods of Text Memorization: Factual errors*

Session	1	2	3	4	5	6	7	8	9
Method	#1, #2	#3	#4	#5	#5	#6	#6	#6	#6
1 <sup>st</sup> narration (not using the method)	4 (2/2)*	2 (1/2)	3 (2/1)	2 (0/2)	6 (3/3)	6 (2/4)	2 (2/0)	0	7 (2/5)
2 <sup>nd</sup> narration	0	2 (1/1)	0	2 (0/2)	2 (0/2)	2 (2/0)	6 (2/4)	0	0
3 <sup>rd</sup> narration	0	7 (5/2)	1 (0/1)	–	–	1 (0/1)	1 (0/1)	–	–
4 <sup>th</sup> narration	2 (0/2)	–	–	–	–	–	–	–	–
5 <sup>th</sup> narration	1 (1/0)	–	–	–	–	–	–	–	–
6 <sup>th</sup> narration	0	–	–	–	–	–	–	–	–

Note. \*The number of all errors made (including significant errors of facts, perseverations and false memorizations)

At the same time, the problem with qualitative errors in memorization was not solved. L. had confabulations and significant confusions of facts. The method of “keywords” and work on “correction of the errors” (a repeated recording of errors) did not solve the problem. As a result, after the sixth session, we changed the algorithm and principles of work with qualitative errors (see Table 5).

The sequence of “correction of the errors” changed its place in the algorithm: in the fourth to fifth session it was conducted after the first text retelling, based on the text’s content; beginning from the sixth session, the “correction of the errors” was performed on errors which were made during the text retelling based on the keywords.

One of the important discoveries we made during the work on decrease of qualitative errors was that correction of these errors was done by putting correct answers in the retold text and not by copying the incorrect answers and changing them to correct ones in a separate table. As seen in Table 4, it allowed the patient to significantly decrease the number of such errors (0 errors during the last 2 sessions). Also, during the eighth to ninth sessions, L. received a printed algorithm with detailed instructions on keyword extraction.

It should be mentioned that during the last two sessions L. worked well and independently. If we had an opportunity to continue the rehabilitation, its objective would be to automatize the skills he had already developed. These skills helped him to work productively with the text.

## Discussion

The main objective of the patient’s rehabilitation was to return him a way of working with his own memory, with the sort of information which he would probably have to analyze, familiarize himself with and remember for his new professional activities and productive family life. In other words, the objective was to help him reconstruct his cooperation with himself.

Apparently, the search for the optimal means to help patients rebuild such cooperation takes time. In our case, it took four sessions to find a way to help him organize the information that would fit into the patient’s subjective configuration. Moreover, finding this optimal method was just the beginning of the rehabilitation: we further needed to teach L. how to use that mean or method and, if possible, automatize the whole process. As seen in Tables 2 and 3, this process of learning and automation took several sessions. However, at the end of rehabilitation (as we already mentioned, the rehabilitation was limited in time because of external factors), we could talk only about relative automation of algorithm and method use. That is, it was an independent, but extended manipulation with the keywords.

According to L.S. Vygotsky’s approach, during the rehabilitation we launched only the process of interiorization of a new functional system. Only a few elements of this system became automated. At the same time, due to the beginning of the interiorization process, the speed, independence and amount of retrieved information increased. In general, however, the memorization process as a new functional system is still exteriorized. To work with the text, the patient still needs some notes

in front of him. Moreover, the productiveness of the first retrieval of information is still modest (but significantly higher than before rehabilitation).

A significant decrease in qualitative errors (false memorizations, perseverations and gaps in significant details) during the adaptation of a new algorithm of memorization also signifies that the interiorization process was launched. Thus, during rehabilitation, a new functional system was developing, using some new supportive means (Vygotsky, 1997). This functional system was directed towards working with text information to analyze, understand and memorize it.

Analysis of mistakes made during the rehabilitation process and their correction are very interesting and important for us. As seen in the Results section, the biggest difficulty our patient had was to decrease the number of quantitative memorization errors: false memorizations, perseverations, gaps and significance of the story plot. The method we used first — writing down incorrect and correct answers — did not lead to improved performance. Moreover, sometimes it even led to the persistence of errors. The successful method was the one directed towards the correction of errors in the text by including correct answers in it.

This mistake we made is important to discuss for several reasons. Firstly, this mistake is quite common: since school we have been taught to “correct the errors” we have made, using an algorithm which has little effectiveness for healthy people and is not effective for patients. This algorithm is based on reproduction of an error before correcting it. Secondly, it is important to pay attention to the mechanism of memory impairment itself and the patient’s mental activity as a whole. Thirdly, it is necessary to explain the physiological basis of the mechanism (described by Russian scientists such as I.P. Pavlov and A.R. Luria) which caused the impairment, and of the algorithm to overcome this impairment.

As we mentioned above, L. made memorization errors during the narration of stories. These errors were related to *impairment of selectivity* of memory traces (false memorizations) and to impairment of flexibility of neural processes caused by the mechanism of *abnormal inertia*. Together these two mechanisms aggravated memory impairment. This aggravation showed itself when our patient inertly reproduced his own errors.

Selectivity of mental processes is based on the physiological “law of strength” (Pavlov, 2011). This law states that it is possible to define a dominant system of arousal. The preservation of this law allows activation of systems of strictly selective connections, at the same time inhibiting irrelevant connections which do not correspond to a patient’s objectives (Luria, 1976). If the optimal level of cortical tone is changed, its arousal decreases; the inhibitory or phasic state of the cortex develops. During this state, characterized by lower arousal of the cortex, the “law of strength” is broken (Pavlov, 1928): in primary stages, weak stimuli are equalized with strong stimuli (Pavlov described this state as an “equalizing phase”); during the deepest “equalizing” phase of the cortex even the weakest stimuli are still evoking reactions, while strong stimuli lead the cortex towards the state of strong inhibition and do not evoke any reactions.

The decrease of cortex arousal eliminates the most important condition for selectivity of mental processes and violates the main requirement of the memorization process: such “equalizing” phases of the cortex easily lead to impairment

of selectivity of relevant memory traces. In line with relevant memory traces, irrelevant connections are also activated. If the cortex tone is optimal, the irrelevant connections are inhibited. If the cortex tone is inhibited, the irrelevant connections are balanced with relevant ones; moreover, they inhibit the activation of relevant connections. That is why the irrelevant connections (stimuli) appear automatically and uncontrollably.

Another important mechanism of memory impairment — the impairment of flexibility of neural processes — manifests itself as abnormal inertia and perseverations. When cortex activity is optimal, the activation of memory traces is organized in temporal sequence: the traces are activated successively. To activate relevant connections, a person must inhibit the traces of previous connections and switch from one trace to the others. Such flexibility of neural processes is impaired in the case of brain injuries. The traces, activated in the cortex, become abnormally inactive, which means that normal shifting from one memory trace to the others is impaired.

Thus, to overcome (or prevent) qualitative memory errors, it was important to account for the specificities of our patient's neurodynamic balance, which were diagnosed during the neuropsychological assessment. The patient should have been placed in a situation in which an error (weak stimuli) could not be "activated" as an irrelevant connection. The similar logic of a rehabilitation program can be seen in such well-recommended approaches as errorless learning (Fish, Manly, Kopelman, & Morris, 2015; Roberts et al., 2016; Wilson, 2013), avoiding possible activations of any irrelevant connections and repeated fixation of relevant stimuli which, according to laws of abnormal physiology, evoke weak reactions.

## Conclusion

In healthy people, the amount of memory traces accessible for retention is increased if they are successfully coded. In other words, the amount of retention of memory traces increases if these traces are included in systems of meanings. Numerous researchers also mentioned this, while K. Bulher (Innis, 2013) supposed that the "memory of thoughts" is much larger than the "memory of elements". Vygotsky, Leont'ev, Luria and others stated the same. This translation of memory processes on a higher level (which actually is the process of semantic organization of memory) significantly increases the amount of memories retrieved and reinforces the stability of memory traces.

The method of finding keywords in the text was the most effective method in our patient's rehabilitation. While the patient was mastering and automatizing it, the method caused a significant increase of the productivity of memorization. In other words, this method actually is one of the well-known methods widely used in different life domains, such as education and health: the method of meaningful organization of information. Combining this method with accounting for the specificities of neurodynamic balance and correcting of memorization errors allowed us to significantly increase the efficiency and accuracy of our patient's memorization. It also gave him a metacognitive strategy as an instrument to work with his own memory.

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## Maternal Communicative Behavior as a Factor in the Development of Communication in Children with Down Syndrome

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**Background.** Special features of communicative development in children with Down Syndrome are reported to correlate with intellectual disability, while their mothers' communication with them is considered to be a reaction to difficulties in building rapport with the child. The cultural-historical approach to human psychological and mental development (Vygotsky, 1982) supports research into the contribution of maternal behavior to the development of communication in children with Down Syndrome.

**Objective.** To analyze the relationship between the development of responsive and initiative communicative actions in children with Down Syndrome and features of maternal communicative behavior.

**Design.** The subjects were 15 pairs of mothers and their children diagnosed with "trisomy 21, Down Syndrome, full (or complete) type of trisomy" and 18 pairs of mothers and their typically developing children. The children in the experimental group are from 18 to 36 months old, the age of mothers is from 24 to 41 years. The children in the control group are from 18 to 36 months old; the mothers' age is from 20 to 44 years. The research included collection of video data and expert video recording analysis. Communication was recorded of mothers and their children without a toy, and then with a toy. Videos were made three times, every 1.5 or 2 weeks, and each session lasted 20 minutes; two videos were analyzed, excluding the first one. The analysis was performed by three experts — researchers at the Federal State Budget Scientific Institution "Institute of Special Education of the Russian Academy of Education" — calculating the frequency of the children's responsive and initiative communicative actions. A qualitative analysis of the mothers' communicative behavior was conducted: Repeated patterns of the mothers' communicative behavior in both groups were identified, and the number of mothers with these communicative actions was calculated.

**Results.** Mothers' actions that correlated with the development of responsive and initiative communicative actions in *typically developing children* were identified, including: The adult caregiver addresses her child directly and personally; she pays attention to the child's actions and supports them; she plays with the child as with an equal. The

communicative behavior of mothers of children with Down Syndrome did not differ from that of the mothers of typically developing children in terms of the behavioral characteristics listed above. The *development of responsive and initiative communicative actions in children with Down Syndrome* correlates with a greater number of characteristics of maternal communicative behavior, such as: continuing the communication despite approximate, uncertain, or contradictory signals from the child; creating vivid and positive emotional support for interactions; and keeping in mind the child's language and motor limitations.

**Conclusion.** Our research suggests that for *the development of communication in children with Down Syndrome*, maternal communicative actions that correlate with the development of communication in typically developing children are not sufficient.

**Keywords:** development of communication in children, communicative behavior of children, communicative behavior of the mother in communication with a child, children with Down Syndrome.

## Introduction

The genetic disorder Down Syndrome (DS) can cause significant obstacles to the development of communication, which is an essential condition for the mental health of a child.

According to various authors, the development of communication in children with DS at an early age has a number of distinct features in terms of the sensitivity and initiative behavior of the child, features which are traditionally used as criteria for quality assessment of communication (Mukhamedrakhimov, 2003; Smirnova, Galiguzova, Yermolova, & Meshcheryakova, 2003;). In the body of literature on interaction of mother and child with DS (Fidler, 2005; Mukhamedrakhimov, 2003; Odinkova, 2016b; Palmov, 2006; Panarina, 2004; Spiker, Boyce, & Boyce, 2002, etc.), many works show that children with DS have a delay in responsive behavior — eye contact, smiling, and vocalizations. The frequency of the child's non-verbal behavioral responses during interaction is significantly lower, the response latency period is longer, and the responses are reported to be less intensive and affectively colorless due to the affective state of the child (Hughes, 2012; Panarina, 2004). The children with DS are not expressive; their smiles are described as muted and their vocalizations are considered atypical (Fidler, 2005). Initiatives in children with DS are marked by low frequency (the number of pointing hand gestures is reported to be low), low intensity, and lack of persistence (Ayvazyan & Odinkova, 2016; Cebula, Moore, & Wishart, 2010; Odinkova, 2015; Palmov & Mukhamedrakhimov, 2008, etc.).

Maternal communicative behavior can have its unique characteristics too. On the one hand, mothers of children with DS are described as less engaged in interaction: They are mostly in a low mood, lacking in enthusiastic, emotional and expressive speech; they don't repeat their child's sounds and expressions — they don't "mirror them" (Panarina, 2004). On the other hand, compared with mothers of typically developing children, the communicative behavior in the mother of a child with DS is described as hyperactive, directive, and more obtrusive; she speaks more strictly to the child, more persistently, giving more orders (Field, 1990; Mukhamedrakhimov, 2003, etc.).

Yet there is also research that describes mothers' behavior in interaction with their children with DS as more effective than that of mothers of typically developing children: It is reported to be better structured and more predictable for the child, focused on development and learning, more sensitive to the child's signals (Palmov & Mukhamedrakhimov, 2008).

Considerable individual differences in parents' behavior during interaction are also noted, with no single behavioral portrait emerging of the mother of a child with DS (Ayvazyan & Odinkova, 2012; Inevatkina, 2009).

Features of communicative behavior in children with DS are believed to stand in direct correlation with intellectual disability — with delayed information collecting and attention disorder (Carr, 1991; Kumin, 2004; Moore, Oates, Hobson, & Goodwin, 2002), while particular features of the mother's behavior are considered to be reactions to difficulty in building rapport and attempts to make up for it (Cunningham & Glenn, 1991; Moore, Oates, Hobson, & Goodwin, 2002; Mukhamedrakhimov, 2003). Specific responsive behavior in children could be interpreted by the mother as reluctance to reply on the part of the child. Due to the specific nature of the actions and the low predictability of the child's behavior, the adult caregiver may get confused and fail to understand the child's signals. As a result, mothers often don't understand their children, don't respond to their initiatives, don't pause to let the child come up with a response (Panarina, 2004; Spiker et al., 2002; Vaughn et al., 1994). Excessive maternal activity is interpreted by some authors as an attempt to compensate for the child's low activity in interaction and to ease or prevent behavioral problems (Cicchetti & Beeghly, 1993; Mukhamedrakhimov, 2003).

With the cultural-historical approach to human psychological development, the focus shifts from biological to social factors that influence the development of communication in children with a genetic disorder (Vygotsky, 1982) and raises the question of the mother's behavior and its contribution to the development of responsive and initiative communicative actions in the child (Razenkova, 2017). Such an approach can have many applications, as it is potentially an excellent step toward preventing and overcoming difficulties in the development of communication in children with DS, by implementing a goal-oriented strategy for changing mothers' communicative behavior.

The aim of the present research is to investigate maternal communication as a factor of (condition for) the development of communicative action in children with DS.

According to the cultural-historical approach, human communication is acquired (not innate) (Lisina, 2009). This process starts from the very first days of life and develops through the child's interaction with the mother or other adult caregivers. The key factor here is the caregiver's values-based attitude toward the child: how the adult feels and thinks about the child. Initially, the adult caregiver meets the baby's natural needs and the need for new experiences, as the adult is a vivid and informative object for the child to explore. It is essential that the adult caregiver be "loving and caring" when interacting with the child, treating the child as an equal partner in communication, who has his/her own intentions and wishes. The child needs such attention, and the communicative need (in its first meaning as social reciprocity) arises as a need for getting caring attention from an adult caregiver. Driven by this need, a child first only responds to initiatives of the adult and

then begins to actively ask for attention, inviting the adult into communication. Thus begins the development of initiative actions (Lisina, 2009).

Certain of the mother's communicative actions — such as giving her loving and benevolent attention to her child — are therefore required for the development of the child's need to communicate, which will be expressed in the child's behavior through responsive and initiative actions. Assuming that the development of communication in children with DS works the same way, we can formulate a hypothesis: The maternal communicative behavior required for the development of responsive and initiative communicative actions in children with DS has its own special characteristics, which are different from those of mothers of typically developing children.

The objectives of the research were:

- to conduct a comparative assessment of the representativity of responsive and initiative actions in communicative behavior in children with DS and in typically developing children;
- to determine mothers' communicative actions that are significant for the development of responsive and initiative communicative actions in children at an early age;
- to analyze mothers' communicative behavior that correlates with the development of responsive and initiative communicative actions in children with DS.

## Method

### *Study Subjects*

The subjects were 15 pairs of mothers and their children diagnosed with “trisomy 21, Down Syndrome, full (or complete) type of trisomy”; the children are from 18 to 36 months old ( $27.7 \pm 5.8$ ). The age of the mothers in the experimental group was from 24 to 41 years ( $33.3 \pm 5.3$ ). The control group comprised 18 pairs; the children were from 18 to 36 months old ( $25.7 \pm 5.4$ ); the mothers' age was from 20 to 44 years ( $27.7 \pm 6.8$ ). In both groups, the following covariates were balanced: family size (more than one child, 46.7% of families in the experimental group and 44.4% of families in the control group,  $\phi^* = 0.28$ , non-significant differences; an extended family, which includes grandparents, made up 46.7% of the experimental group and 27.8% of the control group,  $\phi^* = 1.127$ , non-significant differences); household income (low income — 13.3% of families in the experimental group and 16.7% of families in the control group,  $\phi^* = 0.267$ ; average income — 60% and 66.7% respectively,  $\phi^* = 0.396$ , non-significant differences; high income — 26.7% and 16.7%, respectively,  $\phi^* = 0.699$ , non-significant differences). The groups had differences in the educational level of the mothers (high education — 60% of the mothers in the experimental group, 27.8% of the mothers in the control group,  $\phi^* = 1.89$ ;  $p \leq 0.05$ ), but an additional analysis did not prove this variable to correlate with the mothers' communicative behavior (Ayvazyan, Odinkova, & Razenkova, 2017). All the families with children with DS were provided with early intervention services (in-home services of special education teachers aimed at monitoring of somatic growth and care counseling; classes on how to teach object manipulation, play, self-help, speech).

### **Research Methods**

The research included collection of video data and expert analysis of the video-recorded communications of mothers and their young children.

**Video materials collection procedure.** The videotaping was conducted no earlier than at the third or fourth time that the investigator met with the family, allowing the investigator and the subject-pair to first build rapport and some level of trust. The first two times, the investigator spoke to the mother with her child present and conducted psychological testing of the mother and assessment of the child's neuropsychological development. In the control group, the videotaping was performed at home, whereas in the experimental group it was done at a place very familiar to the child, for instance at home or in a playroom at the early intervention center where the families attended classes. First, the mothers were asked to communicate with their children without a toy, according to the protocol: "Interact with your child the way you usually do". Then a standard set of toys was offered, including a matryoshka nesting-doll, a Seguin Form Board, a pyramid, some blocks, a toy car, a ball, a small doll, a cup, a spoon, a hairbrush, a handkerchief or fabric napkin, and four pictures. The next protocol suggested: "Choose any toy, then interact and play with your child the way you usually do". The interaction of the mother-child pair was videoed three times, every 1.5 or 2 weeks, and each session took 20 minutes; two video recordings were analyzed, excluding the first one.

**Video materials analysis.** In the process of analysis, stories were identified in the mother-child interaction. By stories we mean episodes, complete to a certain extent, that have a clearly outlined beginning, a continuation, and an end of the interaction. The beginning is marked by one of the partners initiating an interaction (performing an initiative communicative action). In the continuation period, the partners can either support each others' initiative actions or not. These stories were converted into text — dialogues that consist of sequences of verbal utterances and "behavioral messages" (movements, vocalizations, evocative expressions of an emotional reaction by mimicry, the expression of the eyes, body posture, gestures, etc.) of the mother and her child.

Then, the frequency of the children's responsive and initiative communicative actions was calculated. The indicators of initiative behavior at the age of two are "various appeals to the adult caregiver: The child is demonstrating skills, asking for help, involved in joint actions, seeking an evaluation of his/her actions and emotional feedback for his/her own experiences" (Smirnova, Galiguzova, Yermolova, & Meshcheryakova, 2003, p. 58). "Sensitivity is revealed in the child's responsive actions when they are performed in response to the adult's addressing him/her (the child takes the offered object, accepts help, tries to "mirror" or imitate the adult's actions, reacts to praise and reproach)" (ibid, p. 36). For the statistical analysis, we used the data about the number of children in whose behavior repeated response and initiative communications actions could be observed (3 or more times in 20 minutes of recording).

A qualitative analysis of mothers' communicative behavior was performed, which required the classification of elements of behavior, due to the high individual variability of phenomena observed. To meet this objective, we used the methodological approach presented in the work "The use of video surveillance for identification of the internal processes of pre-verbal development in infants" (Be-

lova, Nosulenko, & Ushakova, 2016). Upon reviewing the footage, both in regular-speed and freeze-frame mode, we developed a “cross-classification analysis grid” (contingency table). This is a list of classifications with informative descriptions of mothers’ communicative actions (Ayvazyan, Kudrina, Odinkova, Orlova, & Razenkova, 2018). Repeated patterns of mothers’ communicative behavior in both groups were defined in general terms in the grid. The classifications are followed by remarks and examples, which give reason to conclude that the expert evaluation of the video data was given without subjectivity. Then in the cross-classification analysis grid, each of the mothers’ behavioral messages was classified in terms of its communicative actions. Communicative behavior in mothers was classified by three experts, researchers at the Federal State Budget Scientific Institution “Institute of Special Education of the Russian Academy of Education”, Moscow, Russia. When controversies arose in the analysis of episodes, they were classified according to the experts’ collaborative decision, if necessary making corrections to the transcription and adding these to the grid (following the open coding principle of the grid) (Belova, Nosulenko, & Ushakova, 2016).

The number of mothers displaying the specific communicative actions was calculated in order to perform the statistical analysis. The multifunctional Fisher’s angular transformation  $\varphi^*$ -index and Fisher’s exact test were used for comparison of the communicative characteristics of the groups “mother–child with DS” and “mother–typically developing child”.

## Results

Comparison of the frequency of responsive and initiative communicative actions in children with DS with that in typically developing children exhibited a significant difference in **responsive communicative actions**: 40% of the children with DS and 5.6% of the children in the control group showed a low frequency of responsive communicative actions to the mother’s signals ( $\varphi^* = 2.556$ ;  $p \leq 0.01$ ). Thus, when video recorded, significantly more children with DS ignored their mother’s initiatives in interactions or refused to respond to them, avoided tasks, did not imitate the mother’s activities, excluded the mother from their play, etc.

With respect to **initiative communicative actions**, a different picture emerges. The number of children with a low number of initiative actions showed no statistically significant difference between the two groups: 7 children with DS and 5 typically developing children performed actions that attracted the adult’s attention no more than twice in 20 minutes of video recording (46.7% and 27.8%, respectively,  $\varphi^* = 1.127$ , which is a nonsignificant difference). In interactions, those children were passive, waiting for the partner to take the initiative and preferring to explore toys and other objects on their own.

It is only at the extremes that differences are observed: Two children with DS did not exhibit any initiative actions throughout all the video recordings, whereas no such cases were observed in the control group. Three children in the control group initiated communication with their mothers more than 10 times in 20 minutes of recording, while no child with DS did. So, with respect to initiative actions, it is noteworthy that both in the group of children with DS and in the control group there is a large range of individual differences.



The qualitative study of communicative behavior of the mothers highlighted a number of repeated communicative actions in their interaction with their children. These communicative actions are outlined, with remarks and examples, in the cross classification analysis grid (contingency table) that was subsequently used for classification and quantitative assessment of mothers' behavior.

Afterwards, a comparison was made of the communicative development of the children (that is, their responsive and initiative communicative actions) with the communicative behavior of their mothers. This entailed examining the relationship between the communicative characteristics in the children and certain communicative actions (or lack thereof) in the mothers in both groups (see Table 1).

Table 1

*Fisher's exact test values  $\phi$  computed to examine the relationship between communicative actions of children and their mothers in both groups<sup>1</sup>*

Communicative actions of mothers	Responsive communicative actions		Initiative communicative actions	
	in children with DS	in children of the control group	in children with DS	in children of the control group
Uses first/second person when addressing her child	0.87**	0.69**	0.76**	0.57*
Comments on events in the surroundings	0.58*	0.54*	0.47 <sup>1</sup>	0.72**
Supports all the child's initiatives	0.87**	0.45	0.76**	0.56*
Plays along with her child as an equal	0.74**	0.22	0.64**	0.55*
Comes up with innovative elements when playing and during interactions	0.49	0.22	0.61*	0.55*
Responds to her child's actions as to an initiative	1.00**	0.24	0.87**	0.62**
Accepts any response by her child without criticism	0.58*	-0.08	0.76**	0.18
Openly expresses positive emotions	0.76**	0.39	0.61*	0.17
Praises her child	0.58*	0.27	0.76**	-0.06
Gives a negative evaluation of her child	-0.87**	-0.39	-1.00**	-0.45
Points out the child's failure to understand	-0.72**	-	-0.87**	-
Presents questions and tasks without keeping in mind her child's abilities	-0.27	-	-0.53*	-

1 The  $\phi$  value doesn't reach an extreme point in this case, so it is just the trend that is observed here. However, there is a significant negative correlation between the two covariates (behavioral characteristics) "Comments on events in the surroundings" and "Child doesn't take any initiative actions" ( $\phi = -0.55$ ,  $p \leq 0.05$ ).

As can be seen, only two characteristics of mothers' communicative behavior have statistically significant positive correlation both with *repeated responsive actions* and *repeated initiative actions* of children from both the experimental and the control group. Those characteristics (covariates) are as follows: "using first/second person when addressing her child" (66.6% of mothers of children with DS; 88.9% of the control group mothers) and "commenting on events in the surroundings" (66.6% of mothers of children with DS; 83.3% of the control group mothers). The first of these characteristics means that everything the mother says is addressed to her child and that when addressing her child she does not use the third person grammatical form. The second characteristic means that if, during play and other interaction, a child is distracted by some phenomenon or object, the mother calls her child by name or refers to the toddler in her comments showing a neutral or positive attitude, after which she gets the child back to their current activity.

With respect to the children's performing (or not performing) repeated initiative actions, in both groups this was related to further characteristics of the mother's behavior (Table 1). The mother responds to almost every initiative her child takes, and her response is coherent with the situational context ("*supports all the child's initiatives*"; 66.6% of mothers of children with DS; 77.7% of the control group mothers). The mother performs playing actions and uses objects as a means to communicate the way her child does — as opposed to observing and guiding the play through instructions and recommendations ("*plays along with her child as an equal*"; 73.3% of mothers of children with DS; 44.4% of the control group mothers). When a child encounters difficulty playing or loses interest in a game, the mother simplifies it or changes the point of the game; she invents a new character, suggests solutions not defined by the terms of the game at the beginning ("*comes up with innovative elements when playing and during interactions*"; 46.6% of mothers of children with DS; 44.4% of the control group mothers). As a response to the toddler's reactions, independent object manipulations, and vocalizing unrelated to the situational context, the mother begins to communicate or play with her child ("*responds to her child's actions as to an initiative*"; 60% of mothers of children with DS; 50% of the control group mothers).

Comparison of the experimental and control groups revealed a considerably larger amount of statistically significant correlations in pairs of mothers and children with DS. Repeated responsive actions can be observed in those children with DS whose mothers "*support all the child's initiatives*" and "*play along with her child as an equal*". Moreover, the mothers approve any response by the child, even one that barely matches the expected answer ("*accepts any response by her child without criticism*"; 66.7% of mothers of children with DS; 88.9% of the control group mothers). In case of a wrong answer, they respond with a positive attitude, as they would to a joke or to the toddler's having fun. Then they let their children try again, help them get to the right answer, or finally give away the right answer.

When communicating with their children, mothers are mostly smiling, laughing, with joyful tones of voice. They observe their children's actions with interest ("*openly express positive emotions*"; 46.7% of mothers of children with DS;

72.2% of the control group mothers). In response to their actions, the children get loving touches, kisses, praise, and affectionate treatment from the mothers (*"praises her child"*; 67.7% of mothers of children with DS; 55.6% of the control group mothers).

There is also a significant negative correlation with a mother's *"negative evaluation of her child"* (46.7% of mothers of children with DS; 27.8% of the control group mothers). In such cases, she gives a general negative evaluation of her child, mimics him/her in a teasing way, or reproaches the child through questions.

Even more of the mother's actions correlate with the development of initiative actions in children with DS. First, these include the mother's communicative actions mentioned above, which are related to the development of initiative actions in normally developing children (the mother *"supports all the child's initiatives"*, *"plays along with her child as an equal"*, *"comes up with innovative elements when playing and during interactions"*, *"responds to her child's actions as to an initiative"*). Second, these actions include the mother's communicative actions that correlate with the development of sensitivity in children with DS (the mother *"accepts any response by her child without criticism"*, *"openly expresses positive emotions"*, *"praises her child"*; the mother *does not* *"give a negative evaluation of her child"*). There proved to be two more significant negative correlations — those with such characteristics as *"the mother points out the child's failure to understand"* (40% of mothers of children with DS) and *"the mother presents questions and tasks without keeping in mind her child's abilities"* (20% of mothers of children with DS). The first of the above-mentioned characteristics means that the mother shows confusion and asks questions like, "What do you want? I don't get it!" Then she stops communicating altogether. Sometimes this goes along with the mother's judging such signals as the child's reluctance to continue communicating, and so she comments on it. The second characteristic is that when commenting and performing initiative and responsive actions, the mother doesn't keep in mind her child's actual speaking ability and experience with objects and manipulative actions. The mother communicates with the child as if the child were either older or younger.

As the next step of analysis, we performed a quantitative comparison, comparing the number of mothers who exhibited the communicative actions listed above in the experimental and in control groups. The study showed no statistically significant differences between the groups in terms of the number of mothers who exhibited all the communicative actions listed above, with one exception — *"the mother plays along with her child as an equal"*. Contrary to expectations, the mothers of children with DS exhibited a playing-as-an-equal pattern more frequently (*"the mother plays along with her child as an equal"*, 73.3% of mothers of children with DS and 44.4% of mothers in the control group,  $\phi^* = 0.707$ ;  $p \leq 0.05$ ). Perhaps that difference might be due to playful interaction strategies that the mothers of children with DS were taught at an early intervention center. Such behavioral characteristics as *"the mother points out the child's failure to understand"* and *"the mother presents questions and tasks without keeping in mind her child's abilities"* occur due to the nontypical development of the children (with DS) and were not found in the control group.

## Discussion

Comparison of the frequency of responsive and initiative communicative actions in children with DS and in typically developing children yielded confusing results. On the one hand, the results are in line with data reported in previous literature on responsive communicative behavior disorder in children with DS (Fidler, 2005; Mukhamedrakhimov, 2003; Panarina, 2004; Seligman & Darling, 1997; Spiker, 2002, etc.) On the other hand, the wide range of initiative-frequency indicators in children of both groups lends support to the conjecture that it is not only biological factors, but also social ones, that affect the development of communication in children.

Establishing the relationship between mothers' communicative actions and the performance or nonperformance of repeated responsive and initiative communicative actions in children, shown by statistical analysis, yields new insights into the genesis of M. Lisina's concept of communication, which suggests that the role of the adult caregiver is pivotal in the development of communication in children; this also helps to single out the special maternal actions that provide the conditions for the development of responsive and initiative behavior in children.

*"Using first/second person when addressing a child"* and *"commenting on events in the surroundings"* — these are two of the behavioral characteristics of mothers that correlate with the development of responsive communicative actions in children in both groups, and which at first may seem of no great importance.

**Example 1. "Using first/second person when addressing a child".** A mother and her child (22 months) are sitting on the floor across from each other. The mother offers a toy box to the toddler. The box contains a toy car, small balls, blocks, and a doll. The mother looks at the toys and touches them, saying: *"This is what we like"*. The toddler looks at the box and at the mother, then reaches out for the box. The mother says: *"What do you like most? You can choose and pick up any of them!"* The toddler takes a ball, cuddles it, and touches another one. Mother: *"Seems you like balls the most!"*

**Example 2. "Commenting on events in the surroundings".** A toddler (18 months) and a mother are playing patty-cake. The toddler turns away from the mother, looks at the investigator and starts vocalizing. Mother: *"Right, it is a woman sitting there"*. The toddler looks at the mother. They continue to play.

The crucial role of these two characteristics (Examples 1 and 2) becomes obvious when compared to the opposite behavioral characteristics in mothers. In some cases, a mother commented on what was happening with her child, referring to the child in the third person (with the pronouns "he" or "she"), but mostly addressing the investigator who performed the video recording (for instance, a little girl was throwing the toys around, and her mother said: *"Now she won't do anything. No, she's done now"*). In that case the child seems not to be an equal communication partner for the mother, who treats her like an object to take care of and control (rather than an independent subject) while the communication is with the investigator. Based on observations, this behavioral characteristic is not caused by video recording alone, as it proved to be typical of these mothers to address their statements to no one or to some kind of "imaginary observer", even when away from the video recording: *"Alyona is showing in every way: Mom, go away!"*, *"Sasha doesn't want anything at all!"*

Some mothers took a child's interest in objects or events not involved in their play or other interaction as a distraction, and reproached the child for it or just stopped communicating altogether. In such cases, the mother seemed to control the interaction, refusing to continue communication if things didn't go her way. The child's interest in the external world is either not supported or is disapproved.

We can observe that such characteristics in the mothers' behavior as "*using first/second person when addressing a child*" and "*commenting on events in the surroundings*" are signs that they are treating the child as a partner in communication, as an equal partner, whose wishes and interests are as important as the mother's own initiatives. Therefore, for *the development of responsive behavior*, it is essential that the adult caregiver see the child as a human being and that child be considered an active partner in communication, which can be implemented in mother's behavior through directly addressing the child (in the second person) and being involved in the child's interests.

Much more is needed for *the development of initiative behavior*. What is primary here is the sensitively responsive behavior of the mother when she sees the different activities of the child ("*supports all her child's initiatives*") and who reacts not only to the child's communicative actions, but also to non-communicative actions ("*responds to her child's actions as to an initiative*"), continuing the dialogue in response to whatever signal her child gives. These actions of the mother "tell" the child that each and every activity of her/his is important and was noticed.

**Example 3. "Supports all her child's initiatives".** A toddler (18 months) is sitting on the floor and fingering the toys, exploring them. The toddler takes a cup and a spoon and looks at her mother. The toddler smacks her lips. The mother sits down facing the toddler and asks: "Is your baby doll going to drink tea?" The toddler nods and vocalizes. The vocalizing resembles the sound "yes-yes". Mother: "Let's give the baby doll some tea". Then they continue to play.

**Example 4. "Responds to her child's actions as to an initiative".** The toddler (18 months) is sitting in his mother's arms. He turns away from his mother, looks at the camera, and vocalizes: "Ooh-ooh". The mother says: "Ooh-ooh. That is how little babies cry. You went to see little Vasya yesterday, didn't you? And he was crying. How was little Vasya crying?" Toddler: "Ooh-ooh".

Second, a particular playing behavior is needed. The mother has to be involved in playing the way her child does ("*plays along with her child as an equal*") and be interested in the child's vivid emotions when playing ("*comes up with innovative elements when playing and during interactions*").

**Example 5. "Plays along with her child as an equal".** A mother and her daughter (35 months) are sitting on the floor. The mother takes out a toy monkey and says to the toddler, addressing her by name: "Who is this here? A monkey?" The toddler looks at the toy monkey. Mother: "Yes, the monkey has come here to say 'hi' to you!" The toddler smiles and looks at the toy. The mother puts out the monkey's paw to the toddler saying: "Hello, hello, (child's name)!" The toddler shakes the toy monkey's hand. The mother takes a cup and pretends to give a drink to the toy. The toddler grabs the cup out of the mother's hand and "gives a drink" to the toy by herself.

**Example 6. "Comes up with innovative elements when playing and during interactions".** A mother and her child (24 months) are building a block-tower. The



tower falls down. The mother puts the blocks in a line saying: "Now we've got a choo-choo train". The toddler watches, pushes the train made of blocks with his finger and shows a "train" with hand gestures, imagining he is turning the steering wheel, and imitating the sounds of a train: "Choo-choo".

In our study, there were no significant differences between the mothers in the experimental and the control group, regarding the communicative actions described above. Despite some reports in the literature that behavioral patterns in mothers of children with intellectual disability (Field, 1990; Mukhamedrakhimov, 2003; Panarina, 2004; Spiker, 2002, etc.) are unfavorable for the development of communication, the mothers of children with DS in our study did everything that was necessary for the development of responsive and initiative communicative actions in *typically developing children*.

However, those behavioral characteristics appeared to be insufficient for the development of communication in children with DS. In addition to the mother's being attentive to and caring about various of her child's activities ("*supports all the child's initiatives*") it is essential that she be willing to support any participation of her child in "the dialogue" and to accept any response from the child, even one barely matching the expected answer ("*accepts any response by her child without criticism*").

**Example 7. "Accepts any response by her child without criticism".** A mother and a toddler (18 months) are sitting on the floor. The mother shows him two matryoshka nesting-dolls of different sizes and asks: "Which one is bigger?" The toddler raises his hands (a gesture showing "big"). Mother: "That's right! It's so big!" She shows the big nesting-doll and then the small one, saying: "Here is the big one and here is the small one!" The toddler watches. The mother shows the toys again and asks: "Which nesting-doll is the big one?" The toddler reaches out for the big nesting-doll. Mother: "Good job! This is the big nesting-doll".

In addition to full engagement in play ("*plays along with her child as an equal*"), it is crucial that the mother provide vivid and positive emotional support, so not only does she make no critical comments about her child, but she also shares the child's fun, joy, surprise, and pleasure, which also means she enjoys the child's activities and enjoys him just the way he is ("*openly expresses positive emotions*", "*praises her child*"; lack of such communication action as "*gives a negative evaluation of her child*").

**Example 8. "Openly expresses positive emotions".** A toddler (22 months), with a hairbrush and a doll in her hands, is brushing the doll's and her mother's hair. Mother: "Can you brush your hair?" The toddler lets the hairbrush drop and starts "brushing" her own hair with the doll. The mother laughs cheerfully. The toddler looks at the mother's reaction and smiles.

**Example 9. "Praises her child".** A mother and a toddler (22 months) are playing with a doll. The toddler puts a beanie on the doll. Mother: "Did you just put your beanie on it!? Just look at you, you did it for the first time and all by yourself! Good job, sweetie!" She strokes and kisses her child. The toddler smiles.

**Example 10. "Gives a negative evaluation of her child".** A toddler (22 months) is sitting at the table. Behind him, his mother has crouched down to his eye level. The toddler has a cell phone in his hands and a doll sitting on the table in front of him. Mother: "Let the doll speak on the phone!" The toddler moves the phone over



to the doll's face. Mother: "To the mouth first... Now its too close! What you are really doing now is letting her take a bite. Say it: 'I'm always doing things this way. I can't help it.'" The toddler lowers the phone, then takes it up to his ear and starts "talking" and babbling, turning away from his mother.

Communicative actions that are normally not necessary for typically developing children appear to be necessary in the DS group. Most children who have entered their second year and all children who have entered their third year have achieved a language milestone: verbal communication. Children with DS at that age use nonverbal means of communication; they may be lacking in verbal communication or their verbal communication may not be enough, just a few words of autonomous speech. Moreover, the nonverbal messages may be vague and inexpressive, which makes it hard for the mother to "read" them. (Bray, 2016; Odinokova, 2016a; Panarina, 2004). The development of communication therefore depends on the way the mother interprets the child's actions and on how she acts according to her interpretation. For instance, when the mother "*points out the child's failure to understand*", there is very likely to be a communication breakdown (Odinokova, 2016, 2018).

**Example 11. "*Points out the child's failure to understand*".** A toddler (33 months) and her mother are sitting on the couch. The girl has made a pyramid. The mother takes the pyramid and shows it to the child, asking: "Do you want to make it again?" The toddler looks at her mother, looks at the toy, smiles, touches the toy, moves her hand down straightaway and pushes her legs against her mother's legs. The mother addresses her by name and says again: "Do you want to play with the pyramid?" The toddler looks at her mother, smiles, then laughs and slightly pushes her mother with her legs, extends her hands against the couch, and leans back, looking down. Mother: "I don't get it, do you want to play (with the pyramid) or not?"

For the development of initiative behavior in children with DS, it is a prerequisite for the mother to know how to keep communication going if her child's non-verbal message is hard to understand.

The negative correlation between repeated initiative actions in the children with DS and a behavioral characteristic such as "*the mother presents questions and tasks without keeping in mind her child's abilities*" highlights that it is necessary to take into account not only the child's interests, but his/her abilities too, to be aware of them and to realize the child's limitations in speech comprehension and production, and in manipulation of objects.

**Example 12. "*Presents questions and tasks without keeping in mind her child's abilities*".** A toddler (23 months) and a mother are sitting across from each other. The toddler is producing vocalizations, babbling, and not saying any words, does not make sounds that denote concepts. The toddler is fingering some toys: a doll, a toy phone, blocks, etc. Then the child grabs the doll and starts exploring it by looking at it and tasting it. The mother asks: "What is this? What is it? Where are her eyes, can you show me?" (pause). Not looking at the mother, the toddler throws the doll, grabs the toy phone, and starts exploring it. The mother asks: "And what is that?" (pause). The toddler throws away the toy phone.

In summary, the development of **initiative communicative behavior in children with DS** correlates with such maternal behavior as treating the child as an equal communication partner, supporting any responses the child makes, special

play behavior, a positive tone and praising the child, lack of criticism, attempts to understand confusing signals from the child, and keeping in mind the child's current skill levels during communication.

## Conclusion

The results have led us to conclude that:

1. in communication with their mothers, children with DS show lower frequency of responsive communicative actions than typically developing children;
2. low frequency of initiative communicative actions is observed equally in the children with DS and in the typically developing children;
3. for the development of communication in a typically developing child, it is essential that the mother use the first/second person grammatical forms when addressing her child, comment on events in the surroundings, support all the child's initiatives, respond when her child takes an initiative, play along with her child as an equal, and come up with innovative elements when playing and during other interactions;
4. communicative actions necessary for the development of communication in typically developing children are found in the communicative behavior of the mothers of typically developing children just as frequently as in the communicative behavior of mothers of the children with DS;
5. in addition to the mother's communicative actions necessary for development of responsive and initiative communicative actions in typically developing children, for the development of these actions in children with DS it is essential that the mother accept any response her child makes without criticism, express positive emotions, praise the child, not give a negative evaluation of her child, present questions and tasks while keeping in mind her child's abilities, respond to confusing signals from the child by continuing to communicate (not pointing out the child's failure to understand her).

Since a prerequisite for the development of communication in children with DS is the mother's having special communicative skills, development of these skills should be taught by special education teachers. Our study can provide evidence and serve as a basis for such a training program in terms of: goal-setting, suggesting a course of action, assessment of special communicative skills developed in mothers of children with DS. This concept was experimentally tested and found empirical validation (Odinkova, 2015).

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## Intimate Partner Violence: An Overview of the Existing Theories, Conceptual Frameworks, and Definitions

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**Background:** Intimate Partner Violence (IPV), also known as domestic violence, spousal abuse, and relationship violence, among other names, is becoming a widely recognized social and public health problem. Theory and practice suggest it is vital that the issue be addressed comprehensively in both the healthcare and socio-legal contexts. The theoretical perspectives underlying inquiries into the nature and etiology of the IPV phenomenon are of fundamental importance in promoting our understanding of how to prevent, reduce, or eliminate the problem. In order to integrate various aspects of knowledge about the phenomenon, it is important to consider and evaluate the approaches to IPV currently prevalent in the field.

**Objectives:** The present article aims to provide a critical overview of the existing theories, methodological frameworks, typologies, and definitions of Intimate Partner Violence.

**Design:** The present paper reviews the international literature on the conceptual frameworks and definitions of IPV. First, it draws on the conceptual frameworks of violence; it then reviews relevant theories and definitions of IPV considered from sociocultural, individual, and integrative perspectives. The disparities, limitations, and explanatory powers of these theories, as well as their clinical and research applications, are discussed in an attempt to bring more clarity into the current state of understanding in the field.

**Results and Conclusions:** Our review suggests that there is no universally accepted definition of IPV, nor a conceptual framework that would encompass the complexity of the phenomenon. Some of the theoretical frameworks for studying IPV appear to provide potential advantages over others, but their empirical viability has yet to be determined. We argue that, due to the complex multifaceted nature of IPV, a narrow theoretical stance might exclude a variety of exploratory factors and limit understanding of the phenomenon.

**Key words:** Intimate Partner Violence (IPV); theory of IPV; domestic violence; spouse abuse, interpersonal violence; violence against women (VAW).



## Introduction

Intimate Partner Violence (IPV) continues to be a major health and human rights issue around the globe. Although it has been recognized that IPV can be perpetuated and suffered by all population groups (McFeely, Whiting, Lombard, & McGowan, 2013; Robinson, 2006; Smith, 2012), its occurrence is significantly more often documented in women rather than men; 25 to 54% of women report exposure to various types of IPV during their lifetimes (Thompson et al., 2006). According to official statistics, two women are killed every week in England and Wales due to IPV (Home Office, 2015). In Russia, statistics on IPV appear to be more scarce, gender neutral, and hard to obtain (Zabelina, 2008), making it barely possible to draw any conclusions. Furthermore, the social and legal protection systems of both countries call for improvement when it comes to preventing IPV, or dealing with its consequences (Burman & Chantler, 2005; Bryantseva, 2007; Freeman, 1980; Popova, 2012).

Numerous studies suggest a variety of factors that potentially affect disclosure of IPV and hinder women's help-seeking. Those include sociodemographic factors (Barrett & Pierre, 2011) and the degree of women's readiness for change (Alexander, Tracy, Radek, & Koverola, 2009), as well as cultural (Nagae & Dancy, 2010), psychological (Petersen, Moracco, Goldstein, & Clark, 2005), and financial (Feder, Hutson, Ramsay, & Taket, 2006) factors, lack of knowledge about IPV (Chang et al., 2006), and many more. In addition, there is a growing body of research suggesting that a substantial proportion of women exposed to IPV, besides suffering from poor physical health, often present with mental health problems, including depression, anxiety, phobias, post-traumatic stress disorder (PTSD), substance abuse, and suicidality (Bonomi et al., 2006; Ellsberg, Jansen, Heise, Watts, & Garcia-Moreno, 2008; Nixon, Resick, & Nishith, 2004; Plichta & Falik, 2001; Romito, Molzan Turan, & De Marchi, 2005).

Discussion of human violence, both in general and specific contexts, raises questions about the meaning attributed to the term violence. Although the meaning might seem obvious, there is little consensus among researchers on how to define violence and its different "forms" or "types" (Barocas, Emery, & Mills, 2016; Kilpatrick, 2004; Tjaden, 2004). Winstok (2007) suggests that disparities around the definition of violence could be a result of conflicting ideologies, perspectives, theories, and methodologies for studying violence, its perpetrators, and its victims. Therefore, in order to integrate the various aspects of knowledge about the phenomenon, it is important to critically evaluate the prevalent approaches to Intimate Partner Violence (IPV) in the field.

## *Conceptual framework and definition of violence*

Prior to exploring the meaning and conceptual frameworks for understanding IPV, we must discuss what we mean by the term violence. The existing literature proposes a number of ways to define it (Åström, Bucht, Eisemann, Norberg, & Saveman, 2002; Barnett, Miller-Perrin, & Perrin, 2005; O'Moore, 2006; Rhatigan, Moore, & Street, 2005; Smith-Pittman & McKoy, 2009; WHO, 1996a; Winstok, 2007). A comprehensive analysis of violence and its definition, incorporating all its forms and the various aspects contributing to the phenomenon, would be outside

the scope of this discussion, which is focused specifically on IPV. However, it is important to briefly outline the conceptual framework and definition of violence which we adopted in this article, to better situate the IPV phenomenon within the general concept of violence.

The present paper adopts the following definition of violence proposed by the World Health Organization:

The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation. (WHO, 1996b, cited in Krug, Mercy, Dahlbers, & Zwi, 2002, p. 1084)

Like other researchers in the field, we use the terms violence and abuse interchangeably in the present article (Barnett et al., 2005; Capaldi, Knoble, Shortt, & Kim, 2012; Finkelhor, Turner, Ormrod, & Hamby, 2010; Hegarty, Hindmarsh, & Gilles, 2000; Henderson, 2002; Hoffman & Edwards, 2004; Johnson, 2006; Moyer, 2013). The terms batterer, offender, perpetrator, and abuser are also used interchangeably (Follingstad & Rogers, 2014; Jin, Eagle, & Yoshioka, 2007; Moyer, 2013; Vanderende et al., 2016; Wareham, Boots, & Chavez, 2009).

The current article adopts the typology of violence proposed by Krug et al. (2002), suggest that violence can be generally divided into three main categories according to characteristics of those committing the violent act: self-directed, interpersonal, and collective. Each of the proposed categories of violence is divided into subcategories according to the nature of the violent acts (physical, sexual, psychological, deprivation, or neglect).

*Self-directed violence* can be subdivided into suicidal behavior and self-abuse. The former includes suicidal thoughts, attempted suicides, and completed suicides. Self-abuse includes acts such as self-mutilation.

*Interpersonal violence* can also be divided into two subcategories: 1) family and intimate partner violence—violence mainly between members of the family, as well as intimate partners; and 2) community violence—violence between people who are unrelated, and may or may not know each other. The family and IPV subgroup includes such forms of violence as child abuse, elder abuse, and IPV. The community violence subgroup includes random acts of violence, rape, and sexual assault by strangers, and violence at institutional settings such as workplaces, schools, prisons, or nursing homes.

*Collective violence* can be subdivided into three categories: social, political, and economic. Unlike the first two categories, collective violence can be referred to through its possible motivation. For instance, crimes of hate committed by organized groups, or terrorist acts, could be identified as a type of collective violence committed to advance a particular social agenda. Examples of political violence could include war and related violent conflicts. Economic violence includes attacks by larger groups motivated by an economic agenda, such as denying access to essential services, and attacks carried out to disrupt economic activity or create economic division and fragmentation.

Krug and his colleagues emphasize the complexity of the violence phenomenon and the interconnected nature of different types of violence. They highlight the importance of examining the links between different types of violence for po-

tential prevention and collaboration between groups of professionals working on preventing them (El-Bassel, Witte, Wada, Gilbert, & Wallace, 2001; Hindin, Kishor, & Ansara, 2008; Kruh, Frick, & Clements, 2005; LeBlanc & Kelloway, 2002; Swahn & Donovan, 2004; Vanderende et al., 2016).

We distinguish Intimate Partner Violence from domestic violence. We suggest that the term domestic violence be used as a broad term (Barocas et al., 2016) that includes but is not limited to Intimate Partner Violence; it may also involve violence against or between other members of the family who might or might not live together (e.g. adult/child, elder/adult, child/elder, child/parent, or siblings).

For the purposes of this paper, it is particularly important to conceptualize IPV as a subcategory of interpersonal violence. We view IPV as a type of interpersonal violence, occurring in a family/partner setting and directed towards an intimate partner, as we discuss in detail throughout the following sections.

### ***Sociocultural theories of IPV***

#### ***Feminist theory***

Feminist theory, often referred to as the Feminist Model, aims to understand violent relationships through examining the sociocultural context in which these relationships occur. Supporters of this theory often view gender inequality and sexism within patriarchal societies as the main causes of IPV (Bell & Naugle, 2008). In short, they argue that IPV is primarily a problem of men's violence against women being caused by societal rules and patriarchal beliefs encouraging male dominance and female subordination<sup>1</sup> (Abrar, Lovenduski, & Margetts, 2000; Bell & Naugle, 2008; Yllö, 1988). Proponents of the feminist theory suggest that men often use different tactics, including physical violence, to exert control and dominance over women and their families (Dobash & Dobash, 1978), and that women's violent behavior towards their male partners should be understood as self-defense, retaliation, or pre-emption for male violence. Thus, they argue, such violence against women should be studied within the wider context of patriarchy, and the intentions associated with the violent event, by applying non-patriarchal qualitative methods (McMahon & Pence, 1996).

The feminist theoretical tradition views violence towards women as a special case, different from other forms of violence and other forms of crime (Dobash & Dobash, 2004). Therefore, it says that treatment for the problem should be concerned with educating men and addressing their patriarchal beliefs and domineering behavior toward women, while the ultimate goal would be overturning patriarchal social structures to prevent, reduce, and eliminate violence against women (Dutton, 2011).

<sup>1</sup> "It behooves the husband to punish his wife and use fear in private: punishing, taking pity, and talking, and lovingly teaching, and judging. And if the wife, or the son, or the daughter does not listen to a word or punishment, then flog them with a whip, taking in consideration their fault, in private, and not in front of people and, to teach, to calm down and take pity and not to be angry with each other. And for every fault not to beat on the ear and on the face, nor with a fist under the heart. Neither kick nor with a staff pound, not to beat with iron or wood. Whoever in passion or from sorrow beats, many ailments come from that - blindness and deafness, and the arm and leg and finger can be dislocated. And in pregnant women and children in the womb there is damage; and punishment with a whip is reasonable, and it's painful, and scary and healthy but not harmful" (Domostroy/ Ed by: V. Kolesov, EKSMO, 2007).

Some of the studies supporting the feminist theory indicate higher rates of assaults against wives in husband-dominant families, families where husbands hold traditional “gender-role” attitudes, or where there are great discrepancies between the acceptance of patriarchal values between a husband and a wife (Hunnicut, 2009; Leonard & Senchak, 1996; Yllö, 1983).

Feminist research and some studies reporting significantly higher prevalence of IPV victimization in women have been widely criticized for their sample selection. For instance, recruiting women from shelters, refuges, or emergency departments (Dutton, 2011), and then extrapolating their findings from such studies to the general population (Dixon & Graham-Kevan, 2011). In addition, qualitative and correlation studies are often referred to as evidence of a relationship between male patriarchal values and physical violence towards their female partners (Bell & Naugle, 2008). However, meta-analytic reviews do not provide support for such a relationship (Sugarman & Frankel, 1996), or for patriarchy being the most significant risk factor for IPV (O’Leary, Smith Slep, & O’Leary, 2007).

### *Power theory*

Power theorists suggest that the origins of violence are rooted not only in the culture, but also in the family structures (Straus, 1977a). Gender inequality, and social acceptance of violence and family conflict, are assumed to interact, and lead to the development and maintenance of IPV. It is presumed that individuals employ violence to settle conflicts within the family and between intimate partners, because this way of addressing conflicts has been learned in childhood by either witnessing or experiencing physical abuse (Straus, 1977b). Power theorists suggest that power imbalances between partners may increase tension within the family unit and consequently increase the risk of IPV (Sagrestano, Heavey, & Christensen, 1999).

There were a number of studies reporting higher IPV rates in families with high rates of stress and conflict (Cascardi & Vivian, 1995; Leonard & Senchak, 1996; Mihalic & Elliott, 2005).

The power theory addresses a gender-inclusive perspective and encourages research into examining both the male’s and female’s use of IPV. Such a perspective incorporates a variety of theoretical standpoints guiding research to understand why heterosexual and homosexual men and women perpetrate IPV.

### *Exploring the feminist and family violence perspectives: Violence against women (VAW) vs. Intimate Partner Violence (IPV)*

Conceptions of violence against women can be broadly categorized within two traditions which are only partially integrated (Gordon, 2000). The first one evolved from advocacy movements for victims of sexual assaults and domestic violence, and the other from social and behavioral research on sexual assault and family violence (Winstok, 2007). The distinction between the terms domestic and family violence is not random. “Domestic” refers to structure, and “family” to relationships. Winstok (2007) suggests that the term “domestic” violence might imply a feminist perspective, whilst the term “family” violence might be derived from social and family research, and be manifested in the works of researchers on family conflict.

Different theoretical standpoints would produce very different definitions of violence in intimate relationships. As mentioned earlier, Straus (1979), one of the prominent researchers following family violence approach, viewed violence as a non-legitimate tactic individuals employ to settle interpersonal conflicts in general, and between intimate partners in particular. He and his colleagues defined violence as "... an act carried out with the intention of or perceived intention of causing physical pain or injury to another person" (Straus, Gelles, & Steinmetz, 1981, p. 20). Their work was heavily criticized by feminist scholars who opposed their lack of attention to social context, their symmetrical approach to gender, and the scope of violence addressed (Johnson, 1995).

Following the feminist tradition, DeKeseredy (1997) proposed the following definition of woman abuse in intimate relationships:

Woman abuse is the misuse of power by a husband, intimate partner (whether male or female), ex-husband, or ex-partner against a woman, resulting in a loss of dignity, control, and safety as well as a feeling of powerlessness and entrapment experienced by the woman who is the direct victim of on-going or repeated physical, psychological, economic, sexual, verbal, and/or spiritual abuse. Woman abuse also includes persistent threats or forcing women to witness violence against their children, other relatives, friends, pets, and/or cherished possessions by their husbands, partners, ex-husbands, or ex-partners (DeKeseredy, 1997, p. 5).

This definition is broader than the one by Straus and his colleagues, and encompasses various aspects of violence. It clearly defines the victim and the aggressor, sees violence as a misuse of power, and defines the outcomes of violence; however, it lacks the identifying criteria, which makes it difficult to evaluate (Winstok, 2007).

In an attempt to integrate the perceptions of both feminist and family researchers, Johnson (2001) focused on discussing whether only men are violent in intimate relationships, and lead women to perpetrate violence "in defense" (feminist perspective), or whether women are also initiating violence (the standpoint of family conflict researchers). He proposed that the perspectives of both feminist and family researchers can be appropriate in explaining IPV (Abbott, Johnson, Koziol-McLain, & Lowenstein, 1995). This discussion produced a comprehensive typology whereby IPV can be classified into five qualitatively different types: coercive controlling behavior, violent resistance, situational couple violence, mutual violent control violence, and separation-instigated violence (Beck, Anderson, O'Hara, & Benjamin, 2013).

The public health approach is also in a way a compromise between the two perspectives. It defines IPV as "*behavior within an intimate relationship that causes or has the potential to cause physical, sexual, or psychological harm, including acts of physical aggression, sexual coercion, psychological abuse, and controlling behaviors*" (Garcia-Moreno et al., 2015, p. 1686). This definition considers violence mostly within the framework of distinct categories: physical, psychological, and sexual (Gordon, 2000; Löbmann, Greve, Wetzels, & Bosold, 2003). However, it has to be noted that if physical aggression seems to be a relatively clear category, the other two types, especially psychological aggression, are subject to disagreement between the different schools of thought, and even within each school (Winstok, 2007). This aspect will be further explored in the sections below.

## ***Individual theories of IPV***

### *Social learning theory*

As in the power theory, social learning theorists suggest that violent ways of settling family conflicts are often learned through observing parental and peer relationships during childhood (Bandura, 1973; Mihalic & Elliott, 2005; Wareham et al., 2009). They propose that victims and perpetrators of IPV have either witnessed or experienced physical abuse during childhood, resulting in their developing acceptance or tolerance of violence within the family (Jin et al., 2007; Lewis & Fremouw, 2001; Vung & Krantz, 2009).

There are a number of studies reporting that witnessing or experiencing abuse during childhood might be associated with future IPV perpetration or victimization in adulthood (Berzenski & Yates, 2010; Parks, Kim, Day, Garza, & Larkby, 2011; Shook, Gerrity, Jurich, & Segrist, 2000; Whitfield, Anda, Dube, & Felitti, 2003). It has been suggested that whether or not violence continues into adulthood depends on the context and consequences associated with violence in peer and dating relationships during youth (Daigneault, Hébert, & McDuff, 2009; Riggs, Caulfield, & Street, 2000).

### *Background/situational model*

Expanding on social learning theory, Riggs and O'Leary (1996) developed a "model of courtship aggression" to explain a form of IPV. The model describes two general components which contribute to the development and maintenance of courtship aggression: background and situational factors. The background component refers to historical, societal, and individual characteristics which determine future aggression. These factors might include a history of childhood abuse; exposure to violence in childhood; personality characteristics; a history of the use of aggression; psychopathology; social norms; and attitudes towards aggression as means of resolving conflicts.

The situational component refers to factors setting the stage for violence to occur. Those might include expectations of the outcomes of the violence; interpersonal conflict; intimacy levels; substance abuse; or lack of problem-solving skills. The interaction between these factors might affect conflict intensity, and therefore determine whether or not the violence will occur (Riggs & O'Leary, 1996). It has been reported that such factors as witnessing violence, parental aggression, and attitudes toward the use of aggression were predictive of IPV occurrence, while substance abuse, one's partner's aggression, and the degree of interpersonal conflict appeared to have had an impact on courtship aggression (Gwartney-Gibbs, Stockard, & Bohmer, 1987; Riggs & O'Leary, 1996; White & Koss, 1991; White, Merrill, & Koss, 2001).

### *Personality/typology theories*

Researchers have attempted to identify the psychopathology and personality traits that might affect a person's susceptibility to perpetrate IPV. Holtzworth-Munroe and Stuart (1994) proposed the Developmental Model of Batterer Subtypes through reviewing 15 previous batterer typologies for common themes across classification metrics.



Three dimensions of severity, generality of violence, and psychopathology/personality disorder were suggested to classify three main types of male batterer: family only, generally violent/antisocial, and dysphoric/borderline. Later on, an additional subtype defined as a low-level antisocial batterer was identified (Holtzworth-Munroe, Meehan, Herron, Rehman, & Stuart, 2000). It was suggested that generic/prenatal factors, early childhood experiences, and peer experience would affect the development of the variables most closely associated with IPV perpetration. Those include attachment to others, impulsivity, social skills level, and attitudes toward women and violence (Holtzworth-Munroe & Stuart, 1994).

This theory has been successfully tested by various studies (Dixon & Browne, 2003; Holtzworth-Munroe, 2000; Langhinrichsen-Rohling, Huss, & Ramsey, 2000; Waltz, Babcock, Jacobson, & Gottman, 2000). Research exploring typologies of female perpetrators has found similarities to male offenders (Babcock, Miller, & Siard, 2003; Bender & Roberts, 2007; Dixon & Browne, 2003).

Other researchers have developed alternative batterer typologies. Although these typologies categorize subtypes of perpetrators through different lenses, most of them define two or three different subtypes. Some of them focus on behavioral, physiological, or psychological characteristics, whilst offering distinct perspectives on the motives and patterns behind the subtypes of perpetrators (Gondolf, 1988; Gottman, Jacobson, rushe, & Shortt, 1995; Hamberger & Hastings, 1986; Hamberger, Lohr, Bonge, & Tolin, 1996; Johnson, 1995). Such discrepancies make it difficult to synthesize these typologies, or even make comparisons across them (Bender & Roberts, 2007). In an attempt to address these difficulties, Chiffriller, Hennessy, and Zappone (2006) examined clusters of offenders in a large study focused on behavioral and personality characteristics, whereby they distinguished five subtypes incorporating previous typologies: 1) pathological batterers; 2) sexually violent batterers; 3) generally violent batterers; 4) psychologically violent batterers; and 5) family-only batterers.

### *Typology of IPV by type of violence*

Another framework for classifying IPV is by the form of violence or abuse (terms are used interchangeably in this study). Three main categories—physical, sexual, and psychological—are frequently used in the various studies (Devries et al., 2013; Ellsberg et al., 2008; García-Moreno et al., 2015). Some researchers have identified other categories such as financial or social abuse, but it is not clear whether those categories can be considered to be separate dimensions of IPV (Ali, Dhingra, & McGarry, 2016).

#### *Physical violence*

Physical violence refers to the use of physical force to inflict pain, injury, or physical suffering on a victim. Examples of physical violence might include beating, slapping, kicking, pushing, shoving, stabbing, dragging, scratching, choking, burning, and threatening or using a gun, knife, or another weapon (Garcia-Moreno, Heise, Jansen, Ellsberg, & Watts, 2005).

*Sexual violence*

Sexual violence is defined as “any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, acts to traffic, or other coercive actions directed against a person’s sexuality by any person, irrespective of relationship to the victim, in any setting, including but not limited to home and work” (Garcia-Moreno et al., 2015, p. 1686). In the context of IPV, sexual violence refers to forcing a partner, who did not want it, to have sexual intercourse, or do any sexual act that they found degrading or humiliating; harming them during sex; or forcing them to have sex without protection (WHO, 2013).

*Psychological violence*

Psychological violence refers to acting in an offensive, degrading, or humiliating manner toward another, usually verbally, and may include threats, ridicule, withholding affection, and restrictions (e.g. social isolation, financial control (Maiuro, 2001). Some examples of psychological violence in IPV perpetrated by men against women can include verbal abuse, name-calling, blackmailing, saying or doing something to make a person feel embarrassed, threats to beat a woman or children, restricting access to friends and family, and restricting independence and access to information, education, or health services (WHO, 2002, 2013).

*Integrative frameworks of IPV*

The brief reviews in the previous sections did not aim at exhausting the scope of studies on violence, but to demonstrate the complexity and disparity of the issues encountered when one attempts to define IPV and the implications of its definition for theory and practice. Many researchers have argued the need for more comprehensive theories of IPV (Barocas et al., 2016; Sellers, Cochran, & Branch, 2005; Whitaker et al., 2006; Wilkinson & Hamerschlag, 2005). It has been suggested that the theories should take into account the perspective of both the victim and the perpetrator, while integrating the standpoints from various academic disciplines such as psychology, sociology, and criminal justice (Rhatigan et al., 2005). Furthermore, some authors argue that IPV theories should be more ideographic in nature, taking into consideration the significant heterogeneity of IPV (Bogat, Levendosky, & von Eye, 2005), as well as addressing the context and proximal events associated with IPV (Bell & Naugle, 2008; Bogat et al., 2005; Wilkinson & Hamerschlag, 2005; Winstok, 2007).

Bell and Naugle (2008) developed a theoretical framework for IPV, which offers a contextual analysis of IPV perpetration. This framework incorporates empirical findings and theories on IPV, drawing heavily from Behavior Analytic (Myers, 1995), Social Learning (Bandura, 1973) and Background/Situation (Riggs & O’Leary, 1996) theories. They hypothesize that multiple contextual units are implicated in the perpetration of IPV: target behavior (e.g. physical, sexual or psychological aggression); antecedents of target behavior; discriminative stimuli (e.g. presence/absence of others); motivating factors (e.g. substance abuse, emotional distress); behavioral repertoire (e.g. coping skills, anger management skills); verbal rules (e.g. beliefs about violence or women); and consequences (reinforcement and punishment). A number of potentially relevant proximal variables are identified

for each unit. Bell and Naugle (2008) argue that this contextual framework has the potential to offer significant improvements for conceptualizing IPV, as well as in IPV prevention and treatment. However, it is yet to be empirically tested.

Winstok (2007) developed an Integrative Structural Model of Violence (ISMV) that might be helpful in understanding interpersonal violence in general, and IPV in particular, through a set system of criteria and relationships between them. He defines interpersonal violence as “a non-legitimate forceful tactic intentionally employed by one party to cause physical and/or psychological harm to the other in the attempt to control a situation” (Winstok, 2007, p. 352).

ISMV consists of four levels of reference: violent behavior (motive, action itself, consequences); the situation in which the violence occurs; the relationships between the parties; and the sociocultural context of the relationships. For instance, the ISMV provides a framework for formulating the definition of IPV perpetrated by men against their female intimate partners as follows:

Violence is a non-legitimate, forceful (belligerent) tactic a man uses anytime anywhere against a woman with whom he has or had an intimate relationship. This tactic is part of the man's perception of a given situation and of his attempt to control it. The tactic is motivated by the man's need to prevent, balance, or gain something in his or other persons' interpersonal or social realities, as he perceives them. This tactic consists of at least one action of a physical, aural, or visual orientation employed by the man to (intentionally) harm the woman. Using this tactic can cause the woman at least one form of harm of a physical, social, or economic nature, including harming her self-esteem or self-, social, or public image in the short or long term (Winstok, 2007, p. 357).

The above definition gives content to the structural component of the model, and includes reference to the meaning of violence, situational context, motive, action, and consequences; this appears to be a detailed framework for conceptualizing the complexity of IPV.

## Conclusion

Overall, the theory and research on IPV demonstrates the multifaceted and complex nature of the phenomenon. Therefore, it is important that a broad range of factors be considered when assessing and addressing the problem. A narrow theoretical focus might exclude potentially important exploratory factors (Dixon & Graham-Kevan, 2011).

It appears that the existing theories of IPV are limited in their ability to improve the clinical efficacy of IPV interventions, as well as to provide a sufficient basis for conducting research. Furthermore, the variety of competing IPV theories has led to a divide among researchers in the field arising from the overall political and social climate under which those theories have been developed and research conducted. As a result, some of the existing IPV theories are limited as to their ability to explain contradictory findings or the heterogeneity of IPV phenomenon.

To date, there is neither a universally accepted definition of IPV, nor there is a conceptual framework that would encompass the complexity of the phenomenon. Some of the theoretical frameworks of IPV appear to provide a number of potential advantages over others; however, their empirical viability is yet to be determined.

Although initial steps have been taken to conceptualize and explore the context of IPV, we seem to be in need of sufficient progress in the field so that the researchers can systematically examine the context and complexity of IPV in theory and practice.

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## Narrative analysis in Alzheimer's disease

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**Background.** Alzheimer's Disease (AD) is a neurodegenerative illness, which occurs with increasing frequency as people age. While progressive memory impairment is the upfront element associated with the disease, other neurocognitive troubles are also associated with it, such as language impairment which can degenerate into aphasia. Language disorders interfere and worsen the functioning of memory.

**Aim of the study.** To evaluate semantic and textual impairment in AD patients.

**Methods.** The current study involved 151 AD patients undergoing consultation at Brest University Hospital. Certain sociodemographic data (sex, age, cultural levels) were collected, as well as results from the following neuropsychological tests: Folstein (MMSE); Dubois's 5-word test; Dubois's frontal assessment test battery (fluencies); Cornell's scale for depression; and Barbizet's test ("The Lion's tale"). All were subject to textual analysis. Our sample of demented patients included 102 females and 49 males of average age  $80.3 \pm 6.91$ .

**Results.** All the tests, including the number of items recalled much later in the Barbizet's test, showed impairment, all the more by Folstein's test being altered. The demented patients' formal fluency was less impaired than their semantical lexical fluency (scored respectively  $5.74 \pm 1.09$  versus  $4.41 \pm 2.19$ ;  $t = 5.60$ ,  $p < 0.01$ ). The demented cohort exhibited more intrusions ( $n = 36$ ) than inversions in the delayed recollection of the Lion's Tale, both for items and the episodes in which they occurred ( $n = 19$ ). The regressive PLS analysis showed that, to explain the overall scores relating to "The Lion's Tale", calculated later, only attainment of lexical fluency had any notable influence (Regression coefficient  $CR = 0.224$ ) or, more accessorially, the cultural level ( $CR = 0.12$ ).

**Conclusion.** AD patients' proficiency in tests of category fluency and their cultural levels have effects on narrativity.

**Key words:** Alzheimer's Disease, semiotics, semantics, textuality

## Introduction

Alzheimer's Disease (AD) is a neurodegenerative illness which occurs with increasing frequency along with advancing age (P. Thomas, Clement, Hazif-Thomas, & Leger, 2001). While progressive memory loss is the upfront element associated with AD, other neuro-psycho-cognitive troubles are also associated with it, such as language impairment which can degenerate into aphasia (Gewirth, Shindler, & Hier, 1984).

Language dysfunction is one of the most significant symptoms affecting AD patients' ability to narrate a story (Hassenstab et al., 2015). In the earliest stages, the influence is slight, but it increases over time through foreseeable phases. Memory dysfunction also interferes with the patient's abilities to use language (Reilly, Rodriguez, Lamy, & Neils-Strunjas, 2010). The patient's judgment and ability to conduct his/her own life also have a broad impact on their language difficulties. Put another way, disorganized phasic patterns and verbal abilities often limited by aphasia, reflect a deconstruction of a patient's personal meaning, which is itself essential for recall, as well for social interactions with others, and maintaining memories. An inconsistent story of one's life weakens one's self-esteem and ability to monitor daily life, a condition that leads to behavior disorders (P. Thomas & Hazif-Thomas, 2016). Knowing the importance of both these components could help the individual prepare as well as possible for the consequences on his/her social life. We have tried, in this monocentric prospective observation and study, to evaluate the semantic and narrative dysfunction in AD.

## Methods

The cohort we studied were elderly demented patients living at home with AD, who had been followed for at least three months by gerontopsychiatrists for cognitive, behavioral, and memory dysfunction. During a gerontopsychiatric interview, the patients and accompanying family were informed completely and loyally and in understandable language about how the study would be carried out. With the agreement of the patient and his/her assistants, the results of the neuropsychological tests were computer-recorded anonymously. The study protocol was ethically reviewed and approved by the Hospital of Brest ethics committee. Computing procedures for data capture and processing followed the recommendations of the French National Commission on Computer Technology and Freedom.

Criteria were determined for inclusion based on the AD patients (MMSE >10) (Folstein, Folstein, & McHugh, 1975) having given written consent, together with their family assistants, to take part in this study validated by the Hospital of Brest ethics committee. Only those patients still capable of understanding the instructions for the Barbizet's test, showing symptoms of Alzheimer dementia—i.e. without massive memory impairment and capable of asserting their consent and assent during the test and fit and able in the eyes of the Law—were included. A patient's inability to understand information relating to the study, his/her inability to choose whether or not to take part, and the possible opposition of the family member accompanying him/her were decisive criteria for exclusion. The size of the population studied reflects the number of demented persons followed over the period of this one-year study.



Semantic memory is the memory necessary for language manipulation, and is not very vulnerable to amnesia (Tulving, 1995). To evaluate semantic and textual disorders in the cohort of AD patients, we routinely recorded the results of tests measuring memory, as well as noting some sociodemographic data. These were sex; age; and cultural level as estimated by the patient's number of years of schooling: 1 = illiterate ; 2 = can read and write ; 3 = six years schooling ; 4 = 11 years schooling ; and 5 = more than 11 years of schooling. The following are the tests customarily carried out on patients under consultation for AD: Folstein Test (MMSE) (Folstein et al., 1975); Dubois's 5-word test (D5WT) (B. Dubois, 2001); formal fluency (number of animals mentioned in one minute) semantic lexical fluency (number of words beginning with L named in one minute); (B. Dubois, 2001); DFB (Dubois's Frontal Battery ) (B. Dubois, Slachevsky, Litvan, & Pillon, 2000); Cornell's scale (depression) (Alexopoulos, Abrams, Young, & Shamoian, 1988); and Barbizet's test (Barbizet & Truscelli, 1965) aka "The Lion's Tale". The formal fluency test uses mechanisms of analogy between memorized objects, while semantic lexical fluency refers to the use of vocabulary stored in memory, which is vulnerable in Alzheimer's disease.

"The Lion's Tale" (presented in *Table 1*) must be read by the examiner slowly. The subject must be informed that it is a long story, the point of which is to evaluate his memory capacity. He must be told it is not a matter of repeating the story word for word, but just recalling its main thrust and as many details as possible. Barbizet recommended an immediate application, an immediate recall, and then a delayed recall. In practice, in the present framework, the text was read out at the beginning of the consultation, followed by an immediate recall, and then a delayed recall towards the end of the consultation--that is, about one hour later.

Table 1

*"The Lion's Tale" (Barbizet & Truscelli, 1965). Text and sequential organization*

Episode	Text
Escape	A lion named Sultan escapes from its cage, due to the door having been left open by a careless guard
Crowd movement	The crowd of visitors, which is numerous on Sunday, runs away towards the nearby buildings
Woman and child	A woman, dressed in blue, who was holding her one-year-old child in her arms, drops him. The lion seizes him.
Deal	The woman, in tears, retraces her steps, and begs the lion to return her young
Resolution	The animal looks at her for a long time, fixedly, and finally releases the child without having done him the slightest bit of harm.

So this short text, with 22 sub-items learned sequentially, is to be recalled immediately, and repeated later. The elements can be organized, according to the author of the test, into five episodes: escape, crowd movement, woman and child, deal, resolution. Barbizet's test reveals what things from the tale are forgotten, and notes

intrusions and inversions. These data are then compared with that of the neuropsychological tests. Statistics were established with a SAS program by a bio-statistician, Dr. R. Billon. The tests selected were Chi2, Student (un-paired), Pearson's correlations, and Partial Least Squares regression, chosen to reduce risks of collinearity (Tenenhaus, Esposito Vinzi, Chatelinc, & Lauro, 2005). If a classic linear model is used, collinearity between explanatory variables makes the model unstable, and the results uncertain.

## Results

One hundred and fifty-one patients, living at home on their own or with their families, were included in the study. There were no cases recorded of refusal to participate in the study, or to having the results observed and computerized anonymously. The cohort of demented patients was made up of 102 females and 49 males of an average age of  $80.3 \text{ years} \pm 6.91$ . *Table 2* reprises the main results. The average characteristics did not differ statistically between the males and the females. The tests showed that the formal fluency of the demented patients was less impaired than their semantical lexical fluency (scored respectively  $5.74 \pm 1.09$  versus  $4.41 \pm 2.19$ ;  $t = 5.60$ ,  $p < 0.01$ ).

Table 2

*Sociodemographic data and results in the diverse tests (N=151). DFB= Dubois's Frontal Battery; D5WT = Dubois's 5 words test.*

Age	Cultural level	MMSE	DFB
$80.3 \pm 6.9$	$2.82 \pm 0.50$	$16.5 \pm 5.1$	$11.3 \pm 4.5$
Cornell	D5WT	Semantic lexical Fluency	Formal Fluency
$10.6 \pm 4.2$	$4.58 \pm 1.1$	$4.41 \pm 2.2$	$5.7 \pm 1.1$

The studied population showed more cases of intrusion ( $n=36$ ) than inversion in the later narration, whether items or episodes combining the two ( $n=19$ ). Nearly all the inversions were by patients whose MMSE was below 19, and the intrusions were by patients whose MMSE was below 15 (*Table 3*). Admittedly, intrusions are specific to AD pathology, where we find their greatest occurrence. However, these results could suggest that intrusions are essentially linked to executive problems concerning response control. In respect to patients' dysexecutive syndrome ( $DFT < 13$ ;  $n=77$ ), it is to be noted that, overall, inversions occur in the more deficient group (*Table 4*). It is also to be noted that inversions are observed to be more precocious when the disease has caused a deterioration of textuality, and hindered the pragmatics of communication. MMSE for the executive syndrome sub-group ( $n=77$ ) was  $11.9 \pm 2.9$  against  $20.9 \pm 2.6$  for the less seriously affected group ( $n=74$ ).

The correlation matrix for the various parameters showed many correlations, leading to our choice of PLS for regression analysis. The factor studied is the overall score for Barbizet's test, with the model including the variables of the previous

figure. Formal fluency, with a coefficient of 0.224, remains the characteristic that most influences the overall score. The higher it is, the greater the success in the test; this influence is almost three times that of the lexical memory. Then, we will retain cultural level (coefficient = 0.12) and, more accessorially, age (coefficient = 0.11); all the others are less interesting.

Table 3

*Percentage of Inversions (n = 19) and intrusions (n = 36) according to the MMSE. Chi2 with Yates's correction ( $p < 0.05$ ) comparing the number of intrusions and of inversions; and for each items, the level of MMSE (cut-off MMSE >14)*

	MMSE>19 N = 50	MMSE : 19-15 N = 42	MMSE 14-11 N = 39	MMSE = 10 N = 21
Intrusions	2	24	28	61
Inversions	0	20	20	25

## Discussion

We are presenting here the results of a preliminary study on textuality in AD, based on consultation with patients in an old-age psychiatric department. The very nature of the department explains the age of those recruited. The patients' worsening MMSE made it hard for them to understand the text, and even the value of their consent. The aid given by their family or accompanying person was then precious, and all the tests were carried out under the specialized consultation of our establishment.

The executive disorders studied by the DFB test and cognitive disorders estimated by the MMSE are strongly correlated. Also it is difficult to know which verbal problems resulted specifically from which factors. We chose a threshold of 13 for two reasons: one, so that the sub-populations were balanced, and two, for a clear cut-off point showing whether or not there was a dysexecutive syndrome connected to frontal disorders. The presence of such a dysexecutive syndrome, in case of late depression (with or without dementia), impacts on the patient's cognitive status (Hazif-Thomas, Reber, Bonvalot, & Thomas, 2005). The depressive elderly person frequently presents changes in verbal fluencies and deficits of planning connected to frontal disorders (Elliott, Sahakian, Herrod, Robbins, & Paykel, 1997). The scores on the Cornell scale were weak in the population we studied. Depression is common when dementia progresses, especially when the elderly person lives in a nursing home (Alexopoulos et al., 1988). The elderly included in this study lived at home. The scores on the scale of Cornell presented here are low (Table 2:  $11.3 \pm 4.5$ , while the depression threshold value is  $>8$ ).

We shall note in this study the important progression of the narrative disorders observed in the scores on the delayed recall in "The Lion's Tale", all the more degraded that the cognitive disorders are installed. Intrusions and inversions can result from cognitive disorders as well as from related executive disorders. Formal fluencies weigh in in a significant but modest way on the model of regression ( $CR = 0.224$ ), so that with a lower score on the cultural level ( $CR = 0.117$ ), the cog-

nitive disorders of the dementia, as well as the linguistic disorders, are being classically modulated (Arroyo-Anllo, Beauchamps, Ingrand, Neau, & Gil, 2013; Folstein et al., 1975).

Although the PLS model is more influenced by formal fluency, the lexical semantic fluencies are more altered than the formal fluency (*Table 2*). Finding a word beginning with a letter (“L” in French, “S” in English, for reasons of frequency of use of this letter in the beginning of a word) requires a strategy of recovery based on the abstract lexical representation (Lee, 2012). The degradation of formal fluency triggers a more important disorganization of the functions of language. Moreover, the analog mechanisms mobilized by demented patients seem to be more concerned and better conserved in Alzheimer’s disease, judging from the results observed with formal fluency. Memory, together with judgment, build a meaning of life conducive to a coherent self-narrative account (Ricoeur, 1990).

Disorders of judgment and memory seem to be allied in Alzheimer’s disease. Wording and the building of sentences are altered in this disease, but the analog operation seems to be preserved longer. The figures evoked for an analog mechanism mobilize old emotions, and from these emerge ancient memories buried deep in the patient’s mind (Brainerd & Reyna, 2015; P. Thomas, Chandès, & Hazif-Thomas, 2017). The concrete items with strong emotional connotation in “The Lion’s Tale” (A woman, a child, a lion ...) are better recalled than the more secondary features of the story (For a long time, fixedly ...); even there, emotion appears clearly as the “power steering” of the reason and the memory.

## Conclusion

Lexical semantic fluency is more altered than formal fluency in the Alzheimer’s disease. The degradation of formal fluency testifies to a more important disorganization of the functions of the language. Formal fluencies are less impaired (Imaging or Gist memory process) than Semantic lexical Fluency (Verbatim process) (Brainerd & Reyna, 2001). The impairments of fluencies have an impact on the memorization of a text, in parallel with the development of cognitive disorders. The patients’ cultural level also influences his/her narrative skills, which remain sensitive to the emotional aspect of a story when assessed in memory testing. This emotional mobilization is probably an interesting way to motivate patients in speech therapy, for the prevention of damage to, or maintenance of, lexical and textual capacities in patients with Alzheimer’s disease.

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## DEVELOPMENTAL PSYCHOLOGY

### Developmental Change in Full- and Preterm Infants between the Ages of Three and Nine Months in Institutions with Different Caregiving Environments

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**Background.** Studies of children raised in institutions have shown that they are at substantial risk in various domains of functioning, but these studies have not examined the children's developmental change at the very early period of institutionalization.

**Objective.** The main aim of this study was to examine the behavioral development of institutionalized infants between three and nine months of life as a function of their birth circumstances and the nature of their institutional care.

**Design.** General behavioral development was studied in 58 (34 males) infants from two St. Petersburg (Russian Federation) institutions (Baby Homes, BH). The infants were divided into four groups according to 1) their gestational age—full-term children (FCh) of 37-41 weeks gestational age, or preterm children (PCh) of 30-36 weeks gestational age; and 2) the type of institutional care environment—either the typical socio-emotionally depriving, non-intervention Baby Home (NoI BH), or an institution that had undergone a program of training plus structural changes intervention (T+SC BH). All the children were assessed at approximately three and nine months of age with the Battelle Development Inventory (BDI; LINK Associates, 1988).

**Results.** Both the FCh and PCh children from the NoI BH displayed significant declines in their BDI Total scores between three and nine months, whereas only the FCh children in T+SC BH improved over this period of time. In general, the FCh group had higher mean BDI Total developmental quotients (DQs) than the PCh group, and children from the T+SCh BH displayed higher scores than children from the NoI institution.



**Conclusion.** Thus, the current study showed that the impact of spending their early months in an institution on infants' development depends on the gestational age of children and the type of institutional care environment.

**Keywords:** institutions, full-term (FCh) and preterm (PCh) infants, time, intervention, development

## Introduction

The literature on the developmental and behavioral functioning of children raised in institutions has shown that these children are at substantial risk in various domains of functioning, including their physical<sup>1</sup>, general behavioral (Bakermans-Kranenburg et al., 2012; The St. Petersburg-USA Orphanage Research Team, 2008), cognitive<sup>2</sup>, and neurophysiological<sup>3</sup> development. In terms of socio-emotional development, the predominant attachment classification among these infants is disorganized, because they have extremely limited opportunities for developing selective attachments with people.<sup>4</sup>

The research has suggested that the adverse developmental and behavioral functioning of institutionalized children depends on pre-institutional risk factors (The St. Petersburg-USA Orphanage Research Team, 2005; Van IJzendoorn et al., 2011), the quality of care in the institution<sup>5</sup>, and the length of time the children spent in the institutional environment (Julian, 2013; Rutter et al., 2007). Studies have examined the role of the timing of institutionalization in studies of children transferred from institutions to adoptive families, and have shown associations between the time spent in the institution (age at adoption), and the subsequent developmental and behavioral functioning of post-institutional children (Kreppner et al., 2007; Merz & McCall, 2010; Muhamedrahimov et al., 2014). Problems are more likely to occur among children from more severely depriving institutions, and those children with a substantial history of institutional care (between 6 and 24 months depending on institutional conditions) and placement into post-institutional families at older ages (Hawk & McCall, 2011; Julian, 2013). In general, the results suggest that across most domains of development, institutional care which is limited to the first four to six months of life is not associated with a significantly increased risk for long-term adverse effects relative to non-institutionalized children (Zeanah et al., 2011).

Although these studies show that the exposure to institutional environments can increase the risk of later adverse developmental outcomes, they do not examine

<sup>1</sup> Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2007; Warner, McCall, Groark, Kim, Muhamedrahimov, Palmov, & Nikiforova, 2017.

<sup>2</sup> Nelson, Zeanah, Fox, Marshall, Smyke, & Guthrie, 2007; Van IJzendoorn et al., 2011; Güler, Hostinar, Frenn, Nelson, Gunnar, & Thomas, 2012; Lomann, Jonson, Westerlund, Pollack, Nelson, & Gunnar, 2013; Vasilyeva, Korshina, Kurohtina, Vershinina, Kornilov, Muhamedrahimov, & Grigorenko, 2017.

<sup>3</sup> Marshall, Fox, & the BEIP Core Group, 2004; McLaughlin, Sheridan, & Lambert, 2014; Bick & Nelson, 2016.

<sup>4</sup> Bakermans-Kranenburg et al., 2012; The St. Petersburg-USA Orphanage Research Team, 2008; Zeanah, Smyke, Koga, Carlson, & the BEIP Core Group, 2005.

<sup>5</sup> Gunnar, 2001; Merz & McCall, 2010; Muhamedrahimov, Arintcina, Solodunova, Anikina, Vasilyeva, Chernego, Tsvetkova, & Grigorenko, 2016; Chernego, Vasilyeva, Solodunova, Nikiforova, Palmov, McCall, Groark, & Muhamedrahimov, 2017.

the early developmental pattern of delay in relation to the length of time in the institution, especially for those who were institutionalized in the first months of life. There has been no information on the behavioral development of the first year of life infants within the institutional period depending on their risk group (biological or no biological risk) and the type of caregiving environment in the institutions.

### ***Length of Time in Institution***

Since many factors might confound the development of institutionalized children (for example, age at intake, age at assessment, disability status, etc.), an analysis of the developmental and behavioral functioning of institutionally-raised children as a function of the time they spent in an institution would ideally be based on longitudinal assessments of the same group of children over their institutional residency; however, such assessments are rare. Instead, most studies compare the development of institutionalized with non-institutionalized children.

The early studies of the developmental consequences of institutional care on infants in their first year showed that demonstrable impairment was not observed in children under three months, but severe disturbances could be observed in those who had been institutionalized for more than eight months during their first year (Durfee & Wolf, 1933). It was found that, in contrast to children institutionalized at two or three years of age, who could be remediated to some extent, those institutionalized during their first year seemed unable to be remediated (Lowrey, 1940). The first longitudinal study of early institutionalized children found that at the end of the first year, children from a "foundling home" showed manifestations of negative environmental influences for development, namely, severe developmental retardation and deviant behavior patterns (Spitz, 1945), as compared to peers from parental home environments, and from a nursery for children of socially maladjusted and delinquent mothers.

The results of subsequent studies have both supported and contradicted these early data. For example, a study of infants in a Romanian orphanage showed that at an average of 6.5 months of age (with an average of 4.7 months of residence in the orphanage), children were already about three or four months behind the Denver II norms on all developmental variables (Sparling, Dragomir, Ramey, & Florescu, 2005). After an additional 12 months' exposure to the institutional environment, the development of children had dropped to about seven months behind the Denver II norms, while the development of the experimental group exposed to an educational intervention program was still between three and four months behind.

In a study of orphaned Romanian children between the ages of 23 and 50 months, all children exhibited deficits in cognitive and social functioning. The majority were severely delayed, but their deficits were not related to age at entrance, or the length of time in the orphanage (Kaler & Freeman, 1994). A group of children 12-31 months of age raised in Romanian institutions exhibited serious disturbances of attachment, but there was no relationship between the length of institutionalization and their exhibiting signs of either emotionally withdrawn/inhibited or indiscriminately social/disinhibited reactive attachment disorder (Zeanah et al., 2005). Thus, results of these subsequent studies are contradictory: some of them confirm that longer exposure to institutional environment leads to greater deficiencies, and others do not.

### ***Length of Exposure to Interventions in Institutions***

Studies have shown that interventions in institutions aimed at improving the quality of the institutional environment and care, have positive effects on different domains of children's behavioral functioning<sup>1</sup>. It was found that the first positive changes in the behavior of institutionalized children can be observed after three months of exposure to an intervention program (Groark, Muhamedrahimov, Palmov, Nikiforova, & McCall, 2005). Institutionalized children tended to improve developmentally and behaviorally on standardized infant tests after four to nine months of exposure to the training and structural changes intervention program, and continued to improve on many measures of physical growth, behavioral development, and social and emotional behavior after 9+ months of intervention (The St. Petersburg-USA Orphanage Research Team, 2008). These results were based on the analysis of children representing a wide age range. Additional study is needed to understand the effect of time in typical and post-interventional institutions on the development of children during their first months of life.

It is notable that developmental and behavioral improvements after four to nine months of exposure to the institutional intervention program have been observed for children with disabilities, as well as for infants and young children with typical development. To the best of our knowledge, the above mentioned study is the only one on the effect of the length of exposure to institutional interventions on the development of children with disabilities.

Thus, the literature suggests that there are inconsistent results on the association between the length of institutionalization and the development of resident children. Some studies have shown associations between the time spent in the institutional environment and developmental and behavioral functioning of children in institutions, whereas some have not shown such associations. The differences in findings may be because of differences in the institutional environments, ages at assessments, pre-institutional life experiences, and areas of child development (Hawk & McCall, 2011; Julian, 2013; Chernego & Muhamedrahimov, 2014). Our study attempts to resolve the discrepancy between studies finding no effect of time spent in institutions, and those studies finding an effect of time spent in institutions. It is aimed at examining the association between time spent in typical social-emotionally depriving Russian institutions, and the development of infants during the first year of life, including those with at biological risk of developmental delay.

### **Current Study**

The main aim of our study was to examine the general behavioral development of infants living in institutions located in the Russian Federation between three and nine months of life, as a function of their birth circumstances and the nature of the care provided in the institution. We examined behavioral development longitudinally in three- to nine-months-old full- and preterm infants from two St. Petersburg institutions serving children from birth to four years of age (called Baby Homes) which had different caregiving environments: one typical of tradi-

<sup>1</sup> Bakermans-Kranenburg, van IJendoorn, & Juffer, 2008; Berument, 2013; McCall, Groark, Fish, Harkins, Serrano, & Gordon, 2010; The St. Petersburg-USA Orphanage Research Team, 2008.

tional Russian BHs (i.e., typical non-intervention Baby Home=NoI BH), and one in which a training and structural changes (T+SC BH) program of intervention was implemented (The St. Petersburg-USA Orphanage Research Team, 2005, 2008; Solodunova, Palmov, & Muhamedrahimov, 2017).

Our research interest in the group of preterm infants (30 to 36 weeks of gestation) was informed by several factors. First, according to WHO data, the preterm birth rate is dramatically and consistently rising (World Health Organization, 2015) with the moderate and late gestational age groups accounting for most of this increase (Talge, Holzman, Van Egeren, Symonds, Scheid, Senagore, & Sikorskii, 2012). Nearly one-third of children from St. Petersburg orphanages included in this study are preterm, with most being moderate and late preterm without medical complications. Second, despite being born toward the end of the preterm period and considered low-risk infants, this group of moderate and late preterm children is characterized by neurobehavioral immaturity and continues to be vulnerable to postnatal environmental conditions (Kinney, 2006; Nepomnyaschy et al., 2012). Third, it is well established that family-based early intervention programs have a strong positive effect on premature infants' development<sup>1</sup>, but there is a lack of information on the effect of a family-like environment in an institutional setting on a preterm infant's development.

We focused on the general behavioral development of BH infants and posed several questions. First, we examined whether the development of the infants declined between three and nine months of life in the typical NoI BH. We expected that several months of institutionalization in the traditional NoI BH would have deleterious effects on infants' development during the first months of life. Second, we examined whether infants in the T+SC BH would improve, rather than decline, in terms of behavioral development over time. Third, since both NoI and T+SC BHs included both pre- and full-term infants, we tested possible differences in the association between children's general behavioral development across age as a function of gestational age. Since there were large differences between typically developing children and those with disabilities in T+SC BH (The St. Petersburg-USA Orphanage Research Team, 2008), and the amount of improvement was greater for typically developing children, we expected that T+SC intervention would have a different effect on pre- vs full-term infants.

## Method

This study used data from an intervention conducted in St. Petersburg, Russian Federation (The St. Petersburg-USA Orphanage Research Team, 2008), the report of which provides extensive methodological details that will not be repeated here.

## Participants

Our analyses were based on the St. Petersburg BH intervention project database. For the purposes of the current study, those children who met the following criteria were selected: the availability of BH records on their birth information, in-

<sup>1</sup> Landry, Smith, & Swank, 2006; Verkerk et al., 2012; Shapiro-Mendoza, Kotelchuck, Barfield, Davin, Diop, Silver, & Manning, 2013; Myers, Grieve, Stark, Isler, Hofer, Yang, Ludwig, & Welch, 2015.

cluding gestational age; no pathological symptoms of the central nervous system; no severe hereditary and somatic diseases; and complete assessments at three and nine months of age. The total group of 58 children included *full-term children* (FCh,  $N=36$ ) with gestational ages of 37-41 weeks, and *preterm children* with gestational ages of 30-36 weeks (PCh,  $N=22$ ). The birth information, including gestational age, was obtained from BH records. According to the type of BH intervention (NoI, T+SC) and their gestational age (pre-term and full-term), the children were divided into four groups: 1) full-term children from BH with no intervention program (FCh NoI,  $N=21$ ); 2) preterm children from BH with no

Table 1  
Sample Characteristics

Measure	Groups			
	NoI (N=33, 22 males)		T+SC (N=25, 12 males)	
	PCh NoI (N=12; 8 males)	FCh NoI (N=21; 14 males)	PCh T+SC (N=10; 6 males)	FCh T+SC (N=15; 6 males)
Gestational age, weeks $F_{PCh-FCh}(1, 54) = 185.2$ , $p < .001$	37.5 (2.6)		37.6 (2.9)	
	$F(1, 54) = 0.1, n.s$			
	34.7 (1.7) (30–36)	39.1 (1.2) (37–40)	34.4 (1.5) (31–36)	39.7 (0.9) (38–41)
	$F(1, 54) = 88.8, p < .001$		$F(1, 54) = 96.7, p < .001$	
Birth weight, grams $F_{PCh-FCh}(1, 54) = 76.9$ , $p < .001$	2746 (543)		2830 (737)	
	$F(1, 54) = 0.5, n.s$			
	2215 (254) (1680–2590)	3049 (413) (2240–3770)	2141 (429) (1460–2850)	3289 (498) (2601–4100)
	$F(1, 54) = 31.0, p < .001$		$F(1, 54) = 46.1, p < .001$	
Age at entering in institution, days $F_{PCh-FCh}(1, 54) = 9.7$ , $p < .05$	33 (15)		35 (16)	
	$F(1, 54) = 0.1, n.s$			
	40 (11) (24–59)	29 (16) (5–72)	43 (15) (16–66)	29 (15) (7–57)
	$F(1, 54) = 4.7, p < .05$		$F(1, 54) = 5.1, p < .05$	
Time in BH by assessment at the age of 3 months, days $F_{PCh-FCh}(1, 54) = 13.7$ , $p < .001$	72 (17)		59 (16)	
	$F(1, 54) = 7.3, p < .05$			
	58 (13) (37–84)	81 (14) (42–95)	55 (15) (26–78)	62 (17) (29–89)
	$F(1, 54) = 17.8, p < .001$		$F(1, 54) = 1.4, n.s$	
Time in BH by assess- ment at the age of 9 months, days $F_{PCh-FCh}(1, 54) = 39.0$ , $p < .05$	256 (22)		240 (16)	
	$F(1, 54) = 10.8, p < .001$			
	234 (13) (212–252)	268 (15) (224–283)	231 (12) (215–254)	246 (16) (223–272)
	$F(1, 54) = 43.1, p < .001$		$F(1, 54) = 6.4, p < .05$	

intervention (PCh NoI,  $N=12$ ); 3) full-term children from BH after intervention program with family-like environment (FCh T+SC,  $N=15$ ); and 4) preterm children from BH after intervention program with a family-like environment (PCh T+SC,  $N=10$ ).

Table 1 presents the study sample's characteristics (means, standard deviations, and range). The characteristics of the preterm and full-term children were significantly different based on Pre- or Full-Term  $\times$  Intervention Condition (NoI, T+SC) analyses of variance. There were no differences in the proportion of boys and girls within each group, so gender was ignored in the analyses. The age at which preterm children entered an institution was significantly older than for full-term children from both institutions, because usually preterm children spend more time in the hospital before entering an institution. There were no effects of Intervention Conditions (NoI and T+SC) on gestational age, birth weight, and age at the time of entering in the BH, but a significant effect for time in the BH by the time of assessment at the age of three, as well as nine months (see Table 1).

### *Procedure*

*Intervention.* The two Baby Homes that participated in the current study (NoI and T+SC) belong to the health care system, and are considered to achieve acceptable standards for meeting children's basic medical and nutritional needs. Both participated in a large study conducted in St. Petersburg, Russian Federation (The St. Petersburg-USA Orphanage Research Team, 2008). The typical NoI BH is characterized by socio-emotional deficiencies, and business-like and perfunctory routine caretaking activities (Muhamedrahimov, 2000; The St. Petersburg-USA Orphanage Research Team, 2005). By contrast, the T+SC BH was involved in programs for training and structural changes interventions in which caregivers were trained to engage in sensitive and responsive interactions with the children. In addition, structural changes were implemented to reduce the number of different caregivers the children experienced, and to increase caregiver stability. They included a reduction in group size, the assignment of permanent primary caregivers to each group, integration of children by age and by disability status, and no transitions of children to new wards.

*Assessment and procedure.* The Battelle Development Inventory (BDI; (LINK Associates, 1988) was used to assess the children's developmental skills. The BDI includes a Total Score based on subscales for Personal-Social, Motor, Adaptive, Communication, and Cognition. Raw scores were converted to developmental quotients (DQs) based on a U.S. standardization study (LINK Associates, 1988). The BDI was administered in a special quiet room in each BH by independent assessors with psychological training, to individual children accompanied by the caregiver who knew the child best, or had the best relationship with the child (see The St. Petersburg-USA Orphanage Research Team, 2008). In the larger project, children were assessed periodically at different ages; the current study includes all those children who had BDI assessments at approximately three months ( $3.1 \pm 0.3$ , from 2.7 to 4.0 months) and nine months of age ( $9.2 \pm 0.2$ , from 8.5 to 9.5 months). The chronological age, not age from conception, was used for all children.



## Results

Table 2 presents the means, standard deviations, and statistical results for the BDI Total DQs as a function of age, gestational age, and types of institutional care. Repeated analyses of variance were conducted on the BDI Total Scores in relation to Age (3 months, 9 months) x Gestational Age (preterm, full-term) x Type of Institutional Care (NoI, T+SC). Simple effects tests were then conducted to test the difference between the assessments at the two ages within each group of children. The BDI means are graphed in Figure 1 for each group (PCh NoI; FCh NoI; PCh T+SC; and FCh T+SC).

Table 2

*Mean (Standard Deviations) BDI Total DQs and Comparisons*

	Time 1	Time 2
NoI	86.3 (8.5)	72.7 (9.3)
	$F(1, 54) = 34.8, p < .001, \eta^2 = .39$	
PCh NoI	81.9 (7.4)	69.8 (7.2)
	$F(1, 54) = 11.30, p = .001, \eta^2 = .17$	
FCh NoI	88.8 (8.1)	74.2 (10.1)
	$F(1, 54) = 28.39, p < .001, \eta^2 = .34$	
T+SC	84.0 (11.1)	91.0 (12.1)
	$F(1, 54) = 5.9, p = .018, \eta^2 = .10$	
PCh T+SC	81.7 (11.3)	84.4 (14.0)
	$F(1, 54) = 0.47, n.s.$	
FCh T+SC	85.6 (11.0)	95.3 (8.7)
	$F(1, 54) = 9.17, p = .004, \eta^2 = .15$	

The main results of interest were a significant age effect:  $F(1, 54) = 4.32, p = .042, \eta^2 = .07$ , and an Age x Type of Institutional Care interaction,  $F(1, 54) = 32.95, p < .001, \eta^2 = .38$ . There were no significant interaction effects for Age x Gestational Age,  $F(1, 54) = .47, n.s.$ , and Age x Type of Institutional Care x Gestational Age,  $F(1, 54) = 1.93, n.s.$ , which indicated that the Age x Type of Institutional Care developmental changes were not significantly different for children in each gestational age group. Thus, there was a significant decline of the BDI Total DQs from three to nine months for children from the NoI BH, but a significant improvement in BDI Total DQs for children from the T+SC BH. Although the three-way interaction was not significant, Table 2 and Figure 1 suggest that the improvement among T+SC children was significant for FCh, but not for PCh group.

There were two additional main effects: One was for Gestational Age:  $F(1, 54) = 10.2, p = 0.002, \eta^2 = 0.16$ , in which the FCh had higher means than the PCh group. The other was for the type of Institutional Intervention:  $F(1, 54) = 15.6, p < 0.001, \eta^2 = 0.22$ , in which children from T+SC BH displayed higher scores than children from NoI BH. The interaction between these factors was not significant  $F(1, 54) < 1, n.s.$ , indicating that the preterm/full-term differences were not different within each institution.

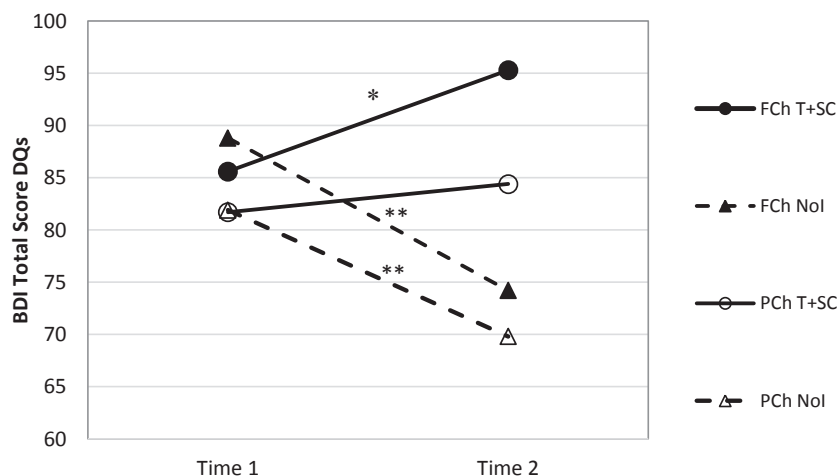


Figure 1. Longitudinal Battelle Developmental Inventory (BDI) developmental quotients (Total Score DQs) for two interventional conditions (NoI, T+SC) and gestational status (PCh, FCh) as a function of time; asterisks ( $*=p<.05$ ,  $**=p<.001$ ) indicate significant change in BDI Total Score DQs during that assessment interval.

## Discussion

The current study focused on a subsample of infants three to nine months of age from two St. Petersburg (Russian Federation) Baby Homes serving children from birth to four years of age. The infants were adequately cared for medically and with respect to nutrition, but deficient in caregiver-child interactions (The St. Petersburg-USA Orphanage Research Team, 2008). One BH received training and structural changes designed to improve the quality of caregiver-child interactions (T+SC), and the other received no such intervention (NoI). The main aim of the study was to examine the general behavioral development of institutionalized infants between three and nine months of age, as a function of the type of Institutional Intervention (T+SC or NoI) and the children's Gestational Age (born preterm at 30-36 weeks or full-term at 37-41 weeks). The primary questions were whether the intervention caused a change in the child's developmental change between three and nine months of age, and whether that change was the same for preterm and full-term infants.

Children in the traditional NoI BH displayed significant declines in BDI Total DQs during the six months between three and nine months of age. These results are consistent with previous study results which showed developmental deficits in institutionalized children within the first year of life, ranging from an average of 4.7 months (from the very early study of infants in orphanages; Durfee & Wolf, 1933) to eight months (from the study of children in the Romanian orphanage; Sparling et al., 2005) in the orphanage. A meta-analysis has shown that institutionalized infants in the first year of life score below infants raised by their parents (Van IJzendoorn, Luijk, Juffer, 2008), and that can be associated with their birth circumstances and their level of development when they entered the institution (The St. Petersburg-USA Orphanage Research Team, 2005). Additionally, the current study

shows that the developmental decline in infants in the first year of life depends on the institutional environment: The exposure to the socio-emotional depriving conditions of a Russian Baby Home can lead to intra-individual developmental decline in infants aged three to nine months, and these declines are shown by both full-term and preterm infants.

Children in the Baby Homes with T+SC programs showed a significant improvement in Total DQs between the ages of three and nine months. These results reveal that, in contrast to the negative effect on children's development of the typical traditional social-emotionally depriving institution, exposure to the caregiving environment not only prevents the decline, but promotes the infants' development in the first year of life. Generally, infants observed at three and nine months of age from the T+SCh BH conditions displayed higher developmental scores than their peers from the NoI BH, and these results suggest that the improvement observed in the larger study for children of a broader age range (The St. Petersburg-USA Orphanage Research Team, 2008) also applies to infants in their first year of life. Thus, a relatively short period of seven to nine months exposure to the socially-emotionally depriving institutional environment leads to infants' developmental decline, while the same length of exposure to a T+SC caregiving environment leads to improvements.

In general, the group of preterm children had lower mean BDI Total DQs than the full-term children. These findings are consistent with the recent studies that have shown the persistence through infancy of developmental delays and negative neurodevelopmental outcomes among preterm children (Eickmann, Malkes, & Lima, 2012; Vohr, 2013; Platt, 2014; Natarajan, & Shankaran, 2016). This might be explained by the fact that preterm birth dramatically interrupts the development of the brain during the third trimester of pregnancy (Kinney, 2006; McGowan et al., 2011; Duerden, Taylor, & Miller, 2013).

The significant developmental improvement of the infants receiving the T+SC intervention between the ages of three and nine months was somewhat stronger for full-term than for preterm infants. Previous studies of children in T+SC BH demonstrated developmental differences between children with disabilities and typically developing children, and that while those with disabilities gained, the improvement was not as much as for typically developing children (The St. Petersburg-USA Orphanage Research Team, 2008). The results of the current study are quite consistent with this finding, and confirm that this trend is true for preterm children without certain obvious disabilities.

There are several possible reasons for this difference. First, the greater variability of individual developmental trajectories of preterm infants could mask or postpone the positive effects of the intervention programs (Engle, Tomashek, & Wallman, 2007; Guillois et al., 2012; McGowan et al., 2011). Furthermore, immature organisms could require longer exposure to the family-like environment, because more prolonged experience with stable and nurturing caregiving is needed for positive developmental outcomes. This is consistent with research showing improvements in the general behavioral functioning of preterm children after nine or 12 months of an intervention program<sup>1</sup>.

<sup>1</sup> Als, Duffy, & McAnulty, 2004; Lassi, Middleton, Crowther, & Bhutta, 2015; Spittle, Orton, Anderson, Boyd, & Doyle, 2015; Schmitt, Arnold, Druschke, Swart, Grählert, Maywald ..., & Rüdiger, 2016.

Second, it is well established that the heightened vulnerability of immature organisms to environmental conditions requires implementation of individualized developmental care programs, in which early social-emotional caregiving interactions are combined with structured and highly differentiated inputs (Aucott, Donohue, Atkins, & Allen, 2002; Phillips, 2013). We assume that an additional early intervention program is necessary in the institutional settings to meet the individual developmental needs of pre-term children as well as those from other biological risk groups.

### **Practical Implications**

The results of this study have practical implications. First, the research findings highlight a crucial need of children left without parental care in a family environment. Although the Russian government has emphasized family care alternatives for institutionalized children, it will take time to implement these procedures, and many children, especially those with disabilities, will be institutionalized for many years before these provisions are carried out.

The special resolution of the Russian government (issued 24/05/2014) does stipulate the creation of institutions with family-like environments, the elimination of periodic transitions of children to new wards, and the establishment of primary caregivers (The Resolution of the Government of the Russian Federation No. 481, 2014). However, that resolution does not provide for caregiver training that is focused on child development and warm, sensitive, responsive caregiver-child interaction. Our research has shown persuasively that only comprehensive intervention, consisting of both structural changes and training of caregivers, can produce significant results, and that such intervention has positive developmental effects for both children with disabilities and those with typical development (The St. Petersburg-USA Orphanage Research Team, 2008).

Second, our research indicated that even children who are preterm without certain obvious disabilities are at higher risk for delayed development, at least in their first nine months. Perhaps an additional early intervention program should be created for them. Such a program should take into consideration the specific needs of individual children, and be an essential supplement to the general program directed to fulfilling children's needs in a sensitive, responsive, and stable caregiving environment.

### **Conclusion**

The current study showed that both full-term and preterm children from the typical socio-emotionally depriving, non-intervention institution (Baby Home) showed significant developmental declines between three and nine months of age, as measured in Battelle Development Inventory Total scores, whereas full-term children in a Baby Home where staff had undergone a training plus structural changes intervention program, improved over this period of time. In general, the group of full-term children had higher mean BDI Total DQs than the preterm group, and children from the Baby Home with the intervention program displayed higher scores than children from the non-intervention one. Thus, the current study showed that

the effect of spending early months of life in an institution on the general behavioral development of infants, depends both on the type of institutional care environment as well as the gestational age of the children.

### Limitations

This study had a number of limitations. First, the sample size of children observed at three and nine months of age was small. This was due to the fact that children housed in orphanages in their first months of life are mostly those who have pathological symptoms of the central nervous system and severe hereditary and somatic diseases; accordingly, the number of healthy children is somewhat small. Another factor was that healthy children of this age are the most attractive for adoption, and therefore often do not stay in the institution long enough to provide full longitudinal data.

Second, the intervention consisted of general training of caregivers on providing sensitive and responsive interactions, not on specific actions and techniques. This approach has the benefit of encouraging caregivers to adjust their behavior to fit children of different ages, but the disadvantage of not providing more specific intervention programs and techniques to match individual children's unique status, especially those with disabilities.

Third, it is possible that the general developmental change during the seven to nine months of institutionalization in the group of preterm children may not be the same or similar as that of children from other biological risk groups. However, the research data from a large intervention project showed a positive effect of the intervention on a wide group of children with disabilities, and the negative influence of a traditional orphanage environment on the development of children (The St. Petersburg-USA Orphanage Research Team, 2008).

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## Adolescent Vandalism: the Role of the Parent-Child Relationship in the Development of Destructive Behavior

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**Background.** While the phenomena of intentional destroying and damaging of private property have been known since ancient times, the term “vandalism” appears only in 19<sup>th</sup> century. In the 20<sup>th</sup> century, much research devoted to vandalism was conducted in the spheres of criminology, sociology, psychology, and education. Nevertheless, little attention has been paid to investigating the correlation between a child’s propensity for vandalism and the child-parent relationship.

**Objective and Method.** The main purpose of our research was to investigate the correlation between the styles of family upbringing and adolescents’ propensity for vandalism. For this purpose, we analyzed the main predictors of adolescents’ propensity for vandalism on the basis of the psychological diagnostics of 60 Russian families from Ekaterinburg. We investigated whether the fact that a child was brought up in a one-parent or disadvantaged family is significant for forming an adolescent propensity for vandalism. We also clarified the influence of various styles of family upbringing on an adolescent’s propensity for vandalism of different types.

**Results.** Based on statistical analysis, we concluded that an atmosphere of violence within the family plays a key role in forming adolescents’ propensity for vandalism. The style of maternal upbringing has a greater influence on determining adolescent destructive behavior than the paternal, especially when the father’s parenting style is “non-interference.”

**Conclusion.** Based on our research results, we suggest that preventive efforts against vandalism should be directed toward the prevention of family violence, and that there should be a differential approach toward parental education directed toward correcting individual parental styles of upbringing.

**Keywords:** vandalism, deviations in juvenile behavior, adolescence, child-parent relationships, styles of parental upbringing, destructive behavior.

## Introduction

***Vandalism as a current social problem.*** Vandalism is widespread in modern society, but the problem of evaluating and preventing it is very complex. As a rule, society does not pay much attention to the significant losses and negative social effects of vandalism, and therefore does not have much interest in revealing its causes and predictors. Yet vandalism results not only in direct losses, but also in negative psychological effects on all members of society due to living in an environment damaged by vandalism. First, such an environment increases the stress level and decreases subjective social prosperity. (Ellaway, 2009). Second, this destruction has the viral effect of creating and spreading the impulse to imitate such action, especially among adolescents. Thirdly, objects damaged by vandals provoke further destructive acts, not only toward the environment, but also toward oneself and others (Wilson, 2013).

In the USA in 2013, more than 160 thousand people were arrested on the charge of vandalism, including more than 37 thousand adolescents (Uniform Crime Report, 2013). More than 16,000 cases of vandalism have been registered at the Moscow railway over the first nine months of 2016<sup>1</sup>. Regardless of its motivation, vandalism causes great damage and financial losses all over the world. Just one of the five Australian railway service companies reported spending about three million Australian dollars on removing graffiti from its rolling stock, and two million on reconstruction of other objects damaged by vandalism (Parliament of New South Wales Legislative Assembly, 2009, p. 4440). Great Britain's Network Rail spends 3.5 million pounds sterling annually on repairing damage from vandalism (Networkrail. Graffiti, 2017). In Saint Petersburg in 2014, losses caused by vandals in suburban trains were over 25 million rubles.

Most of the researchers investigating vandalism concur that such destructive behavior is most common during adolescence (Elliott, 1988; Le Blanc, & Freshette, 1989; Mawby, 2001; Vatova, 2007). It often accompanies adolescents' aggressiveness, alcoholization (Virtanen, Nummi, Lintonen, Westerlund, Hägglöf, & Hammarström, 2015), cruel treatment of animals (Lucia & Killas, 2017), and other deviant behavior.

One of the most important social risks of vandalism is that this model of deviant, substandard, and even illegal adolescent behavior often takes on more severe forms, and can be combined with more dangerous crimes (Agapov & Malkov, 2006). Sporadic acts of vandalism, especially a teen's first and isolated ones, usually happen as a reaction to certain situational factors. But if a single act of vandalism is left anonymous and unpunished, it often is followed by further acts of vandalism (Levy-Leboyer, 1984). Therefore, understanding the mechanisms behind the development of adolescent destructive activity is a basic scientific problem which should be solved, so that we can suggest effective measures for preventing such behavior.

***Adolescent vandalism: the role of the family environment in developing destructive adolescent behavior.*** The roots of adolescents' destructive behavior can be found in their family upbringing. Researchers investigating factors of deviant

<sup>1</sup> See video news 17.09.2016 21:15, URL: <http://www.m24.ru/m/videos/124265>.

and aggressive adolescent behavior often note family upbringing as a dominant contributor (Garbarino, Sebes, & Schellenbach, 1984; De Haan, Prinzie, & Deković, 2012; Gracia, 2015; Vorobyeva, Kruzhkova, & Krivoshekova, 2015). Parent-child relationships become a model and a means of building relationships between the child's personality and environment (Bogdanova & Igoshina, 2011). They define the child's sense of himself in the space of social relationships between the poles of activeness and passiveness; openness and emotional withdrawal; empathy and indifference; and personal values and norms (Avdulova, 2013). Malfunctions in upbringing, and general disharmony and inconsistency in the family's upbringing style, can lead to children's permanent adoption of deviant forms of behavior (Simonova, 2010).

Parental rejection of their children, and the absence of parental love, warmth, and bonding with their children, are often reasons for children's mental problems (Rohner, 1984). Conflicts and physical punishment correlate with children's deviant behavior (Csémy, Hrachovinová, Čáp, & Starostová, 2014). Some empirical Russian research also shows a stable correlation between children's deviant behavior and a hostile family atmosphere: aggressiveness, regular conflicts, and excessive strictness (Kuznecova, 2013; Koreneva, 2004).

Nevertheless, the issue of family determination of a child's vandalism remains uninvestigated. For a deeper understanding of the fundamental reasons for adolescent vandalism, we proposed to investigate the correlation between styles of family upbringing, and adolescents' propensity for vandalism. In accordance with this purpose, we set the following objectives:

- To define whether the fact that a child is brought up in a one-parent or disadvantaged family is significant for forming adolescent readiness for vandalism.
- To clarify the influence of various styles of family upbringing on adolescent readiness to participate in vandalism of different types.
- To find out whether there is a difference between maternal and paternal upbringing influences on adolescents' propensity for vandalism.
- To answer the question of whether maternal and paternal upbringing efforts are coherent with their adolescents' perception of them.

## Research procedure and methods

We used a general sampling method, psycho-diagnostic tools, and further statistical data analysis: clustering, MANOVA, and linear regression.

### *Characteristics of the sample*

60 families with at least one adolescent per family participated in this research. Respondents were:

- adolescents aged 11-15 (total quantity = 60.  $M_{age} = 13.00$ ;  $SD_{age} = 1.50$ );
- mothers aged 29-50 (total quantity = 60.  $M_{age} = 36.63$ ;  $SD_{age} = 4.74$ ),
- fathers aged 35-58 (total quantity = 25.  $M_{age} = 40.68$ ;  $SD_{age} = 5.41$ ).



We categorized families according to two objective criteria:

1. Number of parents: two-parent family or one-parent family. In our research sample, a two-parent family consisted of a biological mother and a biological father who are married.
2. Family wellbeing: disadvantaged families (registered with social and other special services due to the deviant behavior of family members) or well-to-do families (not registered with any social services). We applied family wellbeing criteria according to the definition of a disadvantaged family in Russian federal law, viz.: "Disadvantaged families are families with children who find themselves in a socially dangerous situation or families in which parents or custodians do not execute their duties of upbringing, fostering, care of children, have a negative influence on their behavior or treat them violently" [Federal law, 1999].

### ***Procedure and methods of the study***

1. Intergroup statistical analysis.

First, we investigated the adjacency between the number of parents, the family's social wellbeing, and the adolescents' propensity for vandalism using adjacency matrix and cluster analysis.

2. Psychological diagnostics.

With the help of the questionnaire "*The analysis of family relationships*" (Eydemiller & Yustitskis, 1990) we diagnosed abnormalities in the upbringing process, as well as the parents' personal problems. The survey consisted of 130 statements, developed in binary form, with 20 subscales. Eleven subscales measured problems in parental upbringing style: hyperprotection; hypoprotection; indulgence or ignorance of the child's needs; excessive or insufficient duties for the child; demands on the child and prohibitions; strictness or minimality of sanctions (punishments) for misconduct; and an inconsistent style of family upbringing. Nine subscales defined the parents' personal problems: transfer of the parental feelings (one spouse toward another) onto a child; preference for childish traits in the adolescent; lack of parental confidence in the upbringing process; fear of losing the child; undeveloped parental feelings; projection of the parent's own objectionable traits onto the child; transferring conflicts between parents into the sphere of the child's upbringing; and the preference for masculine or feminine traits. Cronbach's alpha reliability coefficient for the subscales ranged from 0.7 to 0.89 (Eydemiller E.G. & Yustitskis V.V., 1990).

We used the questionnaire "*Parental behavior and adolescents' attitude to parents*" (Vasserman, Gor'kovaja, & Romicyna, 2001) to investigate parental psychological sets, behavior, and methods of parental upbringing from the adolescent's point of view. This diagnostic tool allows one to describe child-parent relationships according to their most general characteristics: benevolence, hostility, autonomy, authoritarianism, and inconsistency. This questionnaire is based on a configurational analysis of children's reports of parental behavior called Schaefer's method (1965), which was adapted by Russian scientists at the Behterev Institute's laboratory of clinical psychology (Wasserman, Gorkova, & Romitzina), and was further

used under the title ADOR (“Adolescents about parents”) (Vasserman, Gor’kovaja & Romicyna, 2000).

The application of both questionnaires provided a complex evaluation of the family upbringing process from the standpoints of both the parents and the children. Adolescents are active partners in the upbringing process, as they have their own ideas about their parents, their relationships with them, and the upbringing efforts used by parents, which can be different from the parents’ ideas. The necessity for such a “cross” estimation was noted by Svedkovskaya and Archakova (Shvedovskaya & Archakova, 2015), Gracia (Gracia, Lila & Musitu, 2005) and many others in the context of investigating children’s behavior. Children’s subjective estimation of parental style of upbringing tends to differ most strongly from their parents’ estimation in the pubertal period, when adolescents actively oppose themselves to the adult world.

The questionnaire “*Motives of vandal behavior*,” developed by I. V. Vorobyeva, O. V. Kruzhkova, and S. A. Ostrikova (Vorobyeva & Kruzhkova, 2015), was used for diagnosing the adolescents’ and juniors’ propensity for vandalism by considering the motivational basis for their destructive behavior. The questionnaire consisted of 80 statements describing different acts of vandalism and their motives. The extent of agreement or disagreement with these statements was scored with a 4-point scale. The method diagnosed 10 forms of vandalism: grabbing another’s property (for one’s own profits, possessions); aggressive (answering an offense or insult); tactical (meaning as a means to some other aims); being curious (excessively curious, destructive experimenting with the purpose of investigation); aesthetic (to change and better the environment according to one’s own ideals); existential (for self-affirmation through using one’s own abilities to influence society and attract social attention); protesting (opposing social and cultural norms of the adult world); conforming (being pushed by a group, necessity, or a wish to imitate the behavior of other group members); provoked by environmental discomfort (initiated by some discomfort and wish to change environment for personal needs, make it more comfortable); and provoked by boredom (searching for new experiences, and the rush connected with danger or defiance of societal bans). Cronbach’s alpha reliability coefficient for the subscales ranged from 0.7 to 0.79 (Vorobyeva & Kruzhkova, 2011).

## Statistical analysis

Statistical processing of the data was done with the professional software IBM SPSS Statistics V.19. The choice of statistical methods was defined by the logic of our research.

First, we made a multivariate analysis of variance (MANOVA) for clarifying correlations between motives for adolescent vandalism and family type, as classified by the number of parents and their social wellbeing.

Then, we did a linear regression analysis in order to determine the predictors of adolescent vandalism depending on the maternal and paternal styles of parental upbringing, and the adolescents’ own attitude toward this upbringing style. We used the total score of the adolescents’ propensity for vandalism as a dependent variable because it reflects adolescents’ general propensity for this type of destructive rela-

tionship with the environment. Such characteristics as style of family upbringing (maternal and paternal), and adolescent perception of the family upbringing, were considered as independent variables. We analyzed regression models in each separate group of families (one-parent well-to-do families, one-parent disadvantaged families, two-parent well-to-do families, and two-parent disadvantaged families). We got the final regression models using the method of single-step exclusion of dependent variables.

*Study limitations.* Limitations of the study result from the cross-sectional design and data based on self-reporting.

## Results

Cluster analysis revealed two relatively homogenous groups of the adolescents in the sample: one with a low degree of readiness for vandalism (90%), and one with a high degree of readiness for vandalism (10%). Clustering convergence equaled 0.7 (likelihood function – log-likelihood, Bayesian information criterion (BIC)).

Table 1

*Distribution of participants according to the family types*

Families		Adolescents		Total F (%)
		Boys F (%)	Girls F (%)	
Well-to-do families	two-parent families	9 (15)	10 (17)	19 (32)
	one-parent families	13 (22)	3 (5)	16 (27)
Disadvantaged families	two-parent families	2 (3)	4 (7)	6 (10)
	one-parent families	14 (23)	5 (8)	19 (31)
Total:		38 (63)	22 (37)	60 (100)

Applying the method of contingency tables, we investigated relationships between the main criteria (in pairs): the number of parents in a family; the family's social wellbeing or not, and the adolescents' propensity for vandalism or not. The results ( See *Table 2*) showed that adolescents with high propensity for vandalism come more often from disadvantaged families ( $V=0.649$ ;  $p=0.000$ ). Further processing of the sample data revealed that one-parent families appear to be disadvantaged more often (Cramer's  $V$  criterion= $0.303$ ;  $p=0.019$  and  $\chi^2=5.503$ ;  $p=0.033$ ).

Based on the MANOVA analysis, we can assume that adolescents from the disadvantaged families tend to be more prone to vandalism. Indicators of adolescents' total propensity for vandalism are high mostly in two-parent disadvantaged families. Adolescents from well-to-do families (both one- and two-parent families) are not characterized by high total propensity for vandalism. Herewith, further investigation of vandalism predictors used only the grouping indicator of social wellbeing as the determinative one. In our sample we have 59% of adolescents from well-to-do families and 41% from disadvantaged families.

Table 2

*Correlations between motives for adolescent vandalism and family type classified by the number of parents and their social wellbeing (MANOVA)*

Dependent variables	$R^2$	Mean			
		One-parent well-to-do families	One-parent disadvantaged families	One-parent well-to-do families	Two-parent disadvantaged families
Grabbing	.53***	9.25	11.80	8.79	18.83
Aggressive	.43***	8.88	11.53	8.37	14.50
Tactical	.48***	8.38	9.79	8.16	12.50
Being curious	.15*	8.13	8.95	8.00	8.00
Aesthetic	.37***	9.94	14.26	8.63	14.83
Existential	.53***	8.19	9.37	8.00	11.00
Protesting	.85***	8.31	8.42	8.00	15.00
Conforming	.42***	8.50	9.74	8.21	12.00
Provoked by environmental discomfort	.49***	8.81	11.21	9.58	17.67
Provoked by boredom	.24**	8.06	8.47	8.11	9.50
Propensity for vandalism, total	.65***	86.44	103.63	84.84	133.83

Note.  $R^2$  = Squared multiple correlation; \* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

Table 3 contains only statistically significant models. These regression models reveal possible predictors of adolescent vandalism in the sphere of parent-child relationships. We can emphasize that in well-to-do families we discovered statistically significant models for all types of data. We did not find statistically significant correlations between indicators of adolescent perception of father's style of upbringing and abnormalities in the father's style of parental upbringing in either well-to-do and disadvantaged families.

We can suppose that the regression models in Table 3 have a high level of predictive value as they have explained a variation of more than 50% in the sample data set. This indicator also points out the significance of family upbringing style in forming adolescents' propensity for vandalism.

## Discussion

### *Motives and general propensity for vandalism*

1. *Adolescents from two-parent disadvantaged families.* Results of the statistical analysis showed greater propensity for vandalism in this group. Adolescents have mainly grabbing motives for their vandalism. They use vandalism as a destructive

Table 3

*Predictors of adolescents' propensity for vandalism in the sphere of parental upbringing.  
The results of linear regression analysis*

		R <sup>2</sup>	Independent variables	β
Disadvantaged families				
Mother	Abnormalities in the style of parental upbringing	.92***	Hypoprotection	-.76**
			Indulgence	-.82*
			Ignoring child's needs	.84***
			Excessive requirements-prohibitions	1.35***
			Lack of duties	-.67***
			Excessive sanctions	.59*
			Inconsistency of parental upbringing style	-1.95***
			Psychological reasons of abnormalities in parental upbringing	.91***
	Preference for childish traits	-1.40***		
	Lack of parental confidence	-1.46***		
	Undeveloped parental feelings	-2.57***		
	Projection of own objectionable traits onto a child	4.22***		
	Preference for feminine traits	7.28***		
	Preference for masculine traits	5.26***		
Father	Abnormalities in the style of parental upbringing	.80*		
Ado-lescent	Perception of mother's style of upbringing	.46**	Positive interest	1.37***
			Autonomy	-1.19**
Well-to-do families				
Mother	Abnormalities in the style of parental upbringing	.75***	Excessive requirements-prohibitions	.65***
			Excessive sanctions	.51***
			Minimization of sanctions	-.20*
	Psychological reasons for abnormalities in parental upbringing	.52***	Transferring conflicts between parents into the sphere of a child's upbringing	.46**
			Projection of parents'objectionable traits onto a child	.54***
Father	Abnormalities in the style of parental upbringing	.98***	Hyperprotection	-.20**
			Lack pf requirements-prohibits	1.00***
			Minimization of sanctions	.23***
	Psychological reasons for abnormalities in parental upbringing	.55**	Preference for masculine traits	.42*
Adolescent	Perception of mother's style of upbringing	.72***	Expansion of parental feelings sphere	.49*
			Positive interest	-.80***
			Hostility	-.29*
	Perception of father's style of upbringing	.37**	Inconsistency of parental upbringing style	-.30*
			Authoritarian	-.61**

Note.  $R^2$  = Squared multiple correlation;  $\beta$  = Standardized regression coefficient; \* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$

tactic for changing their environment and making it more comfortable for themselves, or for the purpose of aesthetic transformation of the environment. Destructive activity by adolescents from this type of family is also systematically initiated by protesting or aggressive reactions. Based on the analysis of motives, we can assume that in this group of adolescents, practically all presented types of motives except curiosity and boredom are common triggers for their vandalism. We should note that, of all the motives for vandalism, only curiosity and boredom are considered to be normative for adolescents, because they are part of socializing mechanisms for this age group (Vorobyeva & Kruzhkova, 2014). The low extent of these (normative) motives in the overall motivation base of vandalism in the adolescents' sample may be evidence of these adolescents' conscious choice of deviant destructive relationships with their environment.

The finding that *adolescents from two-parent disadvantaged families* have the highest risk of vandalism allows us to conclude that the character of relationships between parents and style of family upbringing are more important than the number of parents in the family (Koneva, 2009). Investigations of the influence of these factors on adolescents' propensity for vandalism can be a subject for future research to complement this one.

2. *Adolescents from one-parent disadvantaged families.* In this group the indicator of general readiness for vandalism was also very high. The motives of the adolescents were mainly aesthetic: they wanted to make environment look nicer and more comfortable, according to their ideas about the environmental esthetic. The motives of aggression, protest, and environmental discomfort were more frequently expressed than all others. The prevalence of aesthetic motives for vandalism can be also explained by the popularity of such teenage subcultures as graffiti, street-art, and so on (Nordmarker, Hjärthag, Perrin-Wallqvist, & Archer, 2016). We should also take into account the possibility of compensatory reaction: adolescents' desire to escape from the real life and create their own world with typically adolescent social relationships (Belkin, 2010; Haza & Ducouso-Lacaze, 2006)

3. *Adolescents from well-to-do families* have minimal risk of committing vandalism. Parental attention to their children and constructive dialogue between them do not favor development of these adolescents' negative feelings, because at this age, adolescents' satisfaction with life has a strong positive correlation with the quality and ease of communication in the family (Hodačova, Čermakova, Šmejkalova, Hlavačková, & Kalman, 2015). Adolescents from well-to-do families have a low propensity for vandalism independently of the number of parents in the family. Average indicators of adolescents' propensity for vandalism in this group are less than 10 points. This average is a norm for this age, according to the norms referenced in the test "Motives of vandal behavior" (Vorobyeva & Kruzhkova, 2015).

4. Hence, abusive relationships in the family represent a significant factor forming an adolescent's propensity for vandalism. This finding strengthens the ideas of other authors that an ineffective style of parenting is the main factor causing abnormal socialization of adolescents (Lelekov & Kosheleva, 2006; Istratova, 2013). At the same time, family wellbeing allows parents to choose a more effective



general parental style of upbringing that gives an adolescent more opportunities to form constructive behavior and achieve social wellbeing (Steca, Bassi, Caprara & Fave, 2011).

***Predictors of adolescents' propensity for vandalism in the sphere of parental upbringing***

1. *Disadvantaged families.* Based on the results of the regression analysis, we can conclude that in disadvantaged families, adolescents' propensity for vandalism is formed under the influence of the mother's excessive requirements, sanctions, and ignorance of their needs. Our assumption is that a mother's attention to her children, even with lots of resources and personal efforts spent on the child's upbringing, may have no positive effect if the child's interests are not taken into consideration. In this situation an adolescent is overloaded with an excessive list of duties whose performance is always controlled by his/her parents, and sanctions are never eased. Z. Wajda notes that a mother's strict control can lead to child's aggressive behavior (Wajda, 2013).

Our analysis of the psychological reasons for the abnormalities in the parental upbringing in this group revealed two most probable reasons for such a mother's attitude toward the adolescent and her choice of the destructive style of parental upbringing. They are a projection of her own objectionable traits onto the child, and a stable system of stereotypes about feminine and masculine traits. In addition, mothers from this group tend to be convinced of the rightness of their parental efforts. Also these mothers often perceive adolescents as adults and unconsciously force them to be independent and self-reliant, thus developing guilt complexes, hyper-responsibility, and feelings of inferiority in the adolescents. These mothers demonstrate their own dominant position, and refuse to listen to the adolescents and understand their needs, consciously distancing themselves from children, and demanding submission.

In disadvantaged families, the father plays a minimal role in parental upbringing, has little interest in the child's development, and only participates in the child's upbringing formally or on request. This explication accords with the previous research results of S.L. Sibirjakov, who investigated adolescents with deviant behavior, and found the main reasons of such behavior in the family sphere to be the absence of emotional contact with both parents or one of them, and a low level of mutual understanding and collaboration between parents (Sibirjakov, 1998).

Nevertheless, an adolescent from a disadvantaged family perceives his/her mother's upbringing efforts rather positively. In spite of this, the lack of parental interest in the adolescent and the lack of the adolescent's autonomy create the adolescent's readiness to participate in vandalism. We hypothesize that an adolescent's propensity for vandalism in this case relates to his/her childhood relationships with his/her parents — i.e., when a child attracts parental attention by means of disobedience and other negative behavior patterns (Dittman, Farruggia, Keown, & Sanders, 2016; Bogdanova, Rusyaeva & Vylegzhanina, 2016). Regression analysis did not show any significant correlation between an adolescent's attitude toward his/her father's upbringing style, and the adolescent's propensity for vandalism; this can be a consequence of the father's insignificant participation in the adolescent's life.

2. *Well-to-do families*. Isolated cases of adolescent vandalism within this group have some significantly different predictors in the family sphere. A mother can provoke an adolescent into destructive actions by increasing requirements, limiting his (her) freedom and independence. At the same time there may be too strict punishment for any faults, even those which are rare and insignificant. The reasons for a mother's domination and her strict style of parental upbringing can flow from transferring her conflict with her husband to the sphere of mother-child relationship, and also projecting her own undesirable traits onto a child. As a result, irregular adolescent vandalism may have the function of releasing negative emotions and expressing aggression toward items seen as substitutes for the mother herself (for example, home and mother's personal items, home appliances, furniture, and etc.). A father may provoke an adolescent's vandalism by his non-interference in the upbringing process, a non-interference which may be based on the father's attitude that the adolescent is an adult and responsible person. The father can perceive an adolescent as a friend and partner in common interests, and also a rival struggling for the attention of his wife, and as a stranger who lives own life.

An adolescent from a well-to-do family perceives his/her mother's inconsistent style of parental upbringing as a provocation for destructive activities. The unpredictability of her emotional reactions and actions, and the ambiguity of situations followed by punishments and encouragements, lead to the tense expectations of what she will do. Adolescents in this situation consider the lack of the father's active involvement as a factor enabling his/her own destructive behavior.

Hence maternal and paternal upbringing style have different effects on adolescents' behavior both in disadvantaged and well-to-do families, a result which accords with the research of E. Gracia and colleagues (Gracia, Lila, & Musitu, 2005). In any case, emotional contact between parents and adolescent, and a good (not-conflictive) relationships of the adolescent with his/her parents allows for a decreased risk of adolescent vandalism behavior in general, and especially of vandalism based on aggressive reactions (Csémy, Hrachovinová, Čáp, & Starostová, 2014).

## Conclusion

The results of our research prove a significant correlation between an adolescent's propensity for vandalism and violence, and an unfriendly atmosphere in the family. This correlates with the results of earlier investigations of adolescents with deviant behavior (Sibirjakov, 1998; Csémy, Hrachovinová, Čáp, & Starostová, 2014). In addition, our analysis of the styles of parental upbringing as predictors of adolescents' propensity for vandalism further clarifies which types of maternal and paternal behavior and relationships with a child favor an adolescent's propensity for vandalism.

This research supports the thesis that strict control by others can lead to a child's aggressive behavior (Wajda, 2013), but it also reveals the difference between problem-free and disadvantaged families on this issue. An adolescent from a disadvantaged family perceives the mother's upbringing efforts quite positively.

Our results prove a significant correlation between an adolescent's propensity for vandalism and an atmosphere of violence in the family. The number of parents in the family is an insignificant factor in forming and internalizing adolescent vandalism. The main predictors of adolescent propensity for vandalism can be found in the styles of parental upbringing. Herewith, we should consider that paternal and maternal styles of upbringing have different specific effects for developing adolescents' propensity for vandalism, a result which accords with the research results of Gracia, Lila, & Musitu (2005). Maternal upbringing has the greatest influence on adolescent destructive behavior, especially when the father's upbringing style is non-interference.

These findings should start a discussion about the necessity of transferring the focus of preventive measures against vandalism from the adolescent alone to his/her whole family. We also propose that preventive efforts against vandalism be directed to prevention of family violence, as well to taking a differential approach to parental education, directed to correction of individual parental styles of upbringing. Implementing these recommended changes in the strategy of vandalism prevention will lead to decreasing adolescents' propensity not only for vandalism, but for all forms of deviant behavior.

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## Specific Features of the Relationships between Operational Structures within Preschoolers' Systems of Thought

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**Background.** To build modern effective programs for the development of preschoolers' logical thinking, it is necessary to study the specifics of the operational structures functioning within their thought systems. According to Piaget, two operational groups of thought develop in parallel and synchrony: 1) logical-mathematical (classification, seriation, and invariant construction — the conservation principle); and 2) spatial-temporal — the structuring of space (linear ordering [LO], transformation of geometric forms [TGS], reconstruction of sensorimotor space at the level of representations [RSMS]) and time. However, there has been no empirical verification of the significant links between the levels of development of an individual's logical-mathematical and spatial-temporal operations in his/her system of thought.

**Purpose.** The purpose of this study was to examine the nature of the links between the elements of the logical-mathematical and spatial-operational structures in preschoolers' systems of thought.

**Design.** The study involved the following steps: 1) Individual diagnosis of the developmental level of logical-mathematical and spatial operations in 52 preschool children (5,8 – 7,1 years) using classical Piaget techniques and the Bender-Gestalt test; 2) identification of the operational developmental stage of each examinee; and 3) identification of the nature of the links between the logical-mathematical and spatial operational structures within each child's thinking system, using statistical tools for data analysis ( $\rho$  Spearman; regression analysis).

**Results.** Statistically significant differences between the developmental levels of spatial and logical-mathematical operations were revealed, as well as between the levels of development of spatial operations LO, TGS, and RSMS as measured by the Bender-Gestalt test. It was found that all the spatial operations (LO, TGS, RSMS) were conceived at a higher level than logical-mathematical operations (classification, seriation, and the conservation principle). Significant predictors of the development of logical-mathematical/spatial operations were identified.

**Conclusions.** Piaget's hypothesis that the development of the logical-mathematical and spatial operations within a child's thinking system is an interconnected process has received statistical justification in this study. The data we obtained suggest that both operational structures have similar sets of features. As proof that an internal causal nexus between the logical-mathematical and spatial structures exists, it is necessary to conduct formative experiments

in which some thought operations (predictors) will be formed by training, while previously missing operations are induced to appear in the child's thinking system indirectly.

**Key words:** logical thinking system, logical operations, spatial operations, preschoolers, Piaget.

## Introduction

Effective programs for developing preschoolers' logical thinking require new approaches, in light of increasing awareness of how mental processes are formed and develop. The modern stage of scientific development is characterized by a change of the rationality ideal in the sphere of scientific knowledge, as well as by a transition from non-classical models of knowledge to post-non-classical. Self-developing systems such as those of human beings and their activities, have become objects of knowledge (Mamardashvili, 2010; Stepin, 2012; Chernikova, 2011; Shvyrev, 2007, etc.). The mentality is seen as an open, nonlinear, non-equilibrium system (Prigogine, 1991; Klochko, 2008; Shabelnikov, 2013, etc.).

The functioning and development of nonlinear self-developing systems cannot be explained by external determinants alone. There is a so-called "actual start" within the system, which itself produces certain results, modifying the appearance and behavior of the system. Changes caused by external influences are not definitive, but probabilistic in nature, and identify the structure and characteristics of the system (Barybin, Korlyakov, 2011; Haken, 2015; Knyazeva, Kurdyumov, 2002; Nikolis, Prigogine, 1979; Prigogine, 1991; Prigogine, Stengers, 1986, etc.).

The nonlinearity, poly-variety, and instability of the dynamics of complex systems development require the examination of at least three groups of factors to be able to build developmental models of such systems, which can later become a basis for training program development. The three groups of factors include: 1) the system's own developmental trends (Group 1); 2) the methods of impact on the system (Group 2); and 3) external mechanisms of self-change processes initiated in the desired direction (Group 3) (Pogozhina, 2016). Therefore, in order to build modern, effective programs for aiding the development of preschoolers' logical thinking, it is necessary to study the specifics of the operational structures functioning within their thought systems (Group 1) (Pogozhina, 2015, 2016).

Piaget (1994) identifies two groups of operations in the preschoolers' thinking system: 1) the logical-mathematical, comprised of classification, seriation, and construction of an invariant (conservation principle) and 2) the spatial-temporal, comprised of three-dimensional design patterning (linear ordering, transformation of geometrical shapes, reconstruction of sensorimotor space at the level of representations), and the structuring of time (Piaget, 1994; Piaget, Inhelder, 2003; Bloom, Hastings, Madaus, 1971; Inhelder, Piaget, 2013; Piaget, Inhelder, Szeminska, 2013). These operations, especially the logical-mathematical, have been widely studied from the standpoint of their phenomenology, assessment diagnostic procedures development, and methods of formation. Examination of functional specifics, and the characteristics of the links between the levels of development of the various logical operations were carried out only within the logical-mathematical groups (Pogozhina, 2014, 2016; Astakhova Pogozhina, 2004; Pogozhina, 2011). Analysis of the links within the spatial-temporal operations group remained a challenge.

It should be noted that not all experts consider spatial operations to be part of a child's thinking system. Usually the child's spatial representations are studied based on Euclid's axiomatics (lines, squares, circles, angles, units, etc.). Empirical studies of perception confirm the existence of the child's spatial representations. From early childhood, the child forms a concept of space: the shape, the size, the ratio of figures and their elements in the space, objects localization, etc. (Bauer, 1985; Sergiyenko, 2006; Yakimanskaya 1980, etc.). However, analysis of geometric concepts shows that the child's initial spatial representations are not Euclidean, but "topological." That means that these representations are created only on the basis of qualitative ratios of double continuity, including such concepts as "connection and separation," "environment and order," etc., but excluding projectivity and distance conservation. According to Piaget and his colleagues, the children's spatial representations are topological in nature, and only later become simultaneously projective and Euclidean. In addition, these representations appear to be the result of motive activity and basic topological intuition (Piaget, 1994; Inhelder, Piaget, 2013; Piaget, Inhelder, Szeminska, 2013).

According to Piaget, from the child's point of view, at first there is no single space in which all objects and the child himself objectively (regardless of the child) exist. The child perceives a number of different spaces centered on his body. Gradually, during the child's development, these spaces begin to be coordinated, so that the child's spatial representations undergo significant changes. As a result, ideas appear about the constancy of objects existing independently of the child in a single space with him (the sensorimotor stage of intelligence development).

At the stage of concrete-operational thinking, the development of spatial representations continues. Projective and then metaphorical structures are formed on the basis of topological structures. Logical-mathematical and spatial structures are isomorphic towards each other. For example, the process of constructing an invariant (notions about conservation) is closely linked with the development of the ability to correlate various spatial parameters of objects among themselves (Piaget, 1994, p. 141–213, p. 594–628; Piaget, Inhelder, 2003; Piaget, Inhelder, Szeminska, 2013). If the child is perceiving logical-mathematical relationships between discontinuous, discrete objects of reality, then spatial operations "refer to the continuous objects and based on adjacency. These operations *are built in parallel with the logical-arithmetic and in synchrony with them ...* [emphasis added]" (Piaget, Inhelder, 2003, p. 105–106). However, there has been no empirical verification of the significance of the links between the levels of development of individual logic-mathematical and spatial-temporal operations in a child's thinking system. Therefore studying them is still relevant.

## Method

**Goal<sup>1</sup>.** Examination of the nature of the links between the elements of logical-mathematical and spatial operational structures in preschoolers' thinking systems.

**Sample.** 52 preschoolers aged five to seven years old (5,8 – 7,1) (N = 52). All participants were attending kindergartens, located in Moscow and Miass (Chelyabinsk region), Russia.

1 The research was carried out by us and under our supervision in collaboration with V.A. Kislova within her degree work.

**Diagnostic methods.** 1) decentration assessment — a modified “Three Mountains” technique (Piaget, Inhelder, 2003, 2013; Pogozhina, Lyui, 2009); 2) logical-mathematical operations: classification, seriation, conservation (discrete numbers, length, volume) — Piaget methods (Piaget, 1994; Piaget, Inhelder, 2003; Bloom, Hastings, Madaus, 1971); 3) spatial linear ordering operations (LO), transformation of geometrical shapes (TGS) — Piaget methods (*ibid.* and Piaget, Inhelder, 2013); and 4) reconstruction of sensorimotor space at the level of representations (RSMS) — Piaget methods (*ibid.*), Bender-Gestalt test (Belopol'skii, Lovi, 2008).

Classify levels (stages) of logical-mathematical and spatial operations development: I=operation is not formed; II=operation is partly formed; III=operation is formed in full.

**Data statistical processing.** SPSS 22.0 ( $\rho$  Spearman; regression analysis).

**Procedure.** During individual classes which lasted from 30 to 50 minutes, the children performed diagnostic tasks in the following order: 1) the reconstruction of the sensorimotor space at the level of representations (Bender-Gestalt test); 2) decentration; 3) seriation; 4) classification; 5) understanding of the principle of conservation (discrete quantities, volume, length); 6) transformation of geometrical shapes; 7) linear ordering; and 8) reconstruction of the sensorimotor space at the level of representations (Piaget technique). Each examinee's level of operations development was identified on the basis of the diagnostic results. The data was the analyzed using statistical methods in order to identify the nature of the links between the logical-mathematical and spatial operational structures of the child's thinking system.

## Results

Children's levels of operational structures development are formed inhomogeneously (see Figure 1).

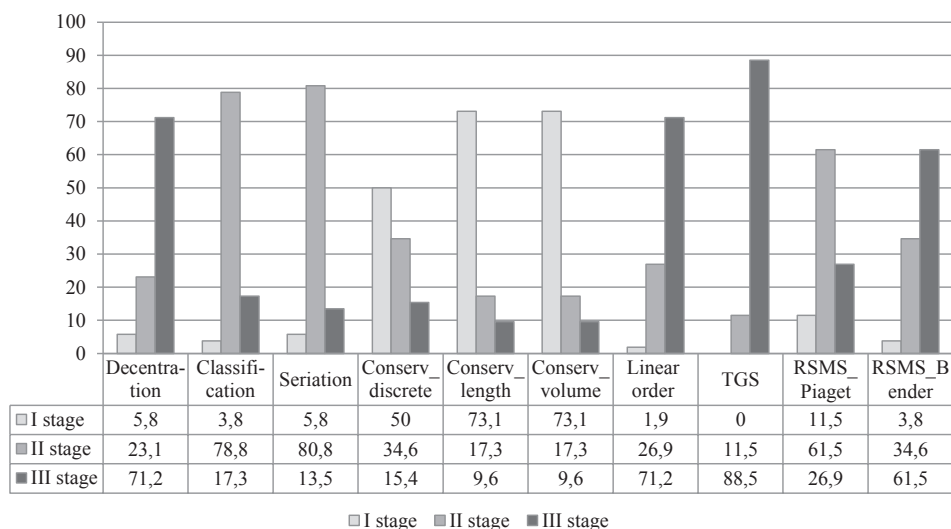


Figure 1. Levels of operational structures development (%; N = 52)

As seen in *Figure 1*, the ability to decentrate and carry out spatial operations is formed on a higher level than logical-mathematical group abilities. The data were processed using statistical analysis methods ( $\rho$  Spearman; regression analysis). Statistically significant differences between the developmental levels of logical-mathematical and spatial operations in the preschoolers' thinking systems were revealed (*Table 1*).

Table 1

*Correlation ratios between operations within preschoolers' thinking systems*  
( $\rho$  Spearman;  $N = 52$ )

	LO	TGS	RSMS_Piaget	RSMS_Bender
Decentration Piaget	.053	.020	.008	-.154
Seriation	<b>.296*</b>	<b>.333*</b>	.144	-.204
Classification	.181	<b>.361**</b>	-.040	-.051
Conservation_discrete	.403**	.092	.196	<b>-.359**</b>
Conservation_length	.105	.217	-.072	-.117
Conservation_volume	.189	.217	.053	<b>-.322*</b>
LO	1,000	<b>.290*</b>	.231	<b>-.329*</b>
TGS	.290*	1,000	.269	<b>-.317*</b>
RSMS Piaget	.231	.269	1,000	<b>-.525**</b>
RSMS Bender	<b>-.329*</b>	<b>-.317*</b>	<b>-.525**</b>	1,000

Note. \*\* Correlation is significant at 0.01 level (2-tailed). \* Correlation is significant at 0.05 level (2-tailed).

As can be seen from *Table 1*, the level of LO spatial operations development is significantly positively associated with the developmental levels of logical-mathematical operations of seriation ( $p < 0.05$ ) and discrete quantities conservation ( $p < 0.01$ ). The level of TGS spatial operations development is significantly positively associated with the development levels of seriation ( $p < 0.05$ ) and classification ( $p < 0.01$ ). The level of RSMS spatial operations development, measured using Bender-Gestalt test, is significantly negatively associated with the levels of understanding of the discrete quantities conservation principle ( $p < 0.01$ ) and the volume conservation principle ( $p < 0.05$ ) (the negative relationship is determined by the Bender test scoring process: the lower the score, the higher the level of development of the RSMS).

Statistically significant differences within a group of spatial operations were also revealed (*Table 1*). There were relationships between the developmental levels of the LO and the TGS, and RSMS Bender ( $p < 0.05$ ); between the TGS and RSMS Bender ( $p < 0.05$ ) development levels; as well as between the RSMS developmental level measured by Piaget and the RSMS developmental level measured by the Bender-Gestalt test ( $p < 0.01$ ).

The results of the regression analysis are presented in *Table 2*.

Table 2

*Significant predictors for space operations (regression coefficients)*

Linear order (LO)					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2,000	.334		5,991	.000
Seriation	.333	.157	<b>.287</b>	2,118	<b>.039</b>
(Constant)	2,248	.161		13,922	.000
Conservation of discrete quantities	.269	.089	<b>.392</b>	3,009	<b>.004</b>
(Constant)	3,138	.196		16,020	.000
RSMS_Bender	-.010	.004	<b>-.324</b>	-2,423	<b>.019</b>
Transformation of geometrical shapes (TGS)					
(Constant)	2,289	.207		11,072	.000
Classification	.279	.095	<b>.384</b>	2,943	<b>.005</b>
(Constant)	1,906	.258		7,379	.000
Seriation	.217	.094	<b>.293</b>	2,312	<b>.025</b>
Classification	.248	.092	<b>.341</b>	2,692	<b>.010</b>
Reconstruction of sensorimotor space at the level of representations (RSMS Bender)					
(Constant)	58,569	5,529		10,593	.000
Conservation of discrete quantities	-7,623	3,058	<b>-.332</b>	-2,493	<b>.016</b>
(Constant)	56,873	5,231		10,871	.000
Conservation of volume	-7,991	<b>3,458</b>	<b>-.311</b>	-2,311	<b>.025</b>

As can be seen from the *Table 2*, significant predictors for LO spatial operations are: seriation; understanding of the discrete quantities conservation principle; and reconstruction of the sensorimotor space at the level of representations (measured by Bender-Gestalt test) ( $p < 0.05$ ;  $p < 0.01$ ). The measure of understanding of the discrete quantities conservation principle more accurately predicts the possible level of LO operations development. For TGS spatial operations the following are meaningful predictors: classification; both classification and seriation; and reconstruction of the sensorimotor space at the level of representations (measured by methodology of Piaget) ( $p < 0.01$ ;  $p < 0.05$ ). The measure of classification and seriation predicts TGS development level more precisely. For RSMS spatial operations, measured by Bender-Gestalt test, predictors are the following: understanding of both the discrete and volume quantities conservation principles ( $p < 0.05$ ). A negative coefficient means that children with higher levels of understanding the discrete and volume quantities conservation principle make fewer mistakes on the Bender-Gestalt test.



## Discussion

Our data show that the operational structures within preschoolers' thinking systems are formed irregularly (*Figure 1*). The ability to decentrate and carry out spatial operations (LO, TGS, RSMS) is formed at a higher level than logical-mathematical operations (classification, seriation, and understanding the conservation principle). Within the spatial operations group, the best developed operation is the transformation of geometrical shapes (TGS): 88.5% of children scored at Stage III (the highest stage of development), and there was not one child (0%) who did not have this operation fully formed (i.e., was at the level of Stage I). Linear ordering (LO) also showed a high level of development: 71.2% of children have scored at Stage III, and only 1.9% of children at Stage I. Reconstruction of sensorimotor space at the level of representations, RSMS measured by Bender-Gestalt test, was fully formed (Stage III) in 61.5% of the children, and was not formed (Stage I) in only 3.8% of the children.

There is a discrepancy between the figures of the RSMS development level depending on whether the Piaget or Bender-Gestalt method was used. RSMS as measured by the Piaget technique was fully formed in only 26.9% of the children (Stage III), while 11.5% of the children did not have this operation fully formed (Stage I); the majority (61.5%) of the preschoolers was at Stage II. (*Figure 1*). From our point of view, such a discrepancy is caused by the fact that the Bender-Gestalt test has clearer and more formalized evaluation criteria than Piaget's methodology. Therefore the Bender-Gestalt test provides more precise data on the level of development. Both methods measure the performance of the same spatial operations and show a significant correlation ( $\rho$  Spearman;  $p < 0.01$ ) (*Table 1*). From our point of view, the RSMS indicators obtained by the Bender-Gestalt test are more precise, a finding which is confirmed by its coherence with other developmental indicators of the spatial operations group (LO and TGS) (*Figure 1*, *Table 1*).

Spatial decentration ability is as highly developed as spatial operations. 71.2% of the children scored at Stage III, and only 5.8% of the preschoolers at Stage I. However, there are no significant relationships between the developmental levels of the decentration ability and spatial operations (*Table 1*). These results are not really consistent with Piaget's beliefs about the place of decentration in a child's thinking system and its impact on the process of building operational structures (Inhelder, Piaget, 2013; Piaget, Inhelder, 2003). Therefore these data require further empirical validation and analysis. Perhaps the lack of a meaningful relationship is associated with significant differences in the content of the data on thinking structures.

The level of development of the logical-mathematical group's operations was lower than spatial group's operations. Seriation and classification operations were mostly at Stage II of development (80.8% and 78.8% respectively). Understanding of the discrete quantities, length, and volume conservation principle was at Stage I (50%; 73.1%; 73.1% respectively). This result may indicate that logical operations of classification and seriation are formed in children faster than understanding of the conservation principle. The data is consistent with Piaget's views about the relationship between the levels of development of logical-mathematical operations (Piaget, 1994; Piaget, Inhelder, 2003), and are consistent with the results of our previous research (Pogozhina, 2014, 2016).

Comparison of the developmental levels of logical-mathematical and spatial operations within the children's thinking systems suggests that spatial operations are formed earlier, and may have some impact on the development of other elements of the system—in particular, on the logical-mathematical operations group. Our research on the logical-mathematical operations group (classification, seriation, conservation) and decentration has experimentally confirmed that it is possible to form and develop operational structures as complex self-organizing systems through already existing content within the child's cognitive system, by external initiation (external cause) of content which stimulates self-organization mechanisms (internal cause). This increases the child's developmental level as a whole from the pre-operational level to the concrete-operational level (Pogozhina, 2014, 2016; Pogozhina, Lyui, 2009).

As much as that is true for the logical-mathematical operations group, we suggest that increased levels of development of spatial operations by managed learning can be an external cause for initiating self-change processes of logical-mathematical content within the child's thinking system. This will open up a new way of building modern efficient programs for developing preschoolers' cognitive structures. Nevertheless, in order to test this hypothesis, it is necessary to identify significant relationships between the developmental levels of spatial and logical-mathematical operations (Pogozhina, 2015).

Statistical methods of data analysis ( $\rho$  Spearman) revealed significant relationships between some logical-mathematical and spatial operational structures (Table 1). Such relationships were revealed between seriation, the discrete quantities conservation principle, and linear ordering (LO); between classification, seriation, and the transformation of geometrical shapes (TGS); and between the conservation of discrete quantities, volume, and space on the first (RSMS Bender). Relationships were also revealed between all elements within the spatial operations group (LO, TGS, RSMS); that is consistent with the views of Piaget on the relationship between operational structures and their mutual influence (Piaget, 1994). This relationship also corresponds with the available data on the existence of significant positive relationships between the structures within the logical-mathematical operations group (Pogozhina, 2015b).

There is no significant relationship between the ability to decentrate and spatial operations development. In our opinion this can be explained by the fact that decentration requires the development of a much higher degree of abstract thinking than other spatial operations. Decentration also illustrates a higher level of development of the child's operational thinking system. Therefore we concede that decentration is not associated with the formation of spatial operations at a certain stage of a child's mental development.

Regression models, along with the correlations, are of great interest in interpreting our results (Table 2). Regression analysis showed that the most significant predictors of LO operations were the development of understanding the principle of discrete quantities conservation ( $p < 0.01$ ) and seriation ( $p < 0.05$ ). In the case of TGS, the predictors were classification ( $p < 0.01$ ), and both classification and seriation together ( $p < 0.05$ ). In the case of RSMS, the predictors were the discrete quantities conservation principle ( $p < 0.05$ ) and the volume conservation principle ( $p < 0.05$ ).

Linear regression analysis also showed that there could be reverse dependencies. These results are consistent with the theoretical assumptions of Piaget, who believed that the genesis of space in sensorimotor intelligence is subject to motions development. The structure of such movements is developed gradually and as a result reaches an equilibrium motor organization state, the structure of the “group.”

Equilibrium of structural components requires reversibility and identity. However, reversibility and identity, along with other conditions (combinativity, associativity, tautology), provide a balance between of basic groups (including classification and seriation logical operations). The emergence groups, in turn, is connected with the construction of invariants, i.e. concepts conservation (Piaget, 1994; Piaget, Inhelder, 2003). This explains the significant relationship between the developmental levels of logical-mathematical and spatial operations. After all, reversibility and identity are included in both spatial and logical-mathematical operations.

## Conclusion

As a result of our empirical research, we found that the operational structures of preschoolers' thinking systems operate and develop in an interconnected manner, so that an increase of the developmental level of some system operations is accompanied by an increase of the developmental level of other operations. We therefore conclude:

1. There is a significant relationship between the developmental levels of spatial and logical-mathematical operations, namely:

- between the developmental levels of the linear ordering spatial operations (LO) and logical-mathematical operations group-seriation ( $p < 0.05$ ), and the discrete the quantities conservation principle ( $p < 0.01$ );
- between the developmental levels of the transformation of geometrical shapes (TGS), and seriation ( $p < 0.05$ ) and classification ( $p < 0.01$ );
- between the developmental levels of reconstruction of sensorimotor space at the representational level, measured by Bender-Gestalt test (RSMS Bender), understanding of the discrete quantities conservation principle ( $p < 0.01$ ), and understanding the volume conservation principle ( $p < 0.05$ );

2. There is a significant relationship between the developmental levels of linear ordering spatial operations (LO), transformation of geometrical shapes (TGS), and reconstruction of sensorimotor space at the level of representations (RSMS Bender) ( $p < 0.01$ ;  $p < 0.05$ ).

3. Spatial group operations (LO, TGS, RSMS) are formed at a higher level than logical-mathematical operations (classification, seriation, understanding the principle of conservation). Significant predictors of the development of logical-mathematical/spatial operations were identified (regression analysis). Significant predictors of logical-mathematical operations development are the following spatial operations:

- Spatial operation LO is a predictor for the logical operation of seriation ( $p < 0.05$ ). Thus, preschoolers who properly perform the task on the linear ordering have a higher development level of seriation and vice versa;

- Spatial operation TGS is a predictor for the logical-mathematical operation of classification ( $p < 0.01$ ), as well as classification and seriation together ( $p < 0.05$ ). This means that these operations contribute to the development of each other.
- Spatial operation LO is a predictor of the understanding of the principle of discrete quantities conservation ( $p < 0.01$ ) and RSMS Bender ( $p < 0.05$ ). This means that children who make fewer mistakes in linear ordering tasks and Bender-Gestalt test tasks, have a higher level of understanding of the conservation principle, and vice versa;
- The RSMS Bender spatial operation is a predictor of the understanding of the volume conservation principle ( $p < 0.05$ ). This means that RSMS operations and understanding the conservation principle contribute to maintaining each other's level of development.

4. The significant relationships we identified between logical-mathematical and spatial operations in preschoolers' thinking systems cannot be regarded as proof of a causal relationship between them. However, the data suggest that the operational structures we studied have a similar set of components, and that is why the appearance of new content in the subject's operational system, and its inclusion in an operational structure, increases the level of its development.

5. In order to prove the existence of internal causal dependencies between the structures of the logical-mathematical and spatial operational systems, it is necessary to conduct formative experiments in which some operations (predictors) will be formed by a managed learning process, while other previously missing operations will appear indirectly through the formation of the mentioned operations.

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## EDUCATIONAL PSYCHOLOGY

### An Observational Analysis of Executive Performance in School Children

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**Background.** Today's research on human executive functioning (EF) demonstrates a deepening understanding of this psychological concept as a mental process, as it has been assessed in testing contexts. But little effort has been made to approach the executive function from an ecological viewpoint, one which allows its study in the context of real life, and treats this function as simultaneously mental and behavioral.

**Objective and Design.** The purpose of the present research was to explore how 37 Colombian children, aged four, six, and eight years old, with typical psychological development, used their executive functions in a daily context, such as school classes.

**Results.** Observational analysis revealed that only 40% of the participants could control and regulate their behavior to achieve class goals. In the few cases where executive regulation was observed, socio-economic status and executive performance marked the behavioral patterns used by children to control and regulate their tasks in class.

**Conclusion.** Participants in this study showed that, independent of their EF performance level, their ability to use EF to control and regulate a daily activity, such as their behavior in class, depends on their ability to understand the advantages of acting executively. Most importantly, this skill differs among children by variables such as socio-economic status.

**Keywords:** executive function (EF), children, observational analysis, cognition, socio-economic status (SES).

## Introduction

Nowadays, studies of Executive Function (EF) address the topic principally from a cognitive and neuropsychological standpoint, which conceives it as a mental process of self-regulation and metacognition associated with neural substrates (Espy, 2004; Friedman & Miyake, 2016; Monette & Bigras, 2008; Reinberg & Banich, 2016;

Yanwei, Grabell, Wakschlag, Huppert, & Perlman, 2016). Specifically, EF is characterized as an action by frontal-subcortical cerebral networks that control and monitor the cognitive system by planning, inhibiting, retaining, anticipating, and giving feedback to the process of making decisions, resolving conflicts, detecting and correcting errors, or solving problems (Benson, Sabbagh, Carlson & Zelazo, 2013; Fernández-Duque, Baird, & Posner, 2000; García-Barrera, Karr, & Kamphaus, 2013; Lee, Bull, & Ho, 2013; Miller, Giesbrecht, Müller, McInerney, & Kerns, 2012; Stuss & Alexander, 2000). In this sense, today's approach to understanding human EF focuses on devising mental and neurological models that explain its internal structure and dynamics.

This approach has resulted in a robust theoretical framework that understands EF as a higher mental function composed of multiple mental processes and cerebral mechanisms, such as inhibition, working memory, planning, self-regulation, flexibility, monitoring, and feedback (Carlson, Mandell, & Williams, 2004; Hughes, 2002; Shayer et al., 2015; Usai, Viterbori, Traverso, & De Franchis, 2014). But little consideration has been given to addressing EF from an ecological viewpoint: that is, a view that considers it a neuropsychological mechanism which facilitates and enhances the interaction between a person and his/her surroundings. More specifically, EF has not been studied as to how it operates in real life; how its associated mental processes are used and expressed behaviorally; or what possible environmental variables could be associated with its acquisition and development in the context of daily life.

Put in terms of the predominant approaches, this new point of view defines EF as the capacity to consciously self-regulate and adjust psychological functioning when presented with novel tasks, while keeping in mind possible future situations; it considers this deliberate control to be made possible by the cortico-subcortical networks of the prefrontal cortex.

Our contrasting approach arises from studying the genesis of the concept of EF, which reminds us that this type of functioning involves intentionally mastering one's own behavior to adapt to different contexts (Arievitch & van der Veer, 2004; Luria, 1970, 1985; Taylor, et al., 1984; Vygotsky, 1987), and arises from cultural-historical contributions to the western conceptualization of EF (Bodrova, Leong, & Akhutina, 2011; Holodynski, 2013; Lewis & Carpendale, 2009). This approach considers the control and regulation of behavior as a person's subordination of his/her present actions to the attainment of future goals through the use of mediation which can control the external environment, but also dominates the person's own behavior based on his/her personal motives and intentions (Akhutina, 2003; Arievitch & van der Veer, 2004; Del Río, 2002; Slobodchikov, 2004).

This new viewpoint on EF represents an ecological approach because it presupposes that relevant research on EF should be designed with the understanding that all mental functioning and behavioral inputs are functional entities of a person interacting with his/her surroundings to ensure his/her adaptation and survival. Mental functioning is responsible for conceptualizing the external world and synchronizing the interaction between the person and his/her surroundings, while behavior refers to the actions the person performs in that external reality to adjust his/her performance to personal motives and environmental conditions. That is, the person acts in his/her internal and external reality to ensure survival; that is

why the person's activity must be productive as it applies *to* something (environmental conditions) and *for* something (the person's own adaptation to a changing world and achievement of personal goals).

EF involves both mental functioning and behavioral inputs at the same time, rather than mental functioning only, as current cognitive and neuropsychological frameworks suggest. Therefore, EF can only be developed by an agent capable of designing, planning, and executing it. This approach differentiates between two types of agents, an agent of action and an agent that masters the action. The latter is the agent that understands, plans, performs, and monitors its own behavior, and has the capacity to lead others' executive performances. To the contrary, the agent of action can perform executively, but does not have the ability to initiate and plan *how* to act executively; he/she must be guided by an agent who has mastered executive performances. More competent individuals must develop and teach agents of action when and how to regulate and control their behavior to act executively.

On the other hand, an agent employs EF to supply a need to adjust to social and natural environments. This need generates a motive to perform executively (reasons to control and monitor one's own performance to fulfill a certain need), and a goal to be reached by acting executively. Then, EF is activated by an agent only when he/she sees the need to adjust his/her acting to ensure an optimal interaction with the environment, and when that agent has the understanding and motivation to execute an action and control it. If there is no understanding and motivation to perform executively, control and regulation of behavior would not happen. That is why this type of functioning is activated not only by novel tasks, but also by all those daily activities in which automatic responses are not sufficient, and thus require deliberate control and monitoring of their execution to ensure effective achievement.

Once a person feels the need to perform executively, the process of control and regulation of his/her own behavior starts. It develops in a step-by-step interaction with the external context, according to the principles of the perception-action cycle (Ardestani, Shen, Darvas, Toga, & Fuster, 2016; Fuster, 2004, 2015), in which cerebral mechanisms connect the organism with its environment through a circular neural processing.

In sum, we conclude that EF is a volitional act, performed consciously by an agent to adapt his/her acting to the internal motives and goals that guide him/her on how to act for personal gain.

The present study highlights the relevance of considering a more ecological viewpoint when approaching EF studies, such as the one just mentioned; to explore how EF is used in the context of real life to control and monitor behavior to enhance personal performance; and to look into what may be the variables that contribute to its acquisition and development.

Specifically, this study explores how children of four, six, and eight years old use their EF in a daily context, i.e. at school, and seeks to determine whether children demonstrating high and low EF performance on a group of psychological tests, show different executive behavioral patterns for controlling and monitoring themselves in school classes. The ages selected in this work correspond to those reported in the literature as critical periods of the development of EF in children (Anderson,

2010). Also, our selection included one preschool age, and two school age years, since our work aimed to explore executive functioning in children during their early school years.

## Method

### *Participants*

The executive functioning profiles obtained in our previous studies (Cadavid-Ruiz & Del Río, 2012; Cadavid-Ruiz, del Río, Egido, & Galindo, 2016) of 244 Colombian children aged four, six, and eight years old who attended public and private schools in Bogotá-Colombia, and who showed typical psychological development, were used to identify children with the highest (percentile scores between 80 and 100) and lowest scores (percentile scores between 1 and 20) on EF performance per age group. We then classified them according to their socio-economic status (SES)--rural, low, middle, and high. Thirty-seven of the children who met these requirements were chosen to participate in the present study. *Table 1* details their characteristics.

Table 1

*Participating children*

Age and EF performance	Rural SES		Low SES		Middle SES		High SES	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Four years								
Low EF	1	1	1	1		1	X	1
High EF	1	1	X	1	1	1	1	1
Six years								
Low EF	X	1	1	1	1	1	1	X
High EF	1	1	X	X	1	1	1	1
Eight years								
Low EF	1	1	1	1	1	X	1	1
High EF	X	1	X	X	1	1	1	1

*Note.* Boxes with an X mean that there were no children with these characteristics in the population where participants were recruited, and white boxes refer to children who did not come to school on the recording day set.

### *Materials*

The behavior of the children during one hour in the classroom was videotaped, and transcribed using Transana (Frassnacht & Woods, 2005) software for further analysis. Specifically, observational analysis was conducted to examine whether the children activated their EF to control and regulate their behavior in class, and if they did, what the children's behavior could tell us about how they functioned executively.

Table 2

*Coding system used in the observational analysis of executive functioning in school*

Conceptual criteria and its categories
<p>External structure of class activity (others' behavior)</p> <ol style="list-style-type: none"> <li>1. Behaviors that interfere with the child's class activity</li> <li>2. Non-distractive behaviors of others</li> <li>3. Explicit social mediation directed to the child's proximal zone of development</li> <li>4. Implicit social mediation that facilitates child's learning</li> </ol>
<p>Verbal behavior — silent and spoken periods</p> <ol style="list-style-type: none"> <li>1. Not related to class activity</li> <li>2. Related to class activity</li> <li>3. Divided between class activity and distractors</li> </ol>
<p>Psychological mediation</p> <ol style="list-style-type: none"> <li>1. Verbal mediation and/or objects used to help the child perceive and understand the purpose and steps of class activity</li> <li>2. Verbal mediation and/or objects used to execute class activity (includes both physical actions, such as coloring or writing, and mental actions, such as reading, calculating, watching a movie, etc.)</li> </ol>
<p>Gaze direction</p> <ol style="list-style-type: none"> <li>1. Looking at a distracting object or person</li> <li>2. Neutral gaze (not looking at any point in particular, as when mentally calculating)</li> <li>3. Social mediator who is directing class activity</li> <li>4. Objects relevant to class activity (for example, the notebook when writing down exercise instructions)</li> </ol>
<p>Hand movements</p> <ol style="list-style-type: none"> <li>1. Touching a distractor — object or person</li> <li>2. Neutral movements</li> <li>3. Social mediator who is directing class activity and/or the object that is being mentioned</li> <li>4. Social mediator who is developing or directing class activity, and/or the object that the social mediator is using and is relevant for the child's own class activity</li> <li>5. Object relevant to class activity</li> </ol>
<p>Body posture</p> <ol style="list-style-type: none"> <li>1. Not appropriate for sustaining class activity</li> <li>2. Sustaining class activity</li> </ol>
<p>Type of action</p> <ol style="list-style-type: none"> <li>1. Distractive action</li> <li>2. Action subordinate to the main class activity (for example, erasing when writing)</li> <li>3. Action relevant to the class activity</li> </ol>
<p>Level of execution of the activity (Type of executive functioning)</p> <ol style="list-style-type: none"> <li>1. Participating execution (when children follow the direction of others in class activity)</li> <li>2. Appropriating execution (child understands what has to be done, but needs minimal orientation for executing some steps)</li> <li>3. Internalized execution (child knows what has to be done and does it)</li> </ol>

For this purpose, the transcribed videos were coded with a system which was designed for the present study, and reflects our own understanding of human executive functioning. The coding system, shown in *Table 2*, consisted of eight different categories, and was based on the idea that executive activity is carried out by an actor in a succession of stages, which integrate into one mental and behavioral process to ultimately profit from that activity. As can be seen, the criteria used to code EF activity assume that any individual who carries out an executive activity does it in a real day-to-day context, and that from the control and regulation of the execution of that activity, the individual will obtain an expected result.

In this vein, the criterion *external structure of class activity* sought to trace stimuli from the child's external environment that were relevant to his/her performance and final result: for example, verbal and non-verbal stimuli generated by others, which may or not guide the child's performance in class. The criteria of *verbal behavior*, *gaze direction*, *hand movements*, *body posture*, and *type of action* were designed to establish what the child's observable behavior could tell us about when the child activates his/her EF, and how he/she uses it to control his/her own behavior. The *psychological mediation* criterion has its conceptual roots in the work developed by Vygotsky (1995) and Del Río (2002), and was used to inquire into the symbolic and material tools that a child uses to understand, execute, and control his/her behavior. Finally, the criterion of *level of execution of the class activity* was developed to deduce the level of proficiency with which a child performs and completes classroom tasks.

All categories included codes for a continuum of executive/non-executive behaviors.

## Procedure

A group of Colombian children who participated in previous work on EF development (Cadavid-Ruiz et al., 2016), and who satisfied the requirements of age, sex, and SES established for this study, were selected to participate. The main objective was to examine whether children aged four, six, and eight years, from different SES levels and with low and high EF performances, behave executively to control and regulate their behavior to accomplish one hour of class goals. After receiving parental approvals (by their signing informed consents) for their children to participate in this study, recordings of one hour of class time involving each recruited child began.

An observer previously known to the children stood at one of the front corners of the classroom before the start of the class, and placed a camera at a height that would obtain a direct view of the face and body of a child in his/her usual place, but at the same time would limit the probability that the child would feel observed. Children who were attending the same class were videotaped at the same time, and, depending upon their location, were captured on video simultaneously, or in periods that allowed tracking of their whole school activity.

The recordings started at the beginning of the class and ended when the teacher concluded it. Teachers were asked to give their classes as they normally did (as a presenter of tasks and motivator). The children were told that the observer, familiar to the children, was accompanying them to record what a day at the school was like, and would be filming other classrooms, as well as theirs.



The resulting videos were used to examine the types of class activities developed by the children, and to identify which of these activities could be considered meaningful for the children. In other words, we explored which class activities were clear enough for children to understand the structure and objectives to be achieved, so their control and regulation made sense to them. According to this reasoning, we sought to identify which activities were meaningful for each of the participants, because these activities might be the ones that children would subject to their supervision and regulation.

This first analysis consisted of a careful examination of the whole content of each videotape obtained, a description of the class activities developed in each one of them, and a subsequent rating of the children's behavior concerning their understanding of the class activity and goals. Activities were considered to be meaningful when children showed an understanding that it allowed them to achieve something concrete and tangible (e.g. building a puzzle to know its final form, or writing and drawing a card that they would give to their mother on Mother's Day), or when they understood the structure of the class activity (which steps of the class activities were initial, intermediate, and final; class elements and tools to be used; who to ask when in doubt, etc.)

The videos of class activities that were identified as meaningful were transcribed using Transana software. The transcripts included verbal content, spatial displacements, body movements, gaze direction, gestures, and postures produced by the participants, as well as teachers and classmates' verbal production and non-verbal behavior when they were interacting or being observed by a participant. Furthermore, all transcripts were marked in time intervals of one second so as to allow temporal tracking of the participants' behavior during the course of their class activity.

Once the transcripts were complete, a coding system was designed based on our understanding of EF. This system was evaluated in a pilot study with four of the final videos, which were analyzed for adjustment to the study requirements. Subsequently, transcripts were analyzed and coded with the final coding system by the same analyst at two different times, with a lapse of two months inbetween. The first rating was used to obtain frequency statistics, and thus determine the possibility that two codes would occur simultaneously, in order to explore possible behavioral patterns when children with low and high executive performances control and regulate class tasks. The second rating was used to calculate the reliability of the coding system.

## Results

A group of children from an extensive study on EF was chosen to explore when and how children activate and use their EF to control and regulate activities in their daily contexts, such as school activities, and determine whether there are different patterns shown by children with different socio-demographic variables, such as sex, age, SES, as to their EF performance.

The reliability of these results was calculated with Cohen's *kappa*. The reliability mean was  $\kappa=0.92$ . Table 3 details the *kappa* values for each criterion of the coding system.

Table 3

*Intra-observer reliability indices for the coding system*

Criteria of the coding system	$\kappa$	$z$
External structure of class activity	0.95	108.55
Verbal behavior	0.93	95.03
Psychological mediation	0.79	75.00
Gaze direction	0.96	138.61
Hand movements	0.91	100.49
Body posture	0.85	80.27
Type of action	0.94	114.05
Level of execution of the activity	0.99	124.59

*Note:* \*  $p(z < .05)$ 

The first finding revealed that only 37 children of the 48 possible combinations of the above variables fit the criteria. As is shown in *Table 1*, few children with high SES showed low executive performances (percentile scores between 80 and 100), and few children with low SES showed high executive performances (percentile scores between 1 and 20). This finding suggests that the development of EF in Colombian children may depend to some extent on their living conditions, which are associated with their socio-economic status (For more information about this subject, consult Cadavid-Ruiz & Del Río, 2012; Cadavid-Ruiz et al., 2016).

Table 4

*Children who control and regulate a meaningful activity during class hour*

Age and EF Performance	Rural SES		Low SES		Middle SES		High SES	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Four years								
Low EF		1						1
High EF	1				1	1	1	1
Six years								
Low EF				1			1	
High EF	1					1		1
Eight years								
Low EF								1
High EF								1

Secondly, observational analysis run on the 37 final recordings showed that only 14 of the 37 children developed a meaningful activity during the class hour.

Table 4 shows that four years old was the predominant age, while eight years old had only two representatives. The most common SES was the high level, and the least represented was the low SES level. Moreover, boys with high EF performances were more numerous than other EF performance combinations.

When analyzing the socio-demographic variables all together, one can conclude that children of four years old, of middle and high SES levels, and with high EF performances comprise the group that tended to develop a meaningful activity during class hour, while eight-year-old children of all SES statuses and of both EF performance levels, comprise the group least likely to develop a meaningful activity during the class hour.

Observational analysis also showed that the criteria of the external structure of class activity tended to be divided between directive and distractive periods, with a slight predominance of the first. The distractive periods referred to movements and sounds generated by the classroom in the course of class activity, but which are not meant to distract children's attention. On the other hand, directive intervals are intended to explain and guide children's attention to the goals, procedures, and tasks that have to be done during the class hour. During these directive intervals, a teacher acted as a clear presenter and motivator of tasks to his/her students during the performance of the class activities.

Finally, observational analysis was used to explore possible behavioral patterns in response to the external structure of class activity, class performance and its control, and the level of EF the children used to control and regulate their class activity. Significant patterns were reported for high and low EF performances, and for four and six year olds. No calculations were made for eight year olds because of the small size of this subsample.

The results showed that children with low EF performances presented two different gaze patterns: they tended to look at and manipulate distractive objects ( $X^2(2, N=5) = 1492.38, p < .05$ ), or look at and manipulate relevant objects for the class activity ( $X^2(6, N=5) = 751.61, p < .05$ ), the first pattern prevailing over the second one. Along the same lines, this group of children tended to use psychological mediations as distraction; they spent part of class time on distraction, unlike the high-level EF performance group, which used it to guide and explore relevant objects for the class tasks ( $X^2(3, N=5) = 416.14, p < .05$ ).

For their part, children with high EF performances are distinguished by the fact that they direct their gaze to relevant others and/or objects for understanding and performing class tasks ( $X^2(6, N=9) = 580.74, p < .05$ ), and manipulate those objects that allow them to guide and execute their class activity ( $X^2(2, N=9) = 394.20, p < .05$ ). In other words, children with high EF performance levels tended to focus their gaze on manipulating objects that had been mentioned in the external structure of class activity, so to enhance their execution and ensure their success with them. They also tended to look at a distractor when they are in a distractive action, and look to relevant objects for a class activity when they are performing it ( $X^2(6, N=9) = 1112.56, p < .05$ ).

In general terms, children of four years old presented the same behavioral patterns as the group of high EF performance; meanwhile, children of six years old tended to behave similarly to the low EF performance group. Four-year-old children are distinguished from the rest in that they better inhibit distractors, main-

taining their gaze directed on the class activity ( $X^2(6, N=7)=246.55, p<.05$ ); due to the teacher's intervention. Six-year-old children stand out by the fact that they spend more of their class activity time looking at and manipulating distractive objects than in performing the activity, even more time than that spent by children with low EF performance ( $X^2(2, N=5)=1418.54, p<.05$ ).

When analyzing the children's types of action in relation to the external structure of class activity, we found that all children tended to be more distracted when the external structure is distractive. Children of four years old ( $X^2(4, N=7)=45.16, p<.05$ ) and the group of low EF performance ( $X^2(4, N=5)=234.71, p<.05$ ) also distract themselves when a social mediator is giving advice to a classmate, even though they could enhance their own class performance by attending to that advice.

The first finding suggests that children of four, six, and eight years old, regardless of their EF abilities, have difficulties self-regulating their behavior, and thus inhibiting any influence from external stimuli. The second result suggests that younger children and children with lower executive abilities had greater self-regulative difficulties since they cannot see that they could benefit from the advice given to others. In all cases, these findings highlight a low appropriation of self-regulation and inhibition to control and regulate their class activity in children aged four, six, and eight years old.

When exploring the type of executive functioning employed by children to control and perform class activities, we found that all children tended to dedicate more time to developing and regulating single steps of the class activity than to the whole task (Table 5). This may be because the class goals and the guides given to children are not adjusted to the children's levels of knowledge and cognitive resources. So, the children do not grasp how to use guidelines offered by the class to perform the activity as a whole, but they are capable of discerning which instructions may be relevant to executing and controlling single steps.

Table 5

*X<sup>2</sup> values for the criterion of type of executive functioning*

Children	$\chi^2$
Four years old	$\chi^2(2, N=7)=50.74, p<.05$
Six years old	$\chi^2(2, N=5)=21.98, p<.05$
Low EF performance group	$\chi^2(2, N=5)=63.99, p<.05$
High EF performance group	$\chi^2(2, N=9)=14.39, p<.05$

*Note. The group of eight years old was not included in these analyses since it did not have the minimum sample size needed for statistical analysis.*

## Discussion

Unlike current studies on EF that focus on investigating the mental abilities associated with this psychological process through test assessment, the present study sought to explore executive functioning from an approach that allowed a more

ecological approximation to this psychological reality. Our assumption was that EF consists of the integration of a mental process with its observable behavior to regulate and enhance a child's adaptation to his/her environment.

The findings of this particular approach revealed that only 40% of the children showed that they could control and regulate their behavior to achieve class goals. This means that less than half of these children activate their executive functioning so as to regulate and enhance their class performance. If, according to our approach, EF "turns on" when the performer of an action considers that its regulation and control may be profitable, then this first result suggests that class activities may offer too few explicit and direct motives to children for stimulating and orienting them on when and how to perform executively to achieve class goals and tasks. As a result, most of the class activities recorded developed by the children following their teacher's instructions and monitoring. Children who did not activate their EF may leave the executive role to another more competent person (an agent who masters the action), because this person is the one who always takes care of monitoring and regulating their performance in class, but is also the one who does not explain to them the importance of getting involved. This finding is in line with cultural-historical approach of social mediation (Bodrova et al., 2011; Del Río, 2002).

In the few cases where a truly executive regulation of class activities was observed, we hypothesized that these children may have obtained their motivation to control and regulate their behavior in class through parental advice, and not only from the teachers as immediate motivators. Parents may have explained the relevance of studying for achieving greater goals in life, and so made clear to the child the importance of controlling and regulating class performance. Therefore, this motivation is used to give meaning to class tasks, and to learning when and how to perform executively. Further studies along these lines are needed to confirm this hypothesis, although it is supported in the study of social motives and EF developed by Lewis & Carpendale (2009).

Children who did perform executively during their class activities revealed some of the behavioral patterns they used to control and regulate their behavior in class. Specifically, children of four, six, and eight years old, of both EF performance levels, tend to look at and perform actions of the same type: When they are looking at a distractive stimulus, they tend to be in a distractive action; when they are looking to a social mediator who is giving advice, they tend to be using the objects the social mediator is mentioning; and when they are looking at objects relevant to the class activity, they tend to be performing it.

Three variables explain some of the differences in the behavioral patterns observed in the children we evaluated: age, EF performance level, and SES. These same variables had been highlighted by studies of EF based on psychometric measures as well (Benson et al., 2013; Cadavid-Ruiz et al., 2016).

With regard to age, we found that at younger ages, more children tend to monitor their class activity. We hypothesize that the reason that more children aged four showed high EF than those aged six and eight years, and that six year olds showed higher EF than eight year olds, was because at younger ages, class contents tend to be concrete and practical, making it easier for children to understand the practical value of controlling and regulating a class activity. On the other hand, at older ages,

class contents are directed to the acquisition of knowledge *per se*, without highlighting how to use this knowledge to function in real life, and therefore the need for the child's behavior to be controlled and monitored. Additionally, we found that most of the class activities recorded consisted of design tasks familiar to the children, and that they already knew their dynamics. Few class activities were directed toward expanding the children's zone of proximal development.

We believe both points may contribute to explaining why the older children tended to control and regulate class activities to a lesser extent than the younger children.

With respect to EF performance differences, we found that at the high EF level, executive behavioral patterns prevailed. These children tended to use most of the class time to develop and monitor their class performance, and even though children with low EF performance levels spent more time in executive actions, they also dedicated more time to distractive actions than children with high EF levels. In particular, they can be looking to relevant objects for their class activity, but be manipulating distractive objects, or they use psychological mediation to understand and guide their class activity and to distract themselves from their main goal in class. Therefore, it can be said that children with high EF levels differ from children with low EF levels in that they understand how to use their executive abilities to control and regulate class tasks, and have better proficiency skills for using them.

In relation to SES differences, the expected results were obtained. Children of middle and high SES levels tend to control and regulate their classroom activities more often than children of rural and low SES levels, as was evidenced in other studies (Cadavid-Ruiz & Del Río, 2012; Cadavid-Ruiz et al., 2016). This may be due to the influence of other variables such as the quality of family and school education the children receive. We assume that families of middle and high SES levels make a special effort to guide their children on how to regulate their daily activities, so as to enhance their functionality in life.

These findings as a whole showed that EF performance levels obtained with traditional test assessment are useful to infer children's behavioral patterns to control and regulate class activities, but are poor tools for determining when children feel the need to perform executively in class activities, so as to obtain a benefit from controlling and regulating their class actions.

## Limitations

Despite the advantages of the particular approach used in this study to highlight when and how children perform executively in a class activity, one of its major limitations is its low applicability to clinical contexts. Future research may focus on developing practical diagnostic tools for clinical use based on the findings, and exploring executive aspects not studied by traditional measures, such as when children feel the need to use their EF to control and regulate daily activities. On the other hand, the children's language competence may need to be taken into account since there are studies of the cultural-historical approach that had showed a strong relationship between EF performance and language competence (Bodrova et al., 2011).



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## Motivations of High School Students of Different Sex and Age

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**Background.** The actual motive may be experimentally diagnosed through study of the system of perceived motivations. However, since perceived motivations are always expressed in terms that are not unambiguous (for a number of reasons, including age, gender, context, etc.), the experimental reconstruction of the actual motive is always associated with an ambiguity in interpretation of the respondents' perceived motivations. We need to use a method of diagnosing motivations that would allow us to identify, for the groups of students studied, not only the contribution of a particular perceived motivation, but also the substantive features of the designated motives, through the pattern of correlations of these perceived motivations.

**Objective.** This article presents the results of research on the age and gender specifics of learning motivations of high school students.

**Design.** Experimental identification of their motivational profiles was made by means of factor analysis, separately for each of four groups of pupils (in Moscow schools with a traditional learning paradigm): two junior groups (8th-9th grades, 14-15 years old) of boys (62) and girls (59); and two senior groups (10th-11th grades, 16-17 years old) of boys (63) and girls (54).

**Results.** As a result, a motivational structure specific for the corresponding gender and age was identified and described.

**Conclusion.** We showed that as a child grows up, the orientation in learning becomes more and more generalized, with a stronger expression for boys than for girls. In the junior group, girls have a motivation that is oriented to the future, whereas boys do not; such motivations in boys are seen only in the senior group and are inextricably linked to the parents' approval. Both for boys and girls, the content of their motivation for cognitive achievement in the older age group is based on two motives, which are independent at the younger age: curiosity and prestige. However, with girls, apart from a desire to learn new things, the aspiration to differ notably from others and to demonstrate their achievements to others is significantly greater than with boys.

**Keywords:** motivation, learning activity, older adolescents, gender, personal development

## Introduction

In adolescence, significant transformations occur in mental and personal development (Bozhovich, 1995), and the motivational sphere undergoes qualitative changes. This period is characterized by the development and strengthening of motives appropriate to mature forms of learning activities. Broad cognitive motives are being strengthened, and the motives of self-improvement, self-education, achievement, and self-realization continue to develop. Social motives become noticeably enhanced. Fundamental qualitative changes occur in the narrow social, i.e., positional, motives of learning. The motivational structure becomes more stable. Adolescents' stable personal interests make them purposeful, create conditions for the will to become self-regulating (Bozhovich, 1995; Ivannikov et al., 2014). However, it is precisely at this age that we can observe a decline in academic progress and a reduction of learning motivation (Badmaeva, 2006; Dotterer et al., 2009; Lepper, Corpus & Iyengar, 2005; Otis & Pelletier, 2006; Grouzet et al., 2006).

A significant contribution to the motivation for learning is made by individual characteristics, which to a significant extent are determined by gender. From the earliest stages of development, there are specific aspects in the socialization of boys and girls, in their assimilation of cultural rules, which reflect their visions of the different social roles of males and females in a given society (Bern, 2004). The connection between gender identity and social anxiety in young people has been studied by Pavlova and Kholmogorova (2017), Garcia-Lopez, Ingles, and Garcia-Fernandez (2008), Peleg (2012), and Moscovitch, Hofmann, and Litz (2005). A number of studies have found differences in the psychological characteristics of students of different sexes (Kudinov, 1998; Sobkin & Kalashnikova, 2015; Babaeva, 2012; Arutiunova & Alexandrov, 2016).

The reasons for gender differences have been explained by stereotypes of masculinity and femininity in the public consciousness, as well as by the historically developed forms of interaction between males and females (Kletsina, 2013). Corresponding psychological differences appear also in the motivational sphere, in manifestations of curiosity that depend on gender (Kudinov, 1998). In the study of younger adolescents, it was found that the attitude of girls to their studies is governed by the desire for social success, while for boys, it is by extrinsic motivation (to occupy a certain position, the respect of their peers). Girls are more inclined to consider learning activities as an important factor in their future professional and social success, whereas among boys, the percentage of those who are not at all motivated to study is much higher (Sobkin & Kalashnikova, 2015). Analogous results have been obtained in analyses of older adolescents (Gordeeva, 2013; Lupart et al., 2004; Walls & Little, 2005): Boys express extrinsic motivation (acknowledgement by their schoolmates, approval by their parents, and respect from their teachers) more than girls, while girls are more oriented to the motivation for achievement.

There are also distinctive age features in the motivation to learning activities. V.S. Sobkin and E.A. Kalashnikova (2015) analyzed the age-specific motivations for learning activity, conditioned by changes in the conceptual position of younger adolescents (6th-9th grades). From the 6th to the 8th grades, the conceptual position of girls involves their attitude toward self-realization and social success, which reflects the personal significance of their learning activities. By the 9th grade, with

a general aspiration to self-realization, they undergo quite complex changes in attitude. A shift occurs from a positive motivation toward learning activities to a negative attitude toward the pragmatic usefulness of the knowledge acquired at school. Absolutely different age-specific characteristics are manifested in boys. Already at the turn of the 6th to 7th grades, their conceptual position is characterized both by a negative attitude toward the knowledge received at school, as well as by extrinsic motivation for learning activities. The same conceptual position is also characteristic of boys in the 9th grade (Sobkin & Kalashnikova, 2015). In other studies (e.g., Gordeeva, 2013), cognitive motives were shown to increase at the turn of the 6th to 7th grades, but by the 9th to 11th grades they declined. Some authors (e.g., Gordeeva, 2013) note that the gender differences in motivation are manifested only in the senior grades: Starting with 9th grade, girls seem to have a more pronounced (intrinsic) motivation for achievement and a less pronounced extrinsic motivation, as compared with boys. Others (Sobkin & Kalashnikova, 2015) detect gender-related differences in learning motivation at an earlier age – starting with the 6th grade. Western researchers are also actively studying the influence of parents and teachers, and age-specific changes in learning motivation (Eccles & Roeser, 2003).

Thus the identification of gender- and age-specific motivation at senior school age is an important question for understanding both the personality structure and the mechanisms of its development in the course of schooling.

Another important problem is that of experimental identification of the motivational structure of the personality. By “motive,” we usually mean the internal reason that prompts and directs a person’s activities, and which is inaccessible to direct observation. Furthermore, learning activity is usually polymotivated (Bozhovich, 1995; Leontiev, 1993), and each motive may have its own qualitative identity for numerous reasons – personal maturity and age, education, gender, etc. In introspection, the motives appear in the form of perceived motivations<sup>1</sup> – conscious interpretations and explanations of one’s own behavior and that of others. The actual motive may be experimentally diagnosed through study of the system of perceived motivations. However, since perceived motivations are always expressed in terms that are not unambiguous (for a number of reasons, including age, gender, context, etc.), the experimental reconstruction of the actual motive is always associated with an ambiguity in interpretation of the respondents’ perceived motivations. Thus one and the same perceived motivation may have different meanings for students of different genders and ages (Vizghina & Pantileev, 2001). Therefore, the diagnostics of motives for learning, with the purpose of identifying students’ age- and gender-specific characteristics, appears to present a very important independent problem.

The motive as a qualitatively unique structure underlying the perceived motivations has to be diagnosed separately for students of different ages and genders. A simple approach, typical of the majority of studies of age- and gender-specific motivation of learning activity, which is based on direct comparison of the results of students’ evaluations of what is formally one and the same motivation, seems

<sup>1</sup> The Russian term *motivirovka* is translated here as “perceived motivation.” A person’s actual “motive” is often not conscious, especially in the case of children. The “perceived motivation” is the way people try to express in words the reasons for their behavior. Our factor analysis used the perceived motivations (obtained from students’ answers to a questionnaire) to attempt to describe the actual motives (factors).



to be insufficient. It may appear, for instance, that boys and girls assess a certain perceived motivation identically, and we may therefore assume that it expresses one and the same motive; but in reality, this motivation has absolutely different meanings for the boys and girls, and is part of a structure of absolutely different motives, determining their qualitative singularity.

The use of simple statistics for intergroup comparison is therefore incorrect in this case. We need to use a method of diagnosing motivations that would allow us to identify, for the groups of students studied, not only the contribution of a particular perceived motivation, but also the substantive features of the designated motives, through the pattern of correlations of these perceived motivations. Such meaningful features may be formalized as a factor model, whereby the factor is correlated with a certain motive, but its content is determined by the factor loads – the extent of contribution to it by a particular motivation, or by a corresponding profile of perceived motivations. An important parameter may also be the total number of factors that determine the general motivational profile, or the extent of polymotivation of a given learning activity.

The purpose of this work is to identify the age- and gender-specific motivations (motivational profiles) of high school students in the pursuit of their studies.

We may hypothesize that for pupils of different genders and ages, the systems of motivation for a learning activity will differ, both in the number of motives that establish the motivational profile, and in the structure of the motives themselves, determined by the perceived motivations of which they are composed.

## **Methods**

We developed a special questionnaire to study perceived motivations for learning activity (Vartanova, 2015). It is comprised of 70 items reflecting possible variants of perceived learning motivations at school, both at the present time and with respect to a future career. The extent of the student's agreement with each statement was assessed on a 5-point scale. Factor analysis was used to identify the motives, using statistical estimation of the number of allocated factors and factor rotation to achieve a simple structure (by the normalized Varimax method). This made it possible to interpret the inner structure of the factors through the weights of the perceived motivations. Identification of gender and age specifics was achieved by comparing the factor structure obtained by separate analysis of the scores of each of the four groups of students.

Participation in the survey was voluntary (with the parents' consent); the subjects were students in the 8th-11th grades at two Moscow schools with a traditional teaching paradigm ( $N = 238$ ), divided into four groups, each of which was analyzed separately: the junior groups (8th-9th grades, 14-15 years old) of boys (62) and girls (59), and the senior groups (10th-11th grades, 16-17 years old) of boys (63) and girls (54).

The survey was conducted in several schools in Moscow, equally representing different types of learning environment (an advanced curriculum school and a regular district education center), each of which uses various educational programmers' - humanitarian, mathematical, biological and so on. In the upper grades of educational institutions in Moscow it is accepted that all subjects are taught by dif-



ferent teachers, therefore the teaching style of specific teachers in this regard could not systematically influence the formation of sense relation to the learning activity of students of this sampling. The study compared groups of schoolchildren of different sexes and ages allocated in each of the studied educational institutions, so the impact of unaccounted factors associated with a particular educational institution on the results of comparing them within the allocated groups was minimal.

## Results

The scores were processed by factor analysis for each of the four groups separately (according to age and gender). The dimension of the factor spaces obtained was estimated according to Cattell's scree test, with the results shown in Figure 1.

The plots show that the junior boys are distinguished by six attributes (factors) from the set of statements (items) on the questionnaire, and the boys of the senior group by only three. The girls of the junior group are distinguished by five such attributes (factors), and those of the senior group by only four. We may conclude from this that as children grow up, their orientation to the importance of learning becomes more and more generalized, and this is more pronounced in boys than in girls.

The factors identified in each group were interpreted as follows:

*In the group of junior boys*, Factor 1 may be denoted as "the need for recognition and a sense of obligation" (includes 17 with absolute Factor Loadings > 0.5). It includes statements that show awareness of the need for successful study, including duty and responsibility, as well as the need for approval from parents and teachers (the urge to comply quickly and correctly with the teachers' demands). Factor 2 may be denoted as "cognition (curiosity)", which includes statements (5 with absolute Factor Loadings > 0.5) on the role of cognition and novelty (to find an explanation for everything, to discover new ways of problem solving). Factor 3 may be denoted as "self-esteem (status motivation)", in which the items (7 with absolute Factor Loadings > 0.5) chosen are dominated by the desire to occupy a rightful place among one's schoolmates, and the feeling that academic success enhances one's significance and merit. Factor 4 may be denoted as "superiority (+duty and responsibility)", since the items (8 with absolute Factor Loadings > 0.5) that comprise it describe a desire to know more than others, to study well because only a knowledgeable person is needed by others, to be the best pupil in the class. Factor 5 may be denoted as "orientation to the group", which includes items (5 with absolute Factor Loadings > 0.5) about acceptance and social approval from parents or the peer group. Factor 6 may be denoted as a "functional motive (taking pleasure in the learning process)". It contains items (6 with absolute Factor Loadings > 0.5) indicative of a wish to attend only classes that are interesting to them. In addition, all factors of motivation in the group of junior boys include items connected with self-esteem, realized in different ways depending on the principal motive.

*In the group of senior boys*, the items are grouped into more generalized factors. Factor 1, which may be denoted as "cognitive achievement", includes items (13 with absolute Factor Loadings > 0.5) that express the desire to learn as much as possible, to understand the academic material as well as possible, to overcome difficulties, to find new ways of solving problems, to prove oneself. Thus, the fac-

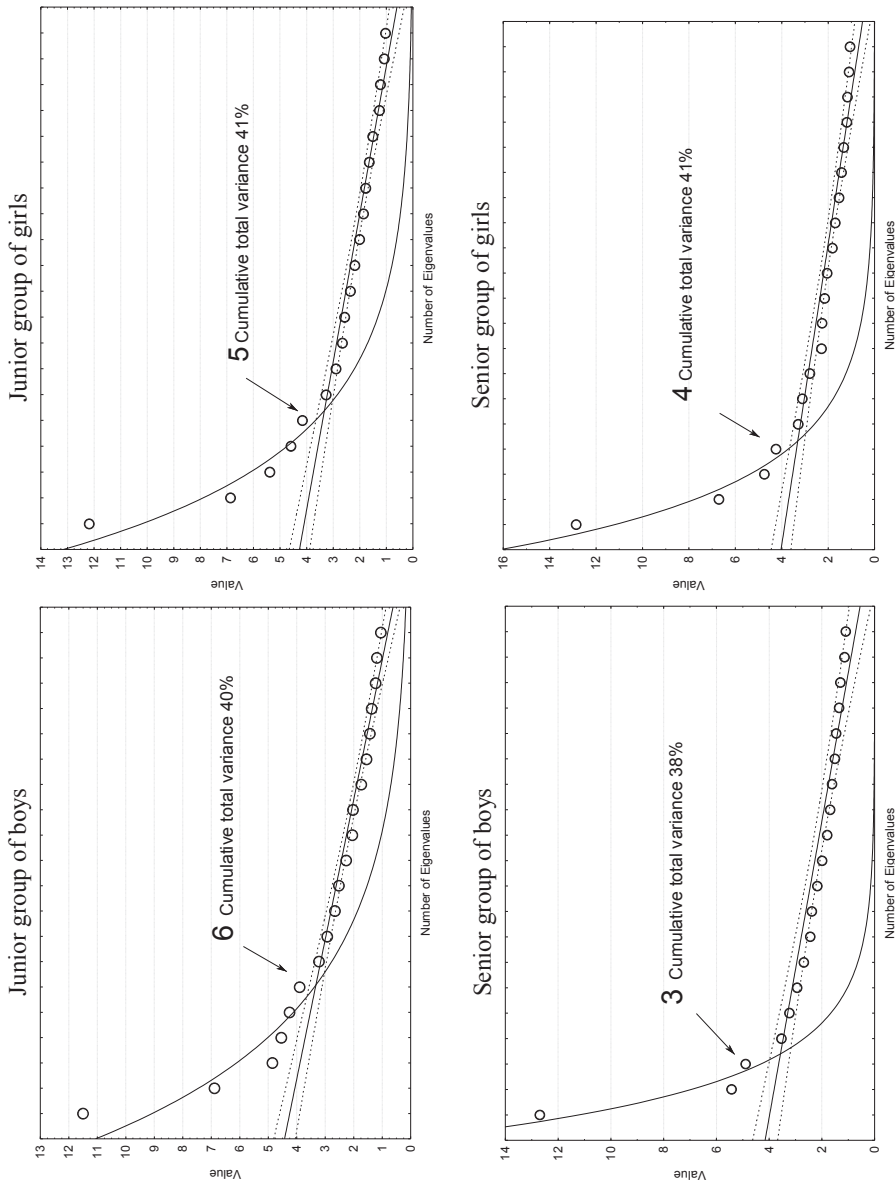


Figure 1. Eigenvalues for each of the groups of students. On the left are the boys, on the right the girls. At the top are the junior groups (8th–9th grades), at the bottom the senior groups (10th–11th grades). Relevant eigenvalues are approximated by an exponential, and the values determined by random noise are approximated by a straight line (the dotted lines show 95% confidence intervals). Figures with an arrow mean the last relevant size

tor contains items that earlier (in the junior group) were included in the factor of cognition as a process (factor 2), as well as partially the prestige factor (factor 4). Factor 2 may be denoted as “orientation to the future” (includes 11 items with absolute Factor Loadings  $> 0.5$ ); the items that comprise it express pragmatic motives about the importance of knowledge for future success in work and life, whereby marks in school are important in order to live up to the expectations of one’s parents and society, to be appreciated as cultural and educated persons. Recognition of the need for knowledge in order to have a successful future appears first with the senior boys. This partly includes items about duty and responsibility that enter into factor 1 for junior boys. Factor 3 may be denoted as “affiliation” (includes 10 items with absolute Factor Loadings  $> 0.5$ ), the need for respect and approval from parents, teachers and schoolmates, the desire to increase one’s own authority (status).

*In the group of junior girls*, factor 1 may be denoted as “orientation to the future” (includes 12 items with absolute Factor Loadings  $> 0.5$ ). As with the senior boys, the items that characterize it include pragmatic motives of the importance of knowledge for future success in work and life, the desire to live up to the expectations of parents and society, to be appreciated as cultured and educated persons. Factor 2 may be denoted as “cognitive motivation” (includes 10 items with absolute Factor Loadings  $> 0.5$ ). Like the junior boys, the junior girls want to know more and to find an explanation for everything; they like to conduct independent research, to invent new ways of solving problems. Unlike the boys, marks for them are not the important thing; it is more important to learn something new and interesting. Factor 3 may be denoted as pursuit of “superiority (prestige)” (includes 10 items with absolute Factor Loadings  $> 0.5$ ). Like the junior boys, the girls want to be the best pupils in the class, to occupy a rightful place among their schoolmates, for their answers in class to be better than all the others’. They value participation in academic competitions only as a way to assert themselves. Unlike the boys, for them it is very important to make everybody notice that they know much more than the other pupils. Factor 4 may be denoted as “orientation to the group” (includes 8 items with absolute Factor Loadings  $> 0.5$ ). Junior girls like classes that allow them to work in a group; they want to receive good marks, to study better, in order to win their friends’ respect. Unlike boys of the same age with analogous motivations, they aspire only to approval from a reference group of peers, and not from parents and teachers. Factor 5 may be denoted as “self-esteem” (includes 7 items with absolute Factor Loadings  $> 0.5$ ). Unlike boys of their age with analogous motivations (who often study in order to win approval from adults and friends), the girls of junior age assert themselves through success in their studies. They like to study, they want it to last as long as possible. They like to express their point of view in class and to defend it. They have developed the habit of working successfully at school, achieving good results; they do not imagine themselves behaving any other way in the learning process. Similar results were obtained in a cohort of young adolescent girls in a study by Sobkin and Kalashnikova (2015).

*In the group of senior girls*, factor 1 may be denoted as “orientation to the future” (includes 15 items with absolute Factor Loadings  $> 0.5$ ). Like the boys of the same age, they are already thinking about what college to attend. They study to become cultured and educated, to acquire the knowledge necessary for further studies and

a prestigious job. At the same time they are trying to live up to the teachers' expectations. Unlike the junior girls and senior boys with analogous motivation, parental approval is not very important to them. Factor 2 may be denoted as "achievement" (includes 16 items with absolute Factor Loadings > 0.5), which determines their orientation to the process and outcome of learning – to find out new things, discover different ways to solve problems, conduct independent research, participate in academic competitions – in order to assert themselves, to be better than the others. Unlike the boys, it is very important for them to make others notice that they know, and know how to do, much more than everyone else. This factor includes the items that in the junior group constituted part of the factor of cognition as a process (factor 2), as well as of the factor of pursuit of superiority (prestige) (factor 3). For the senior girls, factor 3, which may be denoted as "affiliation through social approval of peers" (includes 6 items with absolute Factor Loadings > 0.5), describes the girls' aspiration to be well regarded by schoolmates, to live up to their teachers' expectations, to win their friends' respect. At the same time, they are afraid of discussing the schoolwork with schoolmates and defending their point of view. Factor 4 may be denoted as "affiliation through acceptance and approval by adults" (includes 5 items with absolute Factor Loadings > 0.5). Unlike the previous factor, this one includes items from which it follows that it is especially important to have the approval of parents and teachers; good studying for them means gratifying their parents. Thus, in the senior girl group, unlike the senior boys, the affiliative motives are divided into two independent but complementary parts.

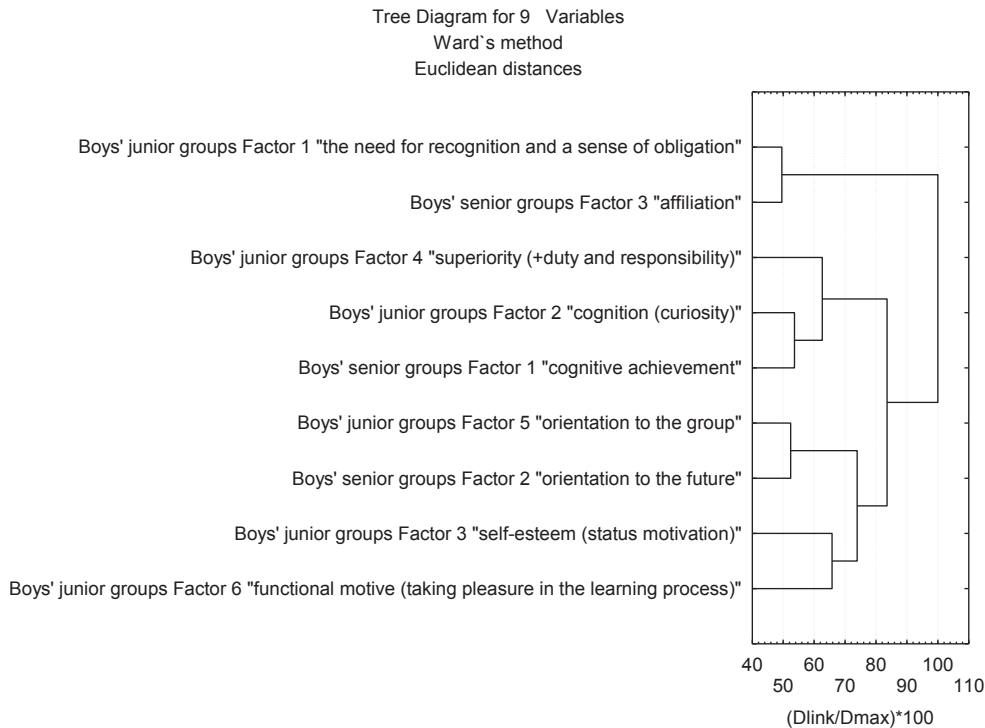


Figure 2. Age-specific changes in the boys' groups. Result of cluster analysis.

A formal comparison of the allocated factors (according to their factor loads) among the groups, with respect to gender and age, was conducted by cluster analysis (the magnitude of the difference was defined as the Euclidean distance; the Ward clustering method was used).

*Age-specific changes in the boys' groups (Figure 2):*

1. The motive of cognitive achievement (factor 1 of the senior group) puts together the items that, in the junior group, entered into factors 2 (cognition and curiosity) and 4 (superiority – to know things better than the others).

2. The motive of pragmatic orientation to the future (factor 2 of the senior group) includes mainly the items that, in the junior group, entered into factors 3 (self-esteem, status motivation) and 6 (functional motive, taking pleasure in the learning process), as well as some items from factor 1 (sense of obligation and need for recognition).

3. The affiliation motive (factor 3) of the senior group mainly includes the items from factor 1 of the junior group (need for recognition). The “urge to realize quickly and correctly the teachers' demands” is declining.

*Age-specific changes in the girls' groups (Figure 3):*

1. The factor of pragmatic orientation to the future (factor 1) of the senior group has mainly preserved the items that make up part of the analogous factor 1 of the junior group, but it has become more structured and “adult” – it has lost the items connected with good marks and an expectation of parental approval (these have moved to factor 4, affiliation).

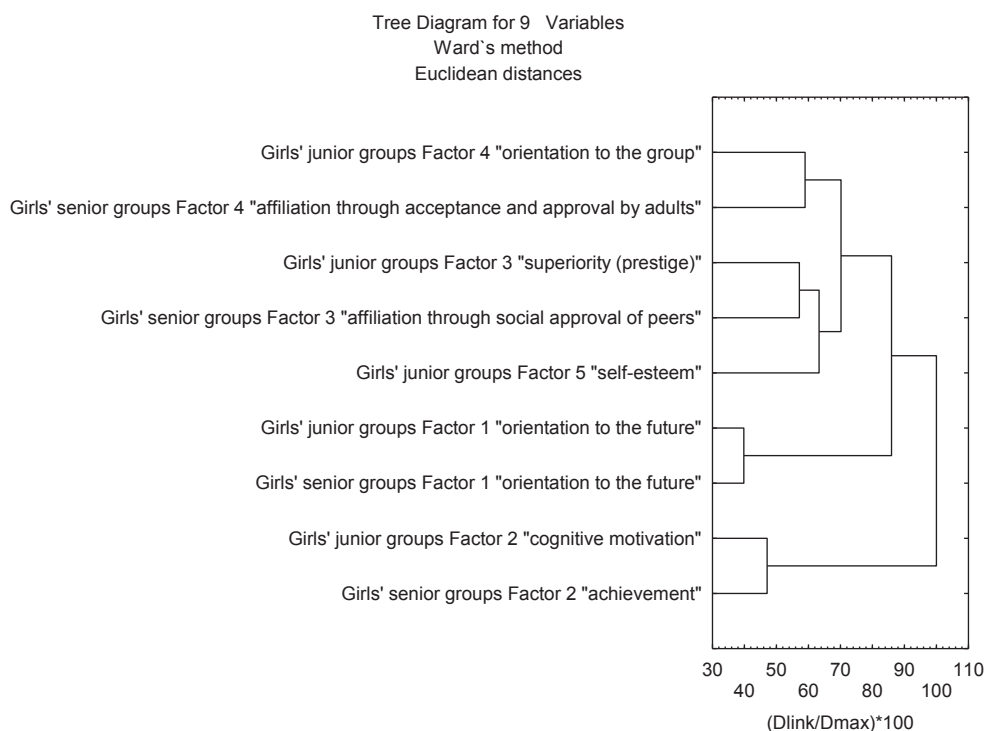


Figure 3. Age-specific changes in the girls' groups. Result of cluster analysis

2. The motive of cognitive achievement (factor 2) in the senior group also preserves mainly the items of the analogous factor 2 of cognitive motivation of the junior group, but adding items connected with the fact that the older girls want to be better in their studies than others (in the junior group, this is included in factor 3, superiority). Furthermore, this factor includes several items of factor 5 — self-esteem through academic success, as a conscious need.

3. The motive of affiliation, social approval in the reference group (factor 3 of the senior group) partially includes the items of factor 5 (self-esteem) of the junior group.

4. The affiliation motivation (orientation towards the family, factor 4) of the senior group partially includes items of factor 1 (orientation to the future, connected with the parents' attitudes), but items are also reinforced that are connected with expectations of adults' approval (parents and teachers).

It should be noted that factors 3 and 4 of the senior group of girls are more similar to each other (in the content of their items and in connection with the need for acceptance), but they differ from each other in that, in the first case, the acceptance is expected from peers, and in the second case, from adults.

*Gender features of motivation in the junior groups (Figure 4):*

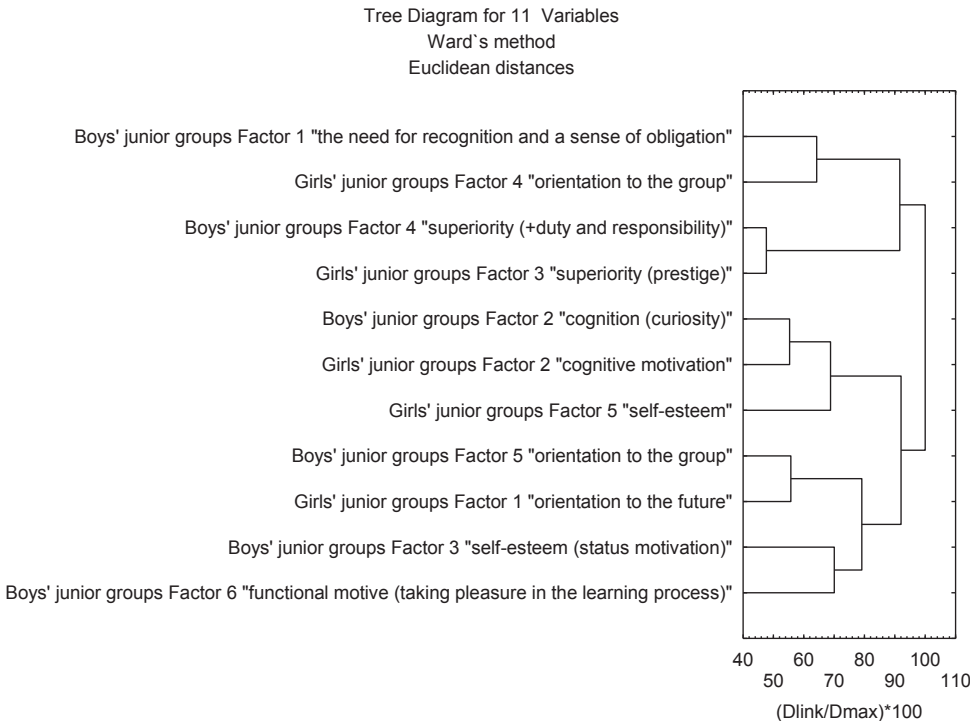


Figure 4. Gender features of motivation in the junior groups. Result of cluster analysis.

1. The motivation of superiority is partially similar (factor 4 for boys and 3 for girls). Apart from the general desire to know more than others, the boys affirm items about duty and responsibility to society, about the common obligation to be



cultured and educated persons. Unlike the boys, for the girls the most important thing is to have others notice that they know much more than the other pupils.

2. The content of items that define cognitive motivation is close for girls and boys (factor 2 for both), but the girls' factor 5 is also close to them, defined as self-esteem through success in one's studies.

3. The girls have a motivation that determines their orientation to the future (factor 1), while the boys of the junior group do not show an analogous motivation — it is seen only in the senior group of boys.

4. There is also partial similarity between the items constituting factor 4 (affiliation, orientation to the peer group) for the girls and factor 5 (affiliation, aim at social approval) for the boys. Everybody likes classes where they can work in a group, to discuss the learning material. However, for the girls, unlike the boys, it is very important to receive good marks, to show their friends how successful they are. For the boys, the marks are not the main thing; it is more important to learn in a way that lives up to their parents' expectations.

5. For the boys of the junior group, factors 3 (self-esteem through status in the peer group) and 6 (functional motivation, orientation to the learning process) stand apart; they are more similar to each other than to the factors allocated to other groups. The girls have no similar factor profiles.

*Gender features of motivation in the senior group:*

1. There is similarity in the content of items that determine the motive of cognitive achievement: factor 1 for boys and factor 2 for girls. However, the boys often want to understand the class material as deeply as possible; they like difficult assignments and to overcome obstacles. For the girls, apart from a desire to learn new things, to find various ways of solving a problem, it is much more important to participate in events where they can assert themselves, to show that they are better than the others. Unlike the boys, it is very important for them to make others notice that they know, and know how to do, much more than everyone else.

2. There is also similarity in the items that determine affiliation (acceptance, respect, authority) for the boys (factor 3) and affiliation (need for social approval, to the extent to conformity) for the girls (factor 3). For the boys, academic success, apart from others' approval, also permits them to feel their own importance and dignity; good schoolwork allows them to increase their authority. Girls with analogous motivation study only in order to live up to the teachers' expectations, to win their friends' respect. At the same time, they do not like to discuss the schoolwork in a group of classmates, to defend their point of view.

3. Factors 2 for the boys and 1 for the girls are also similar: those that determine their orientation to the future. The boys' need to study is connected with their desire to live up to the expectations of their parents and society, to be appreciated as cultured and educated persons. Unlike the boys with the analogous motivation, for the girls the parents' approval is not so important. Older girls who are oriented to their parents' approval are allocated to a separate affiliation group (factor 4). Thus for the boys of the senior group, unlike the girls, the need to study for a successful future is inextricably intertwined with their parents' approval (and in that they are similar to the girls with the affiliation motivation – factor 4), while for the girls with an orientation to the future (factor 1), this is not paramount.

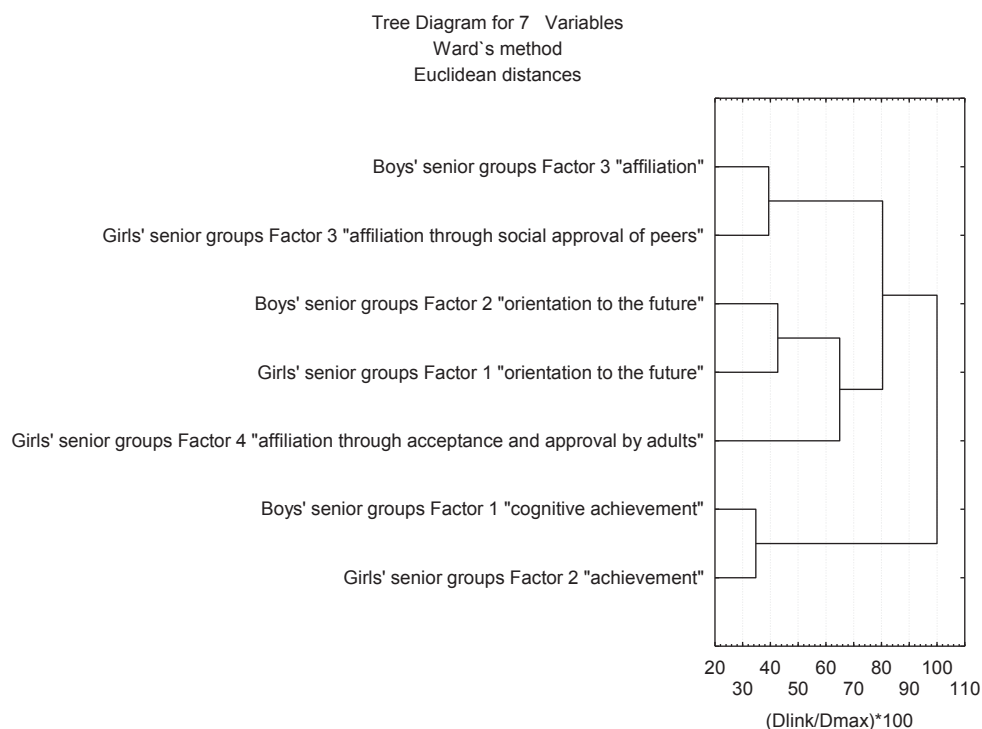


Figure 5. Gender features of motivation in the senior groups. Result of cluster analysis.

## Discussion

We have revealed the gender and age specifics of the motivational attitude to studies, which is that as a child grows up, the orientation to the importance of learning becomes more and more generalized, with a stronger expression for boys than for girls. Girls of the junior group, unlike the boys of the same age with the motivation of self-esteem (who often try to study in order to gain the approval of adults and friends), assert themselves through academic success. Earlier it was shown (Sobkin & Kalashnikova, 2015) that with adolescent girls, the attitude towards schoolwork is determined by their desire to be successful at learning academic subjects, while with the boys the motivation is extrinsic (to occupy a certain position, to win praise and respect). This can be explained by the different social demands on boys and girls (because of attitudes and stereotypes), the feedback they receive from adults, and the special features of their education in Russian culture. Karabanova (2007) demonstrated that boys are more sensitive to the effect of a disharmonious style of upbringing.

Socialization of boys, as the majority of researchers agree (Tupitsina, 2004), is inconsistent, because the development and formation of the masculine identity involves feminization by the basic institutions of socialization, as well as the ambivalence of demands placed on growing boys: to be active and yet obedient, to be independent and yet to obey the rules, etc. Foreign psychological research on gender- and age-stereotypes also show that differing expectations of teachers as well as

parental expectations and attributions, influence the child's self-perception (Bern, 2004; Dweck & Davidson, 1978; Dweck & Bush, 1978) and adolescents' educational aspirations (Lazarides et al., 2016).

In our research, we found that the older girls with the motivation of achievement, unlike the boys with the analogous motivation, aim at distinguishing themselves from others in various ways. Their orientation to knowledge is supplemented by a desire to be noticeably distinguished from others, to draw special attention to themselves. As Vizghina and Pantileev (2001) have pointed out, while men feel "OK" with the importance of their own role and achievement of success when integrated into a group, women characteristically have the ability to present themselves emotionally and expressively, which attracts others' attention. An opposite motivation is observed with girls of the senior group, aiming at social approval, conformity (affiliation, factor 3). That motivation, besides the need for respect and approval, contains a dominating motive of avoidance (they are afraid of working in a group, to defend their point of view).

With the boys, the motivation of affiliation, besides approval and respect, is supplemented by their aspiration to occupy a rightful place among their fellows. It is also significant that the pragmatic motivation (to gain knowledge for a successful future) appears with boys only in the senior group and is inextricably connected to the parents' approval (like the girls with the affiliation motivation – factor 4), whereas for the girls with an orientation to the future (factor 1), it is not paramount; they more often than not think about what knowledge will be needed in the future, and which college they will attend. In other research (Vartanova, 2017), we found that girls also consciously connect pragmatic motives (a successful future) with the need to study well and values corresponding to that, which attests to a more mature perception of academic learning. For them the orientation to self-realization (social and professional success in adult life) becomes of increasingly greater significance in the learning process.

Most boys perceive the learning process on the level of the self-assertive learning activity. The evidence shows that with boys an axiological vector of development is still at the level of motivation of affiliation and self-esteem (Obukhovskiy, 2003).

## **Conclusions**

We have found that age-related changes of motivation at the late secondary school age have a pronounced gender specificity, although one can also observe a common tendency of integration and generalization of its conceptual content.

For the senior boys, the content of the motivation of cognitive achievement is formed on the basis of two motives that are independent at the younger age: the motivation of curiosity and aiming at superiority (prestige). The motive of pragmatic orientation to the future for the senior boys consists of three motives that are independent at the junior age: self-esteem, obligation, and the functional motive of pleasure. The affiliation motivation is actually maintained intact.

For the girls, the motivation of cognitive achievement in the senior age group is based on the analogous motivation of the junior group, to which are added (as in the boys' group) the motives of superiority and self-esteem through success, which

at the junior age were formed by independent factors. The motivation of pragmatic orientation to the future, observed in girls of the senior age group, was transformed from an analogous motive that was already fixed at the junior age. However, we can see not a fusion (supplement), but on the contrary, a shift of some of the perceived motivations to the affiliation factor. This testifies to a more “mature” motivation of the girls, their more rapid development. Moreover, the girls’ affiliation motivations remain more differentiated, consisting, even at the senior age, unlike with boys, of two independent factors: the approval of a reference group of peers and the approval of the family and other adults.

Of course, the revealed features of the semantic attitude to learning are obtained on a limited sample of Moscow students and reflect only the actual state, while the reasons for their formation still require further study. Perhaps, the family (family values and gender stereotypes) influences the formation of the sense relation peculiarities. For high school students their teachers, as well as their closest social environment, can also play an important role. The question of the influence of national and cultural characteristics is no less important. All these questions were not the goals of this study; however, in the future the approach used in this paper seems to be applied to other groups of schoolchildren, formed according to the relevant criteria.

The revealed regularities also have practical significance. Understanding the qualitative singularity of the motives of students of different sex and age will allow realize more differentiated and effective psychological support of educational work in the school. Understanding these features is important for organizing a dialogue with the student in order to increase their motivation to study both from teachers and parents. That as a result will ensure the quality of the educational process.

## Limitations

It is possible that other factors, such as personal and characterological traits and genetic predisposition, also affect the specifics of educational motivation, but these were not the focus of this article. It is also necessary to take into account that the patterns described here were identified only in a limited sample of Moscow students.

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