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## Creativity Formation in the Context of Social and Psychological Adaptation of Preschoolers Aged 5-6 Years

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**Abstract:** The aim of the research is to analyze the creativity manifestation in the early stages of ontogenesis; to verify the relationship between creative abilities and social adaptation of preschoolers. The importance of the topic under consideration is determined by the fact that preschoolers' childhood is the main sensitive period for the formation of creativity as the person's adaptive re-source. The deficiency of development during this period cannot be compensated later. The examination of the creative abilities of 115 children aged 5-6 years has been conducted. Based on the total result of seven subtests Torrance Tests of Creative Thinking, three groups of children have been distinguished. They include children with high (N=20), medium (N=79), and low (N=16) creative potential. Data on behavior have been collected from 142 parents and 24 teachers who supervised children during communication situations. The adaptation of preschoolers have been analyzed on three sides: as a set of individual behavioral reactions conditioning cooperation with the environment (A questionnaire of children's temperament Thomas and Chess); as a social competency – skills in communication with children and adults (expert assessments of teachers based on the open structured supervision), and as an emotional adaptation to life situations (the projective technique of anxiety diagnostics "Choose a face"). In all cases, children with high creative potential demonstrated particular differences. The positive reaction of "approaching" in response to new stimuli, a low sensory threshold, and high speed of adaptation to the change of external terms are a typological profile of a "creative" temperament. Related problems of emotional reaction and the increased anxiety of preschoolers have been detected. The development of skills for social competence lags significantly in the group with a low level of creativity. The factorial structure of creative abilities, which presents three types of creativity (subject, verbal, and figurative), and three leading abilities (productivity, originality, and fluency) have been suggested. The particular parameters of creativity correlate in different ways with the adaptability of preschoolers: the readiness is more successful, and originality is associated with disturbances of emotional regulation. In conclusion, creativity is presented as a natural condition for a child's adaptation.

**Keywords:** creative potential, intelligence, creativity diagnostics, productivity, originality, readiness, social competences, temperament, anxiety.

### Introduction

Understanding creativity evolves with society and its needs. At different times, the ability to be creative was considered as the highest manifestation of the human mind, as a rare talent that contributes to achievements in the sphere of arts and sciences, as a competitive advantage in business, as an attribute of self-actualization, and, finally, as a necessary quality that needs development from an early age (Veldbrekht, 2009). The increased interest in this phenomenon is caused by the growing need for unconventional approaches and innovative products, as well as for cognitive adaptation to social and cultural diversity (Crisp and Turner, 2011). The instability, turbulence of the environment is constantly updating the demands for a person and elevates creativity to the rank of a renewable resource that ensures effective daily adaptation.

The disengagement of convergent thinking bound to a single correct answer and divergent thinking as generating a variety of various ideas in situations where there are no correct answers played a key role in the conceptualization of creativity (Guilford, 1967). The theory of the intellectual threshold was soon

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formulated, proving that intelligence is necessary but not sufficient for creativity (Torrance, 1980). Although discussions on the mutual influence of cognitive abilities are still ongoing (Burlatchuk and Veldbrekht, 2011; Ilgan and Patungan, 2018; Karwowski and Gralewski, 2013); the studies are mainly focused on finding the personal and social prerequisites for creativity. Today, creativity is understood as a set of personal and cognitive qualities contributing to going beyond the things that are known, creating ideas that are novel and, at the same time, correspond to the context (Runco and Jaeger, 2012). The "Four C" model assumes that the results of creativity may have no social value, but be subjectively significant: to educate and transform a personality, to help express oneself, or to solve daily problems (Kaufman and Beghetto, 2009).

Despite the accumulated material, explaining the mechanisms of cognitive processes, their cognitive and personal basis, as well as the social context in which this ability is manifested, the problem of the role of creativity in the formation of adaptive potential is still far from the final decision. The main contradiction is that clear benefits (a possibility to make decisions and act in situations of uncertainty) are combined with problematic aspects. There is a stable idea that creative talent is accompanied by pathologization of the personality, at best, by emotional impertinence and expressed weirdness of behavior. The advantages and disadvantages of creative individuals have been repeatedly confirmed by empirical data (Acar and Runco, 2012; Simonton, 2005; Veldbrekht, 2005; Winston et al., 2014). This inconsistency has led to the creation of a dialectical theory, where creativity appears as a dynamic interaction of order and chaos: creation and destruction, coherence and inconsistency, disinhibition, and restraint (Holm-Hadulla, 2013).

The age-related dynamics of creativity has been studied relatively insufficiently, although it itself can clarify its adaptive nature (Restrepo et al., 2019). In this context, the age of 4-6 is of particular importance, when the first peak of creativity is observed: spontaneous, unconscious, and therefore, the most organic. It is not necessary to teach children creativity - they have a natural bent to explore the world around, wonder, experiment, and fantasize (Hadani and Jaeger, 2015).

We assume that a unique combination of internal and external factors occurs during this short period. On the one hand, the cognitive basis for the development of creative processes is maturing the complication of subject-manipulative operations, speech development, the activation of social interaction, the impetuous development of expertise, and so on. On the other hand, terms of socialization enable a child to demonstrate his/her creativity without special demands and restrictions, as an element of play activity. Then, in the course of socialization, along with the system of rules and means of activity, the child also learns the system of restrictions. It is known that with the beginning of formal schooling, the creativity of children is noticeably reduced and manifests again itself in adolescence, suggesting a critical attitude to the results of their creativity, as well as their conscious opposition to generally accepted rules, stereotypes, and modes of actions (Lilly, 2020). The phase titled "striving for conformity" is necessary for mastering culturally fixed ways of creative activity; at the same time, the psychological mechanisms of mature creativity are based on the abilities developed in early childhood (Druzhinin, 2019; Harrington et al., 1983). Since the preschool age is sensitive for the formation of the creative potential of a personality, the study of creativity in connection with adaptability will help solve important theoretical contradictions, as well as to determine the practical trends of work on developing the necessary qualities in children.

The aim of the research is to analyze the manifestations of creativity at the early stages of ontogenesis, and to find out the relationship between the creative abilities and social adaptation of preschoolers.

The content of research hypotheses determined the following research objectives:

1) to structure the manifestations of creativity in preschoolers, to determine the leading and additional components - we assumed that there is an uneven development of creative processes at this age, which reflects the basic adaptive processes.

2) to clarify the conditions for the formation of creativity on the basis of general cognitive abilities - we assumed that the allocation of creative abilities is due to specific development tasks in certain social conditions.

3) show and prove the differences in the mechanisms of socio-psychological adaptation in preschoolchildren with high and low levels of creativity - we assumed that there are both positive and negative (as well as nonlinear) relationships between creativity and adaptive abilities.

Our study is one of the few that takes a balanced position in the interpretation of creativity as a predictor of socio-psychological adaptation / maladjustment. Separate aspects of creativity have been studied in the context of different aspects of children's adaptation. We consider different sides of this phenomenon in great detail, taking into account the complex action of cognitive, personal and social factors.

## Materials and Methods

### Procedures and measurement

The diagnostic of psychological peculiarities of preschoolers included five courses of action to collect data from different sources:

**1. Torrance Tests of Creative Thinking (TTCT, 1966-1998)** reflects the ideas of J. Guilford's concept of divergent thinking. It is a powerful diagnostic tool enabling to measure the classic characteristics of creative potential, starting from the age of 5: fluency – the ability to generate a large number of meaningful ideas; flexibility – the ability to view information at different angles and apply different strategies for solving problems; originality – the ability to introduce unusual, unique answers going beyond the obvious; elaboration – the ability to elaborate on ideas (Torrance, 1998). Tunick (1998) carried out adaptation and standardization of TTCT in Russian. The coherence, validity, and reliability of the adapted version in samples of different ages have been proved. The guide contains lists of typical responses as well as normative data of representative age groups from 5 to 17 years. We used subtests of the figurative battery "Unfinished figures", "Repeated lines" and the verbal battery: "Questions," "Reasons," "Consequences," "Objects improvement," and "Unusual implementation."

The diagnostic procedure for preschoolers was carried out individually and lasted about an hour (taking into account the time required to provide instructions). Verbal and figurative subtests were performed on different days. When processing the results, the raw scores of the four criteria of creativity were calculated for each subtest, as well as the total indicator of overall creativity.

**2. The questionnaire for determining the temperament of children aged 3–7 years (Thomas and Chess, 1977)** is designed to be filled in by parents. This is a reliable and informative method for diagnosing the psychodynamic characteristics of the children's behavior. The children can be both healthy and with disorders of development. The methodology contains 72 statements describing the child's behavior in various situations of everyday life. Parents evaluate them using the options "never," "rarely," "often", and "always"; there is also an option for a "don't know" answer and an opportunity to comment on the given grades. The parents received forms with questions and standard instructions, which they fill in individually at home. The experimenter asked both parents, if it was possible, to participate in the study, and provide an overall assessment through a collaborative discussion of the child's typical behavior.

The methodology is based on the theoretical foundation, which states that the style of behavior and individuality of the child is the result of the relationship between his/her natural characteristics (temperament traits) and the response of the environment to these traits. The authors highlighted nine components of children's temperament that exist in different cultures and are already noticeable at the age of two-three months. Each scale is represented by 8 statements of the questionnaire: *activity* – the motor component of behavior, mobility/passivity of the child during games, eating, walking, etc.; *rhythmicity* – regularity or unpredictability of reactions associated with physiological needs; *approach/withdrawal* – the reaction to new stimuli (the resulting function of child's fear and exploratory reflex); *adaptability* – ease of getting used to new conditions; the time, which the child needs to adapt after the initial reaction to a new stimulus (food, daily routine, rules, people); *intensity* – the energy level of reactions, regardless of their positive or negative orientation; *threshold* – sensitivity to external stimuli, intensity of the influence necessary for the reaction manifestation; the quality of mood, the predominance of a joyful and satisfied state; *distractibility* – the degree of influence of external stimuli on behavior, the speed of transition from one type of activity to another; *attention/persistence* – the child's ability to concentrate and persistence during activities when difficulties arise. The Russian-language standardized version of the questionnaire was developed by V. Kolpakov and V. Makarov (1993) and has proven validity and reliability. A wide range of parameters makes it possible to build a profile of the child's individual properties and highlight its typological characteristics.

**3. The methodology of the expert assessment of the social competences of children aged 5–7 years** was developed under the guidance of Krivtsova (2013) and is targeted at being filled in by kindergarten teachers based on the open and structured monitoring of children in a kindergarten group. The structure of basic social competences is a list of 45 skills and abilities, united into groups and reflecting crucial aspects of a child's life:

- *Skills of adapting to an educational institution* (11 points): the ability to listen, to be engaged in discussion, ask questions, declare one's needs, seek help from an adult, express gratitude, follow the instruction, finish an activity, etc.

- *Communication skills with peers* (10 points): openness to contacts, the ability to join children, who are playing, play by the rules, ask for a favor, offer help, express sympathy, receive praise, take initiative, share, and apologize.

- *Skills of dealing with feelings* (8 points): the ability to experience and express adequately both positive feelings (joy, pleasure) and those that are negatively assessed by society (sadness, anger, and envy); to recognize the feelings of the other person, empathize, deal with own anger and respond to another person's anger, deal with fears, and experience sadness.

- *Alternatives to aggression* (9 points): the ability to promote one's interests calmly and adequately, express dissatisfaction, respond to undeserved accusations, demonstrate tolerance, admit the guilt, accept the consequences of own mistakes, and so on.

- **Skills of coping with stress** (7 points): the ability to deal with failure (loss), to react to rejection, to say "no", to cope with a situation of ignorance, embarrassment, etc.

These qualities represent the model behavior of a socially competent preschooler. Regarding each item of the list, the content of the competence and a situation in which it can emerge, as well as the examples of immaturity and the steps representing the path of this skill's formation have also been described in detail. The methodology does not have standardized indicators; the competency profile obtained during the study should be considered not as a diagnosis, but as a preliminary basis for building psychological and pedagogical interaction with a child. The first two blocks reflect basic communication skills, which are developed spontaneously during everyday interaction with adults and children. The lack of them may indicate the child's disadvantage, significant problems of social adaptation, and even personality disorders. The rest of the blocks reflect existential and humanistic ideas on mental health and emotional intelligence; they are often developed insufficiently even among adults because other ideas related to addressing feelings that exist in the society for a long time (Krivtsova, 2013).

The kindergarten teachers were trained preliminary in a step-by-step methodology of the open monitoring of a child in the process of communication. The observation was held for 5 days, every time the skills and problematic aspects demonstrated by the child were recorded in the protocol. On the basis of five measurement protocols, the average grades of 45 competences were provided – whether the child demonstrates this skill always, often, sometimes, rarely, or never (points from 5 to 1), which then were summed up as the final scales. For each preschooler, grades were collected from three independent adult experts, at least.

**4. Projective technique for studying children's anxiety** was created by Dorkey and Amen (1947) to identify the degree of emotional adaptation among children aged 3-7 years. Experts show alternately 14 cards depicting plots that simulate typical life situations of preschoolers and provoke anxiety reactions (independent options for boys and girls) to children. They do not have a child's face – a test subject must determine the character's mood by choosing a picture with a sad or joyful face. We used a modified modern version of the methodology (Mykhaylov and Kolesnik, 2016), updated to study anxiety in interaction in the information virtual space. The anxiety index is calculated as the percentage ratio of emotionally negative choices in the total number of drawings; the average rate is 20-50%. The manifestation of anxiety is associated with the negative experience in certain situations. The qualitative analysis of the results is focused on the relationship between positive and negative experiences in three types of situations: relationships between children, "child-adult" relationships, and daily activities.

**5. Diagnostics of intelligence.** Since intelligence is one of the basic resources of adaptability, its consideration was mandatory. The children's version of the Weksler WISC test was used (the diagnosis was conducted earlier by a staff psychologist as part of the mandatory diagnostic minimum in a preschool educational institution). The markers of verbal and non-verbal intelligence were taken into account, as well as the overall IQ.

### **Characterization of the sample**

Individual diagnostics of 115 children aged 5-6 years was conducted. The sample consisted of 56 boys and 59 girls who attend municipal and private preschool educational institutions (hereinafter referred to as PEI) in Khmelnytskyi and Kherson. Parents participated in collecting data on typical children's behavior: 107 mothers and 35 fathers. Pedagogical employees (kindergarten teachers, teachers of creative studios, sport trainers, and other specialists) of seven preschool educational institutions (further PEI) provided information on the social adaptation of preschoolers. The total number is 24 experts.

Based on the overall rate of creativity in the sample of preschoolers, three groups were identified: with low, medium (interval  $M \pm SD$ ), and high creative potential. The low-creative group included 16 respondents, the highly creative group – 20 ones, and the most numerous was the "medium" group – 79 children.

### **Research ethics**

The study was conducted in accordance with the standards provided in the Ethical Principles of

Psychologists and Code of Conduct. Diagnostic tools are approved by the Ministry of Education and Science of Ukraine to be used in educational institutions. The research program was approved by the management staff of preschool educational institutions.

The invitation was announced at parent-teacher meetings in kindergartens. Families were provided with the necessary information on the goals and stages of work. They were motivated to participate voluntarily in the study. The work began after the parents signed informed consent. In addition, the oral consent of the children was also obtained. The personal information collected during the study is strictly confidential.

### Data analysis

The verification of the properties of the primary parameters distribution has showed compliance with the normal form. This allowed to use parametric criteria for further calculations. The data were processed by using correlation and factor analysis. One-way variance analysis (ANOVA) was used to compare the average values of three groups. Mathematical processing of the material was conducted using the IBM SPSS Statistics program (version 17).

## Results

### Creativity manifestations among preschoolers

Some observations that are important for understanding the manifestations of children's creative abilities and methods of their diagnostics should be mentioned in psychological and pedagogical research.

Based on the results of seven TTCT subtests, more than 74.8% of preschoolers demonstrated one or more parameters of creativity which is above the normative (average) level. Most of the children with high indicators were concentrated in preschool groups belonging to creative studios (art school and art lyceum) – Table 1. A preliminary selection of students, as well as focused development and encouragement of creativity, are happening there. In private PEIs, quite a lot of attention is paid to the development of the children's general gifts: cognitive, physical, social, and so on. Municipal kindergartens with the largest data variability got the last place. Due to a large number of children in groups (25-30 people), it is difficult for them to receive the focused attention of teachers of kindergarten. It complicates the development of the cognitive sphere.

**Table 1**

*Average values and standard deviations of raw creativity indicators of children aged 5-6 years*

Types of socialized environment:	fluency	Flexibility	originality	readiness
Preschool groups in creative studios (14 children)	38.2±16.6	19.1±5.4	17.0±7.4	45.6±10.1
Private kindergartens (45 children)	36.1±17.3	18.8±8.3	15.8±8.8	34.2±8.6
Municipal PEI (56 children)	33.5±18.5	18.2±8.5	15.4±9.2	31.4±7.4

The divergent thinking test sufficiently reveals the creative abilities of children; however, the results of certain subtests may not coincide. The tasks completion requires preliminary involvement in the work. It also depends on the emotional contact between the child and the host. Therefore, the one-stage test may not provide reliable information; rather long-term complex diagnostics is required.

Children took tasks of TTCT positively more like a game rather than a test of their abilities. At the same time, the motivation and behavior of preschoolers during the testing process can be regarded as an additional marker of abilities: children who received high grades became quickly involved in the activity. They also reacted on additional instructions and demonstrated vivid positive emotions. They almost did not need external support and approval (although they were glad to hear the experimenter's praise). Besides, they enjoyed the creative process. Such manifestations were recorded in 80% of the highly creative group. They indicate that even in preschool age, creativity includes an emotional and motivational (personal) component.

The irrelevance of the preschoolers' answers (inadequacy concerning the given task) remains a methodological problem. Children are uncritical in assessing their own results; it is especially difficult for them to recognize obvious answers and to understand how other children could respond.

### Comparison of groups with a different level of creativity

Having divided the sample into three groups based on the general indicator of creativity, we found distinct differences in the mechanisms of social and psychological adaptation – Table 2.

**Table 2**

*The comparative analysis of the average adaptation indicators in groups of preschoolers with different creative potential*

Adaptation parameters	A group with low level of creative potential (N=16)	A group with medium level of creative potential (N=79)	A group with high-level of creative potential (N=20)	F (ANOVA)	The significance of differences (sig.)
<b>Questionnaire to determine children's temperament:</b>					
Activity	3.72	4.03	3.96	1.190	0.308
Rhythmicity	4.16	4.25	4.04	0.801	0.452
approach/withdrawal	3.44	3.98	4.75	7.816	0.001
Adaptability	3.38	4.15	4.18	3.521	0.033
Intensity	4.09	4.17	4.22	0.309	0.735
Threshold	3.12	4.27	5.03	9.784	0.000
Mood	4.47	4.35	4.39	0.281	0.755
Distractability	4.15	3.77	4.45	1.332	0.074
attention/persistence	4.76	5.05	4.61	0.778	0.462
<b>The expert assessment of preschoolers' social competences:</b>					
Adaptation skills to PEI	3.15	4.02	3.46	4.334	0.015
Communication skills with peers	2.71	3.85	3.30	10.354	0.000
Skills to treat feelings	2.02	2.25	1.64	2.788	0.066
Alternatives for aggression	1.55	1.67	1.68	0.132	0.876
Skills to overcome stress	1.88	2.00	1.94	0.087	0.917
<b>Projective technique to study child anxiety:</b>					
General level of anxiety	46.08	38.39	43.49	2.026	0.137
Negative experience in communication situations among children	50.25	42.55	38.70	5.537	0.005
Negative experience in communication situations "a child – an adult"	43.18	38.46	35.63	2.355	0.100
Anxiety in everyday actions	44.81	34.15	56.14	13.277	0.000
<b>Wechsler's test for children WISC:</b>					
Verbal intelligence	96.8	104.2	106.4	4.107	0.019
Nonverbal intelligence	102.5	116.4	111.5	4.934	0.009
General indicator of IQ	100.7	111.3	109.9	4.391	0.015

The adaptability of preschoolers is studied on three sides: as a temperament trait that characterizes how quickly or slowly the child adapts to new conditions; as social competence – communication skills with children and adults in terms of PEI, as well as emotional adaptation to standard life situations. In all cases, preschoolers with high creative potential demonstrated specific differences.

**Temperament traits:** The main feature that differentiates the highly creative group was a significant reaction of "approach" in response to new stimuli and situations. Along with the growth of creativity in groups, the threshold of sensitivity, which determines the level of external stimulation required to change behavior, is slowly decreasing. These qualities are combined with increased distractibility and fast switching when exposed to new stimuli, which are of great interest for the child (however, the significance of the differences does not reach the level of 0.05). The readiness to react defines "sensitivity to the world" as the basis of creativity. However, at the same time, it can function as a source of problems and discomfort for the child. Such children are predisposed to complaining about too loud sounds or unpleasant odors. They pay attention to the color of objects, the temperature in the house or outside. In addition, they are sensitive to uncomfortable clothes, etc.

The important result addresses the significantly reduced adaptability of children with a low level of creative potential; at the same time, the groups with medium and high levels of creativity have similar ratings. It means that a decrease in creativity below a certain threshold value determines a long and difficult adaptation to changes of external conditions, the inability to change the initial reaction in the direction

required by the situation. It should be remembered that at a low level, creativity skills are associated with an indicator of general intelligence – Table 2.

**Intelligence.** All children with a level of intelligence below the average (12.2% in the sample) demonstrated simultaneously low levels of creativity, which confirms the threshold hypothesis. Having an average and high IQ level in accordance with the Wechsler test, preschoolers usually have creativity – in the form of the corresponding verbal or non-verbal abilities.

**Social competence.** Relatively low grades of communication skills with peers and adaptation to the conditions in PEI among low-creative children were confirmed. In this case, the highest grades were given to the group with an average level of creativity. Teachers noted the problematic character of dealing with feelings in highly creative children ( $p = 0.066$ ).

**Emotional adaptation.** The general level of anxiety in the groups does not differ significantly. However, distinct differences were found at the qualitative level. The level of creativity determines the specific perception of positive and negative experiences in different life situations. Low-creative preschoolers are characterized by an increased level of anxiety in situations of communication among children. Highly creative children experience negative emotions in situations of habituation to daily rituals and activities. The last result was unexpected for us and required clarification.

A qualitative analysis of the choices showed that highly creative preschoolers are characterized by anxiety in such situations which children with low and medium creative potential usually take positively. In this group, more than half of the respondents chose a sad mood in situations modeling everyday activities and compliance with the daily routine: the need to pick up toys (12 children), going to bed and eating alone (8 children each), dressing (6 children). In unambiguous situations, which provoke negative emotions among the majority of children (isolation, aggression from another child, or conflict because of a toy), some children chose a cheerful face, interpreting events in their own way: as expected, favorable or playful actions. In general, there were ten such observations (8.7% of the sample), eight of which were representatives of the creative group.

### The factor structure of the creative and intellectual abilities of preschoolers

The 23 indicators of creativity, measured by TTCT, required grouping. Factor analysis allowed to determine the necessary minimum of informative variables, as well as to clarify the structure of the cognitive abilities of preschoolers.

During factorization conducted by the method of principal components, five factors, which explain 73.7% of the features variance, were discovered. The first three are the most significant (Table 3).

**Table 3**  
*Factor analysis of creativity and intelligence indicators in a sample of 115 preschoolers*

Variables:		Factor decision without rotation			Factor decision with Varimax rotation				
		F 1	F 2	F 3	F 1	F 2	F 3	F 4	F 5
Subtest 1. «Questions»	fluency	0.799				0.803			
	flexibility	0.682				0.518			
	originality		0.792			0.656			
Subtest 2. «Causes»	fluency	0.721		0.482		0.779			
	flexibility	0.704				0.578			
	originality		0.820			0.691			
Subtest 3. «Consequences»	fluency	0.811				0.754			
	flexibility	0.635							
	originality		0.744			0.733			
Subtest 4. «Objects improvement»	fluency	0.943	-0.360	0.516	0.806				
	flexibility	0.716			0.713				
	originality		0.750		0.845				
Subtest 5. «Unusual research»	fluency	0.878	-0.318	0.538	0.947				
	flexibility	0.713			0.705				
	originality		0.733		0.800				
Subtest 6. «Unfinished figures»	fluency	0.429				0.670			
	flexibility	0.751				0.584			
	originality		0.788			0.739			
Subtest 7. «Repeated lines»	readiness			0.756					0.627
	fluency	0.783				0.866			
	flexibility	0.636				0.723			
General assessment of creativity	originality		0.719			0.760			
	readiness		-0.404	0.782					0.517
	fluency	0.921	0.547		0.615		0.485		
Wechsler's test for children	verbal	0.717	0.505			0.442		0.771	
	nonverbal	0.650		0.438				0.734	
	General IQ	0.897		0.451				0.840	

The first factor (34.4% of the explained variance) included the fluency and flexibility of all TTCT subtests, that is, the productivity of putting forward diverse ideas that meet the requirements of the situation. These qualities, in particular, correlate the most with the general assessment as well with preschoolers' IQ.

The second factor (15.6% of the variance) united indicators of the performance originality of both verbal and non-verbal tasks. It is noteworthy that in some subtests the factor has weak negative correlations with the indicators of fluency and readiness of answers (they are in italics in Table 1). This factor reflects meaningfully our practical observation on the high level of productivity in tasks on divergent thinking, which is often achieved through trivial and obvious answers. Originality in preschool age is achieved mainly through the instruction to invent something unusual, "to answer in a way children did not answer before." For many children, this request causes difficulty and even misunderstanding because they do not know which answers are generally accepted. Only five of the respondents answered without additional stimulation by the experimenter; in all cases, they were students from creative studios, whom the teachers characterized as talented (which would combine innate abilities with early experience of their development in a suitable social environment). Thus, originality is formed based on the productivity of ideas generation as the ability to reject generally accepted decisions at a certain stage.

The third factor, explaining 11.07% of the variance, united elaboration parameters of figurative subtests. It correlates positively with scores of fluency for verbal subtests and intellectual abilities.

*The factorial solution with Varimax-rotation* reveals the orthogonal factors that are most distant from each other. In this case, the filling of the factors was changed and the variables reflecting the solution of cognitive tasks of various types came to the fore. The subtests of the TTCT verbal battery created two independent factors. Although the tasks "Objects Improvement" and "Unusual Use" are verbal in form, they are related mostly to the object activity (children were asked to think of as many unusual uses of cardboard boxes as possible as well as of ways to improve the toy elephant to make it more interesting for a game). Among other subtests, these tasks are associated the most with the practical experience of children and tackling with everyday life issues. The significant correlation of factor 1 with the general test grade suggests that this particular type of creativity is dominant in preschool age. This enables us to distinguish three types of creativity in the structure of the creative abilities of preschoolers – subject (practical), verbal, and figurative. Readiness was again presented as a separate factor.

As a result of factor analysis we reduced 23 particular indicators of creativity to eight integral parameters: productivity (the sum of fluency and flexibility) and originality, which were considered independently for three informative blocks of tasks: verbal (1-3), subject (4-5), and figurative (6-7); in addition, we calculated the total indicator of the readiness of figurative subtests and the total score based on the results of the seven TTCT subtests.

### **Correlations of certain parameters of creativity and adaptation aspects**

Considering the general indicator of creativity in the context of relationships with preschoolers' temperament traits, significant correlations with a positive reaction to new things, reactivity, and quick adaptation should be noted. The indicator of general intelligence also correlates with adaptability, but mostly with the ability to concentrate as well as with engagement, and intensity of reactions. It is reasonable to assume that these qualities are the natural basis for the development of cognitive abilities. Creativity is also associated with low anxiety (lack of negative experience) in situations of communication with children and adults. The correlations obtained reflect various prerequisites for the formation of intelligence and creativity.

The connections between creativity and the child's adaptive abilities become clearer at the level of certain abilities – Table 4.



**Table 4**

*Correlations of indicators for cognitive abilities and adaptation measures in a sample of 115 preschoolers*

Adaptation parameters:	Subject (practical) creativity		Verbal creativity		Figurative creativity		The level of readiness	General creativity <sup>b</sup>	General intelligence
	productivity	originality	productivity	originality	productivity	originality			
The questionnaire to determine temperament of children aged 3-7 years:									
Activity	0.077	0.060	0.066	0.057	0.094	0.123	0.151	0.149	<u>0.231</u>
Rhythmicity	0.055	-0.019	0.125	-0.019	0.110	-0.004	<u>0.188</u>	0.096	0.141
approach/withdrawal	<u>0.194</u>	<u>0.196</u>	<u>0.214</u>	0.257	0.138	0.166	<u>0.186</u>	<u>0.304</u>	0.156
Adaptability	<u>0.187</u>	0.085	<u>0.258</u>	0.057	0.164	0.102	<u>0.225</u>	<u>0.216</u>	<u>0.227</u>
Intensity	<u>0.152</u>	0.145	0.087	0.101	0.074	0.119	<u>0.209</u>	<u>0.125</u>	<u>0.203</u>
Threshold	<u>0.202</u>	0.269	0.109	<u>0.203</u>	<u>0.192</u>	0.243	0.108	0.251	0.112
Mood	0.038	-0.071	0.040	0.049	0.011	0.065	0.025	0.063	0.046
Distractability	0.015	0.105	0.140	<u>0.209</u>	0.101	<u>0.236</u>	<u>-0.188</u>	0.155	-0.071
attention/persistence	<u>0.189</u>	0.140	<u>0.192</u>	0.108	0.002	-0.021	<u>0.202</u>	0.115	0.270
The expert assessment of preschoolers' social competences:									
Adaptation to PEI	<u>0.186</u>	0.113	<u>0.184</u>	0.103	0.126	0.113	<u>0.213</u>	0.151	<u>0.185</u>
Communication skills with peers	<u>0.191</u>	0.134	<u>0.312</u>	0.036	0.082	0.044	0.139	0.117	0.158
Skills to treat feelings	-0.064	<u>-0.184</u>	-0.047	-0.119	-0.163	<u>-0.234</u>	0.061	-0.141	0.066
Alternatives to aggression	-0.005	0.027	-0.010	0.063	-0.014	0.163	0.105	0.078	<u>0.212</u>
Skills to overcome stress	0.081	0.104	0.058	0.041	-0.018	0.098	0.065	0.069	0.089
Negative experience and anxiety manifestation:									
During the communication among children	<u>-0.212</u>	-0.166	<u>-0.200</u>	<u>-0.199</u>	-0.085	-0.051	-0.043	<u>-0.235</u>	-0.141
During the communication situations "a child – an adult"	<u>-0.206</u>	<u>-0.187</u>	-0.172	-0.246	-0.106	0.066	<u>-0.203</u>	<u>-0.208</u>	<u>-0.224</u>
During everyday activities	0.170	<u>0.192</u>	-0.086	0.072	0.180	<u>0.217</u>	0.007	0.174	-0.080
Anxiety degree	-0.105	-0.122	-0.105	-0.154	0.024	-0.027	<u>-0.187</u>	-0.100	<u>-0.188</u>

Note: the critical value of the Pearson correlation coefficient is 0.184 at  $p \leq 0.05$ ; 0.240 at  $p \leq 0.01$ ; 0.298 at  $p \leq 0.001$ .

We see that the originality of the performance of objective and figurative tasks, to some extent, is the opposite of adaptability: it is associated with the child's anxiety in everyday actions and a low assessment of emotional control. Elaboration, on the other hand, is a favorable criterion associated with adaptive capacity, emotional well-being, and social competence.

The performance effectiveness of verbal and subject tasks is directly related to social competencies: probably, children with these abilities really adapt better to social conditions, therefore kindergarten teachers rate them higher.

## Discussions

### Prerequisites for the creativity formation at the early stages of ontogenesis

Preschoolers aged 5-6 years have demonstrated high and sufficient productivity while solving creative problems. When interpreting the results, it should be remembered that children's creativity is largely conditioned by a lack of knowledge, experience, and low thinking criticality. This stimulates the imagination; however, it also complicates the application of traditional criteria to the results of the preschoolers' creativity. The diagnostic methodology of creativity at the early stages of ontogenesis still

requires improvement.

We justified the appropriateness of creativity types division based on the material for generating ideas: verbal, figurative, and subject-practical. Verbal and practical abilities are a strategic factor, and they are closely related to the general level of cognitive development. Previous researchers have pointed out that “subject” subtests are central in Torrance’s test battery (Tunick, 1998); the existence of the so-called “everyday” creativity in student samples was distinguished on their basis (Veldbrekht, 2005; Yakymchuk et al., 2020). Our results clarify that this type of creativity plays a leading role in preschool age.

The results obtained also testify that the creativity and intelligence development of preschoolers creates a single factor. There is a holistic mechanism for the development of cognitive abilities as a result of gaining experience in interaction with the world around, both subject and social. At the same time, creativity should not be considered as something integrated into the structure of intellectual abilities. It is formed by the age of 5-6 based on general intelligence and shortly becomes a separate ability supported by personal prerequisites and favorable social conditions. This is confirmed by the different roles of intellectual and creative resources in the processes of children’s social adaptation (it was demonstrated convincingly by Wallach and Kogan (1965)).

Creativity at the early stages of ontogenesis performs purely pragmatic functions: cognitive and adaptive. This is a special way of processing and using the information received, which expands the adaptive capabilities of the child in situations where the capabilities of intelligence and thinking are insufficient (Vygotsky, 1997).

Creativity is formed in the direction from the basic ability to generate ideas adequate to the given task to the ability to detail and refine these ideas, and then to produce original content. The leading role of game activity in the development of creativity, as well as in the formation of social skills and regulation of children’s emotions should be noted (Hoffmann and Russ, 2012). The speech development (verbal productivity) and the ability to adapt the features of typical objects to one’s own needs play an important role here. Children’s creativity determines the development of personal qualities, and it itself is determined by them.

#### **The profile of individual traits of a creative personality**

Although at the age of 5-6, it is still too early to talk about the completed formation of personality, we can analyze the inclinations of individuality acquired in the process of socialization based on innate qualities. It is known that the temperament features create ontogenetically stable syndromes; earlier, based on the parameters of the Thomas and Chess (1977) test, such types of temperament as “easy,” “slowtowarmup,” and “difficult”; “Home child” (Makarova, 1998) were empirically identified. Guided by this logic, we describe the typological profile of a creative child: high level of sensitivity and readiness to respond, openness to new stimuli, and quick adaptability. In addition to these general features, the ability to concentrate or to switch attention quickly determines the development of certain components of creativity: productivity and originality.

It is known from previous studies that the adaptive abilities of a child aged 3-5 years depend on the parameters of approaching and mood. Then the temperament profile changes – the predictability and intensity of reactions become a key feature (Kolpakov and Makarov, 1993). In our case, the indicator of approaching correlates with general creativity, which determines the inclusion of this variable in the structure of the adaptive abilities of preschoolers.

Special attention should be paid to cases of a negative relationship between abilities for creativity and adaptability parameters: an increase of anxiety during everyday activities and a decrease of control over feelings. The literature noted the same peculiarities earlier. The prime example is the increase of the neuroticism level and the activation of the psychological defenses of preschoolers during the experiment on the development of creative abilities (Druzhinin, 2019). Consequently, the optimal (sufficient) level of creativity is crucial in the resilience system and social adaptation.

#### **Social competences and the influence of the environment on the development of creative potential**

Social and psychological adaptation includes the assimilation of norms, values, rules of society in general, and the inner social circle: family and kindergarten. The acquisition of social norms and sanctions occurs while interaction of preschoolers with other people and the corresponding vigorous activity. The study showed that the advantage in the possibilities of social adaptation does not relate to highly creative children. It belongs to preschoolers with a sufficiently developed (average) creative potential. This confirms the dialectical contradiction between the concept of “social norm” and the concept of “creativity” as a way to go beyond limitations of existing rules.

The study by [Gryazeva-Dobshinskaya et al. \(2020\)](#) identified the adaptation resources of preschoolers with the various structures of creative abilities (the ratio of readiness and originality). A direct link between creativity and personal adaptive resources was only found in the group of children with a high level of both abilities; at a low level of answers readiness, originality acquires negative correlations with the resources of adaptability. Our results represent a different research methodology. However, they show a similar result – the readiness is a marker of adaptation. The productivity of solving practical and verbal problems has a similar effect, too. As a result, creativity has a number of certain cognitive and personal characteristics that have an influence on the quality of adaptation both positively and negatively.

The creativity study always occurs in the context of a certain social environment, stereotypes, and requirements for creativity products ([Lilly, 2014; 2020](#)). Within a particular culture, the creativity of children and adults is manifested and encouraged in different ways. For example, representatives of Western culture demonstrate advantages in the ability to solve innovative problems, but in general, children are flexible in implementing the tools provided by using alternative methods ([Neldner et al., 2019](#)).

According to [Makarova \(1998\)](#), social culture is also “imprinted” in temperament by 8-12 years, creating stereotypical behavioral patterns. When studying the early formation of temperament features in children under 7 years, no population differences were found: gender, age, and ethnicity. The unstable functioning of the nervous system in preschoolers hampers the full assimilation of generally accepted norms and rules. This feature makes this age sensitive for creativity formation both at the cognitive and personal levels. Later, the mechanisms of the creative qualities development are transformed due to the inclusion of critical thinking and self-censorship.

## Conclusions

The creativity of preschoolers is manifested at the level of individual abilities in the subject, verbal, and/or imaginative sphere: the production of a large number of ideas, originality, and the ability to elaborate ideas in detail. These abilities are gradually formed in the process of gaining experience in different spheres of life by developing in the direction from spontaneous “game” creativity to its socially significant forms. In the process of creativity development, its cognitive and personal components are significantly transformed.

The dialectical nature of creativity is manifested at the early stages of the socialization formation – manifestations of creativity can both contribute to and hamper social and psychological adaptation. Adaptive creativity is associated with an open perception of the world around in its changing and diverse manifestations. Creativity contributes to the assimilation of social competencies, it allows to expand significantly the interpretation of stressful situations and implement coping according to the principle of “positive reassessment.” On the other hand, increased anxiety in everyday situations can tip the balance of positive and negative experiences, leading to disturbances in the emotional regulation of behavior. The relationship between creativity and adaptability is largely determined not by high, but by low values (in the zone of relationship with general intelligence). Thus, creativity in preschool age is a part of the child’s normal cognitive development and a natural condition for personality adaptation.

## Implications and Recommendations

Based on the obtained results, a number of important recommendations for psychological and pedagogical support of creativity were formulated. The support of the child’s creative abilities in the family and in the PEI creates the basis for his/her further development. The lack of creative potential readiness of children under 5 cannot be compensated at a later age. This is an important argument for the implementation of creativity in programs of educational establishments.

The main task of preschool age is to teach a child to produce easily a large number of various ideas, which are adequate for the task. This quality is basic for the creation of other creative abilities. Development programs should be comprehensive in nature. Besides, they should include the integration of creativity and related cognitive, emotional, communicative, and regulatory resources. When working with preschoolers, it is important to find a fundamental cognitive ability in the area of actual development (intelligence or creativity in the figurative, verbal, and practical spheres) and develop it, providing appropriate stimuli for deepening and expanding skills.

In parallel, the processes of emotional regulation should be improved; the child should be taught effective and safe ways to find solutions in difficult life situations. In addition, it is necessary to detect timely factors that are unfavorable for social adaptation. Besides, the child should be taught effective and

safe ways to find solutions in difficult life situations.

It is important for adults to understand the diversity of creativity – for example, that emotional regulation problems are caused by sensitivity to environmental stimuli. In preschool age, many behavioral reactions, including increased vulnerability, are assessed as manifestations of the age norm and do not cause wariness. Only with the beginning of schooling, when such behavior creates problems for both children themselves and those who are around, they draw parents and teachers' attention. Early identification and correction of maladaptive manifestations will help the child to adapt successfully at the next stages of development. But rigid attempts to “redesign” the child lead to the loss of early formed adaptive and creative abilities.

## Limitations

The results obtained reflect the regularities of the formation of creativity in children under 5-6 years who are studying in preschool educational institutions. Due to the rapid development of personality and cognitive properties in other age groups, other internal mechanisms are probable. The correlation study leaves open the question of the cause-and-effect direction of the relationships detected.

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### Conflict of interests

The authors declare no conflict of interest

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