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DYNAMICS OF PERSONALITY DEVELOPMENT IN PRE-ADOLESCENCE: LONGITUDINAL STUDY

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Abstract

Pre-adolescence is considered as a transitional age. On the basis of the structural Cattell's personality theory the longitudinal experiment with children aged 9 to 14 was carried out. The Cultural Fair Intelligence Test (CFIT), 12- and 14-factor Cattell's questionnaires (12PF / CPQ and 14PF / HSPQ) were used. It was shown that the transition period from 9 to 12, including the age crisis, was characterized by significant changes in structuring the interconnections between personality traits. These changes have significant gender features and differences according to the level of intelligence development. Quantitative estimates of the relationship of personality traits, made on the basis of factor analysis of psycho-diagnostic data, allow us to analyze this age period in dynamics, in terms of the processes of system integration and differentiation. The results of the longitudinal study presented allow the determination of the time frame of the age (pre-adolescent) crisis, the «peak» of which, according to the data, under modern conditions falls to the age of 11-11.5. The changing of cross-functional relationships is manifested as a system-forming factor in the dynamics of personality development and can serve as a basis for the creation of its non-equilibrium (dynamic) models. The emergence of stabilizing combinations of the personal traits ("psychological formations") that ensure the stability of the non-equilibrium system in the transition (crisis) period is discussed.

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Keywords: Preadolescent schoolchildren, psycho-diagnostic data, system analysis, dynamics of personality.



1. Introduction

The age of 9-12 is the «borderline» between childhood and adolescence. As a central line of mental development, some researchers distinguish the development of intelligence, others - development of personality. In this age range there is an interference (overlapping) of several crises. One is caused by the onset of latent pre-pubertal changes in puberty, which determines the contradictions of this stage of development of the child «from within». Another, the age crisis is associated with changes in social relations and attitudes. «Pedagogical crisis» is stimulated by the «from the outside» changes forms of training (the transition from primary school) (Zukerman, 1998). The resolution of this situation is seen by the foreign researchers in the relationship building with children on the model of primary school (Simmons & Blyth, 1987). From our point of view, such organization of interaction with the child involves building its relationship with the environment. The question remains what happens «inside» of the age crisis in this fragile preteen time? Thus, the age range of 9-12 is a «turbulent zone» in mental development. However, this age is still not singled out by Russian scientists in the age periodizations as specific, different from other periods of development. The regularities of this age period, the corresponding phenomenology and dynamics of psychosocial development of the student are insufficiently studied.

2. Problem Statement

In the description of Russian psychologists the age of 10-12 is traditionally associated with the transition from primary to secondary school. The new order of life, which should be followed by students, entails difficulties in the emotional state, in learning. These problems are determined by both the external situation and internal psychological factors.

The age range of 9-12 years old in the classifications of different authors often falls to different age boundary periods. Foreign and Russian psychological schools use different approaches in describing this age. The followers of the biogenetic direction inclined to consider it as pre-pubertal that cannot be denied. At the same time, many characteristic changes of this time concern psychosocial and personal sphere (De Bolle et al., 2015; Harter, 1990; Lipsitz, 1977). Supporters of the approach of social conditionality of mental development (Elkonin, 1995) also did not avoid contradictions, which are associated with the designation of the boundaries of age and the time of the onset of the crisis, and with the allocation of age characteristics and their psychological content. The unity of researchers is observed in the description of the crisis itself as a turbulent process accompanied by emotionally non-equilibrium states. In a crisis, the stability of the developing system is broken and it affects the structure of cross-functional relationships. The changes in the intra - and inter-functional relationships of cognitive functions is recognized by Anan'ev's (2001) psychological school as an essential criterion for the development.

It is impossible to say that the specified age range remained without attention of researchers. Freud (2011) singled out the age from 5 to 10 years and defined it as a latent stage with learning and socialization. Piaget (1972) defines this period as the time of transition from the stage of concrete to the stage of formal operations of thinking. Kohlberg (1984) paid attention to the development of moral consciousness of children 10-13 years, he wrote that the development of morality in this period is at the conventional level, there is respect for the rules and regulations. Erikson (1950) noted that at the age of 6-12, the ability to

master the environment is intensively developing, which is accompanied by an experience of their skill or inferiority. In the United States, many children 6-12 years old are in primary school, this age is designated as middle childhood (Collins, 1984; Cole & Cole, 1993). Researchers call this age as pre-adolescent. The next age level refers to the age group of teenagers (13-19 years old).

Some researchers called the study period as pre-adolescence (preteens, preadolescent age) with pre-adolescence crisis, indicating its radical difference from the adolescent (Polivanova, 2006; Zukerman, 1998; Simmons & Blyth, 1987; Collins, 1984; Elkind, Dragastin, & Elder, 1975; Kagan, 1972). The approach to the child at the age of 11-12 is marked by certain changes affecting many aspects of mental development, social relations, personal development in general. Nevertheless, numerous works concerning the problem of social conditionality of mental development do not give a complete answer to the question of internal movement and psychological content of the studied transition period. At the same time, Collins (1984) claims that between 9 and 12 years there is such serious crystallization of personal structures that many academic, social and personal characteristics of schoolchildren of this age give the basis for reliable forecasts of his behavior for 4-6 years ahead. Data on a child up to grade 3 do not have predictive power. Based on these ideas, we can assume that psychosocial development at a specified age is determined by the formation and structuring of cross-functional relationships.

In the present work, on the basis of longitudinal research using the Cattell's structural theory of personality, the attempt made to quantitatively describe the age as a transitional, including pre-adolescent crisis.

3. Research Questions

The following research questions have been discussed in the work.

3.1. Is it possible to consider pre-adolescence (preteen age) as a separate transition between primary school age and adolescence?

3.2. Can the structuring of personality traits in pre-adolescence be a criterion of transition time?

3.3. How to determine the time limits of pre-adolescent crisis by the dynamics of changes in the interconnections of personality traits?

4. Purpose of the Study

The purpose of the study is research of the dynamics of structuring personality traits in the transitional pre-adolescence, which includes pre-adolescent crisis.

5. Research Methods

The longitudinal study was carried out from 2013 to 2017 in the 24th school of Cheboksary, Russia. The students from the end of the third to the beginning of the sixth grade at the age of 9 to 12-12,5 were participated in the longitudinal experiment. Diagnostic sections were carried out 2 times in each academic year. Thus, the results of psycho diagnosis were obtained throughout the period of transition from primary to secondary school and, accordingly, cover the transition period from primary school age to adolescence. In the third grade 127 students were tested, at the beginning of the sixth grade - 83 students. In addition, in

2017, an ascertaining psycho diagnostic section was carried out in the 8th grade (age 14-15, 66 schoolchildren). The study was based on the structural Cattell's theory of personality (Cattell, 1990). Used: ESPQ (Early School Personality Questionnaire) for primary school children (3-4 grades), the 12- and 14-factor questionnaire (12PF / CPQ and 14PF / HSPQ) by Cattell (1990) for children aged 10 to 15 (5-8 grades). Intellectual characteristics were diagnosed using Cattell's Cultural Fair Intelligence Test (CFIT), identifying intelligence quotient IQ. The results of personality traits (qualities) diagnostics were processed by factor analysis. The tests used are scaled and standardized, designed for the use of the factor analysis, therefore, at 12-14 initial psychological characteristics, the sample of 35-60 people allows an adequate factor analysis after the division of respondents by gender or IQ level. In addition, control tests were carried out on a sample of 30-35 students in other schools of the Chuvash Republic, Russia. Thus, the results allow us to assess the features of structuring personality traits in dynamics, taking into account gender differences and the level of intellectual development of students.

6. Findings

The table shows an example of factor analysis of personality traits, demonstrating the *dynamics* of structuring the relationships of the relevant psychological characteristics in the process of longitudinal experiment. On the basis of the Kaiser criteria (eigenvalues of factors $E > 1$) (Kaiser, 1960) and «Scree Test» (Cattell, 1966), the analysis identified in this case four main factors with the maximum contribution of S to the total variance.

For example, we will interpret the factor loads for girls in the 3-5 grade dynamics (see the table 01).

At the end of the third grade, the first factor is emotional-communicative: it is determined by emotional balance (D), humility (E), low anxiety (O). To the fifth grade, the contribution S of the first factor is increased more than 1.5 times including the emotional and communicative features (D,E in negative polarity), shyness in communication (H), low volitional self-control (Q3) and high frustration (Q4) are added. Together, these features are called «maladjustment syndrome of the fifth grade» and characterize the manifestations of the age crisis.

Table 01. Factor analysis of the 12 traits at the end of the third to fifth grade (girls)

Scales	Girls of 3th grade				Scales	Girls of 5th grade			
Factors	F1	F2	F3	F4	Factors	F1	F2	F3	F4
A	0.04	0.10	-0.63	0.07	A	-0.48	0.76	0.06	0.01
C	0.01	0.16	0.21	-0.81	B	0.11	0.77	0.14	-0.16
D	-0.66	-0.32	0.16	-0.03	C	-0.10	0.81	0.08	0.11
E	-0.65	0.25	-0.12	-0.44	D	0.79	0.04	0.09	0.34
F	0.21	0.72	0.06	0.03	E	0.79	0.17	-0.23	-0.13
G	0.39	0.31	0.42	0.09	F	0.28	0.52	-0.51	0.03
H	0.28	-0.62	-0.01	-0.37	G	-0.72	0.14	0.06	0.12
I	0.00	0.03	-0.72	0.01	H	0.01	0.01	-0.03	-0.95
J	0.57	-0.01	-0.45	-0.10	I	-0.07	0.27	0.82	0.06
N	-0.04	0.29	0.13	0.55	O	0.53	-0.53	0.36	-0.21
O	-0.75	-0.08	-0.12	0.21	Q3	-0.65	0.26	0.15	-0.08
Q4	-0.16	-0.72	0.30	0.23	Q4	0.77	-0.03	0.01	-0.04
<i>E</i>	2.07	1.79	1.51	1.42		3.36	2.56	1.19	1.15

$S, \%$	17.28	14.96	12.6	11.82		28.24	21.33	9.87	9.54
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*Note: Personality traits in the 12-factor questionnaire: A – gregariousness-isolation; B – abstract-concrete thinking; C – emotional stability-instability; D – tension-balance; E – independence-obedience; F – carelessness-concern; G – high-low-conscientiousness; H – boldness-shyness; I – softness-hardness; J – energy-restraint, N – naivete-trick; O – anxiety-calmness; Q3 – high-low self-control; Q4-tension-relaxation.

The second most important factor in the third grade is also emotional and communicative. It combines certain features, in the future (in the fifth grade) manifested as the most significant (carelessness, shyness, frustration). The second factor in the fifth grade is determined by fundamentally different features: sociability (A), verbal intelligence (B) and emotional stability (C).

The dynamic changes in the first two factors with the maximum contribution to the structure of personality traits are manifested: *emotional and communicative qualities are integrated for children of the fifth grade with intellectual and volitional traits* (Slavutskaya & Slavutskii, 2014; Slavutskaya, 2015).

As can be seen from the table, the contribution of S to the total variance of these factors varies significantly: for the sample of girls, the total contribution of four factors during two years increases from 57% to 69%. Since factor analysis is based on the matrix of correlation coefficients, such changes mean not only significant qualitative changes in the structure of personality traits, but also a significant quantitative increasing in the interdependences between psycho-diagnostic data.

In addition, the combination of personality traits that forms these (the most significant) factors is changing.

The results of the longitudinal study allow us to quantify the overall dynamics of changes in the interconnections of personal qualities of students during the experiment. The corresponding data are graphically presented in figure 01.

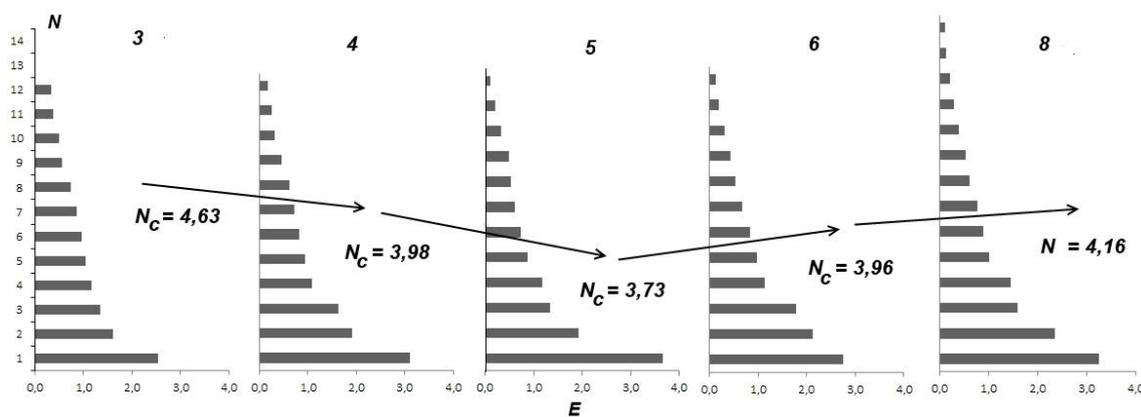


Figure 01. The integral changes in the contribution of all factors during the longitudinal study from 3th to 8th grade

It shows the eigenvalue changes of all factors in the entire sample of children from the 3rd to the 8th grade (approximately aged 9-14). On the vertical axis, the number of the factors - N , on the horizontal, the eigenvalues - E_N . As can be seen from the figure, the contribution of the first factors (their eigenvalues) grows until the end of the 5th grade (aged 11-12), and then the eigenvalues E_N distribution stabilizes.

Quantitatively, this can be shown by means of a weighted average ("center of gravity") distribution of eigenvalues by factors:

$$N_C = \sum_{N=1}^Z \frac{E_N \times N}{Z}$$

Here Z is the sum of all eigenvalues of factors equal to the number of personality traits in the Cattell's questionnaires (12 or 14 -factors). The change in the "weight" of the first factors shown by the arrows corresponds to the increase in their contribution to the total variance, that is, to the quantitative growth of the general interconnections between personal qualities (traits). Thus, the process of *integration* of systemic (cross-functional) links is quantitatively shown. After the crisis, the level of interconnection stabilizes and even decreases, which corresponds to the process of *differentiation*. This is confirmed by the redistribution of factor loads in the main factors that begin to correspond to different areas: emotional, communicative, volitional, intellectual.

Even more clearly, these processes are manifested in the assessment of the dynamics of the total contribution of the first four, the most significant, factors to the overall variance (see table 1). The demonstration data for boys and girls are shown in figure 2.

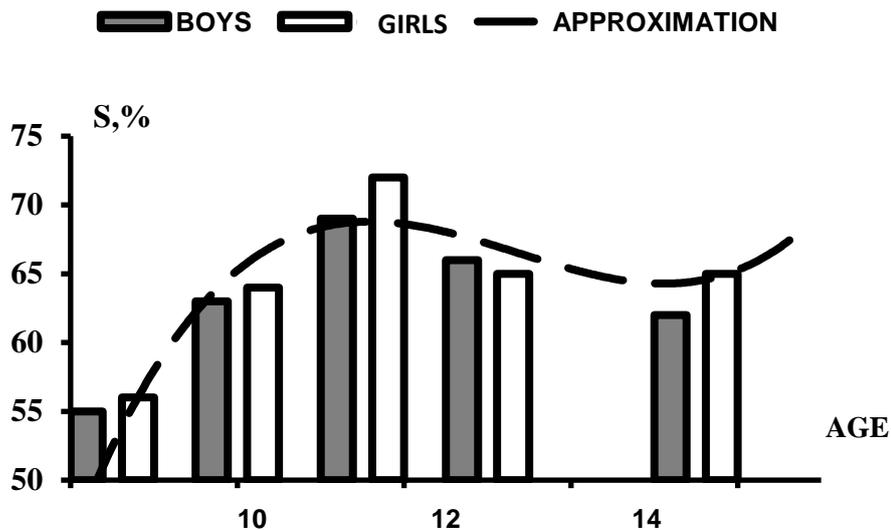


Figure 02. The total contribution of the first four factors to the overall variance in dynamics

The contribution of the first four factors to the overall dispersion increases from 50-55% to 70-75% to the end of the transition (crisis) period, and then – stabilizes and decreases slightly.

7. Conclusion

The age studied in this paper is transitional not only from the point of view of the social situation of development - the transition from primary to secondary school, which is typical of the Russian education system. This, as a whole, is the transitional period in mental development. The results of the longitudinal

study presented above allow us to determine the time frame of the age (pre-adolescent) crisis, the peak of which, according to the data, falls to the age of 11-11.5 years old. The data allow us to evaluate some features of children personal changes in contemporary conditions occurring at this time, based on the restructuring of cross-functional relationships.

The growth and restructuring of cross-functional interconnections is a general pattern of transition age. It, in one way or another, manifests itself for all groups of students, allocated on the basis of gender or IQ level. Experimentally observed gender heterochrony in personal development – for the girls, the signs of age-related crisis occur for six months or a year earlier than boys, the redistribution of the relations of personality traits for them is more pronounced, also the signs of emotional distress during the crisis (Slavutskaya, Nikolaev, Ivanova, & Yusupov, 2018). In the analysis of psycho diagnostic data of students with different levels of IQ found that for children with higher intellectual performance transition period proceeds more smoothly in terms of quantitative and qualitative changes in cross-functional relationships of psychological characteristics.

The formation of stable and temporary (existing on a limited time interval) relations between personal traits should, from the point of view of system analysis, be considered as the emergence of stabilizing combinations ("psychological formations") that ensure the stability of the non-equilibrium system in the transition (crisis) period. Analysis of the dynamics of development in such a period should include the study of the structure of groups of such interrelated psychological characteristics. In contrast to the "psychological neo-formations", characterizing and passing in the next age period, such stabilizing combinations may disappear at the end of the crisis (transition period). In this context, changing (direct or latent) cross-functional relationships are manifested as a system-forming factor (Slavutskaya & Slavutskii, 2018) in the dynamics of development and can serve as a basis for the creation of its non-equilibrium (dynamic) models.

Shown above experimentally quantitative and qualitative changes in the structure of cross-functional relationships correspond to the principles of anticipation, systemic integration and differentiation in mental development. The emergence in the crisis of "maladjustment syndrome of the fifth grade" from the point of view of the principle of anticipation is the preparation of the system for the transition to a new level (the transition to the next age period – adolescence). In parallel, the principle of system differentiation is manifested: the factor analysis of personal traits of students after the pre-adolescent crisis shows the division of interrelated characteristics into spheres: emotional-volitional, intellectual, etc.

In conclusion, it should be noted that the identified features of the dynamics of the personality of students in the transition period should be taken into account for the preparation of educational programs of differentiated training, practical school psychologists – in the process of psychological and pedagogical support of students, in educational work with parents, in the formation of competencies of teachers of primary and secondary schools.

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