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**COGNITIVE STATES OF SCHOOL CHILDREN**

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***Abstract***

The article is devoted to the study of cognitive states of schoolchildren. The purpose of the study was to identify the most typical conditions of schoolchildren of grades 6-11. In accordance with the purpose of the research, a questionnaire was developed to collect information on situations of appearance of states and their manifestations. It is established that the states of reflection, interest, concentration, thoughtfulness and curiosity are significant for all classes. Typical states in each of the studied periods of schoolchildren's learning are meditation, interest and concentration. The place of cognitive states among other mental states of schoolchildren and students is shown. Their share ranges from 39% to 53% of all significant states in the educational process. The specificity of the experience of cognitive states by schoolchildren of middle and high school is revealed. In 6-7 grades, cognitive states are combined with activity, joy, fun, excitement, in 8-9 grades with psychophysiological states of apathy, drowsiness, fatigue and strong-willed states of patience, tranquillity, in 10-11 grades with conditions of activity, cheerfulness, joy, fun, patience, tranquillity. The results of the research can find application in pedagogical activity. Knowledge of cognitive states and peculiarities of their actualization will allow to manage these states in a more effective way.

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**Keywords:** Cognitive states, educational activity, schoolchildren.



## 1. Introduction

One of the typical problems of schoolchildren is the constant complication of educational activity – the growth of the total volume of information. In this connection, the study of the mental states of schoolchildren is of practical importance. Thanks to the regulatory function of the states, the students are adapted to the information-intensive situations of learning activity.

The frequency of actualization of cognitive states in the classroom is one of the factors of successful mastering of knowledge. The formation of cognitive skills relies on the creation and maintenance such conditions in the classroom as cognitive activity (developmental learning), reflection (metacognitive class) etc. Without the systematic experience of these states learners cannot assimilate the whole variety of received knowledge.

In the educational and cognitive activity of schoolchildren and students, cognitive states are more similar in their content to so-called "academic emotions" (Pekrun et al., 2007). This theoretical construct takes into account the importance of the educational situation for students, the behavior and professional level of the teacher, the degree of complexity of the solving tasks being solved, the style of communication, etc. Because the educational activity is largely related to academic achievements, emotions in learning are also called "emotions of achievement". Achievement is defined as a characteristic of an activity or its results, evaluated according to certain standards.

Examples of emotions associated with the result of activity are joy and pride in achieving the goal in learning, and frustration and shame in case of failure. The emotions associated with the activity itself, for example, include excitement, boredom when teaching in the classroom or anger, anger over the demands of the teacher.

Academic emotions are determined from the point of view of the object of their orientation (the learning process or its results), their valence (positive / negative) and activation influence on educational activity (activating / deactivating) (Linnenbrink, 2007). To date, the most influential is Control-value theory of achievement emotions. (Pekrun et al., 2002). Academic emotions are defined as emotions related to achievement, and to the results of these activities (Pekrun et al., 2007, p. 15).

From the point of view of the authors of the concepts of academic emotions, they have an important diagnostic value for teachers, since they reveal cognitive attitudes and internal concerns of students, and also signal difficulties in learning.

In addition, the knowledge of the academic emotions of their functions in the learning process will allow us to better understanding of the phenomena of cognitive activity and the role of motivation for achievements in the learning process. Research should answer the question of how different types of academic emotions affect student motivation, behavior self-regulation, the use of learning strategies, the distribution of cognitive and physical resources, and ultimately academic achievement (Elliot & Church, 1997).

## 2. Problem Statement

A significant shortcoming of theories of academic emotions is a limited number of measured emotions. Significant emotions for education are selected on the basis of their belonging to the basic emotions. So, the basic questionnaire AEQ measures eight separate emotions: pleasure, hope, pride, anger,

anxiety, shame, hopelessness and boredom. It is divided into three sections: emotions in the audience, emotions about learning, emotions associated with the tests (Pekrun et al., 2002).

However, studies show that students experience many other conditions that do not relate to academic emotions. Among them there are those that relate purely to cognitive states, for example, confidence, confusion, curiosity, inspiration, interest (Bernardo et al., 2009). This research is devoted to the study of these states.

### **3. Research Questions**

It is necessary to answer the question, what cognitive conditions are typical for schoolchildren.

### **4. Purpose of the Study**

The main aim of this research is to study the peculiarities of the cognitive states of schoolchildren, taking into account the year of study.

### **5. Research Methods**

In accordance with the purpose of the research, a questionnaire was developed in such a way that makes it possible to collect information on situations of occurrence of states and their manifestations. In addition, based on the analysis of the theoretical literature, a list of cognitive states was compiled.

The organization of empirical research was as follows. Before the research, participants were offered to read the glossary of cognitive states. During the main activity, students selected from the list of cognitive states 5-6 the most typical states.

#### **5.1. Participants**

Pupils of 6-11 grades of the Russian comprehensive school between the ages of 11 and 18 took part in the study. There was a total of 635 subjects.

#### **5.2. Data analysis**

The relative frequency of occurrence of each state in all groups of respondents was calculated. Significant and typical mental states were allocated on the basis of the  $\sigma$  criterion. If the relative frequency of occurrence of the state fell within the interval  $(x_m - 0.5\sigma, x_m + 0.5\sigma)$ , then it was considered as significant. Relative frequencies exceeding the boundary  $x_m + 0.5\sigma$  served as a criterion for the typicality of the state.

### **6. Findings**

The first study involved schoolchildren aged 11 to 14 years. It is established that the most typical cognitive states of pupils of 6-7th grades are: thoughtfulness, interest, concentration, reflection, doubt, puzzling. Significant states are curiosity, absent-mindedness, insight, boredom, cognitive dissonance. The most characteristic for schoolchildren is a state of thoughtfulness, about 70% of students experience this state of learning. Among typical states, there is a decrease in the frequency of doubt, as well as an increase in concentration, interest, thoughtfulness from the 6th to the 7th grade. The most common non-cognitive state of schoolchildren is activity. This condition is associated with phase states of excitability of the

cerebral cortex (decreased or increased cortical activity). The state of activity in the lesson is characterized by an increased capacity for work, a mood for mastering knowledge, attention to the teacher's words, non-standardness in solving problems, and independence. In the list of the most frequent states in the educational activity of schoolchildren of grades 6-7 cognitive states account for about 60%. Typical cognitive states of boys and girls, in general, coincide, but some features of manifestations can be noted. Girls are more likely to experience states of concentration and reflection. In the seventh grade, the incidence of anxiety, doubt and fatigue in girls is much higher.

In the second study, students 8-9 grades aged 14-15 years took part. Typical states of students in grades 8-9 are inspiration, curiosity, thoughtfulness, meditation, boredom, interest. Thoughtfulness, concentration, cognitive dissonance, puzzlement, dreaminess, doubt, absent-mindedness are significant states. Typical conditions of girls and boys basically coincide. The state of inspiration is more often experienced by girls, and the state of boredom is boys.

Among the other states, psychophysiological (apathy, drowsiness, fatigue) and volitional states (calmness, patience) come to the forefront. Compared with grades 6-7, the proportion of cognitive states in the general set of significant states is significantly reduced. In the general context of states, the negative cognitive state of boredom comes to the forefront. The states of joy, fun, activity, characteristic for schoolchildren of junior high school, move to the middle part of the list of states. In general, the order of the location of cognitive states among typical conditions indicates a decrease in the cognitive activity of schoolchildren in 8-9 grades, the proportion of cognitive states among typical 33% (against 55% in grades 6-7). The reason for this lies both in the specifics of educational activity in these classes, and in the age-specific characteristics of 14-15-year-olds.

In 8-9 classes there is an increase in the number of subjects studied, the curriculum becomes more complicated, the requirements to the level of knowledge and educational and cognitive skills of adolescents are increased. Preparations are beginning for the passing exams for a certificate of incomplete secondary education. Training becomes more difficult, which leads to increased mental tension and fatigue. At the same time, the frequency of experiencing volitional states is increasing, which is an indicator of arbitrary regulation of activity.

In addition, ninth-graders (adolescents aged 14-15) are on the border between adolescence and early youth, the period of their education coincides with the peak of the "adolescent crisis". The sphere of interests of adolescents is often contradictory, characterized by the absence of a stable dominant in the system of interests. This leads to disorientation in the subjects studied, adolescents do not understand why you need to learn a particular subject.

At the same time, many schoolchildren have been already faced with the problem of choice, the problems of personal and professional self-determination. Important educational disciplines are identified that are relevant to future professional activities.

In the third study, schoolchildren of 10-11 grades were studied; the age of respondents was 16-18. It has been established that the typical states of students in the 10-11th grades are concentration, interest, reflection, curiosity, thoughtfulness. Significant states are inspiration, dreaminess, thoughtfulness, puzzlement, insight, surprise, bewilderment, anticipation, boredom, doubt.

The differences in the answers of the pupils of the 10th and 11th grades are insignificant (curiosity, dreaminess is more characteristic of the students of the 10th grade, and meditation, puzzlement - to the

students of the 11th grade). The most pronounced states in these classes coincide. Also, there are no significant differences in the experiences of respondents of different sexes (curiosity and inspiration are more inherent to girls; thoughtfulness and dreaminess are for young people). The most pronounced states in both groups are the same.

Negative states of bewilderment, insensitivity, fatigue, absent-mindedness, dullness are low-frequency, therefore, uncharacteristic for schoolchildren of 10-11 grades. In the course of educational activity, students in the upper grades experience mostly productive, positive states.

Among the other mental states of high school students, the positive motivational state of mindset (focus on teaching) and the emotional state of happiness come to the forefront. These conditions are combined with typical states of concentration, interest and meditation. Significant states for schoolchildren are psychophysiological states of activity, vivacity; emotional states of joy, fun and strong-willed states of patience, tranquillity. In general, the composition of significant states of students in the upper grades is close to the mental states of schoolchildren of the 6th and 7th grades.

## **7. Conclusion**

The results of the research carried out show that the states of reflection, interest, concentration, thoughtfulness, and curiosity are significant for all grades. Typical states in each of the studied periods of schoolchildren's learning are thoughtfulness, interest and concentration.

The states of perplexity and doubt are more characteristic for pupils of the 6th and 7th grades, boredom for the 8-9th. The state of thoughtfulness is more often experienced from 6th to 9th grades, and inspiration is from 9th to 11th.

Compared with grades 8-9 in the upper grades, the proportion of typical cognitive states in a number of other states increases. A group of the most marked cognitive states is distinguished: thoughtfulness, interest, concentration, curiosity. Thus, states of thoughtfulness and interest are experienced by more than 90% of students, a state of concentration and curiosity about 70% of students.

The place of cognitive states among other mental states of schoolchildren and students is shown; their share ranges from 39% to 53% of all significant states in the educational process. The specificity of the experience of cognitive states by schoolchildren of middle and high school is revealed. In the 6th and 7th grades, cognitive states are combined with activity, joy, fun, excitement, in 8-9 grades with psychophysiological states of apathy, drowsiness, fatigue and strong-willed states of patience, tranquillity, in 10-11 grades with conditions of activity, cheerfulness, joy, fun, patience, tranquillity.

The results of the research can find application in pedagogical activity. Knowledge of cognitive states and peculiarities of their actualization will allow to manage these states in a more effective way: to maintain the duration and optimal intensity of the learning process.

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