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## **PSYCHODIAGNOSTICS OF IMPLICIT THEORIES OF INTELLIGENCE FOR MIDDLE SCHOOL PUPILS**

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*The Aim* of the study is to determine the possibilities of diagnostics of implicit theories of intelligence of pupils of middle school.

*Material:* The study used the original questionnaire of academic self-regulation, standardization of which is described below. The sample included 444 people (421 women and 182 men) among them - 84 pupils of the 5th form, 120 from the 6<sup>th</sup> form, 84 from the 7<sup>th</sup> form, 85 to 8<sup>th</sup> form, 70 students of the 9th form and 62 students of the 10th form of the gymnasium №169 of Kharkiv.

*Results:* The paper characterizes the means of psychodiagnostics of implicit theories of intelligence for middle school pupils: indicators the growth and fixed mindsets, which requires two points of view to one's own intelligence – the first supposes somebody to believe that knowledge, abilities and competence can be acquired provided the effort or study, and the second - the abilities are mostly innate and cannot be improved. The standardization of "Implicit theories of intelligence Questionnaire" and its validity and reliability are shown.

*Conclusions:* According to Dweck's mindset theory of Implicit Theories of Intelligence we consider two ways of beliefs: the growth mindset and the fixed mindset, which requires two points of view to one's own intelligence – the first supposes somebody to believe that knowledge, abilities and competence can be acquired provided the effort or study, and the second - the abilities are mostly innate and cannot be improved. The results of the "Implicit theories of intelligence Questionnaire" standardization have shown. Its validity and reliability were proved.

*Keywords:* implicit theories, learning activity, the growth and fixed mindsets, hubristic motivation, motivation of learning, middle school pupils.

### **Психодіагностика імпліцитних теорій інтелекту учнів основної школи**

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Стаття характеризує засоби психодіагностики імпліцитних теорій інтелекту учнів основної школи: показники нарозумованої та заданої установок, де перша передбачає віру у те, що знання, здібності та компетентність можна

отримати за умовою докладання зусиль, а друга – здібності є заданими і не можуть бути вдосконаленими. Показана стандартизація методики «Опитувальника імпліцитних теорій здібностей» та її валідність та надійність.

Ключові слова: імпліцитні теорії здібностей, навчальна діяльність, теорії народження та заданих здібностей, губристична мотивація, мотивація навчання, учні основної школи.

**Introduction.** The problem of psychodiagnostics of implicit theories of intelligence for pupils of middle school (teenagers) seems particularly relevant in connection with the need to ensure the success of the educational targets. In modern domestic psychology the development of self-regulation in different types of activity questionnaires is presented in K.I. Fomenko (2017), O.M. Hrinchenko (2018), T.P. Starovoit (2015) investigations.

Current study allows us to use the original interpretation of the implicit theories concept in Dweck's theory and, at the same time, to broaden the understanding of implicit theories based on Ukrainian pupils on the cognitive characteristics of learning motivation. C.S. Dweck states that there are two categories (growth mindset versus fixed mindset) that can group individuals based on their behaviour, specifically their reaction to failure. Those with a "fixed mindset" believe that abilities are mostly innate and interpret failure as the lack of necessary basic abilities, while those with a "growth mindset" believe that they can acquire any given ability provided they invest effort or study (Dweck, 2006).

C. Dweck has studied implicit theories as factors of internal determination of students' and pupil's learning and showed that people differ in their beliefs about intelligence, which can be defined as entity theory or incremental theory (Dweck, 1999; Good & Dweck, 2006). C. Dweck has studied the role of lay beliefs about intelligence and personality in the context of studying subjective factors of learning regulation. These beliefs (or representations) have been referred to as implicit theories (Dweck & Leggett, 1988; Furnham, 1988). Implicit theories related to one as well as to others can focus different aspects of a self-concept's regulative function in the development of internal (specific) learning motivation on themselves (Kornilova&Kornilov, 2009).

The implicit theories are connected with learning performance in elementary-aged pupils. Given the opportunity for fifth graders to choose their own learning tasks, when primed towards gaining skills, they will pick challenging tasks. When they are primed towards assessment, they will pick tasks that they think they will be successful at to show off their abilities. Thus, they will forgo new learning if it means the possibility of making mistakes (Elliott & Dweck, 1988). If the situation is framed in a manner that

emphasizes learning and process rather than success, mindset can be altered (Dweck, 2006). Transitioning between elementary school and middle school is a time when many students with an entity theory of intelligence begin to experience their first taste of academic difficulty. Transitioning students with low abilities can be oriented to a growth mentality when taught that their brains are like muscles that get stronger through hard work and effort. This lesson can result in a marked improvement in grades compared to students with similar abilities and resources available to them who do not receive this information on the brain (Blackwell, Trzniewski & Dweck, 2007).

Later, Dweck (2006) applied her theory to the psychology of success and demonstrated the role of implicit theories as “mindsets” in many different domains (e.g., sports, business, and everyday life).

The fact that implicit theories are present on both conscious and unconscious levels allows one to view this construct as containing the variable of personality regulation of goal formation and efforts allocation that may act as a link between self-evaluations and goal structures of learning (Kornilova & Kornilov, 2009).

The **aim** of the article is to determine the possibilities of diagnostics of implicit theories of intelligence of pupils of middle school. According to the research aim, the following **tasks** were set: 1) to adopt a questionnaire of implicit theories of intelligence and check its validity and reliability; 2) to determine the structure of the motivation of the learning activity, taking into account the role of implicit theories of intelligence in it.

**Research methods.** The study used the original questionnaire of academic self-regulation, standardization of which is described below.

The sample included 444 people (421 women and 182 men) among them - 84 pupils of the 5th form, 120 from the 6<sup>th</sup> form, 84 from the 7<sup>th</sup> form, 85 to 8<sup>th</sup> form, 70 students of the 9th form and 62 students of the 10th form of the gymnasium №169 of Kharkiv.

**Discussion.** According to the C. Dweck’s theory we adapted the Gordeeva’s questionnaire aimed at academic self-regulation. The first task of the study involves the standardization of the questionnaire, in particular, its reliability, constructive, discriminatory and convergent validity, and test-retest reliability.

*Reliability of the questionnaire.* Russian-language adaptation of the questionnaire was carried by T.O. Gordeyeva (2009). We translated 12 items, which in content correspond to the structure of school activities for pupils, the following instruction was created: "Please indicate how each statement reflects your opinion on your own learning activities. Use the

following answers: "Disagree", "Rather Disagree", "It is difficult to answer", "Rather agree", "Agree".

The first step in processing the raw data received was to check the internal consistency of the questionnaire. The Cronbach's alpha statistics were calculated for a scale that includes all 12 items. The value of the Cronbach's alpha for a scale of 12 items was 0,510, which is below the acceptable level of 0,7.

According to the results of the analysis of the indicators of Cronbach's alpha for the each item of the questionnaire it was established that items 4 and 10 impair the psychometric index of one-time reliability. Consequently, they were excluded from the final version of the questionnaire, which influenced the increase of the Cronbach's alpha to 0.519. The re-checking of alpha values for each item showed that paragraphs 1, 2, 7 and 11 reduce the reliability of the questionnaire containing 10 points. Removing these items has increased the reliability to the alpha value of 0.819 and all 6 items have high reliability.

*Constructive validity of the questionnaire.* The factor analysis was used to detect the internal structure of the questionnaire, excluding the items 3, 5, 6, 8, 9 and 12. As a result of explorative factor analysis (with angular rotation) two factors that were not correlated with each other (0,011) were found.

*Factor 1* (44,7% of dispersion) created by the items: the 3<sup>d</sup> "Anyone who makes enough effort can understand what is being taught at school" (0,734), the 5<sup>th</sup> "Anyone who makes a great effort can learn even complex material" (0,727), the 8<sup>th</sup> "If you are really diligent at school, you can become wiser" (0,654), 12<sup>th</sup> "The more diligent you work at a school, the smarter you will become"(0,573). The content of this factor formed the items that are included in the scale of the *growth mindset*.

*Factor 2* (16,9% of dispersion) includes items: the 6<sup>th</sup> "If a student is really diligent, then he will be able to understand even a very difficult lesson" (-0,786) and the 9<sup>th</sup> "Anyone who really strives to become one of the best students in the classroom can achieve it" (-0,711). The psychological content of the factor points is that it reflects the *fixed mindset*.

Thus, the final version of the questionnaire «Implicit theories of intelligence Questionnaire» represented by scales – *growth mindset* and *fixed mindset*. The developed technique meets the modern requirements for psychometric substantiation of personal questionnaires.

*Test-retest reliability of the questionnaire.* Repeated testing of the same sample (120 people) was conducted at intervals of two weeks. The correlation between the results of the first and second tests was at the level

of  $r = 0,831$ , which indicates a sufficiently high test-retest reliability of the questionnaire.

*Normative scale.* In table 1 the descriptive statistics of «Implicit theories of intelligence Questionnaire» are set.

Table 1

Descriptive statistics of «Implicit theories of intelligence  
Questionnaire»

Indicators	Mean	Min	Max	Std. dev
Growth mindset	8,36	4	16	1,97
Fixed mindset	5,18	2	8	1,05

Dividing into three intervals the marginal values of the norm for the indicators of the Growth mindset scale are 6-10 points, for the Fixed mindset – 4-6 points.

*Convergent and discriminant validity* of «Implicit theories of intelligence Questionnaire» checked out by identifying the correlation between the indicators of academic self-regulation and the indicators of the hubristic motivation (K.I. Fomenko, 2017) (convergent validity), and motivation of the learning activity (Fetiskin, Kozlov & Manuilov, 2002) (discriminant validity).

There is a positive correlation between the growth mindset and a *hubristic motivation*: aspiration to perfection ( $r=0,58$ ,  $p < 0,0001$ ). Growth mindset is positively related to the cognitive motive ( $r = 0,53$ ,  $p < 0,0001$ ) and the achievement motive ( $r = 0,64$ ,  $p < 0,0001$ ), thus the focus on learning achievements and interest in study envisages the growth mindset.

There are no statistically significant relationship between growth and fixed mindsets and such learning motives as communicative motive, positional motive, self-development motive and emotional motive.

**Conclusions.** According to Dweck’s mindset theory of *Implicit Theories of Intelligence* we consider two ways of beliefs: the growth mindset and the fixed mindset, which requires two points of view to one’s own intelligence – the first supposes somebody to believe that knowledge, abilities and competence can be acquired provided the effort or study, and the second - the abilities are mostly innate and cannot be improved. The results of the “Implicit theories of intelligence Questionnaire” standardization have shown. Its validity and reliability were proved.

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**APPENDIX**

Implicit theories of intelligence Questionnaire (final version)  
Опитувальник імпліцитних теорій інтелекту (кінцева версія)

Пункти опитувальника	Не згоден	Скоріше не згоден	Скоріше згоден	Згоден
1 (3). Кожен, хто докладає достатньо зусиль, може зрозуміти те, чого вчать у школі.	1	2	3	4
2 (5). Кожен, хто докладає великі зусилля, може вивчити навіть складний матеріал.	1	2	3	4
3 (6). Якщо учень буде по-справжньому старанним, то зможе зрозуміти навіть дуже важкий урок.	1	2	3	4
4 (8). Якщо ти по-справжньому старанний у школі, то можеш стати розумніше.	1	2	3	4
5 (9). Кожен, хто по-справжньому старається, може стати одним з найкращих учнів у класі.	1	2	3	4
6 (12). Чим більш старанно ти працюєш в школі, тим розумнішим станеш.	1	2	3	4

Ключ. Роль зусиль (вираженість прибуткової теорії здібностей) – пп. 1, 2, 4, 6; шкала Роль здібностей (вираженість заданої теорії здібностей) – пп. 3, 5.

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