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INVESTIGATION OF SOME PSYCHOLOGICAL ASPECTS OF INFORMATION PROCESSING BY STUDENTS OF MEDICAL UNIVERSITY

Abstract. *183 students of medical university were interviewed using modern methods of psychotype determination. After that students' psychic qualities, important for successful study, were assessed (such as attention, memory for visual stimuli, operation of logical information) in groups of respondents, distributed according to the leading psychological functions. It has been established that the studied mental qualities and perception of information depend on the leading functions of a psychotype. Therefore, investigations of ways how to improve assimilation of educational material by students, using their psychotype properties, are of grait interest.*
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Introduction. Modern realities require from students of medical universities to be able not only to assimilate intensively a large volume of information but moreover to transform it into professional competences (experience and skills). According to Swedish psychiatrist K. Jung theory, later developed and complemented by his followers [1, 4, 6], the ability to process information is determined by certain mental faculties called psychological functions. Such a statement is based on investigations claiming that some people can better process logical information (considerations, conclusions, proofs), while others can better operate with emotional one (relations of people, their feelings). Some individuals are characterized by more advanced intuition (anticipation, perception in general), while others – by advanced sensation (perception of external and internal sensory stimuli) [1, 6]. According to this 16 psychological types were designed which are based on pairs of psychological functions. Thinking (T) and feeling (F) determine the basis for decision-making; intuition (N) and sensing (S) – ways how to accept information; extraversion (E) and introversion (I) – consciousness orientation, while judging (J) and

perception (P) – organization of life. In each pair of functions somebody usually prefers to use one more often than the other [1, 4, 6]. According to concept of A. Kepinski and A.Augustinavichute, jungian functions are in the same time channels of information perception. Various psychotypes can unequally process the same aspect of information. Filally, information of the same type is transmitted and perceived by the same functions of communication partners only [1, 6].

Practical application of above mentioned principles could improve the process of information assimilation by medical students. Moreover, today there is only little evidence of how much students' qualities, important in studing process, are associated with their psychological types.

The aim of the study: to investigate individual psychological qualities of students (attention, memory, perception of visual material, logical operation with information), depending on their leading psychological functions.

The sample and methods. The research covered 183 3rd-year medical faculty students of I. Horbachevsky Ternopil State Medical University, Ukraine, aged 19-21, including 112 females and 71

males, residents of different regions of Ukraine. Psychotypes of respondents were identified using the following methods: 1) interviewing respondents using Myers-Briggs Type Indicator® (MBTI®) [4], 2) acquaintance with descriptions of psychotypes [1], 3) diagnostic interview using Meged'-Ovcharov's test [2].

After that the respondents were examined for such psychic qualities needed in learning process as attention, memory for visual objects, operation of logical information. Standard questionnaires were selected for the purpose addopted in professional psychodiagnosis and in occupational sciences [3]. The obtained results were processed by methods of variation statistics with the calculation of the average value (M), its errors (m), reliability (P) [5]. The difference between the mean values of the indicators was considered reliable at $P<0,05$. Calculations were carried out using the application computer program "Excel spreadsheets" (Microsoft, USA).

Results of the research. For the purpose of determining the psychotype, 183 respondents were tested by the MBTI® test, and also they were acquainted with psychotypes descriptions of which each of respondents had to choose one

seemed the most natural to him/here. On the next stage of the research the diagnostic interview was conducted to each respondent in order to clarify the dominant function in each pair of jungian functions. The psychotype was considered to be defined if the results of 2 or 3 of the 3 polls coincided. 19 students (10,4 % of all respondents), whose results of 3 trials did not coincide, were not included in further studies. Considering that the description of each psychotype gives a complete set of leading jungian functions, we represented their distribution among the rest of respondents whose psychotype was established (see table 1).

Next stage of the study was devoted to students' mental qualities investigation (attention, processing of logical information, memory). In order to study the dependence of these properties on the leading psychological jungian functions, all the respondents were consequently separated into two groups corresponding to pairs of functions (S-N, F-T, J-P, E-I), the results were compared between two groups of each pair. The groups were named according to dominant function as in Mayers-Briggs classification (see table 1).

Selectivity of attention, its concentration and

Table 1

Distribution of leading psychological functions among respondents, %

Pairs of psychological functions	Leading function / name of group of respondents	Number of students	% of respondents
Sensing (S) –Intuition (N)	Sensing / S	105	64,0
	Intuition / N	59	36,0
Feeling (F)- Thinking (T)	Feeling / F	103	62,8
	Thinking / T	61	37,2
Judging (J)- Perceiving (P)	Judging / J	101	61,6
	Perceiving / P	63	38,4
Extraversion (E)- Introversion (I)	Extraverts / E	117	71,3
	Introverts / I	47	28,7

volume were investigated using the Munstenberg's technique. During 2 minutes the investigated person had to look through, find and underline words, hidden in the text where there were no spaces between words and the words were put into the random set of letters. The result was represented in units called "indicator of success". It was calculated by the formula, based on number of correctly and incorrectly underlined words. The results of the study are presented in

table 2.

It was established that concentration and selectivity of attention in the interviewed students were higher in Thinking (group T) in comparison with Feeling (group F) (P<0,05). There was no difference of this property in pairs of groups Sensing-Intuition (S-N) and Extraversion-Introversion (E-I), but the insignificant trend was observed toward better selectivity of attention from Perceiving (group P) opposite to Judging

(group J) (t =1,77, P>0,05).

Logical thinking was studied according to the following tests: 1. Test "Quantitative relations" is based on solving 18 logical expressions within 5 minutes, each of the expression contains values A, B and C, there are certain numerical relationships between A and B, B and C. It was necessary to find the relation between A and C. 2. Purpose of the test "Regularities of the numerical series" was to assess the logical aspect of thinking based primarily on information analysis and synthesis. Students had to set the rules for constructing 7 series of digits and insert numbers that were missing in accordance with the given regularity of the series during 5 minutes. The evaluation of both tests was carried out using the scale based on the number of correct answers.

Table 2

Results of respondents' psychical qualities assessment

Name of test Groups of students	Concentration of attention, indicator of success	Quantita-tive relations, points	Regulariti-es of the numerical series, points	Memory of images, points	Recognizing the figures, points
F, n=103 T, n=61 P	0,82±0,02 0,87±0,01*	10,14±0,55 12,28±0,89*	9,33±0,51 11,42±0,41** *	0,964±0,024 0,920±0,026	11,30±0,40 11,13±0,70
S, n=105 N, n=59 P	0,84±0,01 0,84±0,02	9,75±0,70 12,75±0,72 **	10,43±0,51 9,67±0,61	0,970±0,017 0,798±0,011 ****	11,214±0,47 12,75±0,67
J, n=101 P, n=63 P	0,81±0,02 0,86±0,02	10,08±0,77 11,75±0,70	10,67±0,52 9,50±0,65	0,934±0,023 0,948±0,028	11,40±0,59 11,00±0,44
E, n=117 I n=47 P	0,84±0,02 0,83±0,01	10,50±0,58 10,50±1,05	10,43±0,88 9,67±0,51	0,978±0,011 0,793±0,033 ****	10,67±0,58 14,00±0,37 ****

*Note: P – the criterion of reliability when comparing the results of the study in groups distributed in pairs of jungian functions: * – P<0,05, ** – P<0,01, *** – P<0,002, **** – P<0,001.*

According to the results of the study, the group of Thinking (T) showed significantly better ability to recognize both hidden patterns (P<0,002), and numerical relationships (P<0,05). The result could be assumed. Futhermore, there was observed better recognition of quantitative relationships in group N in comparison with group S (P<0,01), while the missed digits in numerical series in these groups were recognized with the same success. There was a weak trend toward better vision of numerical relationships among students of group P (t=1,6, P>0,05), whereas regularities were better solved by respondents of group J (t=1,40, P> 0,05).

In order to study short-term memory on visual stimuli, the following tests were used: 1. Test "Memory of images": respondents had to memorize during 20 sec the maximum number of images (well-known objects, geometric figures, letters, numbers) from a given table, and then for 1 min they had to reproduce these images (to write a name or to draw). 2. Test "Recognizing the figures" was focused on evaluation of short-term memory on abstract figures formed by bent or broken lines. Respondents had to observe carefully 9 figures in a given table for 10 seconds. Then they were shown another table with more figures, where it was necessary to find figures from the first table. The assessment of both tests was carried out using the scale based on the number of correct answers.

It was established (see table 2) that students with extrovert attitude (group E) reliably better reproduced images (P<0,001), whereas memory on abstract figures was significantly better in group I (P<0,001). In addition, in pair of functions F-T, a weak trend was observed towards better recognition of images by group F (t=1,24, P>0,05). At the same time, there was no difference in

recognition of abstract figures in both groups (t=0,21, P>0,05). The Sensing better memorized images (P<0,001). There was also a trend for better recognition of abstract figures by group I (t=1,88, P>0,05).

In groups J and P the research results were practically equal inn all tests/

Discussion. It was established that such mental qualities as concentration and selectivity of attention, solving the regularities of numerical series (which characterize the ability to see hidden patterns) as well as numerical relationships (shows the ability to recognize relations between objects) were better developed in students with leading psychological function "thinking". However, there were only 32,7% of such students among the respondents. In the rest 2/3 of the students the leading function was "feeling" so these students probably were oriented on ethical aspects of information rather than on logical aspects.

There were also differences in perception of visual stimuli: students with leading function "extraversion" and "sensing" reliably better memorized well-known images, while memory on abstract figures was much better developed in students with leading introversion. This can be explained by the fact that the extravert setting is directed at the object, therefore familiar objects are easier to recognize, while the introversion is directed on the relations between objects.

In general in pair of groups E-I (Extraversion-Introversion) the reliable differences of test results relate to visual material perception while there is no difference in processing of logical material. All this means that as students perceive information in different ways, it is not a good idea to provide training material only through the channel of thinking, many of them require more visual representation of information.

Conclusions. Individual mental qualities such as selectivity of attention, its concentration and volume, memory on visual objects, operation of logical information relate to psychological type of a student. It is necessary to continue research based on psychological aspects of information perception and processing in order to improve education of stuents in medical universities.

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