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The Structure, Variables and Interdependence of the Factors of Mental States of Expectations in Students' Academic and Professional Activities

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Abstract

The study presents the content-analysis (n=135) and factor analysis of students' mental states of expectations (n=123). The understanding of mental states of expectations by education workers allows for the operationalization of the process of solving tasks of students' academic and professional training.

The purpose is to examine the structure, variables and interdependence of the factors of students' mental states of expectations.

The research methods are content-analysis, tests with standardized questionnaires, factor analysis. Factor analysis was used to determine the structure of mental states of expectations. The principal factor in this structure is F1"meaning-of-life moderation" (20.70%), which is interrelated with F2 "pragmatic regulation" (=.404; p≤.01) and F3 "subjective regulation" (=.357; p≤.01). The obtained results could be useful for education directors organizing the academic process of students, and also for scientists in the field of psychology of expectations, psychology of constructing the future.

Keywords: *academic and professional activities, mental state of expectations, expected situation, realization of expectations, structure of mental state of expectations*

Introduction

Mental states of expectations are the kinds of mental states which integrate mental processes and properties and act as important regulators of students' progress. Efficient organization of students' education requires instructors of the educational process to know the structure, variables and psychological content of students' mental states of expectations. The achievement of expected results by students is directly dependent on the kind of mental states of expectations. Understanding of mental states of expectations by education workers allows for the operationalization of the process of solving tasks of students' academic and professional training. Mental states of expectations accompany the process of education and manifest themselves as internality, externality, activeness, passiveness, openness, closeness, etc. These states are closely related to the mental activity of a person, sometimes the necessity to act acquires the characteristics of mental stress (Izard, 1991).

Mental states of expectations affect the functioning of mental processes, and when frequently repeated they acquire stability and become a personality trait (Popovych, 2017). Mental states are determined by a person's needs, aspirations, abilities and resources, supporting his/her development in particular conditions of the environment (Prokhorov et al., 2015a).

A mental state of expectations implies an integral complex of available features, which have an impact on the expected performance of students' activity. These views are confirmed by the study of cognitive states in the process of students' intellectual activity through the structure of the state of interest/mental stress (Prokhorov et al., 2015b), the mental state of chronic fatigue, which worsens a person's physical work ability (Marcora et al., 2009), etc.

Social expectations as a person's mental state reflect the correlation of a subjective estimation of the actual situation of interaction and an individual's notions about him/herself as a subject of behavior in this situation (Tyshkovsky, 1998). It was empirically investigated and shown that a child's expectations of a pure, primary state of expectations, come to a certain, determined, essential state, i.e., the mental state of expectations of an adult (Popovych, 2014).

Theoretical analysis of the scientific literature (Tyshkovsky, 1998; Marcora et al., 2009; Popovych, 2014, 2017; Prokhorov et al., 2015a, 2015b) showed that the place and role of mental states of expectations in the process of students' academic and professional activities have not been thoroughly examined. The authors assume that the structure, variables and interdependence of the factors of mental states of expectations are important components of students' academic and professional

activities. Application of the research results will contribute to efficient organization of students' educational process.

The purpose and research issue

The purpose of the study was to examine the structure, variables and interdependence of the factors of students' mental states of expectations.

Research Methodology

Methodological aspects in the research on cognitive mental states (Prokhorov et al., 2015a) were taken into consideration. The characteristic of the fulfillment of an actual task was obtained with the use of content-analysis. The text of research participants is a simplified reflection of the social reality causing it. Content-analysis does not measure the things the research participants say, will do or try to do, but the things they have really done. Content-analysis allows for interpreting mental states of expectations, distinguishing one state from another, and determining the properties of mental states of expectations. It was proved in psycho-semantic analysis of motivation that content-analysis is a scientific method which reveals important aspects of human behavior (Zasyekina, 2004), since mental processes and states are related to the functioning of language (Harley, 2008). However, it is evident that the accuracy of the obtained information depends on respondents' ability to describe an expected situation and realization of expectations in the context of task performance. Further, we chose a complex of methods according to the purpose and research subject. The methods allowed for determining the characteristics (variables) which created a factor structure of mental states of expectations. Such logic was confirmed in the research proving that a mental state of expectations is an integral complex of available characteristics which affect a person's expected performance (Popovych, 2017).

Participants

The students of the 2nd–4th years of study of Kherson State University took part in the research; their average age was 20.1 years. The sample consisted of 135 persons. The research was conducted according to the ethical standards of the committee on the rights of experiments of the Declaration of Helsinki (WMA Declaration of Helsinki, 2013).

Instruments and Procedures

During the academic year we used psycho-diagnostic instruments for measuring the research parameters. The questionnaire "The Level of Social Expectations" ("LSE") (Popovych, 2017): the level of social expectations of personality (LSE_p), the level of awareness of the expected events (LAE_p), the level of the expected attitude towards the participants in interpersonal interaction (LEA_p), and the level of the expected performance (LEP_p). The questionnaire "The Level of Subjective Control" ("LSC") (Rotter, 1966): general internality (IG), internality in the area of achievements (IA), internality in the area of failures (IF), internality in family relationships (IFR), internality in the area of labor relations (ILR), and internality concerning health and illness (IHI); "Purpose in Life Test" ("PIL") (Leontiev, 2006): goals of life (GL), process (P), result (R), locus of control – self (LCS), locus of control – life (LCL), general sense of life (GSL); the questionnaire "The Level of Personality Aspirations" ("LPC") (Herbachevskyi, 1990): internal motive (IM), cognitive motive (CM), the motive of avoiding (MA), the motive of competition (MC), the motive of changing activity (MCA), the motive of self-respect (MS), the significance of results (SR), task complexity (TC), volitional effort (VE), the estimation of the level of obtained results (ELAR), the estimation of personal potential (EPP), a projected level of mobilizing efforts (PLME), an expected level of results (ELR), the regularity of results (RR), and initiative (I). The responses were estimated by means of the bipolar semantic differential scale, its value was within the range of -3 (absolutely not agree) to +3 (absolutely agree). The reliability indices obtained by means of Cronbach-α statistics were: $\alpha_{LSE} = .777$; $\alpha_{LSC} = .813$: $\alpha_{PIL} = .823$; $\alpha_{LPC} = .859$. The sociometric method "Expectometry" (Popovych, 2017): the coefficient of expectations (CE), expectometric status (ES), the level of adequacy of self-expectations (LS), the coefficient of reciprocally expected choices (CC) – the reliability coefficient obtained by means of Cronbach's alpha statistics was $\alpha = .737$. The "Expected situation" (Popovych, 2017) and "Realization of expectations" (Popovych, 2017) methods were used to determine the properties of social expectations: internality/externality (IE_p), activeness/passiveness (APp), openness/closeness (OC_p), adequacy/inadequacy (AI_p). A dichotomic scale was used, Cronbach-α was $\alpha = .836$. The reliability indices of Cronbach-α were within the range of sufficient (.7) and high levels (.9).

Data analysis

Statistical processing of the empirical data and graphical presentation of the results were performed by means of the statistical programs "SPSS" v. 23.0 and "MS Excel". The principal component method involving oblique Promax rotation

was used, which allowed for calculating the correlations between the factors. Arithmetic mean value of parameters () and mean-square deviation () were calculated. The differences between the values of the variables at the level p≤.05 are considered statistically significant.

Research Results

Content-analysis of students' mental states of expectations

The "Expected situation" method implied a short description of a respondent's behavior (8–10 sentences) in an actual situation (participation in a students' conference). The respondents chose delegates from their group. The conference was over, then all the respondents described (8–10 sentences) the realization of their expectations, reproducing the social reality (n=135). The results of the properties of mental states of expectations were estimated with the use of the scales of the arithmetic mean () and the mean square deviation (), as presented in Table 1.

Table 1. The arithmetic mean and the mean square deviation of the scales of the properties of mental states of expectations (n=123)

Scale	Arithmetic mean	Mean square deviation
IE_p	.47	.19
AP_p	.46	.20
OC_p	.71	.23
AI_p	.73	.23

M – arithmetic mean; **SD** – mean square deviation.

The obtained results of content-analysis proved that the prevailing state of internality of expectations was characteristic of 18.03% of the research participants, the state of externality of expectations was characteristic of 24.59%, openness was characteristic of 38.04%, the mental state of closeness of expectations – 21.96%, the mental state of adequate expectations – 41.48% and the mental state of inadequate expectations – 18.52% of the research participants. Further statistical analysis was performed using the data only of those respondents whose mental states of expectations had full description and were dominating (n=123).

The factor structure of mental states of expectations

The obtained results of the research parameters were estimated with the use of the scales of the arithmetic mean () and the mean square deviation (), as shown in Table 2.

Table 2. The arithmetic mean and the mean square deviation of the scales of the research parameters (n=123)

Scale	Arithmetic mean	Mean square deviation
	«LSE»	
LSE_p	68.11	12.29
LAE_p	17.32	3.25
LEA_p	14.66	1.77
LEP_p	36.18	8.28
	«Expectometry»	
CE	.44	.16
ES	.20	.13
LS	.73	.23
CC	.09	.08
«LSC»		
IG	197.95	20.43
IA	54.33	7.79
IF	49.94	8.13
IFR	39.67	6.76
ILR	36.71	5.28
IHI	18.72	4.45
	«PIL»	
GL	31.42	7.42
P	29.89	5.65
R	25.33	4.89
LCS	21.03	4.47
LCL	30.03	4.33
GSL	102.17	14.40
	«LPC»	
IM	12.67	2.97
CM	15.42	2.79
MA	11.54	3.59

Scale	Arithmetic mean	Mean square deviation
MC	11.96	3.31
MCA	12.84	3.48
MS	13.94	3.15
SR	8.94	3.13
TC	5.73	2.64
VE	12.64	3.01
ELAR	9.85	2.15
EPP	13.68	3.02
PLME	14.02	2.71
ELR	9.77	2.13
RR	13.67	2.53
I	12.98	2.75

M – arithmetic mean; – mean square deviation.

The complex of 35 psychological parameters is methodologically substantiated, which reflects the subject of the research on students' mental states of expectations. The names of the scales reflect the essence of the research parameter. Some similar scales will be explained: LCS – measures the notion about a person him/herself as a strong individual possessing sufficient freedom of choice to construct his/her life according to his/her aims and understanding of its meaning; LCL– measures an individual's ability to control his/her life, make decisions easily and implement them in life.

The correlation matrix with 35 variables was determined with the principal component method. 10 factors have the values which are more than unity and explain 71.63% of the variable dispersion (Table 3).

Table 3. The matrix of factorial loads

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
LSE_p		**.985**		-.090					.068	
LAE_p		**.948**		-.142						-.175
LEA_p		**.903**						.207		-.159
LEP_p		**.897**	-.069							.139
CE		.378	-.227					-.189		
ES				.143	**.798**					-.205
LS		.330				-.158				**.545**

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
CC		-.126		-.186	**.844**					
IG			**.878**					-.088		-.225
IA	.137		**.674**						.181	
IF	-.190		**.934**						-.239	
IFR		-.179	**.918**	-.124						
ILR		.227	.332							**-.686**
IHI			.338				-.327		.403	
GL	**.903**	-.107							-.145	
P	**.814**			.115				.137		
R	**.612**				-.243					.255
LCS	**.897**	-.122				.155				
LCL	**.735**								-.273	-.317
GSL	**.923**	.109							-.081	
IM				**.788**			-.359	.243		
CM		-.226		**.829**					-.257	
MA				.146		.239		**.867**		
MC						**.754**		.296	.310	
MCA						.325		**.568**	.289	
MS				.230		.378	**.510**			
SR		-.458				-.314				-.186
TC	-.255							.170	**.896**	
VE							.353		.268	**.532**
ELAR				-.160			**.875**		-.150	
EPP	.210			.428		-.252				
PLME				**.818**		.118			.160	
ELR	.245	.235				**.589**				
RR		**.514**		.435		.318				
I				.414		-.439	.312			
Dispersion, %	20.70	9.90	8.76	7.38	5.57	4.60	4.26	3.86	3.41	3.19
∑ dispersion, %	20.70	30.60	39.36	46.74	52.31	56.91	61.17	65.03	68.44	71.63
Value	7.243	3.466	3.066	2.583	1.949	1.609	1.491	1.351	1.194	1.117

Note: The loads of the significant variables are given in bold type.

F1 "Meaning-of-life moderation" shows the dependence of the expectations related to academic and professional activities on the meaning-of-life and value orientations of a subject, on the level of his/her general sense of life, on setting aims of life, localizing control on "self", on life, on process, and on performance. The effect of this factor is characterized by the meaning-of-life regulation of academic and professional activities.

F2 "Pragmatic regulation" is an expected regulatory ability of a subject, the ability to regulate and predict academic and professional activities pragmatically, and at the same time, to be oriented towards performance.

F3 "Subjective regulation" is the reflection of different types of internality. The mental state of expectations is related to the aspiration for internal regulation, which is accompanied by a subject's desire to consider him/herself the reason for everything that happens to him/her in all areas of life.

F4 "Self-actualization activity" is significantly related to cognitive activity, mobilization activity, directed towards the aim, supported by internal resources. This mental state of expectations has a high self-actualization ability.

F5 "Affiliation aspiration" consists of the variables whose psychological content reflects the aspiration to be in the company of other people, the need for building warm, emotionally significant relationships with other people.

F6 "Competitive activity" is characterized by a subject's aspiration to be better than others. The subject aspires to obtain acknowledgement of his/her own rating and professional status not only from the people around, but also his/her own acknowledgement.

F7 "Self-confirming activity" shows that mental states of expectation are accompanied by a subject's aspiration to set him/herself more and more complicated aims in a single-type activity. The orientation is aimed at the evaluative component of academic and professional activities. Such a mental state of expectation is characteristic of the subjects who "study not for knowledge", but "for marks".

F8 "Avoiding frustration" is characterized by a subject's fear of showing a low level of results and being responsible for the consequences of these results. The mental state of expectation of a subject is accompanied by the tendency to stop doing the activity he/she is engaged in at that time. It is opposite to "self-actualization activity".

F9 "Estimation of complexity" is the aspiration to estimate the tasks of academic and professional activities. The place of this factor in the structure of mental processes of expectations allows for stating that F9 is not students' principal mental state.

F10 "Confident activity" consists of adequate self-expectations of a subject combined with the motive of a volitional effort. It is also characterized by the variable with a negative load, which reflects a subject's responsibility for everything that occurs in academic and professional activities.

The following factors have the load that is beyond the limits of the total dispersion of variables (less than 0.943). Therefore, the results of the statistical analysis allowed for determining 10 basic factors (71.63%) determining the structure of mental states of expectations (Figure 1).

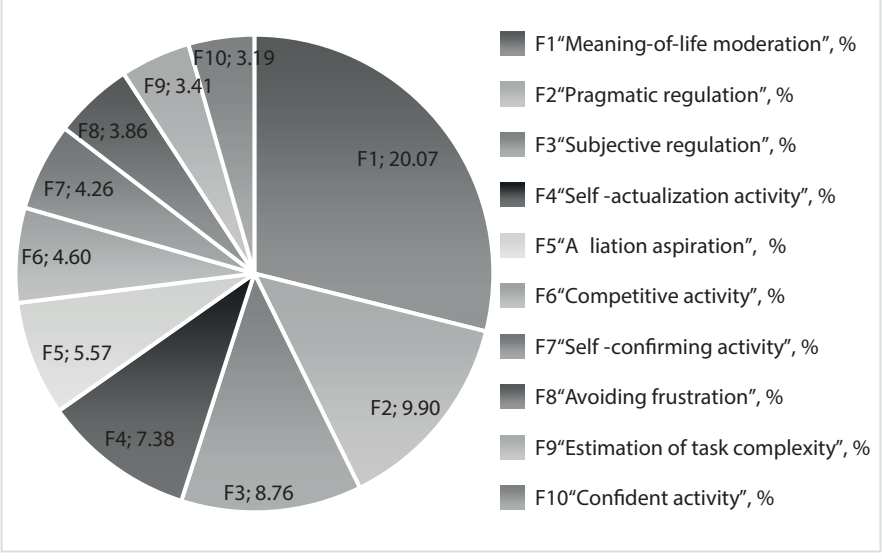

Figure 1. The structure of mental states of expectations

The interdependence of the factors determining the structure of mental states of expectations

We will analyze the most significant relationships between the chosen factors (cf., Table 4). The most significant correlation ($p \leq .01$) is correlation F1 and F2 (.404), F1 and F3 (.357). F2 has the greatest number of significant relationships with F1, F3 and F4. Thus, pragmatic regulation is an important component in the structural and functional organization of mental states of expectations. The most dependent factors in the structure of the states of expectations are F2, F3 and F4.

Table 4. The correlation matrix of the components of the structure of mental states of expectations

	1	2	3	4	5	6	7	8	9	10
1	1.000	.404**	.357**	.145**	.027	.131**	.146**	-.079	.081	.108*
2	.404**	1.000	.281**	.238**	.099*	.096*	-.003	-.172**	.005	.198**
3	.357**	.281**	1.000	.270**	.066	.010	.153**	-.262**	.126**	.088*
4	.145**	.238**	.270**	1.000	-.095*	-.059	.211**	-.165**	.048	.286**
5	.027	.099*	.066	-.095*	1.000	.110**	-.078	-.034	-.041	.039
6	.131**	.096*	.010	-.059	.110**	1.000	.004	-.053	-.248**	.002
7	.146**	-.003	.153**	.211**	-.078	.004	1.000	-.044	.129**	-.074
8	-.079	-.172**	-.262**	-.165**	-.034	-.053	-.044	1.000	-.257**	-.169**
9	.081	.005	.126**	.048	-.041	-.248**	.129**	-.257**	1.000	.112**
10	.108*	.198**	.088*	.286**	.039	.002	-.074	-.169**	.112**	1.000

* – statistical significance of $p \leq .05$; ** – statistical significance of $p \leq .01$.

Discussion

There are few topical studies on mental states. The research on cognitive states in the process of intellectual activity of students has scientific and methodological value (Prokhorov et al., 2015b). Other scientific research illustrates a positive significant correlation between social expectations and the results of academic and professional activities (Popovych, 2017).

It is known that mental states of expectations often acquire stability and become personality traits (Popovych, 2017). Thus, this or that dominating mental state of expectations from the structure under study (cf., Figure 1) affect students' content of activities and results. In particular, F4 "self-actualization activity" and F8 "avoiding frustration" are oppositely directed, which is important in students' education. It confirms our assumption that the structure, variables and interdependence of the factors of mental states of expectations are important components of students' academic and professional activities.

The examination of the research subject depends on the set of methods. The application of the "Expected situation" and "Realization of expectation" methods allowed for tracing important aspects of the students' behavior, differentiating one mental state of expectations from another, determining the properties of

mental states of expectations. The content-analysis shows that the majority of the respondents' answers are aimed at solving the suggested task acting as an image of the expected result. The variables of actual mental states of expectations and the interdependence of the factors reflect the levels of the respondents' regulatory ability. Obtaining the expected result is directly dependent on the type of a mental state of expectations. The obtained results have much in common with the empirical research on the regulatory role of mental states in the structure of motivational and cognitive resources of personality (Silvia et al., 2009; Prokhorov et al., 2015a).

Therefore, it could be stated that the obtained results of the research on students' mental states of expectations operationalize the process of solving the tasks of academic and professional activities. It is obvious that the application of the research results will contribute to efficient organization of students' education process. The problem of the correlation of a particular mental state of expectations and the indices of students' progress is open-ended.

Conclusions

The content-analysis of the students' own answers showed that mental states of expectations emerging in the process of performing a task are quite complex phenomena. The content analysis allowed for qualitative interpretation of mental states of expectations, distinguishing one state from another, determining the properties of mental states of expectations.

The factor analysis determined the structure of mental states of expectations consisting of 10 basic factors (71.63%). It was established that the principal factor is F1 "meaning-of-life moderation" (20.70%), which is interrelated with F2 "pragmatic regulation" (=.404; $p \leq .01$) and F3 "subjective regulation" (=.357; $p \leq .01$).

It is substantiated that the structure, variables and interdependence of the factors of mental states of expectations are important components of students' academic and professional activities; the obtained empirical results of the research will contribute to efficient organization of the education process. The research results may be useful for the directors of educational institutions, education workers, and also researchers in the field of psychology of expectations, constructing the future. The prospects of further research are outlined.

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