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Influence of Mental States on Reflexive Processes in Academic Activity

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ABSTRACT

The increasing role of mental states in students' academic activity makes the studied problem relevant. The research of mental states is integrated with the appeal to regulatory mechanisms in which reflexive processes play the leading role. The goal of the present paper is to establish the way mental states influence the realization of reflexive processes in students during their academic activity. Correlation data analysis and subsequent highlighting of structure elements as well as multiple-factor dispersive analysis (ANOVA) are leading methods applied to do the research into this problem. Features of reflection change due to qualitative characteristics of states are shown: modality, content, sign, duration and intensity, and the level of students' regulatory abilities. The specificity of mental states impact on the course of reflexive processes of recognition, awareness and identification is established. "Leading" (core) structural elements are considered in reflection and mental states integration. The significant role of personality's regulatory abilities in students' reflexive processes and mental conditions interaction is revealed. Research results are of certain practical value as they explain the role of mental states in realization of reflexive processes in students' academic activity.

KEYWORDS
Education; mental state; reflexive processes; academic activity; modality.

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Introduction

The predominant role of reflexive processes in mental states regulation does not cause any doubt, at present (Prokhorov & Chernov, 2013). Awareness, assessment and identification of an actual state with the required one is realized with their help; if necessary, the subject brings in some correction in the applied ways and methods of regulation. The inclusiveness of reflexive mechanisms is caused by the regulation goal – need to change a mental state as inadequate to

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the situation and purpose of activity. Reflexive mechanisms form steady functional complexes consisting of operational means, models, cognitive and regulatory meta-processes and meta-properties; their development is carried out within the range of the current time and in conditions of repeating or similar situations of activity. Reflection as a feedback mechanism in person's activity is not only the result but a process as well which is connected with the reconsideration of one's thinking basis and features of a mental state. However, considering reflection as the process to represent its own content to mentality, it is necessary to consider the return influence of mental states on the content of reflexive processes. The present paper reveals the way the process of reflection changes due to change of various characteristics of subject's mental states in educational activity.

Reflection is considered in psychology as "the process of subject's reflection of their own mentality content, self-perception of mental processes content, properties, states, and their regulation" (Karpov & Skityaeva, 2005); however, it can be presented as a psychological property intrinsic only to the human, and as the state of perception something.

According to R Glaser' researches the formation of reflexive mechanisms gives students a chance to be much more productive in their metacognitive links with reality (Glaser, 1984). Thus the author draws a conclusion that the more expressed metacognitive mechanisms of intellectual activity regulation are, the more efficient educational activity is. According to a metacognitive paradigm of reflexive processes research (Flavell, 1976; Grant, 2001), there are specific processes which the authors called metacognitive ones and that are not directly involved in perception and further processing of information, but they implement a regulation task. In educational activity low success of students with high tendency to reflection are not explained only by its quantitative characteristics. In rare cases, this circumstance can be explained by an incorrect scale of the context of reflexive output (Salikhova, 2015).

M. Snyder (1974) introduced the similar concept of "self-monitoring" as a personality trait. The subject's ability to trace their reflexive behavior through self-supervision and realization of this ability, namely, management of the impression produced on people makes a part of this concept. Self-monitoring, thus, is understood as the ability to self-reflection in communicative situations. Besides, reflection can be regarded as some tendency to introspection, and is defined as the ability to think of oneself and others as subjects moved by internal states (Farber, 1989). Despite the variety of approaches to the research of this issue, the problem of the impact that mental states produce on students' reflexive processes during educational process is still insufficiently studied.

Methodological Framework

Students of both genders trained according to different specialties (humanities and natural-science) took part in the research: 143 students aged between 18 and 22. The following techniques were used in the research: 1. Grant's technique of expressiveness level and reflection orientation including scales of socio-reflection and self-reflection (Grant, 2001); 2. Karpov and Ponomaryova's technique to diagnose the general degree of reflection development, including diagnostics of retrospective reflection, actual and perspective activity, and communicative reflection (Karpov & Skityayeva, 2005).

3. Schraw & Dennison technique to diagnose metacognitive inclusiveness in activity (MAI) (1994); 4. Nikiforov's technique to diagnose self-control processes development (Nikiforov, 1988); 5. Questionnaire "Style of behavior self-control" by Morosanova & Konoz (2000); 5. Prokhorov's technique "Relief of a personality mental state" (1998). 6. Original author's technique "Diagnostics of reflexive processes: recognition, awareness and identification" (Chernov & Yusupov, 2012). The impact of reflection on students' mental states was researched during their learning activity (at a lecture and seminar): the intensity of mental states was measured. Then the diagnostics of reflection and personality regulatory abilities was carried out in the situation of extra class activity.

The degree of structures organization was calculated according to Karpov's method. The sense of this method is to attribute scores to correlation links having different degrees of significance. Accordingly, the index of structures organization (ISO) was estimated; 1 score was attributed to links at the level of statistical importance $p \leq 0.05$, 2 scores at the level of $p \leq 0.01$, and 3 at the level of $p \leq 0.001$. The parameter having the greatest score on all statistically significant links is considered as the leading one in the structure. The following was used in the research: the correlation analysis (Pearson's method), one-factor and multiple-factor dispersive analysis (MANOVA), and structural analysis (the index of structure organization was calculated). SAPSS 16.0 program was applied to process the results.

Results

The ascertainment of the character that mental states of various modality, sign, and duration produce on the content of students' reflexive processes was solved during the first stage. After that, the dispersive analysis (ANOVA) was carried out to reveal those characteristics of mental states which influence reflexive processes.

At this stage all mental states were divided according to the duration into short-term (concentration, cheerfulness, etc.) and long-term (exhaustion, depression, etc.). Then the analysis was performed where the indicator of activity self-control (a regulatory component of reflection) acts as a dependent variable, and mental state duration is an independent variable. The research results specified that the duration of states significantly influences a regulatory component of reflection ($p \leq 0{,}003$): in case when short-term states are experienced the intensity of a reflection regulatory component is significantly higher than at experiencing states having long-term character. It is caused by the fact that short-term states, experienced during learning, subject to more self-control and are better realized.

When all mental states were divided according to their duration, the correlation analysis was performed in compliance with Pearson's technique; that confirmed the absence of reliable interrelations between components of reflection and long-term states and, at the same time, it reveals a large number of correlations with states having a short-term range. It testifies to the fact that short-term states are better realized and regulated by the subject. These states are connected with a communicative reflection to a high degree. The indicator of mental processes acts as the leading substructure of mental states in interaction with this component of reflection.

Further, the distribution of the general sample took place relating to the level of mental state activity where states of low and high mental activity were

specified. Isolation of states peculiar to different levels of activity is connected with isolation of an energetic scale of mental states; Lindsley's continuum of activation and the scale of mental activity levels developed by Ganzen make up its basis. According to data obtained, states of a high level of mental activity are accompanied with more intensive manifestations of self-reflection while states of low mental activity, on the contrary, become a condition for decrease of own experiences reflection. This model is reliable at the level of ($p \leq 0{,}003$).

It was specified that states of a high level of activity are connected with a reflexive process of recognition ($p \leq 0{,}050$), whereas states of lowered activity are associated with a communicative component of reflection ($p \leq 0{,}05$). Besides, the more intensive the state is the less expressed the communicative component of reflection is. Physiological reactivity acts as the leading element of this structure.

Direct influence of states that have different signs (positive or negative) on components of reflections was not proved. Nevertheless, the research specified the interrelation of reflection and mental states grouped according to the sign. Cheerfulness, mobilization, tranquility and liveliness were included in the sample of positive mental states. Nervousness, depression and exhaustion made the group of negative states. Positive states are more connected with a cognitive component of reflection through the substructure "mental processes", whereas negative states correlate with reflection through the substructure "physiological reactions". In the latter case correlations are stronger and affect practically all types of cognitive reflection ($p \leq 0{,}01$).

The following groups of states created on the basis of content characteristics are specified in students' academic activity: emotional (pleasure, tranquility, grief), volitional (exhaustion, struggle of motives, mobilization), and intellectual (thoughtfulness, interest, curiosity). The above described method determined that the strongest interrelations of mental states and reflection are observed when students experience emotional states of tranquility and pleasure. Interaction of emotional states and reflection is realized through mental processes and mental state in general. To a lesser extent, reflection is connected with the substructure of physiological reactions as a result of its low degree of awareness. Let us note that intellectual states impact reflection mainly through the substructure "mental processes" and volitional through "experience". The identified substructures are key and structure-forming in the description of volitional and intellectual states.

Let us address to ISO of various components of reflection: cognitive, regulatory and communicative (Table 1).

Table 1. Index of structures organization of mental states and various components of reflection

Component of reflection/ substructures of states	MP	PR	Exp.	Beh.	Average	Total
Cognitive reflection	5	3	2	3	3	**16**
Regulatory reflection	1	1	0	7	2	**11**
Communicative reflection	1	1	1	1	1	**5**

Symbol legend: MP – mental processes, PR – physiological reactions, Exp – experiences, Beh – behavior, Aver – average in parameters

The greatest index of structures organization (ISO) in interrelation with a cognitive component of reflection is noted in the substructure "mental processes"; that is explained by their common cognitive basis. In turn, regulatory reflection is connected with mental states, generally through the substructure "behavior" due to the fact that this component of reflection is associated with conscious regulation of subject's activity and behavior. And, finally, communicative reflection has close but, at the same time, the smallest (in comparison with other components of reflection) number of correlations with substructures of mental states that indicates its low involvement into interaction with states and educational process in general. Let us consider the impact of mental states having various contents on an self-reflection indicator (understanding of own experiences). This model is reliable at the level of ($p \leq 0{,}015$). Figure 1 demonstrates that self-reflection is most intensively expressed when students experience emotional states, whereas in intellectual and volitional states it is less expressed.

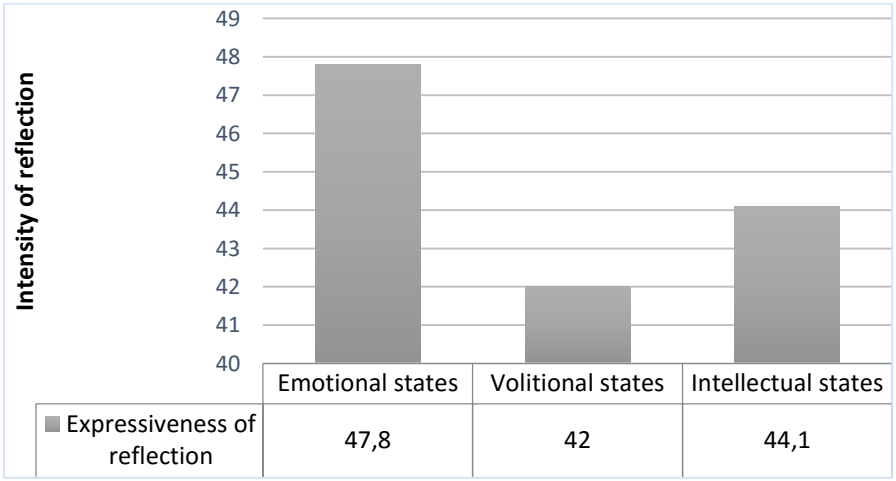

Figure 1. Influence of content characteristics of mental states on self-reflection

The smallest expressivity of reflexive processes is characteristic for volitional states of exhaustion and mobilization. This fact can be explained by the following: in the context of intellectual states a person is focused on the object of activity but not on own experiences, therefore the indicator of self-reflection is at a low level. In emotional states, on the contrary, mental processes are more active that affects processes of reflection. In case of volitional states, subjective activity is connected with overcoming of external and internal barriers, at this moment reflexive processes decrease.

Results specifying the impact of states content characteristics and students' regulatory abilities interaction on self-reflection are of certain interest. When self-reflection was analyzed as a dependent variable, it was revealed that the model of dispersive analysis is statistically significant at the level $p \leq 0{,}019$. Interaction of "state modality" and "regulatory abilities" variables is statistically reliable at the level $p \leq 0{,}035$, whereas separate influence of regulatory abilities does not reach the necessary level of reliability.

The research specified that self-reflection depends on the content of mental states and the level of subject's regulatory abilities as well. In case when abilities to self-regulation are of a low level the intensity of self-reflection is high only in emotional states, though it remains rather low in volitional and intellectual states.

High regulatory ability gives a different kind of observation: the difference in reflection indicator is leveled and self-reflection remains at the average level at any types of mental states. Self-reflection is remarkably expressed at a low regulatory ability when the subject experiences emotional states. The lowest indicators of reflection are observed when volitional states are experienced. Thus, it is possible to conclude that regulatory abilities directly impact the process of reflection and students' mental states interaction.

The next task is to specify the impact of mental states arising in students' educational activity on reflexive processes: recognition, awareness, identification. The conducted research revealed that the expressiveness of considered reflexive processes at different states has a number of regularities. Figure 2 shows that in the state of nervousness the least activity of all reflexive processes is observed.

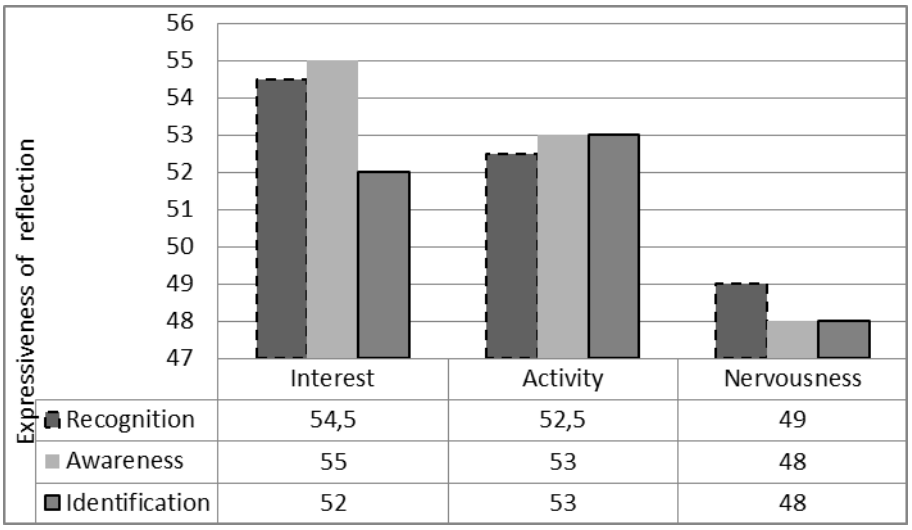

Figure 2. Impact of mental states on students' reflexive processes

Let us note that states of activity, interest and nervousness similarly influence processes of recognition, awareness and identification: systematic decrease of reflexive processes indicators occurs. However the identification process appears to be more productive at student's activity. However, the state of interest remains the most preferable to manifest reflexive processes.

In conclusion, let us regard the research results of self-reflection processes and reflection of others considered above during experience of such mental states as nervousness, interest and activity. The results thus obtained specify that the state of nervousness is unfavorable for reflection processes of the person themselves and other people in the same way as in cases of recognition, awareness and identification processes. In this state own and other people's

experiences are realized by the subject least of all. The figure shows that the most productive state for reflection is the state of interest where both types of reflection demonstrate maximum values. Let us note that in the state of activity the indicator of self-reflection prevails over the indicator of others' reflection. It is probably connected with a high energetic level of the mental state itself. In general, emotionally positive states promote the efficiency of reflexive processes more than negative ones.

Discussions

Due to earlier researches (Prokhorov & Chernov, 2014), there were revealed regularities that reflection produces on students' mental states; they were divided according to various bases: modality, duration, sign, content and level of mental activity. It was shown that typical states for daily educational activity are most intensively endured in case when cognitive reflection is of an average level, and high rates of a regulatory reflection have high rates; leading components of mental states are characteristics of "behaviour". In turn, "high-reflexive" ones experience mental states of low intensity more often in their tensed educational activity, whereas "low-reflexive" ones experience states of both high and low intensity equally. The leading element of state structure is "experience".

Reflection in educational process gives each student a chance to analyze and estimate the state, and therefore, to draw the corresponding conclusion on the necessity of its correction. The researches on mental states self-control in educational and professional activity (Mirziyev, 2002) revealed that the efficiency of self-control in negative mental states depends on various components of consciousness: in particular, on reflection, an image of a desirable and actual state, and motivation and personal sense as well.

Earlier researches (Prokhorov & Chernov, 2015a) specified that the impact of reflection on mental states is mediated by specialties taught, form of educational activity, and level of students' regulatory abilities. States of increased mental activity are characteristic for "average-reflexive" students studying Humanities subjects and "low-reflexive" students of technical specialties. The most intensive mental states are endured by persons with identical characteristics of regulatory abilities and reflection. The level of regulatory abilities is a key indicator influencing mental states, and reflection performs a transforming function. Subsequent works (Prokhorov, Chernov & Yusupov, 2015b) illustrate that informative states being actualized during educational activity have their structural and functional features of manifestation.

Despite the variety of researches on the impact that reflection produces on characteristics of mental states, the opposite effect of mental states on the course of the subject's reflexive processes has not been studied sufficiently.

Conclusion

The research results obtained testify to the impact of experienced mental states on reflection. It was specified that short-term states are more connected with reflection than long-term ones. It is noted that positive states correlate with a reflection cognitive component through the substructure "mental processes", whereas negative states interact through "physiological reactions".

Influence of mental states on cognitive reflection is mediated by mental processes while influence on regulatory reflection is realized through the substructure "behavior".

Self-reflection was found to be more intensively expressed when students experience emotional states than in case of intellectual and volitional states. It was revealed that this interaction is mediated by subject's regulatory abilities; at high rates they level the impact of mental states on reflexive processes.

It is shown that the state of student's interest is more favorable for manifestation of reflexive processes of recognition, awareness and identification; the state of nervousness is the least suitable.

So, the following regularities of impact that mental states produce on reflexive processes have been revealed:

1. The impact of mental states on reflexive processes is mediated by duration, sign, and modality of mental states.

2. When short-term states are experienced the intensity of a reflection regulatory component is higher than at long-term states.

3. States of high intensity are accompanied with low expressiveness of a reflection communicative component.

4. Positive states are connected with a cognitive component of reflection through the substructure "mental processes", whereas negative states are connected through "physiological reactions".

5. Intellectual and emotional states influence reflection mainly through the substructure "mental processes", volitional through "experience".

6. Processes of reflection are most intensively manifested when students experience emotional states, and significantly less in intellectual and volitional states.

7. Regulatory abilities directly influence the process of reflection and students' mental states interaction: self-reflection is expressed at a low regulatory ability when students experience emotional states.

8. States of interest, activity and nervousness similarly influence processes of recognition, awareness and identification: systematic decrease of indicators of reflexive processes in the triad interest-activity-nervousness takes place. The subject realizes own and others' experiences in the state of nervousness the least.

Recommendations

Materials of the paper are of interest to psychologists working in education, teachers, and a wide range of specialists-teachers.

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