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Metacognitive Awareness as a Destructive Risk Factor Prevention in Educational Environment

Alla V. Frolova* (a)

(a) Kazan Federal University, 420008, Kazan (Russia), 18 Kremlyovskaya street, alfrol1@mail.ru

Abstract

Metacognition as a phenomenon is the subject of discussion in many scientific spheres. In modern reality, a person's efforts to overcome life difficulties is studied within the framework of the cognitive paradigm, where representatives analyze the way the person perceives and assesses their metacognitive capabilities, how the level of cognitive response is related to the coping strategies and self-regulation, in what ways the individual's motivation in overcoming destructive risks can be enhanced (Wells, 2011; Sun et al., 2017).

Thus, the study of the features of cognitive-behavioral and metacognitive responses allows us to determine the manifestation of destructive risks in the individual and predict the possibility of maladaptation.

Based on the foregoing, the purpose of the study is to identify peculiarities of metacognitive awareness, investigate the relationship of metacognitive involvement in cognitive style activities, study markers, destructive "risk zones" contributing to the formation of maladaptive forms in behavior.

Research methods used were as follows: the questionnaire "Metacognitive Awareness Inventory" of Shraw and Dennison adapted by Karpov and Skityaeva (2005); "The Embedded Figures Test" (Witkin et al., 2002). "The Free Associations Methodology" (Gardner et al., 1959) was applied as well to assess cognitive style "rigid-flexible cognitive control"; the questionnaire "Negative prognosis" (Sychev, 2008); the test of anticipatory consistency (predictive competence) (Mendelevich, 2005); the scales of dysfunctional distortions by Beck and Weisman adapted by Zakharova (2013).

It was established that dysfunctional beliefs are imprinted in the individual system of meanings in the form of stable cognitive schemes that cause a negative metacognitive personality style. It was revealed that interrelated indicators of metacognitive involvement, anticipatory consistency, and constructive cognitive style are predictors of effective personal resources.

Keywords: metacognition, cognitive style, metacognitive resources, negative prognosis, anticipation.

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* Corresponding author. E-mail: alfrol1@mail.ru

Introduction

Currently, the active search for opportunities to enhance socio-psychological resources of the individual, develop human's ability to consciously regulate their own activities (Panadero, 2017) is taking place in scientific psychological and pedagogical space.

Over the past decades, the study of metacognitive thinking phenomenon as a psychological resource has acquired a certain interest (Flavell, 1979). Among cognitive resources, intelligence is most often regarded as a person's general adaptive ability; according to Jaspers (1997), mind (or consciousness) cannot fall sick. Metacognition is interpreted as the control over the quality of one's own thinking and products of one's own cognitive efforts, as well as the integration of understanding one's emotional state, ability to self-regulate and anticipate behavior and results of one's activity (Mendelevich et al., 2011). Human's adaptive abilities can be assessed through the evaluation of the level of metacognitive characteristics development that are considered as the most significant ones for the regulation of mental activity; the higher the level of these characteristics development is, the higher the probability of a person's successful adaptation and the greater the range of adaptive environmental factors. These psychological peculiarities make up personal adaptive potential which includes the following characteristics of metacognition: individual's self-esteem that is the core of self-regulation and that determines the degree of adequacy of activity conditions perception and one's capabilities, the ability for predictive activity (anticipatory consistency), metacognitive styles (Kholodnaya, 2004; Koriat, 2007).

Metacognitive resources are largely specified by the ability to create integrated behavior; the higher the ability to integrate behavior is, the more successful adaptation and overcoming of stressful situations are (Byzova et al., 2019). Meta-resource as conscious self-regulation aimed to achieve personal goals in various spheres of life is a self-regulatory psychological tool that allows a person to consciously use their individual resources to change features of their character and personality development (Morosanova, 2013).

This research topic is of particular importance since neurotic disorders, depression and deviant behavior in the educational environment relate to the forms of maladaptation where non-constructive forms of meta-belief play a significant role as a consequence of primitive, immature thinking predominance over mature (Sun et al., 2017). The study of metacognitive awareness suggests the possibility of effective and rational management of intellectual activity and cognitive resources that may prevent deviant forms of behavior in the youth environment.

Purpose and objectives of the study

The purpose of the study is to identify features of metacognitive awareness, investigate the relationship of metacognitive involvement in activities with a cognitive style, study markers, destructive "risk zones" that contribute to the formation of maladaptive behaviors.

Methodology

Research methods of this study included the following diagnostic techniques: "Metacognitive Awareness Inventory" of Shraw and Dennison adapted by Karpov and Skityaeva (2005), was developed to measure the parameters of "field dependence-field independence" cognitive style and used to diagnose impulsive-reflective cognitive style. "The Free Associations Methodology" (Gardner et al., 1959) was applied as well. It is aimed to assess cognitive style "rigid-flexible cognitive control". To study the manifestation of a negative prognosis, the questionnaire "Negative prognosis" (Sychev, 2008), the test of anticipatory consistency (predictive competence) by Mendelevich (2005) and the scales of dysfunctional distortions by Beck and Weisman adapted by Zakharova (2013) are used. Statistical processing was carried out using SPSS 19.0.

The research work was carried out in higher educational institutions in the city of Kazan. The results of diagnosing 80 students (male and female), aged 19 to 23 made up the empirical base of the study. The sample consisted of two groups, 40 people each.

In the first stage, cognitive styles were studied in relation to the presence or absence of dysfunctional attitudes. In the second stage, features of metacognitive involvement in activities and the specificity of predictive competence were investigated. A comparative analysis of the data obtained was carried out.

Literature review

Modern science defines the ability to reflect on cognitive strategies, know about performance control systems, monitor cognitive processes, assess cognitive states and be able to self-govern them as metacognition. Koriat (2007) formulated five questions regarding metacognition. These questions concerned foundations of metacognitive judgments during cognitive activity monitoring, the degree of confidence in such judgments and the influence of this confidence on the performance result, processes that affect the success of the cognitive performance, how metacognitive control affects the results of metacognitive monitoring, and how metacognitive monitoring and control affect performance (ibid.). Educational psychology studies metacognition in the context of self-regulation learning concept (SRL).

In this case, SRL is interpreted as a basis for understanding how cognitive, metacognitive, emotional, motivational and social aspects of learning interact in resonance (Panadero, 2017). According to Pintrich (2000), SRL is “an active, constructive process in which students set goals for their learning, and then try to control and regulate their cognition, motivation and behavior guided and limited by their goals and task peculiarities” (Pintrich, 2000).

Flavell is honored to be called the discoverer of metacognition phenomenon. The author considers metacognitive knowledge as a conventional experience and correlates intentional, planned and goal-based thinking aimed at performing cognitive tasks. Metacognitive experiences, in turn, were defined as an intentional, conscious phenomenon that is directed towards future and subordinated to goals (Flavell, 1979). The notion of “thinking about one's own thinking” (meta-thinking) is the basis of Flavell's metacognition concept. Flavell distinguishes two main plans in metacognition structure: the plan of mental behavior control and the plan of its monitoring.

The term "cognitive style" is applied when individual psychological resources of the personality are studied. Due to Kholodnaya's definition, cognitive styles are individually unique ways of processing information that characterize the specificity of a particular person's mindset and distinctive features of their intellectual behavior, as well as their preferred way of solving problems (Kholodnaya, 2004).

Modern cognitive psychology has significantly expanded the concept of cognitive style; as a result, it includes various categories: for example, along with traditional understanding, the notion of "negative cognitive style" at depression which denotes the assessment of negative life events in terms of stability (constancy in time), global dimension (breadth of coverage of various spheres in life), internality (tendency to take responsibility for a “bad” event happened) have become current (Wells, 2011). The emphasis on thinking dysfunctions as the key psychological cause of depression first appeared in Aaron Beck's works (Beck et al., 2004); he believes that depression is based on the cognitive triad: negative basic beliefs about self, the world around us, and negative outlook for the future.

According to the theory of executive functions and self-regulation (EFSR), dysfunctional metacognitive beliefs contribute substantially to the development of psychopathology (Wells, 2011). Dysfunctional beliefs (negative and meta-beliefs) appear to be connected with various psychopathologies (Sun et al., 2017). There is an assumption that all mental disorders are united by the activation of dysfunctional patterns of thinking and attention, and are called cognitive attentional syndrome (CAS) which manifests itself in rigid self-focused attention, perseverative style of thinking in the form of anxious ruminations, a fixed strategy of attention and monitoring of danger (threat) as well as thought suppression.

Thus, the development of metacognitive processes makes it possible to improve self-regulation and self-control. Wells (2011) identifies transdiagnostic ideas that are typical for any disorder or violation of the sphere of metacognition and that take part in the system of the cognitive attentional syndrome.

In this regard, we should note that Hacker and colleagues (2009) supplemented the definition of metacognition by including the ability to track and regulate not only cognitive processes but also a wide range of emotional states. Thus, the adaptive meaning of metacognition was expanded, and the causes of many disorders of personality affective sphere were explained through metacognitive mechanisms.

At present, there are a large number of works devoted to the introduction of methods aimed at developing specific aspects of metacognitive abilities into psychological and pedagogical practice. For example, the program to form metacognitive strategies was elaborated by an American researcher Dirkes (1985). The main goal of this program is to enlarge the range of metacognitive skills and ways to use them to enhance adaptability.

Within the framework of this direction, metacognition as a theoretical concept is often assessed through the concepts of self-efficacy, the need for cognition, the illusion of control. For example, Bem's self-perception theory (1972) can be considered as a metacognitive theory in the sense that attitudes and beliefs about oneself are concise inferences about past behavior.

The study of metacognitive awareness should necessarily consider the phenomenon of anticipation, which is regarded as a form of brain constructive activity aimed at recreating a picture of an empirically unobservable phenomenon. It has, as its content, an information model of future events and can act as a way of cognition.

We distinguish anticipation as a specific cognitive-regulatory process based on integral mechanisms of brain working. The range of "resolving power" of anticipatory processes and their effectiveness according to various criteria are always based on the analysis and synthesis of past experience, constant comparison of current events with it, and, that is especially important, on the selective attraction of information from memory. In this regard, the leading-temporal effect, as well as the maximum elimination of uncertainty in the course of decision-making should be considered as the most significant characteristic of anticipation as a process (Mendelevich et al., 2011).

Results

The analysis of cognitive styles specified the following features: 24% of respondents demonstrated the predominance of rigidity in assessing their cognitive activity.

The thoroughness of thinking, getting stuck, excessive detailing, difficulty to switch from one way of processing information to another are characteristics of this cognitive style. It should be noted that a reflective style has similar semantics. Diagnostic results show that a reflective cognitive style predominates in 26% of respondents; it manifests itself in the tendency to carefully consider decisions, calculate possible risks (discretion as a character trait). Such people spend a lot of time making any decision since all possible decision options are analyzed. This style can be described as slow and precise in solving problems. However, a reflective style admits a high number of problem-solving variants. An impulsive cognitive style (24% of respondents) is manifested in a quick response to presented incentives. Diagnostic results demonstrated that 27% of young people had a field-independent cognitive style, and 9% of respondents had a field-dependent style.

Metacognitive involvement revealed significant connections with a number of scales: it was reliably established that parameters of metacognitive involvement in activity (scales of "self-regulation of activity and own cognitive resources" and "Problem-solving process") are expectedly associated with cognitive styles.

Thus, respondents with high scores on the scale of activity self-regulation and their own cognitive resources gave the following statements: "I am aware of what strategies I use when I make decisions"; "I am aware of my intellectual advantages and limitations"; "I know exactly for what purpose I use different problem-solving strategies"; "When I make an important decision, I tend to analyze the effectiveness of the strategies I use"; "I know in which case each of the strategies I use will be most effective"; "I am able to control the quality of decisions I make" "I know what my manager expects from me"; "I concentrate on the general sense of the work more than on the details"; "I automatically apply effective strategies for solving problems"; these respondents were reliably characterized by a field-independent cognitive style. It can be assumed that they tend to rely on their own perceptual experience, the ability to separate real and ideal goals, understand the boundaries of their competence, have a formed sense of social identity ($r = 0.487$ at $p = <0.01$).

The cognitive style "impulsivity-reflectivity" was reliably associated with the scale "Problem-solving process"; the following statements corresponded to it: "Periodically I ask myself if I am achieving my life goals"; "I am considering several alternatives for solving the problem before choosing the final one"; "I am able to structure information well"; "After finishing the work (completing the task), I summarize what I have done"; "I think over several ways to solve the problem and choose the most optimal one", $p = <0.01$. Respondents who demonstrated an impulsive style were characterized by quick reaction, recklessness in decision-making, spontaneity; they had low scores on this scale and high on the scale of self-regulation.

Probably, this group of respondents tends to overestimate their own cognitive resources, they unwillingly estimate possible risks and mistakes during the activity. Diagnostic results show that respondents with the predominance of the cognitive style are characterized by flexible cognitive control, the ability to quickly switch from one task or idea to another, the flexibility of thinking, and the ability to create associative connections. These statements correspond to the above-mentioned style: "When I read about something new, I correlate it with what I already know in this area", "I learn better when the topic is interesting to me"; "I am trying to translate new information into a form accessible to me"; "I use my intellectual strengths to compensate for my weaknesses"; "When the solution to the problem is completed, I ask myself if all the goals have been achieved"; "I use different strategies due to the situation" ($p < 0.01$). Comparative analysis of indicators among respondents with field-dependent and field-independent styles revealed statistically significant differences in the overall total score (116.38 ± 1.58 and 147.59 ± 2.63 , respectively), in many items of the questionnaire (70.0%), in the manifestation of dysfunctional relationships that determine the dependence of the state on feelings, opinions, assessments and attitudes of other people towards them ("You cannot be happy if other people do not love you" ($p < 0.001$)). Data on the presence of a significant positive correlation ($p > 0.05$) between the cognitive styles "field dependence", "rigidity" and such dysfunctional behavioral patterns as: "obligations to others" and "obligations to oneself" were obtained in the course of the study.

Comparative analysis of dysfunctional beliefs, metacognitive involvement, cognitive style and predictive competence revealed the following specific features. Respondents with pronounced dysfunctional beliefs have the following pattern: the higher the negative prognosis is, the lower the anticipatory competence is. That is, negative anticipation of prospects for one's future, pessimism in assessing one's own activities, imagination about insurmountable obstacles and dangers, turns out to be reliably associated with the ability to adequately assess one's metacognitive abilities and personal resources. A negative prognosis among respondents with a field-dependent cognitive style and low scores on scales with metacognitive involvement in activity turn out to be associated with pronounced dysfunctional distortions, namely, the tendency to exaggerate the significance of problems and react violently to them is of a preventive nature, i.e. it is aimed at proactive preparation for future adverse events (preference is given to the most unfavorable, negative interpretation of life experience out of many options for the future). At the same time, a negative prognosis among respondents who do not have dysfunctional cognitions has the feature of probable unfavorable development of events.

Attention is drawn to the fact that in statements characterizing respondents with a field-dependent style, a significant place is occupied by descriptions of emotional reactions to a possible problem in the form of anxiety or worry: devaluation of their capabilities, achievements, desire to seek protection and patronage, declaring their weakness and helplessness as an excuse for failure, unwillingness to overcome existing difficulties. It is quite probable that the less manifestation of emotional assessments in the statements of respondents with dysfunctional distortions can be explained by the fact that the preventive nature of the forecast seems to reduce the subjective probability of a possible failure or problem. At the same time, the emotional assessment of respondents with a low level of dysfunctional relationships is a reaction to insecurity in front of possible difficulties, and it ensures the mobilization of resources ($p < 0.01$). To regulate affective experiences, respondents with an impulsive style use cognitive strategies in the form of accepting what happened with the distraction of thoughts to other events, reducing the significance of the event by comparing it with other more complex situations. Respondents with a rigid style more often use emotional response schemes in the form of a “tendency to rationalize feelings”; ambivalent emotions are hardly accepted.

General anticipatory inconsistency was revealed in 63 % of respondents from the group with field-dependent cognitive style, their results did not reach the normal limit of 241 points. The remaining 37% of respondents with the aforementioned cognitive styles demonstrated predictive competence, which brings them closer to a group of individuals with a reflective and field-independent style according to the studied indicator. However, we should note that these respondents' results (27%) slightly exceed the normal limit ($241 \leq CAS \leq 250$). The t-test showed that the mean CAS in the group of people with field-dependent differs from the mean CAS in the group of people with field-independent and reflective styles by a statistically significant value ($t = 2.27$, at $p \leq 0.05$). The monovariant type of anticipatory activity prevailed significantly in the group of persons with a field-dependent cognitive style.

Those who prefer constructively transforming strategies, namely, field-independent, reflexive, flexible cognitive control, are individuals with a high level of meta-awareness of their own activities, an optimistic worldview, stable positive self-esteem, a realistic approach to life and a pronounced motivation for achievement. Individuals with rigid, field-dependent cognitive styles, avoiding difficult situations, resorting to mechanisms of psychological defence, inclined to “downward social comparison” perceive the world as a source of danger, they have low self-esteem, and their worldview is colored with pessimism.

Discussion

Thus, it can be stated that the results of psychological research prove the existence of anticipatory mechanisms of neurogenesis.

Individuals with a field-dependent cognitive style tend to exclude undesirable events and actions from anticipatory activity, they always focus only on desirable ones, they are unable to adequately predict their cognitive activity and life events, they are characterized by the inability to anticipate the result of their own activity, and to accurately allocate time. "Getting into an unpredicted, unfavorable and displaced from the situational scenario life collision, an individual finds themselves in the pressure of time to apply coping behavior" (Mendelevich et al., 2011). In conditions of forecast divergence and with an extreme manifestation of emotional experiences associated with this prognostic error, the person may not use possibilities of meta-inclusion and will fall ill with neurosis.

Our study results are consistent with other works data pointing to the problems of finding optimal meta resources, the complexity of relationships between dysfunctional distortions and the choice of cognitive strategies.

The research proves the opinion that metacognitive involvement allows a person to plan, track and control the process of one's own activity, to regulate not only cognitive processes but emotional states as well. Developed metacognitive skills, on the contrary, can contribute to constructive coping strategies selection (Semerari et al., 2003).

Conclusion

It was found that dysfunctional beliefs are imprinted in the individual system of meanings in the form of stable cognitive schemes that determine the negative metacognitive style of the personality.

Analysis of the most pronounced dysfunctional distortions revealed that most of them reflect the dependence of a person's state on the emotional attitude of others towards them. It became clear that cognitive vulnerability impacts the change in a person's socio-psychological characteristics such as cognitive styles, metacognitive involvement in activities, and the ability to anticipate (predict).

Personality activity can be considered within the framework of the cognitive-behavioral paradigm, when it analyzes how a person consciously perceives and evaluates own activity, how the level of self-esteem is related to meta sources, in what ways an individual's motivation can be enhanced in any activity, etc. This study presents a paradigm associated with the analysis of individual's metacognitive abilities from the standpoint of his/her own inner world. In this regard, the emphasis is placed on that subjective reality that each person forms in their living space based on his/her own system of significant values (cognitive map), which acts as a kind of coordinate system in relation to which external events are interpreted.

It is shown that respondents who possess constructive metacognitive strategies are able to introspectively view and track the progress of their intellectual activity, predict (anticipate) problems that may arise in educational activities, and distribute their cognitive resources.

It was revealed that interrelated indicators of metacognitive involvement, anticipatory consistency, constructive cognitive style are predictors of effective personal resources.

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