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Матеріал надійшов до редакції 7.08.2026

Прорецензовано 31.08.26

Схвалено до друку 5.10.2026

УДК 159.922.7:376-056.26/.36:355.48(477)

Hennadii Miskov,

Postgraduate Student

ittek@ukr.net

<https://orcid.org/0000-0002-4135-8880>

[Web of Science ResearcherID G-6504-2019](#)

Геннадій Міськов,

аспірант

Mykola Yarmachenko Institute of Special Pedagogy and Psychology

National Academy of Educational Sciences of Ukraine,

M. Berlinskoho street 9, Kyiv, 04060, Ukraine

Інститут спеціальної педагогіки і психології

імені Миколи Ярмаченка НАПН України,

вул. М. Берлінського, 9. м. Київ, 04060, Україна

**PSYCHOLOGICAL MECHANISMS OF THE INTERRELATION BETWEEN
ANTICIPATORY CAPACITY AND THE STRUCTURE OF FEARS IN CHILDREN
WITH SPECIAL EDUCATIONAL NEEDS**

**ПСИХОЛОГІЧНІ МЕХАНІЗМИ ВЗАЄМОЗВ'ЯЗКУ АНТИЦИПАЦІЙНОЇ
СПРОМОЖНОСТІ ТА СТРУКТУРИ СТРАХІВ У ДІТЕЙ З ОСОБЛИВИМИ
ОСВІТНИМИ ПОТРЕБАМИ**

Abstract. The study theoretically substantiates and empirically identifies the destructive patterns of temporal psychic organization disruption in primary school children with hearing loss and intellectual disabilities under martial law. The aim of the research is to reveal the specific transformation of childhood fears driven by anticipatory capacity deficits and to experimentally verify an adaptive digital technology for psycho-emotional stabilization. The diagnostic framework integrated a critical validity appraisal of the standardized HADS questionnaire, the projective "Map of Fears" technique for spatial-thematic visualization of concerns, screening of bodily somatic tension, and non-parametric statistical methods (Spearman correlation, Mann-Whitney U test). The findings prove that chronic war-induced stress triggers paralogical anticipation, where the inability to mentally construct a predictable safe future breeds generalized anxiety. Pronounced nosological divergence was identified: children with auditory deprivation exhibit hypervigilance to rapid visual flashes and vibrations due to compensatory sensory reliance, whereas children with cognitive

impairments demonstrate diffuse dread devoid of a tangible threat locus. Psychic distress somatic discharge was empirically verified through facial and shoulder motor tics in 45% of participants, alongside sleep fragmentation and selective mutism. The HADS scale was found psychometrically invalid in 65% of crisis pediatric SEN cases due to linguistic complexity and failure to capture dynamic predictive loops. A three-tier digital stabilization system (predictive gaming algorithms, Ukrainian Sign Language environment, family co-regulation) was implemented, yielding anxiety reduction in 40% of subjects. These conclusions necessitate shifting from static diagnostics to predictive-oriented dynamic digital rehabilitation of vulnerable children during wartime.

Key words: children with special educational needs, hearing impairments, intellectual disabilities, anticipatory capacity, structure of fears, somatic anxiety, predictive brain, digital stabilization, martial law, sign language environment.

Анотація. У статті теоретично обґрунтовано та емпірично виявлено деструктивні закономірності розпаду часової організації психіки у дітей молодшого шкільного віку з порушеннями слуху та інтелектуального розвитку в умовах воєнного стану. Мета дослідження полягає у розкритті специфіки трансформації дитячих побоювань під впливом дефіцитарності прогностичних функцій та експериментальній перевірці адаптивної технології психоемоційного відновлення особистості. Діагностичний комплекс охоплював якісний аналіз обмежень стандартизованої шкали тривоги HADS, застосування проєктивної техніки «Мапа страхів» для візуалізації просторово-тематичних векторів хвилювань, скринінг невротичних тілесних проявів та методи математичної статистики (критерії Спірмена, Манна-Вітні). Встановлено, що хронічний воєнний стрес викликає феномен паралогічного прогнозування, за якого неможливість опредметнення безпечного майбутнього генерує генералізовану тривогу. Доведено нозологічну диференціацію переживань: для осіб із сенсорним дефіцитом властива гіперчутливість до світлових спалахів та вібрацій середовища через компенсаторну зорову орієнтацію, тоді як в осіб із ментальними розладами домінує дифузний афект без конкретного джерела загрози. Емпірично зафіксовано соматичний скид психоемоційного напруження у формі невротичних тиків обличчя та плечового поясу у 45% обстежених, розлади сну та ситуативний мутизм. Доведено непридатність опитувальника HADS для досліджуваного контингенту в 65% випадків через надмірну семантичну складність і статичність. Апробовано авторську багаторівневу модель цифрової стабілізації (ігровий прогностичний тренажер, жестомовний інтерфейс, родинна корегуляція), яка забезпечила зниження тривожності у 40% дітей. Отримані висновки обґрунтовують перехід від статичного діагностування до предиктивно-орієнтованих динамічних технологій реабілітації дітей у кризовий період.

Ключові слова: діти з особливими освітніми потребами, порушення слуху, порушення інтелектуального розвитку, антиципаційна спроможність, структура страхів, соматизація тривоги, предиктивний мозок, цифрова стабілізація, воєнний стан, жестомовний простір.

Introduction. The full-scale military aggression against Ukraine and the prolonged legal regime of martial law have radically transformed the safety environment and existential conditions of the individual. Children with special educational needs (SEN), specifically those with hearing impairments and intellectual disabilities, find themselves in a state of extreme psycho-emotional vulnerability. Their psyche experiences a cumulative destructive load: primary sensory or cognitive deficits combine with a permanent existential threat to life, leading to the formation of specific, deeply somatized, and diffuse forms of anxiety and fear.

The central psychological mechanism governing an individual's emotional response to threat is anticipation—the capacity for proactive reflection of reality, event forecasting, and the temporal organization of one's own experience. Under war conditions, the stable "prediction machine" of the human brain experiences failure. In children with SEN, this process is exacerbated by nosological limitations. A deficit in auditory perception deprives the child of the ability to orient toward acoustic danger markers, recalibrating anticipation toward visual and vibrational triggers, whereas intellectual impairments hinder logical probability appraisal of threats. Consequently, a specific deformation of anticipatory mechanisms emerges, directly shaping a unique architecture of childhood fears.

Because chronic fear in children with SEN stems directly from the collapse of predictive reference points, traditional verbal psychocorrective interventions demonstrate limited efficacy. Current challenges necessitate the development and implementation of "digital stabilization" technologies. The use of adapted, rigorously structured, and gamified virtual spaces allows for the creation of a safe therapeutic environment for the child where behavioral algorithms are predefined and predictable. This provides compensation for deficient forecasting abilities, reduces

the level of somatized anxiety, and restores emotional self-regulation.

Analysis of relevant research. Contemporary international scientific discourse conceptualizes fear not as a static affect, but as a dynamic product of the functioning of the "predictive brain," which continuously generates models of the surrounding world to minimize uncertainty (Clark, 2016). Rational risk evaluation and the inhibition of impulsive fear reactions in the amygdala directly depend on the ontogenetic maturation of the prefrontal cortex (Sapolsky, 2017). In neurotypical ontogenesis, the dynamics of childhood fears reflect the growing complexity of the cognitive sphere: while early childhood is dominated by reactions to immediate sensory stimuli (loud sounds, darkness, isolation), the development of imagination gives rise to abstract, anticipatory fears of objects and phenomena absent from the direct field of perception (Gullone, 2000). A secondary consequence of this process is the formation of cognitive "worrying" (worry) – a persistent propensity for anxious negative forecasting of the future (Muris et al., 2000), which escalates into cognitive catastrophizing under war-induced stress. In children with special educational needs (SEN), these processes acquire specific deformations due to the limitations of perceptual or analytic-synthetic information processing.

The fundamental basis for the study of proactive reflection in the Ukrainian psychological school is the concept of temporal organization of the psyche by I. H. Batrachenko, where anticipation is defined as a baseline mechanism for projecting and objectifying an individual's future (Batrachenko, 1996; Batrachenko et al., 2011; Miskov, 2025c). The disruption of the foundational sense of security and the destabilization of the secure attachment system (Bowlby, 1973; Miskov, 2025b) under war conditions impede the formation of adequate predictive models. The specific ways in which cognitive appraisal of a situation transforms into sustained emotional states and behavioral reactions are elucidated in the works of O. Chebykin: his concept of the phased functioning of motivational-emotional components of regulation (Chebykin, 2017) explains the mechanism of regulatory failure, wherein the inability of a child's psyche to adapt to an emotiogenic situation disrupts exploratory and cognitive activity.

The issues of psychological safety, emotional resilience in children during

crisis war conditions, and technological tools for gamification and digital environmental stabilization for individuals with SEN constitute a distinct, powerful cluster of contemporary Ukrainian scientific discourse. As demonstrated in our systematic bibliographic review of effective practices over the past decade (Miskov, 2025b), leading trends in this domain focus on the development of trauma-informed technologies (play therapy, fairy-tale therapy, art therapy) aimed at restoring predictability and safety within the child's microsocial space. At the same time, in stabilization processes, it is critically important to consider sociocultural and communicative adaptation factors, particularly the development of a sign language environment and barrier-free policy for children with hearing impairments, which is comprehensively substantiated in the foundational works of S. Kulbida (Kulbida, 2023). This proves the necessity of differentiating psychocorrective intervention depending on the child's perceptual and cognitive capacities to predict safety.

Despite a substantial number of studies, a specific psychological mechanism remains overlooked by researchers: precisely how nosology-dependent anticipatory deficiency (sensory or intellectual) qualitatively transforms the content structure and forms of somatization of childhood fears during wartime. Most available diagnostic tools (notably HADS) record only a static level of anxiety, disregarding the dynamics of predictive processes (Miskov, 2025a). This determines the necessity of our study.

Aim of the Study. The aim of this study is the theoretical substantiation and empirical identification of the destructive psychological mechanisms linking the level of anticipatory capacity deformation with qualitative transformations in the structure of fears in children with special educational needs (specifically those with hearing impairments and intellectual disabilities) under martial law, as well as the substantiation of effective technologies for their digital stabilization based on a predictive-oriented approach.

To achieve this aim, the following objectives were formulated:

- outline the theoretical and methodological foundations of predictive coding and the temporal organization of the psyche as factors in the development of childhood anxiety;

- analyze the nosological specificity and dynamics of the transformation of childhood fears (from concrete sensory to diffuse somatized forms) under the crisis conditions of martial law depending on the nature of perceptual or cognitive impairments;
- substantiate and present empirical findings on the application of dynamic, projectively oriented diagnostic methods (specifically the "Map of Fears" technique) and digital emotional stabilization models for children with SEN, which become vital given the verified limitations of traditional static rating scales in crisis conditions.

Research Methods. To implement the research objectives, an integrated methodological approach combining theoretical analysis of scientific literature, empirical diagnostic methods, and elements of qualitative modeling was employed. The study sample comprised primary school children with special educational needs, specifically individuals with hearing impairments and intellectual disabilities, residing under conditions of chronic war stress in Ukraine.

During the empirical data collection, the following instruments were used:

1. Critical Analysis of the Hospital Anxiety and Depression Scale (HADS). Building upon our previous studies, it was verified that in more than 65% of cases, the HADS scale demonstrates substantial validity limitations when applied to children with SEN under crisis conditions of martial law. It captures exclusively a static level of anxiety symptoms, completely disregarding the dynamic predictive processes of the psyche and the nosological specificity of threat perception.

2. Projective "Map of Fears" Technique. This instrument was employed to externalize the subjective spatial and thematic profile of childhood anxieties. The technique enables the child to visualize and localize their fears, allowing the researcher to evaluate the level of deformation within their anticipatory mechanisms (a propensity for cognitive catastrophizing or regression).

3. Psychophysiological Somatization Screening Method. This method was utilized to identify the bodily equivalents of blocked anticipation (specifically the presence of neurotic tics, recorded in 45% of respondents as a consequence of chronic predictive failure).

Statistical processing of the obtained results was conducted using comparative analysis criteria (the Mann-Whitney U-test) to identify nosological

differences in the structure of fears, and correlation analysis (Spearman's rank correlation coefficient, r_s) to establish the relationship between the level of forecasting deformation and the degree of anxiety somatization.

Results. Extreme factors of the wartime environment exert a destructive impact on the temporal organization of the psyche in children with SEN. Chronic stress and the permanent threat to life block higher cognitive levels of future forecasting, leading to the child "getting stuck" at lower, sensory-perceptual levels of anticipation. Instead of constructive action planning, the psyche functions in a mode of "paralogical anticipation" – a state of chaotic premonition of threat, where the impossibility of rationally anticipating a safe future is replaced by irrational fear.

The application of the projective "Map of Fears" technique made it possible to record specific fractures in the child's anticipatory structure and differentiate emotional responses across nosological groups:

1. Children with hearing impairments. The structure of their fears is dominated by anxieties associated with unexpected visual environmental changes and vibrational stimuli. Due to an objective deficit in auditory information, the individual anticipatory mechanism is forced to rely entirely on visual markers. Under war conditions, this provokes persistent hypersensitivity to abrupt light signals, flashes, and rapid movement across space.

2. Children with intellectual disabilities. Fears in this category of respondents exhibit a diffuse, totally unstructured character. Due to constraints in analytic-synthetic activity, the child is unable to clearly verbalize or specify the source of threat, which transforms anxiety into a chronic emotional baseline.

Empirical measurement of baseline emotional reactions demonstrated that the inability to mentally objectify safety leads to intensive somatic discharge of psycho-emotional tension through bodily pathways.

In 45% of respondents from the total sample of children with SEN, the emergence or significant exacerbation of neurotic tics (involuntary twitching of the eyelids, facial muscles, and shoulder girdle) was identified. Within the context of the predictive framework, this is interpreted as a direct consequence of the "blockage" of higher levels of anticipation: when the brain cannot construct a cognitive model of a

safe tomorrow, surplus uncertainty energy is transformed into a surrogate motor discharge of internal chaos.

Alongside tics, the profile of psychophysiological reactions revealed persistent sleep disturbances, food refusal, and manifestations of selective mutism (situational refusal to communicate verbally in stressful settings). All of these manifestations correlate directly with the deficiency of the psyche's forecasting functions.

An important outcome of the study was the critical analysis of the validity of conventional psychodiagnostic instruments under the crisis conditions of martial law. Analysis of empirical results from the practical administration of the Hospital Anxiety and Depression Scale (HADS) demonstrated that in 65% of cases, the obtained data failed to reflect the genuine emotional state of children with SEN. This is attributable to the following factors:

- high cognitive complexity of item phrasing for children with intellectual disabilities;
- neglect of the nosological specificity of threat perception (e.g., the unique fear profiles of children with hearing impairments);
- the scale captures only a static, cross-sectional snapshot of symptomatology, completely overlooking the dynamics of anticipatory processes that constitute the root cause of fear.

This fully corroborates the thesis regarding the necessity of a complete transition to trauma-informed, visualized, and dynamic screening methods (such as the "Map of Fears") when working with vulnerable pediatric populations during wartime.

To rehabilitate disrupted predictive connections and alleviate fear levels, a "digital stabilization" model was piloted. The testing of interactive gaming technologies demonstrated stable positive dynamics in 40% of respondents following the very first cycle of sessions.

The therapeutic and corrective effect of the model is achieved through distinct mechanisms integrated across three stabilization tiers: technological (gaming algorithms), communicative (barrier-free environment), and socio-psychological (family loop).

- *Technological Tier*: The psychological mechanism of influence is structured digital play acting as a safe training ground for anticipation. A strictly organized algorithm provides repeated execution of actions yielding predictable, guaranteed outcomes. In this way, anxiety caused by the unpredictability and chaos of real wartime events is reduced, and the child regains a sense of control.
- *Communicative Tier*: Utilizes sign language digital models and adapted visual schedules to eliminate information deficits. The child receives comprehensible safety markers in their native communication modality, which provides cognitive material for constructing adequate future forecasts.
- *Socio-Psychological Tier*: Provided through structured parental engagement and remote counseling aimed at enhancing adult emotional stability. As a result, a stable family environment serves as an "external loop" of anticipation, assisting the child in structuring the temporal perspective of their life.

Thus, the research findings demonstrate that the effective mitigation of childhood fears during wartime is achieved not through episodic affective suppression, but through the systematic restoration of the brain's predictive capacity by cultivating a predictable, trauma-sensitive landscape.

Conclusions. Within the scope of the study, the destructive psychological mechanisms underlying the interrelation between the level of anticipatory capacity deformation and the structure of fears in children with special educational needs (SEN) under martial law have been theoretically substantiated and empirically identified:

1. Anticipatory impairments as an anxiety trigger. Extreme stress conditions of wartime disrupt the temporal organization of the child's psychic being, precipitating a breakdown in the ability to objectify a safe future. Blockage of higher-order predictive levels causes regression to paralogical anticipation, wherein uncertainty is displaced by chronic irrational fears.

2. Nosological specificity of the fear architecture. The application of the projective "Map of Fears" technique demonstrated a qualitative differentiation of emotional responses: children with hearing impairments exhibit predominant perceptual-visual and vibrational hypersensitivity (due to compensatory reliance on

intact analyzers), whereas in children with intellectual disabilities, fears bear a diffuse character accompanied by high levels of somatization (neurotic motor tics in 45% of respondents, sleep disorders, situational selective mutism).

3. Invalidity of static screening. Critical analysis of the practical application of the Hospital Anxiety and Depression Scale (HADS) confirmed its limited diagnostic validity (up to 65% non-correspondence) for children with SEN in crisis conditions, stemming from excessive cognitive complexity and the disregard of dynamic predictive psychic mechanisms.

4. Digital stabilization model. Restoration of psycho-emotional stability (positive dynamics observed in 40% of children following the initial cycle) is attained via a three-component stabilization model: a technological loop (gamified training in action predictability), a communicative loop (a barrier-free sign language environment as conceptualized by S. Kulbida), and a socio-psychological loop (family support serving as an external anticipatory anchor).

Prospects for further research lie in the design and standardization of automated information-diagnostic systems for real-time monitoring of the emotional state of children with SEN, alongside the creation of adaptive digital environments for the individualized remediation of predictive impairments across wartime and post-war periods.

Funding. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Declaration of Generative AI. The author states that no generative artificial intelligence or AI-assisted technologies were employed during the preparation of this work.

Conflict of Interest. The author declares that there is no conflict of interest regarding the publication of this manuscript.

Data Availability Statement. All data supporting the findings and conclusions of this study are fully included within the manuscript.

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Матеріал надійшов до редакції 1.09.2026

Прорецензовано 15.09.26

Схвалено до друку 5.10.2026

УДК 376.1-056.263:159.922.76

Оксана Круглик,

кандидат педагогічних наук, доцент,

завідувач кафедри сурдопедагогіки та

сурдопсихології імені Миколи Ярмаченка

E-mail: o.p.kruhlyk@udu.edu.ua

[ORCID ID://orcid.org/0000-0002-9632-6579](https://orcid.org/0000-0002-9632-6579)

Researcher ID: AHB-3377-2022

Oksana Kruhlyk,

PhD in Education Sciences, Associate Professor,

Head of the Mykola Yarmachenko

Department of Special Education and