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Personality sensory restructuring of forced migrants: Neuropsychology and psychotherapy of adaptation

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Abstract. The aim of the article was to examine the features of sensory adaptation in forcibly displaced Ukrainians, drawing on data from neuropsychology and psychotherapeutic practice. The study employed critical analysis to compare group outcomes with published evidence, psychoeducational and stabilization techniques during meetings with respondents, analytical observation and systematization methods to describe participants' reactions and changes, as well as Hedges' g calculations to assess effect sizes. At the initial stage of therapeutic work, respondents demonstrated impairments in predictive brain mechanisms, including decreased concentration, intensified shame associated with reduced personal autonomy, diminished cognitive flexibility and episodic memory, and a tendency toward isolation. A review of the literature indicated that the most effective approach for restoring these mechanisms is the multimodal stimulation framework, integrating visual, auditory, and tactile inputs. Observations revealed that approximately 70% of participants, before therapy, and about 25% afterward, exhibited elevated spatial–cognitive dissociation, indicating an initial disruption in the accurate processing of sensory signals. Among temporarily displaced individuals, muted or absent dreaming reflected a reduction in one of the key neuropsychological mechanisms for processing adverse experiences. Lateral neurophysiological differences between the mother's and adolescent child's brain functioning, under conditions of maternal anxiety, may contribute to the development of OCD-like symptoms in the child. Overall, the sensory adaptation of displaced individuals shows notable parallels with early developmental processes during the first 3–24 months of life, underscoring the depth and complexity of this reorganization. The practical significance of the findings lies in providing a foundation for developing sensory-informed therapeutic strategies and psychosocial support protocols for Ukrainian displaced persons

Keywords: dissociation; thalamocortical pathways; neuroplasticity; traumatic experience; psychosomatics; sensory integration

Introduction

Forced population displacement caused by the war in Ukraine generated unprecedented challenges for understanding the psychological (emotional adaptation, socialisation, stress resilience, etc.) and neuropsychological (cognitive regulation, sensory adaptation, etc.) processes of adaptation among internally displaced persons and refugees. Unpredictable migration created extremely complex conditions for the psyche and intensified sensory prediction errors. The discrepancy between expected and actual sensory or cognitive outcomes constituted a key element of adaptive processes, the formation of new behavioural patterns, and emotional regulation.

Sensory reorganisation of the personality reflected a process of altered human responses to the surrounding environment. Among emerging challenges, when the sensory system functioned as the primary "detector" of a new reality, the subsequent stage involved a turn towards the theoretical foundations of neuropsychological adaptation. Based on knowledge of neurophysiological mechanisms, the first link of the adaptive chain -sensory recalibration -was examined by A.E. Dogan *et al.* (2025). At the intersection of the thalamus and the primary sensory cortex, a new sensory grid began to emerge, capable of "learning" to perceive an unfamiliar environment as its own. Sensory systems

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responsible for receiving, processing, and sorting incoming signals – visual, auditory, tactile, olfactory, and thermal -under conditions of altered sensory fields (new country, language, urban rhythm, etc.) encountered the necessity of reappropriating space. The process of sensory recalibration was analysed by O.O. Borysova (2024) from the perspective of changes in sensory information processing through the inclusion of new connections between the thalamus, the primary sensory cortex, and the prefrontal network. The thalamus, as the central sensory "filter", transmitted information to the cortex via thalamocortical pathways, which updated the sensory grid within human consciousness.

Polish studies of acute stress disorder (ASD) among refugees recorded exceptionally high levels of traumatisation, affecting not only emotional and cognitive mechanisms but also sensory adaptive processes. The study by P. Kordele *et al.* (2024) identified 93.5% probable cases of ASD among Ukrainians, with decisive factors being not physical displacement itself but exposure to attacks, lack of resources, and feelings of loneliness in host countries. These conditions generated a state of disconnection between internal bodily sensations and the external environment, increasing sensory disintegration and reinforcing a phenomenon in which the body became "anchored" in a new space while mental processes remained connected to Ukraine. The high prevalence of ASD, combined with a fragmented bodily-sensory focus, formed a foundation for subsequent manifestations of dissociation and somatisation, confirming the necessity for programmes of sensory reconfiguration and early psychological support. Data reported by N. Khailenko & A.M. Bacon (2024) demonstrated that unique coping strategies mediated the relationship between reduced resilience and intense post-traumatic symptoms among Ukrainian refugee women and internally displaced persons, forming a model of detached–dissociative response, in which the psyche reduced contact with internal signals, and the sensory system lost integration with contextual reality. This mechanism closely corresponded to the phenomenon "the body is here, the thoughts are in Ukraine", and reinforced the assumption that dissociative adaptive strategies developed as a lower-level response, when resilience was depleted or inaccessible.

The study by A. Yefimova (2025) established that social and economic integration gradually increased; however, clinically significant emotional distress persisted among displaced persons several months after migration. These findings indicated that integration did not guarantee automatic psychological recovery and required long-term support. Similar results were obtained in the study by V. Abdullayeva (2025), which revealed that later waves of arriving refugees reported poorer overall health, but slightly lower levels of psychological distress compared to those who arrived earlier. Acute stress reactions immediately following traumatic events, were associated with activation of the hypothalamic–pituitary–adrenal axis, which affected emotional dysregulation. Additionally, Y. Slipetska & S. Bula (2025) identified the influence of cultural and linguistic barriers on integration processes, and demonstrated that adaptive strategies depended on environmental characteristics and the availability of psychological services. These findings emphasised the necessity of a culturally sensitive approach in psychosocial support.

While examining interoception and predictive coding as fundamental mechanisms of adaptation, the study by G. Taskasaplidis *et al.* (2024) indicated that the accuracy of perceiving internal bodily signals influenced an individual's capacity for emotional regulation and stress coping. The authors demonstrated that reduced interoceptive accuracy was associated with increased severity of trauma-related symptoms and the development of psychosomatic disorders. Researchers A.M. Pinto *et al.* (2023) described that a prediction error emerged, when an expected sensory signal failed to correspond to the actual input. In a novel sensory environment, prediction errors led to experiential fragmentation, loss of perceptual coherence, and states of depersonalisation. Taken together, these findings explained why displaced persons experienced disruption of the "self–body" connection and difficulties in adaptation.

Subsequent studies elucidated specific neural mechanisms underlying these processes. S. Furutachi *et al.* (2024) described the role of thalamocortical loops in tracking unexpected sensory signals and updating neural predictions. The reported results explained that prediction errors were formed within radically altered sensory environments, through comparison of predicted signals with those exerting direct impact. These conclusions were complemented by findings from C.Y. Fong *et al.* (2020), who demonstrated that sensory disturbances could arise at the subcortical level, prior to the involvement of higher cognitive structures. The thalamus was therefore conceptualised not merely as a sensory "relay", but as a central element in perceptual recalibration and the formation of top–down control. Only a limited number of studies directly measured neurophysiological markers of sensory adaptation among displaced persons from Ukraine. Nevertheless, these investigations provided the foundation for the development of an integrative model of sensory adaptation. Within this model, the sensory system was conceptualised as the primary "detector" of a new reality, initiating recalibration processes via thalamocortical pathways. The aim of the present study was to investigate the neuropsychological mechanisms of sensory adaptation in forcibly displaced individuals who encountered a new environment as a result of the war in Ukraine.

Materials and Methods

The implementation of the study was made possible through four main stages, which were based on analysis

of adaptation characteristics observed among participants in therapeutic groups within a new environment, as well as critical examination of published research in this field in order to validate the obtained findings. The study was conducted with the involvement of Ukrainian displaced persons who were forced to migrate to Germany following the onset of the full-scale Russian invasion. Two therapeutic groups were included, consisting of 10 participants (Group 1) and 12 participants (Group 2). Group members originated from Mariupol, Mykolaiv, Kherson, Zaporizhzhia, Kharkiv, Odesa, Kyiv, and other affected regions of Eastern and Southern Ukraine. Group psychotherapeutic work was initiated in Germany in March 2022. The participant sample was recruited via social media platforms (Facebook, Instagram), which facilitated the inclusion of Ukrainian displaced persons interested in receiving psychological support.

The groups were conducted exclusively in a face-to-face format. During the first three months, therapy in each group was held twice a week. The groups functioned as a space of safety, in which participants were able to share their personal histories, experiences of displacement, living under conditions of war, and their earliest memories of the first day of active hostilities. The work with the sensory re-formatting groups was carried out under conditions of regular supervision within a supervisory group led by Professor Oleksandr Filts, of which the author has been a member for over 15 years. This supervisory format ensured methodological coherence, adherence to ethical standards, and the quality of therapeutic interventions in group work. After the initial three-month period, a proportion of participants (approximately 40%) returned to Ukraine or relocated to other EU countries. Consequently, the groups continued their work with 6 and 7 participants respectively, meeting once a week. In this format, the groups remained active for a period of one and a half years. Over this time, a stable group structure emerged – described by the participants themselves as a kind of "circle". The group functioned as a supportive psychotherapeutic setting, integrating elements of stabilisation, self-reflection, and bodily reintegration. The overall study period extended from March 2022 to September 2024.

The content of the meetings was psychoeducational and stabilising in nature. The psychoeducational approach involved a detailed explanation of the characteristics of stress and anxiety. Particular attention was paid to the identification of emotions that could arise under stress and cause discomfort. The stabilising focus of the therapeutic meetings was directed towards reducing emotional tension and improving participants' condition through psychological practices. Each session included a brief sharing circle, followed by sensory exercises aimed at restoring connection with the body: breathing techniques, physical exercises, tapping, and short elements of group Eye Movement Desensitisation and Reprocessing (EMDR) and brainspotting. The primary therapeutic objective was associated with a reduction in internal tension, restoration of bodily sensitivity, normalisation of breathing, and improvement of sleep. Observation of the process was conducted in the form of a qualitative description of participants' reactions and changes. The data were not statistical in nature; instead, the analysis was carried out according to the principle of thematic generalisation, whereby recurring themes of bodily, emotional, and behavioural change were identified. This included an analytical assessment of the main predictive mechanisms that had been disrupted, as well as the characteristics of dissociation in respondents, which was substantiated in the article on the basis of published scientific studies, in order to compare the obtained conclusions.

The first stage of the study was aimed at identifying the most common disruptions of predictive mechanisms and brain functions among the respondents. The final results were obtained through systematisation of information collected from respondents during therapeutic sessions, with reference to their initial psychological state. The second stage of the study involved a comparison of existing published approaches aimed at improving predictive processes and brain functions. To substantiate the significance of the most widespread theories, a Likert scale from 1 to 10 was used. The application of the Likert scale to assess the significance of scientific theories included an analysis of the validity of the stated theories and their practical applicability in therapeutic consultations. The significance score primarily reflected the practical aspect, whereas the relevance of scientific conclusions reflected the theoretical aspect. The comparison of the significance of studies with their relevance (level of dissemination of scientific theories, number of citations) was achieved using Hedges' coefficient. The calculation of the coefficient involved determining the magnitude of the effect between two indicators. If the calculated value did not exceed 0.2, a negligible effect was observed. When values exceeded 0.8, the obtained indicators demonstrated a substantial difference (Buck *et al.*, 2022):

$$g = \frac{M_1 - M_2}{SD} \times J, \quad (1)$$

where M_1 and M_2 – represented mean values; SD – represented the pooled standard deviation; J – represented the correction coefficient used to eliminate effect size inflation. The third stage included an assessment of the level of somatosensory and emotional dissociation in respondents and changes in characteristic features over time (during the first three months of therapy and after completion). The ratio of high levels of sensory and emotional dissociation among respondents was identified using the observation method. Data systematisation included analysis of tone of voice, speech tempo, and facial expressions, which made it possible to form

descriptive results. The fourth stage of the study was aimed at determining the adaptive capacities of forcibly displaced persons in a new environment. Issues related to the similarity between personal adaptation in a new space and child developmental processes between 3 and 24 months were considered, which involved the use of methods of analysis and comparison of literary sources.

The selection of literature for analysis within the study was associated with an orientation towards interdisciplinary sources, including neuropsychological, social, and psychotherapeutic perspectives. To ensure a thorough analysis and to substantiate the results obtained from participants in the therapeutic groups, the literature was selected on the basis of its relevance, primarily within the last five years. Consideration was given to the credibility of sources and their correspondence to the research topic; therefore, attention was paid to the scientometric indicators of journals and the substantiation of materials in each source. The analysed sources formed the basis for understanding the features of sensory and emotional transformation of respondents under the influence of stressful situations, which informed the analytical substantiation of the presented results. Particular attention was paid to literature sources characterised by a logical structure of presentation and consistency of results. Group work was conducted in compliance with ethical principles of confidentiality, voluntariness, and psychological safety. The involvement of participants in the therapeutic group was carried out in accordance with the norms of the Declaration of Helsinki (WMA..., 2024). All participants sought assistance independently, expressed verbal consent to participate, and were aware of the purpose of participation. Names were not recorded, and all case descriptions were presented in anonymised form. The study did not require separate approval by an ethics committee, as it was conducted in the format of psychological support without the collection of personal data or the use of testing procedures. Only general characteristics common to all participants in the therapeutic group were presented in the study, which was discussed with them prior to the commencement of therapy. At the same time, the right of each participant to withdraw from participation at any moment, without any consequences was ensured.

Results and Discussion

Assessment of the impact of stress factors on brain activity during forced migration

Stress factors caused by forced migration during the war exerted an adverse impact on individual psychological stability, as they led to profound lifestyle changes, disruption of established social ties, and negatively affected predictive mechanisms and brain functions. These alterations were reflected in behavioural patterns, motor coordination, and diminished capacity to anticipate subsequent actions. During interaction with the therapeutic groups, disruptions of predictive mechanisms and overall brain functioning were identified in all participants at the initial stage of therapy (Fig. 1).

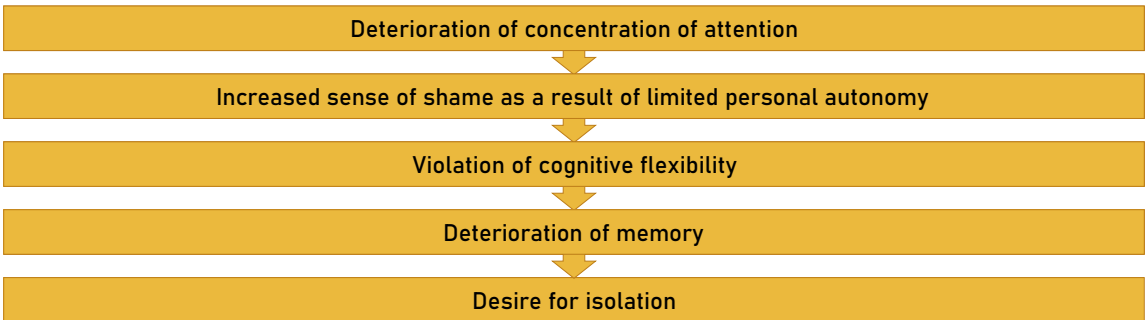

Figure 1. Variability of disruptions in predictive mechanisms and brain functions among participants of the therapeutic groups

Source: developed by the author based on interaction with participants of the therapeutic groups

Initial analysis of the psychological state of the therapeutic group participants revealed the presence of disrupted predictive mechanisms and brain functions. Impaired attentional concentration manifested as an inability to focus on specific details, excessive verbosity, or abrupt withdrawal. Memory deterioration was observed, reflected in inaccurate recall of routes and other task-related information, which was associated with reduced brain neuroplasticity. Impairment of cognitive flexibility was evident in difficulties switching attention from one task to another, affecting activity organisation and problem-solving strategies. These disrupted predictive mechanisms were associated with sensory unpredictability. This condition was reflected in reduced activity of the prefrontal cortex, manifesting as apathy, procrastination, and loss of goal orientation. Under normative conditions, the prefrontal cortex is responsible for planning, cognitive flexibility, impulse control, emotional regulation, and the ability to construct a future-oriented model. In states of forced displacement, particularly following prolonged exposure to stress and trauma, reduced

vagal nerve activity was frequently observed, leading to disturbances in cardiac rhythm, interoception, affective regulation, and capacity for social engagement. This condition may have contributed to dissociation, specifically a disconnection between body and consciousness, as well as chronic somatic tension. The vagus nerve, as a key structure of the parasympathetic nervous system, played a critical role in sensory regulation, stress adaptation, and restoration of the bodily self (Gidron *et al.*, 2025).

A pronounced factor among respondents was heightened shame, resulting from restricted personal autonomy and manifested through dependence on external evaluation. Shame appeared as increased reliance on others' opinions, which intensified vulnerability and maintained a sense of internal non-autonomy. Attentional focus on negative consequences contributed to denial of positive aspects. The tendency towards isolation was associated with a need for psychological safety and a sense of social exhaustion. Loss of habitual social connections was reflected in decreased self-esteem, loneliness, and reduced readiness for integration into a new environment and culture. As a result of persistent sensory discrepancies and unintegrated prediction errors, a split emerged between the personality before and after trauma. Life experience was characterised by loss of coherence, including loss of the past and disruption of temporal continuity. Under dissociative conditions, particularly in contexts of sensory overload, affective regulation deteriorated, manifesting as emotional instability. As demonstrated in the study by E. Ozturk (2024), Ukrainian displaced persons in European countries exhibited elevated levels of anxiety, dissociation, and somatic detachment, especially in the absence of social rootedness. Chronic dissociation was associated with reduced hippocampal volume and disrupted connectivity between the insula and the prefrontal cortex, which impeded deep self-perception (Schurz *et al.*, 2024). Stress factors during forced displacement were reflected in a rupture between the expected and the actual, thereby undermining the fundamental capacity of the psyche to think and experience coherently. A phenomenon described as spatial–cognitive dissociation was also observed, in which the body attempted to adapt to the new environment, while thoughts, internal language, and emotional imagery remained anchored to Ukraine. This condition was characterised by partial presence in the current physical space, alongside simultaneous mental presence in the country of origin, creating an impression of dual localisation. Such a state may be interpreted through the framework of predictive coding, according to which the brain continuously generated hypotheses about future signals and compared them with actual sensory input (Sprevak, 2024). Sensory stimuli that did not correspond to expectations activated prediction errors, which, in the absence of adequate psychological processing, failed to integrate into experience and instead transformed into somatic symptomatology, including pain, insomnia, cranial pressure, hyperventilation, and emotional confusion. To identify possibilities for improving predictive mechanisms and brain functions, existing research in this domain was analysed. Based on this analysis, the most methodologically sound approaches for conducting consultations within therapeutic groups were identified (Table 1).

Table 1. Comparison of the significance of results from existing studies for improving predictive mechanisms and brain functions

Researched sources	Significant value	Relevance of scientific conclusions	Hedges coefficient
M.L. Neel *et al.* (2025)	9	10	0.150
V. DeLuca *et al.* (2024)	6	8	0.304
M.T.R. van Kesteren *et al.* (2020)	5	7	0.316
G. Lai & B.A. O'Brien (2020); F. Carter *et al.* (2023);	8	9	0.153
T. Singer (2025)	7	9	0.297

Source: developed by the author based on research findings

From a practical perspective, several interventions were indicated as facilitating this process. In a study employing hyperscanning, M.L. Neel *et al.* (2025) demonstrated that gradual integration of visual, auditory, and tactile stimuli during joint activity created a rhythmic framework for aligning new signals with prior experience. These findings formed the basis of multimodal training approaches, which incorporated simple movements accompanied by music, balance exercises, and combinations of vocal commands with motor responses, to integrate sensory channels. Attention was also directed towards integrative reconfiguration (bilingual experience), which was examined in another group of studies (Lai & O'Brien, 2020; Carter *et al.*, 2023). These authors demonstrated that multilingualism altered cognition through adaptation of attentional systems, rendering them more efficient. Specific aspects of linguistic experience differentially overlapped with neural control circuits, which was directly reflected in behavioural monitoring indicators. This model ensured that the previous cognitive schema (native language, habitual rhythms) was gradually aligned with new sensory

demands (another language, new rhythms), with control systems functioning as a "bridge" for integrating past and newly acquired skills.

Taken together, these results converged on a single conclusion: integration of prior and novel experience was achieved through a neurophysiologically coherent process. Schemas within the neocortex provided a hypothesis space for new experience, while the hippocampus and associated networks supported binding, transfer during sleep, and transformation. Concurrently, white matter changes via myelination rendered newly formed pathways faster and more synchronised. In adulthood, particularly under migration conditions, this process manifested as gradual adjustment of pre-existing cognitive strategies to new sensory statistics, wherein attentional networks served as the "bridge" and stability ensured long-term structural–functional plasticity (Singer, 2025). Consequently, systematic training of sensory attentiveness contributed to reduced anxiety levels and improved integration of bodily signals. This approach was applied in work with displaced persons to restore the connection between body and psyche following trauma. To improve predictive mechanisms and brain functions among displaced persons, the study by H.J. Lee *et al.* (2025) indicated that attention needed to be directed towards modification of individuals' internal attitudes. Therapeutic consultations were required to focus on examination of somatic reactions elicited by personal experience, rather than solely on external stressors. The analysis conducted by M. Ajith *et al.* (2025) demonstrated that therapeutic emphasis on visualisation elements facilitated qualitative processing of conditional information. Models constructed through visualisation influenced more efficient perception of multilevel interactions between cognitive activity and neural connectivity. Agreement with the outcomes of the published studies was supported; however, therapeutic consultations required stronger orientation towards the specific needs of displaced persons, ensuring integration of auditory, visual, and tactile components. Application of integrative reconfiguration approaches facilitated qualitative alignment of previous and new sensory conditions (language, culture, etc.).

Research by V. DeLuca *et al.* (2024) confirmed that specific aspects of linguistic experience directly reconfigured neural circuits of control and attention, supporting integration of new perceptual models. Simultaneous use of multiple languages facilitated cognitive and neural adaptation, which was associated with changes in grey matter volume within specific brain regions. During periods of sustained bilingual interaction, alterations in white matter were also observed. M.T.R. van Kesteren *et al.* (2020) emphasised the importance of dual coding, whereby new knowledge was presented in association with existing representations, activating prefrontal integrative mechanisms. Material congruent with existing schemas was better retained; however, incongruent content occasionally demonstrated an advantage due to novelty mechanisms. Integration in such cases occurred through reactivation of prior representations during new learning, accelerating the "binding" of new information to existing structures. Memory consolidation and transformation – the gradual transfer of memory traces from the hippocampus to neocortical systems – enabled memory systems to reconfigure prior models in response to new environmental demands, through repeated reactivation during sleep and wakefulness.

Assessment of sensory adaptation impairment in forcibly displaced persons

The process of individual adaptation to a new environment under stress conditions was reflected in elevated levels of somatosensory and emotional dissociation. During the study, the ratio of severity levels of emotional and somatosensory dissociation was compared. Results were analysed in relation to the first three months of therapy and at the final stage of intervention (Table 2).

Table 2. Severity of sensory and emotional dissociation among respondents

Type of dissociation	Proportion among respondents, %	Characteristics of manifestation
During the first three months of therapy		
Somatosensory dissociation	30	Absence of typical pain sensitivity Disturbance of bodily perception Reproduction of auditory and visual imagery beyond the boundaries of objective reality Sleep disturbances Minimal frequency of dreams
Emotional dissociation	70	Intensification of emotional reactions within imagined experience Mood fluctuations without an identifiable cause Detachment of thoughts from the physical space occupied by the body Increased internal competition Predominant processing of information detached from actual environmental context, with cognitive functioning within an imagined world model Manifestation of envy as an outlet for aggressive emotional states

Table 2. Continued

Type of dissociation	Proportion among respondents, %	Characteristics of manifestation
After completion of therapy		
Somatosensory dissociation	15	Development of the ability to focus on sensory experiences Restoration of bodily self-perception Improvement of spatial orientation
Emotional dissociation	25	Increase in instrumental–consumer-oriented interaction patterns as a transformation of interpersonal engagement processes Activation of a new functional system based on an established baseline level Formation of a sense of safety Development of new pathways, activation of capacities, and exploration of new directions of activity

Note: * two types of dissociation could be observed in a single respondent
Source: developed by the author based on interaction with participants of the therapeutic groups

The ratio of different types of pronounced dissociation among respondents, before and after therapy, indicated a predominant increase in emotional dissociation at the initial stage of intervention. Dissociation manifested primarily as an immediate response to traumatic stress, particularly to experiences of occupation, destruction of housing, and loss of physical contact with close relatives. A representative example was provided by the account of a woman who left Mariupol after one month under occupation. Prior to the war, she reported arterial hypertension, back pain, and sleep disturbances. Following evacuation, these symptoms completely disappeared. However, this absence of symptoms did not indicate recovery. The respondent reported a complete loss of bodily sensation and an inability to determine the presence of pain or changes in blood pressure. This presentation indicated profound bodily dissociation, specifically disengagement of interoceptive monitoring mechanisms, which is characteristic of post-traumatic conditions. Somatosensory dissociation among respondents manifested as absence of bodily perception, leading to disruption of sensory channels and loss of integrative bodily awareness, and was associated with reduced activity of the sensorimotor cortex.

Concurrently, hyperactivation of the amygdala was observed, which contributed to diminished perception based on incoming stress-related stimuli. The impact of stress was reflected in sensory malfunction, as the sensory system remained in a state of socio-psychological isolation. The positive effect of therapy was manifested through the formation of new neural connections, associated with continuous processing of stress factors and gradual orientation of respondents towards a new reality. During the first three months, group participants particularly experienced detachment of thoughts from the physical space occupied by the body; cognitive presence remained in Ukraine, despite physical residence in a safe environment. This process was conditioned by insufficient formation of cortical integrative pathways, persistent recall of prior life circumstances, and dissociation between bodily presence and cognitive activity. This feature functioned as a protective psychic reaction, which contributed to difficulties in processing traumatic experience. Persistence of previous internal bonds prevented the formation of new adaptive connections. Among respondents, this condition manifested as a pervasive sense of emptiness. Such a state emerged from imbalance in neurotransmitter systems and hippocampal functioning, associated with imprecise encoding of emotional memories and processing of stressful situations without affective involvement.

At the onset of group work, a marked and atypical reduction in dream frequency was observed. One of the distinctive features of sensory reorganisation during forced migration appeared to be the phenomenon of undreamt dreams. Only minimal periodicity of complex dreams was observed, which was associated with emotional processing and construction of corresponding cognitive models. Consideration of undreamt dreams was of substantial importance for understanding the specificity of psychological transformation among forcibly displaced persons; therefore, theoretical substantiation was provided. Such dreams were conceptualised not merely as imaginary fragments, but as a profound mechanism of psychic processing of experience. Blocking of mental space occurred through overload, shock, or depressive states, which resulted in inhibition of experiential processing. This interpretation was consistent with the conceptual framework proposed by T.H. Ogden (2022). By integrating Ogden's (2022) concept of undreamt dreams and thinking space with contemporary neurobiology, the mechanism of somatisation could be explained as a consequence of interrupted psychic processing of experience. Displaced persons frequently lacked the capacity to safely think or dream their experiences; consequently, the body began to express these experiences through somatic symptoms. This condition was characterised as neuropsychological dissociation, wherein bodily symptoms reflected internal psychic processes. Under conditions of disrupted REM sleep, the brain became over-trained, rigid, and incapable of generalisation (Bothe *et al.*, 2025). The capacity to update

internal models was reduced, resulting in automatic reactivity. Among group participants, this manifested as somatic fatigue, heightened anxiety, and emotional exhaustion, even when external circumstances appeared stable.

Women frequently lacked the capacity to safely conceptualise their lived experience; therefore, sensory adaptation involved not only socialisation but also restoration of the capacity for thinking and dreaming. According to a survey conducted by the Ukrainian Union of Psychotherapists in 2024, psychologists who were forced to leave the country as a result of the war demonstrated a significantly higher level of somatic complaints, compared with specialists who remained in Ukraine (Ukrainian Union of Psychotherapists, n.d.). The body of research indicated that adaptation to new sensory conditions represented a prolonged, multilevel process. Initially, the brain stabilised basic sensory networks through the combination of familiar and novel stimuli; subsequently, "bridging" strategies were formed with the involvement of the prefrontal cortex and control networks. Only at a later stage did an integrated cognitive model emerge, enabling effective functioning within a new environment. The application of targeted training in memory, attention, and sensory integration not only accelerated this process but also reduced cognitive load, facilitating integration of prior experience with the strategic demands of a new life context. Understanding disruptions of predictive systems in displaced persons was not only theoretically significant but also critically important for the development of psychological support programmes. Sensory adaptation, stabilisation of interoceptive signals, and restoration of cognitive flexibility constituted the foundation of psychological recovery.

In the study by P. Długosz (2023), a high prevalence of probable post-traumatic stress disorder among Ukrainian refugees was associated with intolerance of uncertainty and loss of perceived control, which created conditions for sensory dissociation between bodily and cognitive presence. These factors impeded synchronisation of attention with bodily signals, maintaining a state in which cognitive activity remained embedded within the Ukrainian context, while the body adapted to a different environment. V. Romoli *et al.* (2022) reported that social instability, cultural barriers, and isolation exerted a significant influence on the psychological state of forcibly displaced migrants. These factors contributed to elevated anxiety and depressive symptoms, the mitigation of which was associated with support within a new community and the experience of safety. Difficulties of adaptation within a new sensory environment were associated with mismatch between expected and actual sensory signals, resulting in loss of perceptual coherence. To assess psychological adaptation in forcibly displaced persons, N.O. Maruta *et al.* (2024) applied clinical-psychopathological and psychodiagnostic methods. The results demonstrated that the most pronounced mental health disturbances included asthenic, agrypnic, somatovegetative, and anxiety-depressive syndromes. The dynamics of these experiences, reported in published studies, were consistent with the findings of the present investigation. However, the present study focused on identifying a constellation of disrupted predictive mechanisms, associated with impaired attentional concentration, heightened shame, reduced cognitive flexibility, memory deterioration, and a tendency towards isolation. The study by O. Lushchak *et al.* (2024) examined features of sensory reorganisation among displaced persons under adverse conditions caused by the war in Ukraine. Among 1,000 forcibly displaced individuals, moderate to high stress levels were observed in 15.5%, anxiety in 19%, and post-traumatic stress disorder in 39.4%. Lower stress levels were identified among individuals residing within national communities. These stress-related manifestations were associated with psychological distress, post-traumatic factors, coping demands, and resilience processes (Ellis *et al.*, 2024). Findings reported by E. Ellis *et al.* (2024) indicated that women demonstrated poorer psychological well-being compared with men.

Features of individual traits of cerebral lateralisation in forcibly displaced persons and characteristics of personality adaptation in comparison with child development

Following examination of general and autonomic mechanisms of personality adaptation, observational analysis of individual adaptive traits was conducted, with particular attention to cerebral lateralisation and interaction within the mother–child dyad. Characteristics of interaction between the left and right cerebral hemispheres, which supported adaptation to a new environment, were presented in Figure 2. Analysis of human adaptation processes to a new environment established that the left and right cerebral hemispheres were responsible for distinct adaptive functions related to individual personality characteristics. Neuroimaging studies demonstrated that the right cerebral hemisphere assumed a leading role in detecting sensory disturbances, particularly in situations where incoming stimuli did not correspond to expected patterns (Thome *et al.*, 2022). These responses were directly associated with the mechanism of sensory prediction error, in which the right hemisphere performed a comparative function between current stimuli and prior experience. In individuals with right-hand dominance, a tendency towards rapid suppression of sensory signals during repeated stimulation was observed, which was corroborated by findings from the therapeutic groups. In such cases, the left hemisphere exhibited a tendency towards forming new cognitive templates, while the right hemisphere functioned as a novelty

scanner. This interaction resulted in sensory overload under conditions of excessive or unpredictable stimulation, indicating a rapid, but potentially vulnerable, form of adaptation to change. In left-handed individuals (with dominant right-hemisphere processing), cognitive templates were formed more slowly, but demonstrated greater resistance to environmental influence. Activation of both hemispheres during processing of novel sensory stimuli created a more flexible adaptive system, with reduced impulsivity in response to change, although stabilisation processes occurred more gradually (Kearney & Lanius, 2022). Results from prior studies confirmed that cerebral lateralisation played a significant role in understanding sensory adaptation across different population groups. A. Skinner (2025) emphasised that in right-handed individuals, network interactions were more localised and clearly structured, whereas left-handed individuals demonstrated broader bilateral hemispheric engagement, resulting in a more balanced signal-processing system.

Socio-Psychological factors	Interaction with the individual	Individual resources	Adaptive outcome
• family environment • educational context • social expectations • digital environment • social instability	• subjective perception of demands • available adaptive resources • level of social support	• self-regulation • response styles • coping strategies	• psychological adaptation • strained adaptation • psychological maladaptation

Figure 2. Characteristics of cerebral lateralisation associated with processes of personality adaptation
Source: developed by the author based on studies by J. Thome *et al.* (2022), N. Ilyina (2024), M. Schurz *et al.* (2024), U.S. Akmalovna (2025), A. Skinner (2025)

According to the study by S. Grygorieva (2021), differences were identified in thalamic hemispheric dominance between mothers and their adolescent children. Distinct modes of sensory information processing and sensory system functioning within the dyad formed different cognitive styles in mothers and their adolescent children. Specifically, when the mother demonstrated left-hemisphere dominance, predominantly responsible for analytical and structured information processing, the child exhibited right-hemisphere dominance, associated with holistic, emotional, and spatial perception and integration of novel sensory input. This functional asymmetry was considered evolutionarily adaptive for maintaining dyadic balance; however, it assumed critical significance under conditions of adaptation to new environments, particularly in the context of forced migration. Clinical observations obtained during psychological consultations with families of Ukrainian forcibly displaced persons indicated that adolescents frequently became carriers of their mothers' sensory and emotional experiences while failing to activate their own adaptive systems (Grygorieva, 2021). This dynamic inhibited natural adaptive mechanisms in the child that could otherwise have facilitated greater openness to novel sensory and social environments.

Mothers with differing neuropsychological functioning patterns unconsciously transmitted their adaptive styles, which were grounded in more rigid cognitive schemas. Consideration of lateralisation differences within the mother-child dyad substantially enhanced understanding of family dynamics and supported the development of more flexible adaptive models under new living conditions. A substantial portion of humanity's biological memory was represented as changes within predictive systems that determined future perception of the world by the individual. Thus, the brain not only stored representations, but also transformed experience into expectation parameters that shaped responses to new events. Decisions regarding memory consolidation and suppression directly influenced adaptive capacity, signal prediction, and behavioural regulation. In cases of depersonalisation, structural alterations were identified, including thickening of the premotor and medial prefrontal cortices, reduced grey matter volume in the caudate nucleus, thalamus, and occipital cortex, as well as white matter disruption in parietotemporal regions (Schurz *et al.*, 2024). Disruption of interoceptive predictions played a central role, whereby dominant visual or auditory expectations suppressed weaker bodily signals, leading to alienation from the body and emotions.

In the study by U.S. Akmalovna (2025), forced retraining of left-handed individuals to right-hand use induced structural changes in the pericentral cortex and basal ganglia. These findings were interpreted as manifestations of brain plasticity under external constraints and confirmed the capacity of the sensory system to reorganise in response to environmental change. Based on these data, it was assumed that, in the context of forced migration of Ukrainian displaced persons to European countries, right-handed and left-handed individuals demonstrated distinct sensory adaptation

strategies. As noted by A. Skinner (2025), clearer lateralisation in right-handed individuals enabled faster adjustment to repetitive novel stimuli, while simultaneously increasing vulnerability to sensory overload under chaotic or unpredictable conditions. The obtained results indicated that sensory adaptation in forcibly displaced persons depended on individual neuropsychological characteristics, particularly on cerebral lateralisation. However, as emphasised by the cited authors, further studies were required to directly examine the influence of these factors within migration contexts. Group experience accumulated over 1.5 years of work was compared with patterns of neurophysiological functioning. The results indicated that processing of novel sensory information possibly reflected a spiral model of personality development originating in early life. Consequently, individuals situated within a new environment appeared to re-experience developmental stages characteristic of childhood between 3 and 24 months of age (Fig. 3).

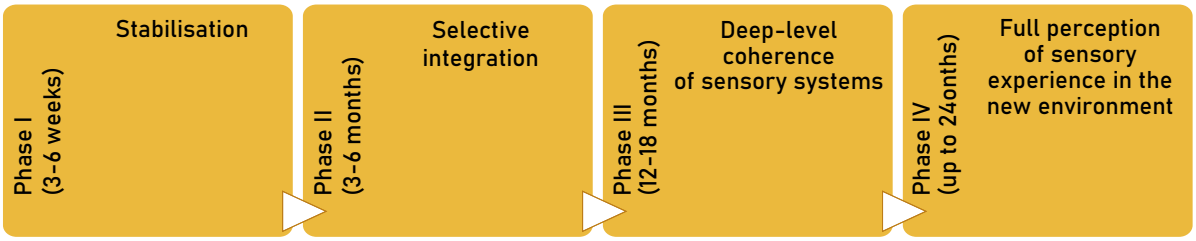

Figure 3. Stages of sensory system development in an alternative environment
Source: developed by the author based on data from I. Kostović (2024), V. Sydnor *et al.* (2025), W. Yin *et al.* (2025)

Psychotherapeutic observations indicated that within 1.5-2 years following displacement, many Ukrainian displaced persons exhibited elevated levels of somatisation and sensory disorientation. This period was characterised by sensations of bodily instability, altered sensory perception, fluctuations in anxiety levels, and sleep disturbances, which were associated with sensory reorganisation during which the nervous system gradually constructed a new environmental perceptual model. Adaptive processes in adults demonstrated significant similarities to those observed in children aged 3-24 months, a developmental period marked by maturation of thalamocortical connections, increased synaptic density, and integration of sensory experience. During this stage, infants learned to coordinate auditory, visual, and bodily signals, forming a stable sense of space and safety. In an analogous manner, the brain of a displaced person, upon entering a new sensory field, recalibrated to different sounds, rhythms, smells, and light conditions, effectively re-entering an early developmental phase. This process facilitated the formation of new neural connections and predictive schemas. This phenomenon was conceptualised as a second phase of sensory integration, in which the body and psyche jointly constructed a new map of reality aligned with a new location, climate, language, and social context, while simultaneously integrating this configuration with prior experience.

A more detailed analysis indicated that during the first phase, forcibly displaced persons, similarly to young children, underwent a process of stabilisation. During this period, a reduction in reactivity occurred. In the second stage of selective integration, a gradual attenuation of unfounded anxiety was observed, alongside strengthening of top-down control mechanisms, which was reflected in more conscious regulation of reactions and emotions. The third phase was oriented towards the formation of stable sleep patterns and the capacity for automatic utilisation of alternative regulatory structures. Processes of personality adaptation within a new environment were associated with developmental features observed during qualitative transformation of self-regulation in early childhood. Closer to 24 months of age, multimodal neural networks were formed, enabling integration of information from different sensory systems (vision, audition). Consequently, sensory adaptation among displaced persons reflected not only a psychological process but also a neurophysiological reorganisation that structurally reproduced the logic of early brain development- from chaotic sensory signals towards organised thalamocortical integration and restoration of an internal sense of stability. Within a new sensory reality, the adult brain appeared to re-experience a process akin to sensory rebirth. Neuroplastic processes were activated, dendritic branching expanded, and new synaptic pathways between the thalamus and the cortex were formed, directed towards integration of novel spatial and emotional signals. Such reorganisation was accompanied by a temporary dissociation between sensory and cognitive levels, manifesting as somatic symptoms (tension, pain, insomnia, bodily anxiety responses), which functioned as a mechanism of adaptive renewal. Accordingly, sensory adaptation in displaced persons was conceptualised as a form of repeated maturation of the sensory system, comparable to the neuroplastic wave observed in infants during the second year of life, when a stable sense of bodily self and environmental predictability was established (Flom & Hyde, 2021; Yin *et al.*, 2025).

In turn, H. Jie *et al.* (2025) demonstrated that thalamocortical plasticity could be reactivated beyond classical critical developmental periods. These findings were pivotal for explaining the phenomenon of sensory recalibration in adult displaced persons exposed to radically new living conditions characterised by different languages, architectural forms, cultural signals, and daily rhythms. The published study did not address the role of sensory recalibration in relation to sensory and emotional dissociation. Results of the present investigation demonstrated how manifestations of somatosensory and emotional dissociation changed under the influence of therapeutic intervention. The analysed clinical expaerience supported the hypothesis that sensory dissociation among displaced persons functioned not only as a defensive psychological reaction, but also as a process of rebuilding connections with the environment. However, this mechanism could complicate diagnosis of somatic disorders and suppress individual recovery resources. In this context, dissociation represented not merely a psychological symptom, but a neurobiological rupture, in which new sensory predictions failed to update and remained in a fragmented state. Intervention targeting this condition required inclusion of sensory-based therapy, enhancement of interoceptive awareness, and restoration of the self-body connection through physical, symbolic, and social grounding. The analysis demonstrated that adaptive success largely depended on integration of sensory experience, quality of the social environment, and individual resources of cognitive flexibility. The presented results contributed to a more comprehensive understanding of the neuropsychological dynamics of adaptation among displaced persons and supported formulation of practical recommendations for psychosocial assistance.

Conclusions

The study conducted among 22 participants of therapeutic groups identified that, at the initial stage, disruptions of predictive mechanisms and brain functions were manifested through impaired attentional concentration, heightened feelings of shame as a consequence of restricted personal autonomy, reduced cognitive flexibility, memory deterioration, and a tendency towards isolation. These disturbances were associated with prolonged stress exposure and reduced activity of the prefrontal cortex. To improve predictive mechanisms and brain functioning, attention was directed towards analysis of existing research. One effective approach was identified as the integration of tactile, auditory, and visual stimuli. Additionally, emphasis was placed on integrative reconfiguration, taking multilingualism into account, which facilitated the integration of previously acquired and novel skills.

Observations of the therapeutic groups demonstrated that adaptation within a new country was associated with elevated levels of somatosensory (30%) and emotional (70%) dissociation. Emotional dissociation was more pronounced and reflected increased sensory-stress sensitivity, which impeded integration of new environmental signals. This condition was characterised by spatial-cognitive dissociation, in which bodily localisation and mental space failed to synchronise, underscoring the necessity of targeted sensory integration interventions for displaced persons. Theoretical analysis of undreamt dreams demonstrated their significant role in processing psychic experience. Examination of general autonomic mechanisms of adaptation established that the right cerebral hemisphere was responsible for comparison of current stimuli with prior experience, while the left hemisphere contributed to formation of new cognitive templates. Group-based therapeutic work revealed persistently high levels of somatosensory and spatial-cognitive dissociation, which remained over extended periods even under conditions of relative physical safety. Adaptive processes among displaced persons were found to parallel child development during the first 24 months of life, involving stages of stabilisation, selective integration, deep-level coordination of sensory systems, and comprehensive perception of sensory experience within a new environment.

The obtained results demonstrated that somatosensory adaptation in forcibly displaced persons represented a complex process of psychic reorganisation, originating within sensory systems and extending across all levels of consciousness. Within a new environment, the brain formed an alternative cognitive map of reality, and insufficient integration of sensory signals increased the risk of chronic anxiety, somatisation, and dissociation. Disruption of predictive coding, as a foundational mechanism underlying dissociation and somatisation, generated a gap between expected and actual stimuli, resulting in emotional–sensory distress. Successful adaptation was dependent on social support, regulation of sensory input, sleep stabilisation, and the establishment of a new safety system. Application of interventions including sensorimotor psychotherapy, meditation, and biofeedback contributed to restoration of internal equilibrium. Future research directions were oriented towards identification of sensory neuroplasticity of the brain under conditions of varying adaptation periods among displaced persons, with particular focus on sensory integration processes.

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Conflict of Interest

No conflict of interest was declared.

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Сенсорна перебудова особистості у вимушених переселенців: Нейропсихологія та психотерапія адаптації

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Анотація. Мета статті була спрямована на вивчення особливостей сенсорної перебудови особистості у вимушених переселенців, орієнтуючись на нейропсихологію та психотерапію адаптації. У якості методів було використано критичний аналіз для обґрунтування результатів терапевтичної групи з опублікованими дослідженнями, психоедукаційний і стабілізаційний підходи для проведення зустрічей з респондентами, аналітичне спостереження та метод систематизації для опису реакцій і змін учасників дослідження, розрахунки коефіцієнту Хеджеса. Встановлено, що у якості порушень предикативних механізмів та функцій мозку у респондентів на початку терапевтичних занять, проявлялись погіршення концентрації уваги, посилене почуття сорому, як наслідка обмеженої особистої автономії, порушення когнітивної гнучкості та пам'яті, прагнення до ізоляції. На основі аналізу існуючих джерел літератури виявлено, що найбільш ефективними підходами для покращення предикативних механізмів та функцій мозку є симбіоз зорових, слухових, тактильних стимулів. За поміченими тенденціями, у приблизно 70 % респондентів до терапії та близько 25 % після неї проявлявся підвищений рівень просторово-когнітивної дисоціації, що відображало первинну стресову реакцію, пов'язану з неточною обробкою сенсорних сигналів. У тимчасових переселенців, за спостереженнями, відсутність або приглушеність сновидінь, свідчили про втрату одного з ключових механізмів нейропсихологічного опрацювання негативного досвіду. За наявними спостереженнями адаптація особистості у вимушених переселенців з України, в іншому сенсорному середовищі, схожа до процесів розвитку дитини у віці 3-24 місяців. Практичне значення статті полягало у можливості розробки стратегій сенсорної терапії та підтримки переселенців психологами, психотерапевтами та фахівцями психосоціальної допомоги на основі встановлених особливостей сенсорної перебудови особистості

Ключові слова: дисоціація; таламокортикальні шляхи; нейропластичність; травматичний досвід; психосоматика; сенсорна інтеграція