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Psychological Adaptation During Prolonged War-Related Stress in Ukraine: A Narrative Review

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ABSTRACT

Background and Aims: Civilian populations exposed to prolonged stress, loss, illness, displacement, and other uncontrollable life events demonstrate substantial variability in psychological adaptation. Contemporary research suggests that psychological outcomes are influenced not only by the severity of adversity but also by patterns of cognitive-emotional processing, including locus of control, rumination, self-compassion, and meaning-making. The ongoing war in Ukraine represents a distinct context in which civilians must adapt not after the cessation of trauma, but while recurrent threat, displacement, loss, and disruption of everyday life continue. The aim of this narrative review was to examine psychological and neurobiological mechanisms associated with the preservation of agency during prolonged war-related stress and to define their practical implications for civilian mental health care in Ukraine.

Methods: A narrative review of meta-analyses, systematic reviews, and authoritative epidemiological reports indexed in PubMed, PsycINFO, Cochrane Library, and international health organizations.

Results: Rumination and externalized control beliefs are associated with poorer psychological outcomes, whereas self-compassion, perceived control, meaning-making, and adaptive coping are associated with more favorable psychological functioning. Self-pity is discussed as a clinically relevant but comparatively under-researched construct. Neurobiological evidence suggests that processes relevant to these psychological patterns involve interacting self-referential, executive-control, salience, and memory-related systems, although direct evidence in Ukrainian civilian populations remains limited.

Conclusions: Preserving response-focused agency, while supporting self-compassion and meaning-oriented processing, represents an evidence-informed and ethically grounded therapeutic principle for civilians living under prolonged war-related stress, although Ukraine-specific intervention evidence remains limited.

1 | Introduction

Since the onset of the full-scale war in Ukraine in 2022, civilians have been exposed to prolonged threat, loss, forced displacement, and chronic uncertainty. A meta-analysis used by the World Health Organization estimated that approximately one in five people living in conflict-affected settings has a mental disorder, including depression, anxiety, post-traumatic stress disorder (PTSD), bipolar disorder, or schizophrenia [1].

Ukrainian studies conducted during the full-scale invasion confirm a substantial mental health burden, although estimates vary according to sampling method, population, and screening instrument. In a nationwide online survey conducted 9–12 months after the invasion, moderate-to-severe anxiety affected 44.6% of non-displaced respondents, 49.1% of internally displaced respondents, and 52.0% of refugees; high PTSD symptom levels were reported by 32.9%, 39.4%, and 47.2%, respectively [2]. A national study of 8096 Ukrainian adolescents

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found that 32.0% screened positive for moderate or severe depression, 17.9% for moderate or severe anxiety, and 35.0% for clinically relevant psychological trauma [3].

The most common war-related stressors affecting Ukrainian civilian populations and their potential psychological consequences are summarized in Table 1. These stressors rarely occur in isolation and frequently exert cumulative psychological effects during prolonged war-related conditions.

Despite shared exposure, psychological outcomes vary substantially. This suggests that mental health is shaped not only by external stressors but also by internal cognitive-emotional organization. Within the conceptual framework proposed in this review, the term victim mindset is used to describe a maladaptive pattern involving self-pity, externally focused control beliefs, and persistent rumination. In contrast, response-focused agency is conceptualized as a potentially adaptive orientation under conditions of limited external control. In the context of the ongoing war in Ukraine, such knowledge is particularly relevant for psychotherapists, psychiatrists, neurologists, and other healthcare professionals involved in supporting civilian mental health. The Ukrainian context differs from many previously studied disaster and post-conflict settings in that psychological adaptation is taking place while the threat remains active. Civilians are required to maintain family, occupational, caregiving, and community roles despite recurrent attacks, displacement, bereavement, disrupted access to services, and persistent uncertainty. Consequently, interventions based primarily on restoring a sense of control over external circumstances may have limited applicability. A more clinically relevant objective is to preserve the capacity for self-regulation, flexible decision-making, and purposeful action within circumstances that remain largely uncontrollable.

The contribution of this review lies in integrating evidence on cognitive-emotional processes with contemporary models of large-scale brain networks and translating this evidence into clinically applicable principles for civilians living under continuing war-related stress. Rather than treating resilience as the absence of distress or posttraumatic growth as an expected outcome, the review conceptualizes adaptation as the preservation of agency, narrative continuity, and value-consistent behavior during ongoing adversity. This framework is particularly relevant to the Ukrainian experience and may also inform civilian mental health care in other prolonged humanitarian crises.

Previous research has established a substantial burden of depression, anxiety, posttraumatic stress symptoms, sleep disturbance, and functional impairment among populations exposed to war and displacement. Separate bodies of literature have also examined rumination, locus of control, self-compassion, meaning-making, posttraumatic growth, and the neurobiological consequences of chronic stress. However, these findings are commonly presented within distinct psychological, psychiatric, or neuroscientific frameworks. A clinically important gap remains in understanding how these cognitive-emotional processes interact in the preservation or erosion of agency during prolonged exposure to an ongoing threat. In particular, the available literature has not been sufficiently integrated to explain how self-referential processing, executive regulation, threat detection, and narrative reconstruction may jointly influence civilian functioning when the traumatic context has not ended. This limits the translation of existing evidence into practical and ethically appropriate mental health interventions for civilians who must continue everyday life under conditions of recurrent danger and limited external control.

Accordingly, a narrative synthesis was undertaken to bring together evidence from psychological research, neurobiology, trauma studies, and civilian mental health practice. This approach was selected to examine relationships across conceptually diverse fields and to develop a clinically coherent framework relevant to prolonged war-related stress in Ukraine.

The aim of this narrative review was to examine psychological and neurobiological processes associated with the preservation or erosion of agency during prolonged war-related stress and to consider their practical implications for civilian mental health care in Ukraine. The review focused on rumination, locus of control, self-compassion, meaning-making, posttraumatic growth, and narrative identity as conceptually related and potentially interacting processes that may either undermine or support adaptive functioning under conditions of continuing external threat.

The model summarizes conceptually related and potentially interacting psychological processes identified across the literature reviewed. Bidirectional connections indicate potentially reciprocal relationships rather than obligatory temporal or causal sequences. The adaptive and maladaptive pathways are not intended to represent fixed, mutually exclusive stages; their relative prominence may vary across individuals and over time.

TABLE 1 | Common war-related stressors affecting Ukrainian civilian populations and their psychological consequences.

War-related stressor	Potential psychological consequences
Repeated missile attacks and air raid alarms	Hypervigilance, sleep disturbance, anxiety
Forced displacement	Identity disruption, social disconnection
Bereavement and family separation	Grief, depressive symptoms
Chronic uncertainty regarding safety	Emotional exhaustion, anticipatory anxiety
Economic instability	Chronic stress, reduced future orientation
Continuous exposure to traumatic information	Emotional overload, cognitive fatigue

Note: The associations summarized in Table 1 are synthesized from peer-reviewed conflict and displacement research, Ukrainian studies, and a documented assessment of war-related damage and recovery needs [1–8]. They are illustrative and do not imply that each stressor produces a uniform psychological outcome.

Neurobiological mechanisms are included as a complementary explanatory level informed predominantly by indirect and transdiagnostic evidence and should not be interpreted as established causal pathways, diagnostic biomarkers, or neural alterations specifically demonstrated in Ukrainian civilians.

1.1 | Conceptual Framework

Based on the evidence synthesized in this review, we propose a conceptual framework distinguishing two interacting patterns of psychological adaptation during prolonged war-related stress (Figure 1). The maladaptive pattern encompasses externally focused control beliefs, perceived helplessness, maladaptive rumination, persistent self-focused negative processing, and reduced behavioral engagement, which may interact with and reinforce the erosion of agency. The adaptive pattern encompasses response-focused agency, perceived influence over one's own responses, self-compassion, flexible reflective processing, meaning-making, and value-consistent action, which

may contribute to the preservation of agency and adaptive functioning despite continuing external threat.

These processes are conceptualized as interacting and potentially reciprocal rather than as fixed components of a sequential causal pathway. Individuals may move between adaptive and maladaptive patterns over time, and elements of both may coexist depending on the nature of the stressor, available social and material resources, individual vulnerability, and the continuing level of external threat. Accordingly, the framework is intended to organize the relationships among the constructs reviewed rather than to propose a validated stage model of psychological adaptation.

The functional brain systems discussed in the review are presented as a complementary explanatory level rather than as direct neural correlates of the proposed adaptive and maladaptive patterns. The available neurobiological evidence is derived predominantly from broader experimental, clinical, trauma, and transdiagnostic research, and direct evidence

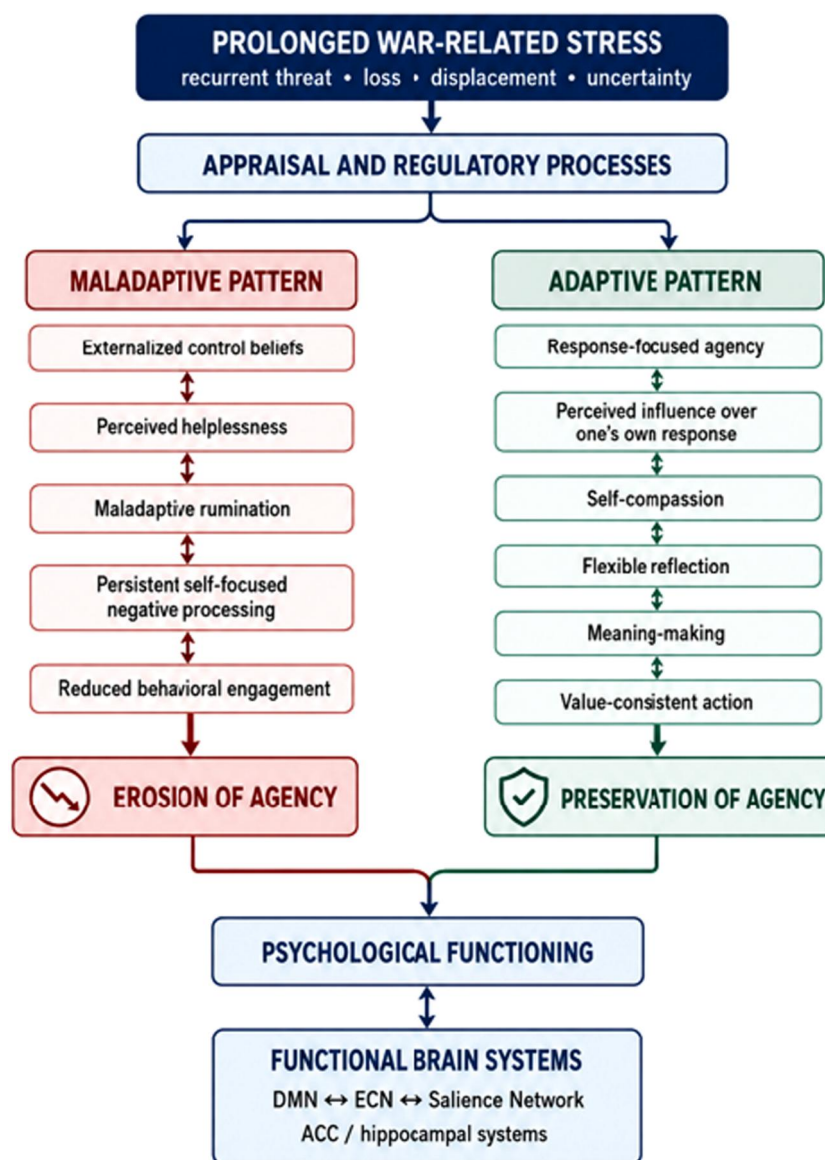


FIGURE 1 | Conceptual framework of adaptive and maladaptive pathways during prolonged war-related stress.

demonstrating these network-level relationships in Ukrainian civilian populations remains limited. The framework should therefore not be interpreted as establishing causal neurobiological pathways or diagnostic biomarkers specific to civilians exposed to the ongoing war in Ukraine.

2 | Methodology

A structured narrative review was undertaken to integrate evidence from psychology, psychiatry, neuroscience, trauma research, and civilian mental health concerning the preservation or erosion of agency during prolonged war-related stress. A narrative design was selected because the review addressed interrelated psychological constructs, neurobiological mechanisms, epidemiological findings, and clinical implications that span several distinct evidence domains.

Literature searches were conducted in PubMed, Scopus, PsycINFO, and the Cochrane Library. The search was organized around six conceptually defined domains: (1) civilian mental health during war and forced displacement; (2) rumination and repetitive negative thinking; (3) locus of control, perceived control, and agency; (4) self-compassion and resilience; (5) meaning-making, narrative identity, and posttraumatic growth; and (6) neurobiological mechanisms of chronic stress and emotional regulation. Search terms included combinations of “war,” “armed conflict,” “war-related stress,” “civilian population,” “forced displacement,” “Ukraine,” “psychological adaptation,” “rumination,” “locus of control,” “agency,” “self-compassion,” “meaning-making,” “posttraumatic growth,” “narrative identity,” “default mode network,” “executive control network,” and “salience network.” Search expressions were adapted to the indexing and syntax of each database.

The review primarily considered publications issued between January 2004 and December 2025. Earlier seminal sources were retained when they provided the original definition or theoretical basis of a construct central to the review, including locus of control, existential meaning, and trauma-related disruption of core assumptions. Additional searches were conducted on the websites of recognized international and national institutional websites, including the World Bank, for documented assessments of war-related damage, displacement, and recovery needs in Ukraine. Reference lists of relevant systematic reviews, meta-analyses, and key conceptual publications were also examined to identify additional eligible sources. Eligible sources included systematic reviews, meta-analyses, large epidemiological investigations, peer-reviewed psychological and neurobiological studies, consensus or conceptual papers, and methodologically transparent reports from recognized public health organizations. Sources were included when they addressed civilian exposure to war, displacement, or prolonged uncontrollable stress; examined one or more of the psychological or neurobiological processes central to the review; or provided findings relevant to clinical and psychotherapeutic support for civilian populations.

Publications were excluded if they focused exclusively on military personnel, acute battlefield psychiatry, or non-human models without clear relevance to civilian mental health. Non-scholarly materials, publications without a transparent

evidentiary basis, duplicate records, and sources that did not contribute directly to the conceptual or clinical aims of the review were also excluded.

Titles and abstracts were initially assessed for thematic relevance, followed by full-text evaluation of potentially eligible publications. Selection was based on methodological quality, direct relevance to the review questions, and contribution to the integration of psychological adaptation, agency, meaning-making, and neurobiological regulation. Because this was a narrative rather than a systematic review, formal risk-of-bias assessment and exhaustive study inclusion were not undertaken. The final narrative synthesis comprised 50 sources: 47 peer-reviewed publications, one institutional assessment, and two foundational scholarly books. Sources were organized thematically according to the principal psychological constructs, neurobiological mechanisms, and clinical implications examined in the review.

To ensure appropriate interpretation of evidence in relation to the Ukrainian context, findings were considered according to the population from which they were derived: (1) studies conducted directly in Ukrainian civilian populations; (2) studies of civilians exposed to armed conflict, forced displacement, or other conflict-related adversity outside Ukraine; and (3) studies of broader trauma, chronic-stress, or clinical populations not specifically exposed to war. Evidence from the second category was considered contextually relevant to conflict-related adaptation but was not treated as direct evidence concerning Ukrainian civilians. Evidence from the third category was used primarily to inform broader psychological, mechanistic, neurobiological, and clinical interpretation. Where Ukraine-specific evidence was unavailable, extrapolation from these broader evidence bases is explicitly acknowledged in the narrative synthesis.

2.1 | Conceptual Clarification of Agency and Related Constructs

Several conceptually related but distinct constructs—agency, locus of control, perceived control, and self-efficacy—are used throughout this review. Agency refers broadly to the capacity to initiate and regulate intentional, goal-directed action and to experience oneself as an active participant in shaping one's responses and behavior. In the context of prolonged war-related stress, agency does not imply control over external events; rather, it refers to the capacity to make choices and undertake intentional actions within the constraints imposed by the environment [9–11].

Locus of control refers to generalized beliefs concerning whether important outcomes are primarily contingent on one's own actions or on external forces and circumstances beyond personal influence [9, 12, 13]. An internal locus of control reflects a greater expectation that outcomes are related to one's own behavior, whereas an external locus of control reflects a greater attribution of outcomes to chance, powerful others, or external circumstances [12].

Perceived control is related but more context-dependent and refers to the subjective degree of influence an individual perceives

over a particular situation, response, or outcome [9, 10]. Thus, an individual may recognize that major external events are uncontrollable while retaining perceived control over specific aspects of everyday behavior, coping, and response selection.

Self-efficacy refers to an individual's belief in their capability to organize and execute the actions required to manage particular situations or attain specific goals [14]. Self-efficacy also differs from perceived control in that it concerns perceived capability to perform an action rather than the broader perceived controllability of a situation or outcome.

In this review, these constructs are therefore treated as complementary but non-interchangeable. Agency represents the broader capacity for intentional and value-consistent action; locus of control concerns generalized beliefs about the determinants of outcomes; perceived control concerns the subjective degree of influence available within a particular context; and self-efficacy concerns confidence in one's ability to perform the actions required within that context. This distinction is particularly important under conditions of ongoing war, in which external controllability may be objectively limited while perceived control over specific responses and response-focused agency may nevertheless remain possible [9–13].

3 | Self-Pity and Self-Compassion: A Critical Distinction in the Context of War-Affected Civilian Populations

In this review, self-pity refers to a cognitive-emotional pattern involving heightened attention to one's own suffering, perceived unfairness, and feelings of helplessness, frequently accompanied by rumination and reduced engagement in active coping. While transient self-pity may arise naturally following loss or trauma, persistent self-pity may become associated with maladaptive patterns of psychological functioning. Evidence consistently demonstrates that rumination—a process closely related to persistent self-focused negative thinking—is associated with depressive and anxiety symptoms, prolonged emotional distress, and impaired functional recovery [15–17].

In war-affected civilian populations, the distinction between self-pity and adaptive emotional processing requires particular caution. This issue is especially relevant to Ukraine, where missile attacks, displacement, bereavement, and prolonged uncertainty constitute objective experiences of injustice and loss. Such experiences may also disrupt basic assumptions concerning safety, predictability, and personal meaning [18]. Evidence from conflict-affected populations nevertheless indicates that psychological outcomes are shaped not only by the severity of exposure but also by patterns of cognitive and emotional processing [6, 7, 15–17]. Persistent inward-focused narratives centered on unfairness and helplessness may contribute to emotional dysregulation, avoidance, and disengagement from restorative social and occupational roles. However, direct empirical research examining self-pity as a distinct psychological construct in Ukrainian civilian populations remains limited. Accordingly, the relevance of self-pity to the Ukrainian context should be interpreted cautiously and should not be inferred solely from evidence concerning rumination or related maladaptive cognitive processes.

Importantly, self-pity must be distinguished from self-compassion, a construct that has gained substantial empirical support over the past two decades. Self-compassion involves three core components: self-kindness rather than self-criticism, recognition of common humanity rather than isolation, and mindful awareness of suffering without over-identification [19]. These associations and intervention effects have been observed across diverse clinical and non-clinical populations [20–22].

In the Ukrainian context, where civilians may experience moral injury, survivor guilt, and cumulative trauma, self-compassion may provide a protective framework for acknowledging suffering without over-identifying with a victim role. In contrast to self-pity, self-compassion combines emotional openness with reduced self-criticism and may support problem-solving, help-seeking, and continuation of adaptive routines [19–22]. This interpretation should be understood as a clinically relevant extrapolation from the broader self-compassion and trauma literature rather than as a conclusion derived from studies conducted exclusively in Ukrainian civilian populations.

Direct neurobiological studies comparing self-pity with self-compassion are limited. However, rumination and persistent self-referential negative processing have been associated with impaired disengagement from distressing material and insufficient executive modulation [23, 24]. By contrast, self-compassion is consistently associated at the psychological level with lower distress and more adaptive emotional regulation [20–22]. It is therefore plausible, although not yet definitively established, that self-compassion supports a more balanced interaction between self-referential and regulatory processes.

4 | Locus of Control as the Core of Agency Under Conditions of External Powerlessness

Locus of control refers to generalized beliefs about the degree to which outcomes are contingent upon one's own actions vs. external forces. Classic and contemporary research indicates that more external control beliefs are associated with greater depressive and anxiety symptoms [9, 13], whereas greater perceived control and mastery are associated with better psychological and physical health [9, 10].

In armed conflict, civilians objectively experience a major reduction in external control. Air raids, forced displacement, economic instability, and threats to physical safety are frequently unpredictable and cannot be mastered through individual effort [6–8]. Under such conditions, an indiscriminate emphasis on “controlling circumstances” is neither realistic nor ethically appropriate. The protective value of perceived control is better understood as the capacity to influence one's cognitive, emotional, and behavioral responses when external outcomes remain uncontrollable [9, 10]. Individuals who retain this response-focused sense of agency are more likely to use active coping, preserve routines and social roles, and sustain adaptive functioning under adversity [9–11].

Evidence from broader trauma and chronic-stress research indicates that prolonged exposure to cumulative and unpredictable stressors may increase vulnerability to helplessness, hopelessness,

and reduced future orientation. Ukrainian studies and reports document substantial exposure to such stressors and associated psychological distress [4–8]. However, direct studies specifically examining locus of control as a determinant of adaptation among Ukrainian civilians remain limited, and the available Ukrainian literature does not always distinguish locus of control from related constructs such as perceived helplessness or loss of future orientation. The application of the locus-of-control framework to this population should therefore be regarded as an evidence-informed clinical interpretation rather than a Ukraine-specific causal finding. Taken together, the available evidence supports preserving domains of response choice without assuming that civilians can control the course of external events.

Direct neuroimaging evidence linking locus of control itself to specific large-scale brain-network configurations remains limited. Nevertheless, experimental and translational research shows that chronic uncontrollable stress can impair prefrontal functions involved in planning, inhibition, working memory, and cognitive flexibility [25, 26]. Repeated experiences of helplessness may therefore narrow perceived behavioral options and reinforce passive coping. Supporting a response-focused sense of agency in war-affected civilians, rather than simply promoting an internal locus of control, should not imply denial of objective danger or minimization of suffering. Rather, it involves identifying domains of agency that remain available, such as daily routines, interpersonal conduct, moral choices, help-seeking, and self-regulation [9–11]. In this sense, locus of control provides a useful framework for distinguishing perceived helplessness from adaptive agency in the Ukrainian context. Interventions may appropriately reframe control as influence over one's next response rather than dominance over external circumstances, while explicitly acknowledging the real constraints imposed by war [9–13].

5 | Rumination as a Mechanism Maintaining the Victim Mindset

Rumination is a repetitive, passive, and self-focused cognitive pattern characterized by sustained attention to distress, its perceived causes, and its consequences, without engagement in active problem-solving. Psychological models conceptualize rumination as a transdiagnostic process that maintains emotional disorders rather than resolving them. A substantial body of psychological and cognitive research indicates that rumination is strongly associated with the onset, severity, and recurrence of depressive and anxiety disorders, as well as with prolonged stress reactions and impaired functional recovery [15–17, 23, 24]. Within the conceptual framework proposed in this review, rumination may function as mechanism sustaining the victim mindset. While self-pity provides an emotionally coherent narrative of injustice and suffering, rumination repeatedly rehearses this narrative, reinforcing a sense of helplessness and passivity. Instead of facilitating emotional processing, rumination traps individuals in a loop of unproductive self-referential thought, preventing adaptive reappraisal and behavioral engagement. This mechanism is particularly detrimental in prolonged crises, such as war, where stressors are ongoing rather than discrete [6–8].

Rumination has been linked to impaired attentional disengagement from negative self-referential information [24].

Broader neurobiological models of depression describe attenuated top-down cognitive control over negative information processing [23]. At the systems level, self-referential and executive-control processes are supported by interacting large-scale functional networks [27–30].

Across trauma- and conflict-exposed populations, repetitive negative thinking may be intensified by uncontrollable and morally salient stressors, including bereavement, displacement, and perceived injustice [6, 7, 31, 32]. Such thinking may initially represent an effort to understand and integrate what has occurred. When it becomes repetitive, passive, and difficult to disengage from, however, it is associated with greater emotional distress, impaired concentration, sleep disturbance, and reduced engagement in daily activities [15–17, 24]. Although Ukrainian civilians are extensively exposed to many of the conditions that may promote repetitive negative thinking [6, 7], direct longitudinal evidence establishing rumination as a specific mediator of psychological outcomes in Ukrainian civilian populations remains limited. The relevance of rumination to the Ukrainian context should therefore be understood as an evidence-informed interpretation based on the convergence of documented war-related exposures in Ukraine with broader conflict, trauma, and transdiagnostic evidence on repetitive negative thinking, rather than as a Ukraine-specific causal finding.

Stress-related neurobiological changes further exacerbate this process. Chronic stress exposure is known to impair prefrontal regulatory function and enhance limbic reactivity, reducing the brain's capacity to interrupt maladaptive cognitive loops [25, 26]. As a result, individuals experiencing prolonged war-related stress may become increasingly vulnerable to ruminative cycles, even when they possess adequate cognitive resources under non-stressful conditions. Rumination differs fundamentally from reflective self-examination or meaning-oriented processing. Whereas adaptive reflection is deliberate and goal-directed, rumination is repetitive, self-focused, and difficult to disengage from [17, 24].

Psychological interventions that target repetitive negative thinking may aim to improve disengagement from maladaptive thought patterns [17, 24]. Claims that such interventions directly restore specific network connections should be made cautiously because the available evidence does not support a uniform network-level mechanism.

Addressing rumination is particularly relevant in Ukraine because stress exposure is recurrent and often cannot be resolved through immediate problem-solving. Without strategies that interrupt repetitive negative thinking, some civilians may remain cognitively and emotionally immobilized even when limited opportunities for adaptive action are available [6, 15–17]. Interventions that strengthen attentional control, cognitive flexibility, and value-consistent behavior may help preserve functioning without denying ongoing danger.

Thus, rumination functions as a key psychological and neurobiological bridge between external stressors and internal loss of agency. Its modulation represents a central target for both psychotherapeutic intervention and structured self-help in war-affected civilian populations.

6 | Meaning-Making, Narrative Identity, and Posttraumatic Growth

Posttraumatic growth (PTG) is commonly defined as positive psychological change arising through the struggle with highly challenging circumstances [33]. In prolonged armed conflict, PTG should be treated as a possible pathway of adaptation rather than an expected or universally beneficial outcome. Evidence suggests that reported growth is associated with deliberate meaning-making, value reorganization, and narrative reconstruction, while distress may remain substantial [31, 33–37]. Accordingly, the concept is most useful when it describes potential changes in priorities, relationships, or self-understanding without implying that trauma itself is beneficial.

For many Ukrainian civilians, trauma is not a single completed event but a sequence of recurrent threats, displacement, bereavement, economic disruption, and uncertainty [3–8]. Under these conditions, adaptation may involve preserving a coherent sense of self and purpose rather than achieving symptom resolution alone. Narrative identity and meaning-making frameworks suggest that traumatic experiences can be integrated into a broader life story without becoming the sole organizing feature of identity [18, 31, 36–38]. Posttraumatic growth is more consistently associated with deliberate reflective processing than with persistent maladaptive rumination [33, 37].

The neurobiological interpretation of PTG remains preliminary. Deliberate reflection, emotion regulation, autobiographical integration, and cognitive flexibility are supported by interacting executive, self-referential, and memory-related systems [27–30]. It is therefore conceptually plausible that adaptive meaning-making depends on coordinated engagement of these systems; however, direct neuroimaging evidence specific to PTG, and especially to war-affected Ukrainian civilians, is limited. Neurobiological explanations in this review should consequently be regarded as integrative hypotheses rather than established biomarkers of growth.

Meaning-making and narrative reconstruction may contribute to long-term adaptation when they are supported by interpersonal relationships, culturally meaningful narratives, and opportunities for value-consistent action [31, 32, 36]. Collective narratives emphasizing dignity, solidarity, and responsibility may provide a framework within which individual suffering can be contextualized, but their effects are not uniformly positive and depend on personal, social, and cultural circumstances. PTG should therefore be presented as a potential adaptive process rather than as a required outcome of trauma [35, 37].

7 | Functional Brain Networks as the Neurobiological Basis of Self-Narrative and Agency: A Clinically Oriented Overview for Psychotherapists

Over the past two decades, neuroscience has increasingly adopted a network-based framework for understanding brain function. Rather than operating as isolated regions, cognitive and emotional processes emerge from the coordinated activity of large-scale functional brain networks [27, 28, 39].

This network perspective is clinically informative because processes relevant to identity, agency, emotional regulation, and meaning-making involve distributed interactions among cognitive, affective, and autobiographical systems [27, 28, 30]. However, this framework does not imply that complex psychological or psychotherapeutic phenomena can be localized to, or explained by, the activity of any single brain region or functional network. The neurobiological evidence summarized below is derived predominantly from experimental, clinical, and trauma-related neuroscience conducted outside Ukrainian civilian populations. Accordingly, the network-level mechanisms discussed in this section are presented as a biologically plausible explanatory framework rather than as evidence of neural alterations specifically demonstrated in Ukrainian civilians. Direct neuroimaging evidence characterizing large-scale functional brain-network alterations in civilians exposed to the ongoing war in Ukraine remains limited.

7.1 | The Default Mode Network (DMN): Neural Substrate of Self-Narrative and Identity

Physiological role and structure. The default mode network (DMN) is primarily involved in self-referential processing, autobiographical memory, mental time travel, and narrative identity formation. Its principal nodes include the medial prefrontal cortex (mPFC), posterior cingulate cortex (PCC)/precuneus, angular gyrus, and medial temporal structures, including the hippocampus [27–29]. The DMN shows increased activity during rest, introspection, and reflection on personal meaning.

Functionally, the DMN supports the construction of a coherent sense of self across time, allowing individuals to integrate past experiences with present identity and future expectations [29, 36].

Traumatic stress has been associated with alterations in DMN activity and connectivity, although findings vary across populations, tasks, and clinical presentations [23, 24, 30, 40]. Excessive self-focused processing may coexist with weakened integration of autobiographical information, and these patterns may contribute to rumination, depersonalization, or disturbances in identity continuity. Such interpretations remain probabilistic rather than diagnostic at the individual level.

In civilians repeatedly exposed to uncontrollable threat, disruptions of autobiographical continuity may be experienced as a “broken life story” rather than as a response to one discrete event [4–8]. The proposed involvement of the DMN in this experience is theoretically plausible, but direct studies in Ukrainian civilian samples are not yet available.

7.2 | The Executive Control Network (ECN): Cognitive Agency and Goal-Directed Behavior

Physiological role and structure. The executive control network (ECN), also referred to as the central executive network, underlies planning, decision-making, cognitive flexibility, and working memory. Core regions include the dorsolateral

prefrontal cortex (dlPFC) and posterior parietal cortex [25, 27]. ECN functions are relevant to cognitive processes that contribute to goal-directed behavior and aspects of agency, including goal formulation, option evaluation, and translation of intentions into action [25, 27]. Chronic stress can impair prefrontal functions involved in working memory, planning, and cognitive control [25]. Such stress-related executive constraints may contribute to indecision or reduced goal-directed behavior [25, 26].

Ukrainian civilians are exposed to prolonged uncertainty and cumulative stressors that may plausibly contribute to cognitive overload and difficulties in maintaining everyday roles [5, 8]. However, the proposed contribution of stress-related executive dysfunction to these difficulties is extrapolated from broader chronic-stress and trauma neuroscience rather than demonstrated directly in neuroimaging studies of Ukrainian civilian populations. Accordingly, these experiences should not be interpreted solely as failures of motivation or personal resilience; stress-related constraints on executive functioning represent one plausible contributing mechanism, supported by broader experimental and translational evidence [25, 26].

7.3 | The Salience Network (SN): Threat Detection and Network Switching

The salience network (SN) detects behaviorally relevant stimuli and contributes to switching between the DMN and ECN [39, 41, 42]. Its key nodes include the anterior insula and anterior cingulate cortex (ACC) [39, 42]. Under acute stress, neural resources may shift toward salience-related processing and away from executive-control functions [43]. Such stress-related changes may contribute to heightened attention to threat and difficulty disengaging from salient danger-related stimuli. These findings derive primarily from broader stress and trauma neuroscience and should not be interpreted as evidence of salience-network dysfunction specifically demonstrated in Ukrainian civilians.

7.4 | The Anterior Cingulate Cortex (ACC): Conflict Monitoring and Psychological Endurance

The ACC contributes to conflict monitoring and behavioral regulation when emotional discomfort competes with goal-directed action [27, 28]. Reduced efficiency within these regulatory processes has been associated with avoidance and difficulty sustaining effort under stress. Psychotherapies that cultivate distress tolerance and value-consistent action may engage related regulatory functions, but direct evidence that such interventions specifically produce “ACC-mediated resilience” remains insufficient.

7.5 | The Hippocampus: Contextual Memory and Narrative Integration

The hippocampus supports contextual memory and temporal organization of experience. Chronic stress is associated with hippocampal structural and functional alterations relevant to memory processing [26]. Such alterations may contribute to

difficulties in contextualizing traumatic memories, whereas intrusive recollections and trauma-related imagery involve broader distributed memory systems [44].

7.6 | The Insula: Embodied Awareness and Emotional Regulation

The insula contributes to interoceptive processing and the integration of bodily signals with emotional awareness. Trauma-related alterations in insular and salience-network functioning have been associated with hyperarousal, somatic distress, and difficulty regulating attention to internal sensations [24, 28, 39, 42]. Body-focused regulation may be clinically useful for some patients, although its neural mechanisms and effectiveness vary and should not be inferred from network models alone.

7.7 | Network Integration and the Neurobiology of Narrative Change

Psychological resilience and agency emerge not from isolated networks but from coordinated interaction among DMN, ECN, and SN systems [27, 28]. Trauma disrupts this coordination, fragmenting identity, agency, and emotional regulation [40]. The major psychological constructs discussed in this review and their potential neurobiological correlates are summarized in Table 2.

As summarized in Table 2, the proposed correlates are based on converging evidence from cognitive, affective, and network neuroscience [23–30, 39–43]. They should be interpreted as conceptual associations rather than one-to-one biomarkers of the psychological constructs listed. Psychotherapeutic work on narrative reconstruction, meaning-making, and value-consistent action may be conceptualized as supporting more flexible coordination among self-referential, executive, salience, and memory-related processes [27–30, 36]. This formulation is a translational model, not evidence that psychotherapy produces a specific or uniform pattern of network “reintegration” in every patient.

The relationships among the principal neurobiological systems, psychologically relevant functions, and processes associated with adaptation are summarized in Figure 2.

Figure 2 summarizes neurobiological systems and functions discussed in the reviewed literature and their potential relationships with psychological processes relevant to adaptation [23–30, 39–44]. The relationships shown are conceptual and based predominantly on evidence from broader experimental, clinical, trauma, and transdiagnostic neuroscience. Arrows indicate functional associations rather than established causal pathways. The figure should not be interpreted as demonstrating one-to-one neural correlates of psychological constructs, diagnostic biomarkers, or neurobiological alterations specifically established in Ukrainian civilian populations.

8 | Frankl's Perspective as a Conceptual Framework for Meaning and Agency

The concept of agency under conditions of extreme adversity has been profoundly articulated by Viktor Frankl, whose perspective

TABLE 2 | Psychological constructs and their potential neurobiological correlates during prolonged war-related stress.

Psychological construct	Psychological manifestations	Potential neurobiological correlates
Maladaptive rumination	Repetitive negative thinking, emotional fixation	Involvement of self-referential and executive-control networks
External locus of control	Helplessness, passivity, reduced behavioral engagement	No specific network correlate established; potential involvement of prefrontal regulatory processes
Self-compassion	Improved executive-emotional integration	No specific network correlate established; potential involvement of regulatory processes
Meaning-oriented processing	Narrative coherence, adaptive reflection	Potential involvement of self-referential and memory-related systems
Hypervigilance	Persistent threat anticipation	Increased salience-related processing under stress

Note: The neurobiological associations summarized in this table represent conceptual syntheses based on references [23–30, 39–43] and should not be interpreted as diagnostic biomarkers, one-to-one neural correlates of psychological constructs, or direct evidence from Ukrainian civilian samples.

was shaped by both existential thought and lived experience of captivity, deprivation, and extreme threat. In the present review, Frankl's work is considered as a philosophical and psychotherapeutic framework for understanding meaning, responsibility, and the preservation of personal agency under conditions in which external control is severely constrained. It should not be interpreted as a neuroscientific theory, nor do Frankl's writings provide evidence for specific neural mechanisms. Rather, several elements of his conceptual perspective can be considered alongside contemporary psychological research on meaning-making, resilience, and value-oriented adaptation [45–47].

A central element of Frankl's perspective is the distinction between external circumstances that cannot be controlled and the possibility of retaining some degree of choice in one's attitude and response to those circumstances. Importantly, this perspective does not deny the reality of suffering or injustice, nor does it imply that individuals are responsible for the adversity imposed upon them. At the level of psychological constructs, this distinction is conceptually consistent with contemporary approaches to perceived control and response-focused agency, in which adaptive control concerns the capacity to influence one's own responses rather than mastery over objectively uncontrollable outcomes [9, 10, 12, 13]. This conceptual correspondence should not, however, be interpreted as evidence that contemporary empirical models directly validate Frankl's philosophical framework.

Ukrainian civilians exposed to prolonged war-related stress experience loss of safety, unpredictability, moral conflict, displacement, bereavement, and repeated uncontrollable threat [3–8]. These circumstances differ historically and ethically from those described by Frankl and should not be treated as directly equivalent. Nevertheless, his distinction between uncontrollable external conditions and the remaining possibility of a value-consistent response provides a potentially relevant conceptual lens through which agency under continuing threat can be considered. Its application to the Ukrainian context should therefore be understood as conceptual rather than as direct empirical evidence concerning psychological adaptation in Ukrainian civilians.

At a separate explanatory level, contemporary neuroscience provides evidence that processes relevant to response selection under emotional distress involve executive and conflict-

monitoring systems, whereas autobiographical integration, self-referential processing, and memory involve distributed functional brain systems [25, 27, 28, 30]. These findings may inform the neurobiological understanding of psychological functions relevant to agency and meaning-making, but they should not be interpreted as neural validation of Frankl's concepts. No specific configuration of the default mode, executive control, or salience networks, or of associated cortical and limbic systems, can currently be regarded as a neural correlate of Franklian meaning-making or response-focused agency. Direct neuroimaging evidence examining these processes in civilians exposed to the ongoing war in Ukraine remains limited; the neurobiological interpretation presented here is therefore heuristic and derived predominantly from broader experimental, clinical, trauma, and transdiagnostic neuroscience rather than from Ukraine-specific evidence.

Everyday expressions of agency among Ukrainian civilians may include caring for family members, continuing professional or volunteer roles, preserving moral boundaries, maintaining social responsibilities, and sustaining future-oriented commitments. Such behaviors should not be interpreted as evidence that distress is absent or that adaptation requires emotional invulnerability. Rather, they may represent forms of value-consistent action in the presence of fear, grief, and uncertainty, a pattern consistent with broader resilience and meaning-making research [35, 36, 46–49]. Frankl's perspective should therefore be applied without romanticizing suffering, prescribing meaning, or imposing resilience or posttraumatic growth as a moral obligation.

Thus, Frankl's perspective and contemporary empirical research should be regarded as complementary but distinct levels of interpretation. Frankl provides a philosophical and psychotherapeutic framework for considering meaning, responsibility, and choice under conditions of constrained external control, whereas contemporary psychological and neuroscientific research provides empirical evidence concerning specific processes relevant to agency, adaptation, cognitive regulation, and meaning-making. In the context of Ukraine, bringing these perspectives into dialog may help conceptualize resilience not as optimism, emotional invulnerability, or mastery over uncontrollable circumstances, but as the preservation of meaningful and value-consistent action within the domains of agency that remain available.

NEUROBIOLOGICAL SYSTEMS AND PROCESSES

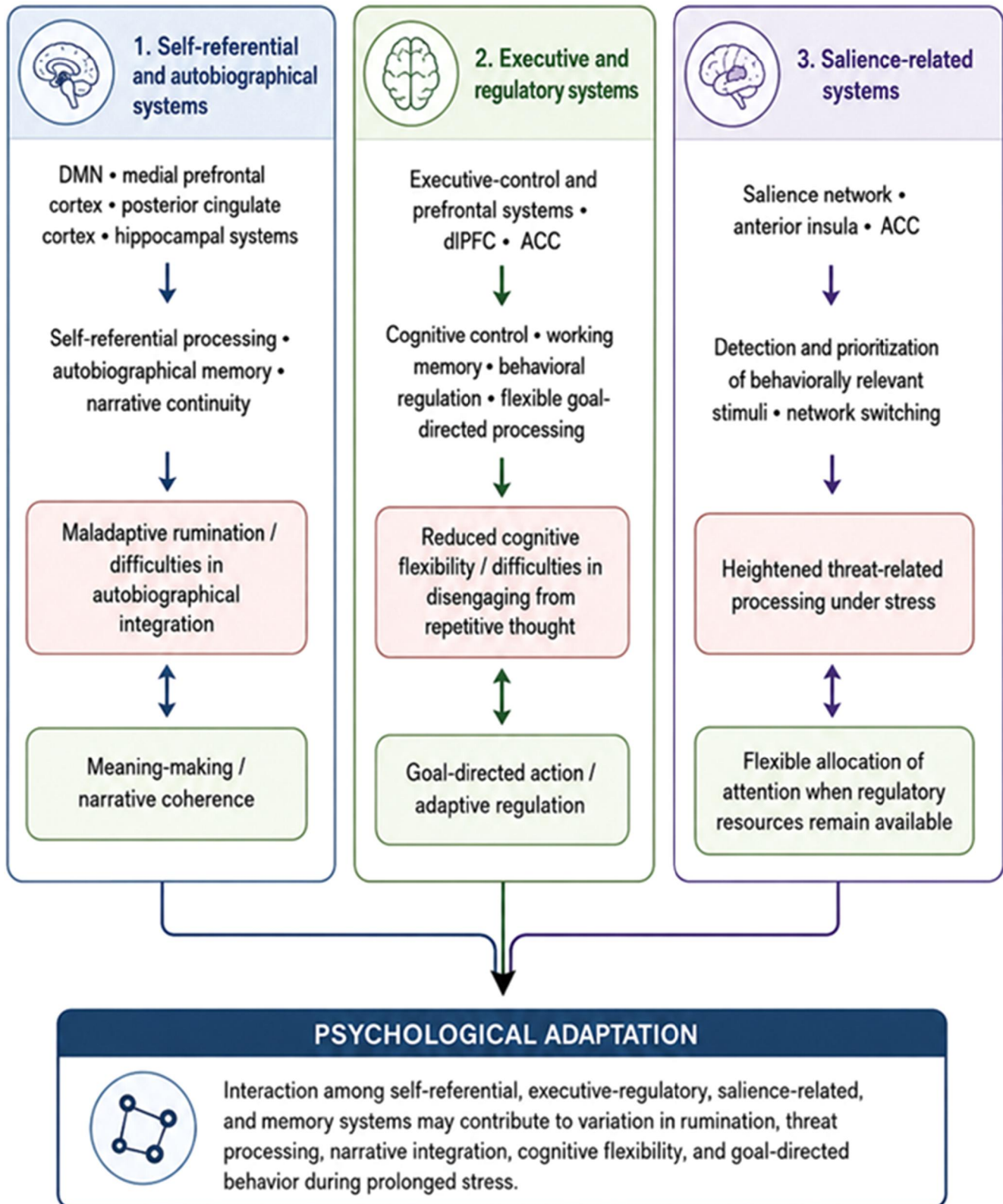


FIGURE 2 | Neurobiological systems relevant to psychological symptoms and adaptation during prolonged stress.

9 | Clinical and Psychotherapeutic Implications for Preserving Agency During Prolonged Stress Exposure

The clinical implications presented below draw on three levels of evidence: direct observations from Ukrainian and other conflict-affected populations, evidence from broader trauma and chronic-stress research, and theoretically informed extrapolations from the conceptual framework developed in this review. These levels of evidence should not be regarded as equivalent. Where intervention recommendations extend beyond direct evidence from Ukrainian civilians, they are presented as clinically plausible applications requiring context-specific evaluation rather than as established Ukraine-specific treatment effects.

The evidence reviewed in this paper suggests that psychological adaptation during prolonged adversity is associated with the preservation of agency, maintenance of a coherent self-narrative, and the capacity to engage in value-directed behavior despite external constraints. Although no single psychotherapeutic approach is universally effective across all contexts of trauma exposure, several clinically relevant principles converge across contemporary research on resilience, self-compassion, locus of control, meaning-making, and neurobiological regulation [9, 10, 12, 13, 33–36, 45–47]. The recommendations discussed below should therefore be understood as differing in the strength and directness of their empirical support, rather than as components of a single validated intervention model.

In populations exposed to chronic stress, including civilians affected by war, therapeutic work may benefit from helping individuals differentiate between circumstances that remain outside their influence and aspects of their responses that can still be shaped through personal choice and behavioral action. This distinction is consistent with contemporary approaches to perceived control and agency and is supported by evidence linking greater perceived control with reduced helplessness, more adaptive coping, and better psychological functioning [9, 10, 12, 13]. In the context of ongoing war, however, this principle should not be interpreted as an expectation that individuals develop control over objectively uncontrollable circumstances. Rather, its clinical relevance lies in identifying realistic domains of response-focused agency.

A related principle concerns the restoration of perceived agency through manageable and achievable actions. Evidence from broader stress and coping research suggests that maintaining everyday routines, fulfilling social roles, and engaging in meaningful activities may help counter passivity and support adaptive self-regulation [9, 10]. Their application to Ukrainian civilians should nevertheless be regarded as context-sensitive, particularly where displacement, bereavement, material insecurity, or continuing threat substantially restrict the range of actions available to an individual.

The reviewed literature also highlights maladaptive rumination as a potentially important therapeutic target. Persistent repetitive thinking focused on loss, injustice, or personal helplessness is associated with greater emotional distress and poorer

psychological adjustment [15–17]. This should be distinguished from deliberate reflection aimed at integrating difficult experiences, reconsidering priorities, or identifying future-oriented goals. Accordingly, psychotherapeutic strategies that strengthen attentional control, cognitive flexibility, and metacognitive awareness may be clinically relevant in prolonged stress contexts. However, their specific effectiveness in Ukrainian war-affected civilian populations should not be inferred from the broader rumination literature alone and requires direct evaluation.

Another recurring theme across research on resilience, post-traumatic growth, and psychological flexibility is the role of personally meaningful values in adaptation to adversity [33–36, 45–47, 50]. Meaning-oriented coping does not eliminate suffering or imply that traumatic experiences must acquire a positive meaning. Rather, it may provide a framework through which individuals maintain continuity between their experiences, relationships, responsibilities, and future-oriented commitments. For some individuals, sustained engagement with family, professional identity, moral principles, community participation, or spiritual beliefs may serve as a psychological anchor during prolonged instability. Therapeutic exploration of these domains may therefore represent a clinically relevant, theoretically informed application of the broader evidence, but they should be explored individually rather than prescribed as universally adaptive responses.

Broader evidence supports the clinical relevance of emotional regulation and awareness of physiological arousal in adaptation to prolonged stress [24, 25, 43]. Within this broader framework, practices such as paced breathing, mindfulness, gentle movement, and other self-regulation strategies may be considered adjunctive clinical tools. Their inclusion here represents a clinically informed application of broader self-regulation principles rather than evidence that these specific practices have been established as effective interventions in Ukrainian war-affected civilians. They should not substitute for evidence-based trauma-focused treatment, appropriate clinical assessment, or improvements in material safety. Their effects on large-scale brain networks should not be overstated, particularly in the absence of direct neuroimaging evidence in Ukrainian civilian populations. Preservation or restoration of narrative continuity represents another clinically relevant consideration, as trauma may disrupt autobiographical coherence and the perceived connection between past, present, and future [18, 30, 36–38, 44]. However, the use of narrative-restoration strategies as a specific intervention in Ukrainian civilians should be regarded as an evidence-informed clinical application rather than an intervention with established population-specific efficacy.

Finally, contemporary evidence indicates that adaptive functioning during prolonged adversity should not be equated with the absence of fear, sadness, grief, or emotional exhaustion. Resilience is increasingly conceptualized as the capacity to maintain or regain functioning despite significant adversity rather than as freedom from psychological distress [48, 49]. Within this framework, self-compassion may have a protective role by reducing excessive self-criticism while supporting emotional regulation, motivation, and adaptive coping [19–22]. This evidence provides a rationale for considering self-

compassion-oriented strategies in clinical practice; however, their specific effectiveness in Ukrainian civilians exposed to ongoing war should not be inferred from the broader literature alone. Their application should be adapted to individual circumstances and regarded as an evidence-informed clinical approach rather than a Ukraine-specific intervention with established efficacy.

Taken together, these findings support a clinical perspective in which preservation of response-focused agency, cultivation of self-compassion, reduction of maladaptive rumination, maintenance of personally meaningful values, and restoration of narrative coherence represent complementary, but not necessarily sequential or equally evidence-supported, pathways of psychological adaptation. In war-affected civilian populations, these processes may contribute to the preservation of functioning, identity, and psychological well-being; however, their relative importance is likely to vary according to individual characteristics, trauma exposure, social resources, and the continuing level of external threat.

For civilian mental health care in Ukraine, this synthesis supports consideration of approaches that extend beyond symptom reduction alone and explicitly address functioning under conditions of continuing threat. Clinically, this may include helping individuals distinguish controllable from uncontrollable aspects of their situation, reduce maladaptive rumination, preserve essential daily and social roles where feasible, and identify achievable, value-consistent actions. These clinical implications combine empirically supported therapeutic principles with theoretically informed, context-sensitive applications derived from the conceptual synthesis; they should not be regarded as a validated Ukraine-specific treatment protocol, and their effectiveness in this population requires prospective evaluation. Crucially, such approaches must not imply that civilians are responsible for the circumstances of war or for their psychological suffering. Their purpose is to preserve available domains of personal agency while fully acknowledging objective danger, loss, displacement, and injustice.

10 | Limitations

This narrative review has several limitations. First, because the review was not conducted as a systematic review, study selection was not exhaustive and may have been influenced by selection bias. Although the literature search was structured across several databases and evidence domains, formal risk-of-bias assessment was not performed.

Second, much of the underlying psychological and trauma-related literature relies on self-report measures, including symptom-based assessments of depression, anxiety, posttraumatic stress, rumination, perceived control, and related constructs. Such measures may be influenced by recall bias, reporting differences, and variation in the instruments and thresholds used across studies.

Third, direct evidence from Ukrainian civilian populations remains limited for several of the psychological constructs discussed in this review. Accordingly, some interpretations are based on evidence from other conflict-affected populations or

from broader trauma and chronic-stress research and should not be regarded as Ukraine-specific findings.

Finally, the neurobiological evidence included in this review is predominantly indirect and is derived mainly from experimental, clinical, trauma, and transdiagnostic neuroscience conducted outside Ukrainian civilian populations. The proposed relationships between psychological processes and functional brain systems should therefore be interpreted as conceptual and biologically plausible associations rather than as established causal mechanisms, diagnostic biomarkers, or neural alterations specifically demonstrated in civilians exposed to the ongoing war in Ukraine.

11 | Conclusions

Psychological resilience is not a moral characteristic but an emergent property arising from the integrated functioning of cognitive, emotional, and neurobiological systems [48, 49].

Persistent rumination, helplessness, and externally focused control beliefs are associated with poorer psychological adaptation, whereas self-compassion, meaning-making, and response-focused agency are more consistently associated with adaptive functioning [9, 10, 12, 13, 15–17, 19–22, 33–36, 46, 47]. Neurobiological interpretations of these relationships are plausible but remain partly indirect and should not be treated as established biomarkers.

The Ukrainian experience represents a distinctive context for studying adaptation while threat remains active and may contribute important evidence to trauma and resilience research [3–8].

Frankl's emphasis on responsibility for one's response remains conceptually relevant, provided that it is not used to minimize objective danger, social injustice, or the limits imposed by trauma [45].

Author Contributions

Nataliya Nekrasova: conceptualization, writing – original draft, writing – review and editing, methodology, formal analysis, supervision, data curation. **Yevgenia Solovyova:** data curation, formal analysis, writing – review and editing, writing – original draft, methodology. **Dmytro Butov:** data curation, formal analysis, methodology, writing – original draft. **Olivier Uwishema:** writing – original draft, writing – review and editing, conceptualization, formal analysis, project administration, supervision, methodology. **Oksana Kauk:** data curation, formal analysis, methodology, writing – original draft.

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responsibility for the integrity of the work and the accuracy of its presentation. The corresponding author affirms that this manuscript is an honest, accurate, and transparent account of the review; that no important aspects of the work have been omitted; and that any discrepancies from the originally intended structure have been appropriately addressed during revision.

Ethics Statement

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data supporting this narrative review are contained within the article and its cited sources.

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