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The internal health picture and coping strategies of Ukrainian men under wartime conditions: a neuropsychological and metacognitive model

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This study explores the neuropsychological and cognitive dimensions shaping the internal health picture (IHP) of Ukrainian men under wartime conditions in Ukraine.
The objective: **to elucidate the impact of wartime conditions on health perceptions and stress responses, proposing a comprehensive model integrating key psychological and cognitive factors.**
Materials and methods**. The study involved 342 men from the Kyiv region. Psychodiagnostic tools were applied to assess health-related quality of life, cognitive appraisal of stress, irrational belief systems, and socio-psychological personality traits. Factor analysis using IBM SPSS Statistics 28 was conducted to extract the principal components underlying the IHP and coping strategies under wartime conditions.**
Results**. The analysis revealed five key components of IHP for men with Constructive and Transformative Coping Strategies: Situational Awareness and Coping Mechanisms, Constructive Self-Perception and Social Functioning, Cognitive Flexibility and Problem-Solving, Resilience and Emotional Stability, and Health Perception and Stress Vulnerability. For men with Constructive and Adaptive Strategies, three components were identified: Cognitive and Situational Challenges, Emotional and Physical Health Interactions, and Health Perception and Resilience Factors. Men with Non-Constructive Strategies exhibited components centered around Negative Cognitive and Personality Traits, Emotional and Cognitive Difficulties, and Physical and Neurocognitive Health.**
The findings highlight the multifaceted impact of chronic stress and war on men's health, emphasizing the need for targeted interventions that address both psychological and physical dimensions. The study underscores the importance of enhancing cognitive skills, promoting emotional and social support, and improving physical health management to foster resilience and well-being.
Conclusions**. This comprehensive model provides a robust framework for understanding the IHP of Ukrainian men in war conditions. The research advocates for integrated healthcare approaches that address cognitive, emotional, and physical health, aiming to support the overall well-being and resilience of individuals during prolonged stress and wartime.**
Keywords: *internal health picture, men's health, wartime legal regime, full-scale russian invasion of Ukraine, irrational beliefs, attributional styles, personality functions, coping strategies, neurocognitive activity.*

Внутрішня картина здоров'я та копінг-стратегії в українських чоловіків в умовах воєнного стану: нейропсихологічна та метакогнітивна модель

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Дослідження презентує нейропсихологічні та когнітивні виміри, що формують внутрішню картину здоров'я українських чоловіків в умовах воєнного стану в Україні.
Мета дослідження: з'ясувати вплив воєнного стану на сприйняття і репрезентації здоров'я та реакції на стрес, пропонуючи комплексну модель психологічних і когнітивних факторів цього явища.
Матеріали та методи. У дослідженні взяли участь 342 чоловіки з Київської області. Було застосовано психодіагностичні методики для оцінювання якості життя, пов'язаної зі здоров'ям, когнітивного оцінювання стресу, ірраціональних переконань та соціально-психологічних рис особистості. Для виокремлення провідних компонентів, що лежать в основі моделі внутрішньої картини здоров'я та стратегій подолання в умовах воєнного часу, проведено факторний аналіз із використанням IBM SPSS Statistics 28.
Результати. Під час аналізу виявлено п'ять ключових компонентів внутрішньої картини здоров'я у чоловіків із конструктивно-трансформативними копінг-стратегіями: ситуаційна обізнаність і механізми подолання, конструктивне самосприйняття та соціальне функціонування, когнітивна гнучкість і розв'язання проблем, життєстійкість та емоційна стабільність, а також сприйняття здоров'я і вразливість до стресу. Для чоловіків із конструктивно-адаптивними стратегіями було виділено три компоненти: когнітивні та ситуативні виклики, взаємозв'язок емоційного й фізичного здоров'я, а також фактори сприйняття здоров'я та життєстійкості. Чоловіки з неконструктивними стратегіями демонстрували

компоненти, зосереджені на негативних когнітивних і особистісних рисах, емоційних та когнітивних труднощах, а також фізичному і нейрокогнітивному здоров'ї.
Отримані дані свідчать про багатогранний вплив хронічного стресу та війни на здоров'я чоловіків, наголошуючи на необхідності цілеспрямованих утручань, які охоплюють як психологічні, так і фізичні аспекти. У дослідженні акцентовано на важливості розвитку когнітивних навичок, емоційної та соціальної підтримки, а також на покращенні управління фізичним здоров'ям для зміцнення стійкості й благополуччя.
Висновки. Комплексна модель забезпечує надійну основу для розуміння внутрішньої картини здоров'я українських чоловіків в умовах воєнного стану. Дослідження виступає за інтегровані підходи до охорони здоров'я, які стосуються когнітивного, емоційного та фізичного здоров'я, спрямовані на підтримку загального благополуччя і життєстійкості громадян під час тривалого стресу в умовах воєнного стану.
Ключові слова: *внутрішня картина здоров'я, чоловіче здоров'я, правовий режим воєнного стану, повномасштабне російське вторгнення в Україну, ірраціональні переконання, атрибутивні стилі, особистісні функції, копінг-стратегії, нейрокогнітивна активність.*

The concept of the internal health picture (IHP) transcends mere somatic and psychological health indicators, representing a complex interplay of neuropsychological and cognitive factors. For Ukrainian men, the protracted and unpredictable full-scale russian invasion has created unique environmental and psychological conditions that deeply influence their IHP.

Based on a review of key health behavior theories [1], four factors potentially influencing individual behavioral intentions and actions were analyzed: perceived susceptibility to illness or infection; individual attitudes towards specific behaviors; behavioral norms influenced by close social and environmental factors; and self-efficacy, or confidence in performing and maintaining certain behaviors. The impact of media campaigns promoting healthy behaviors and preventing unhealthy ones is also emphasized. Research on subjective health evaluation and perception has traditionally focused on clinical and pathological signs, primarily of illness. These concepts are explored in various frameworks such as: internal picture of illness, awareness of illness, attitudes towards illness, autogenous representation of illness, somatonosognosia, illness experience, reaction to illness, personal stance towards illness, and self-image of disease [2]. The concept of the "internal health picture" remains underexplored and necessitates a positivist approach to fully understand its implications.

In the pursuit of precision medicine, integrating advanced imaging techniques with computational tools has proven transformative, as exemplified by Arnaout's work in applying machine learning to cardiac ultrasound [3]. This fusion of medicine and data science not only enhances diagnostic accuracy but also offers a model for understanding complex health phenomena such as the IHP. By leveraging similar interdisciplinary approaches, we can better comprehend how chronic stress and prolonged wartime impact neuropsychological and cognitive processes in individuals, particularly Ukrainian men.

In understanding the complex interplay between mental and physical health, recent studies have highlighted the importance of comprehensive care across both domains. Koomson, Shotton, Docherty, and Srivastava [4] underscore the need for integrated physical healthcare within mental health inpatient settings to improve patient outcomes. Their review, conducted by the National Confidential Enquiry into Patient Outcome and Death, reveals systemic barriers and suggests clinical and organizational changes to enhance care quality [4]. This integrated approach resonates with the concept of the IHP, where neuropsychological and cognitive processes are crucial for managing health, particularly under prolonged stress.

In examining the nuanced relationship between mental and physical health, Molloy, Brand, Munro, and Pope [5] provide a critical look at the phenomenon of diagnostic overshadowing, where physical symptoms of mental health consumers are often misattributed to their mental disorders by healthcare professionals. Their systematic review highlights the multifaceted nature of this issue, including systemic healthcare flaws, limited mental health expertise among professionals, and the stigmatization faced by mental health consumers [5]. This understanding is crucial for developing a comprehensive IHP, which integrates neuropsychological and cognitive processes to improve healthcare delivery for those under chronic stress, such as Ukrainian men in war zones.

Our previous research underscores the necessity of viewing the IHP of men, particularly in the context of the ongoing armed aggression, as a multifaceted phenomenon. We explored the intricate connections between health perceptions, personality adaptation, and psychosomatic responses in men living under prolonged stress [6]. Similarly, studies on the psychological impact of military aggression on Ukrainian youth [7] and the psychological underpinnings of terror awareness [8] further highlight the complex interplay between mental health, stress, and physical health in war zones.

Drawing on these insights, this article delves into the neuropsychological and cognitive dimensions of the IHP for Ukrainian men affected by the ongoing wartime. It examines how chronic stress alters brain function, impacting key regions such as the prefrontal cortex (PFC), amygdala, hippocampus, and anterior cingulate cortex. Additionally, it explores the role of metacognitive processes, including self-monitoring, cognitive reappraisal, and adaptive coping, in shaping health perceptions and responses. By integrating these neuropsychological and cognitive factors, we aim to provide a comprehensive understanding of the IHP and propose targeted interventions to support the mental and physical well-being of men in war-affected regions.

The primary objective of this study is to develop a comprehensive neuropsychological and metacognitive model of the IHP for Ukrainian men amidst prolonged wartime. By examining the interplay of key factors such as irrational beliefs, attributional styles, situational assessment and response, personality functions, coping strategies, neurocognitive functioning and personality traits, this research aims to elucidate how chronic stress and wartime impact mental and physical health perceptions.

Theoretical Framework

Neuropsychological and Metacognitive Nature of the IHP

Chronic stress and illness significantly impact brain function, leading to alterations in both structure and activity. The brain's response to these persistent stressors involves several key regions, each contributing to different aspects of cognition and emotional regulation, ultimately influencing the IHP.

The PFC plays a crucial role in executive functions, decision-making, and rational thought processes. It is essential for planning, regulating behavior, and solving problems. Chronic stress, however, can impair the function of the PFC, leading to difficulties in handling everyday challenges and increasing vulnerability to irrational beliefs. Prolonged stress diminishes the PFC's ability to exert top-down control over emotional responses, which can result in heightened emotional reactivity and poor decision-making. This is particularly important in the context of the IHP, as it undermines the individual's capacity for logical reasoning and effective problem-solving, leading to a distorted perception of health and well-being.

The PFC is central to the uniqueness of human experience and is often involved in mental health disorders. Noninvasive neuromodulation techniques, such as electroconvulsive therapy (ECT), repetitive transcranial magnetic stimulation (rTMS), and transcranial direct current stimulation (tDCS), can directly target the PFC and its neural circuits, unlike pharmacotherapy [9]. Neuroimaging studies have consistently shown abnormal activity patterns in the PFC and connected circuits in obsessive-compulsive disorder (OCD) during symptom provocation and neurocognitive tasks. Advances in technology now allow these findings to inform the development of novel targeted interventions [10].

The amygdala plays a crucial role in emotional regulation and threat detection. It is the brain's alarm system, activating in response to perceived dangers. Prolonged stress can result in hyperactivity of the amygdala, which heightens anxiety and fear responses. This heightened state of emotional arousal contributes to an exaggerated perception of threats to health and well-being, thereby distorting the IHP. An overactive amygdala can lead to persistent feelings of fear and anxiety, making it difficult for individuals to accurately assess their health status and manage stress effectively.

Anxiety is experienced in response to threats that are distal or uncertain, involving changes in one's subjective state, autonomic responses, and behavior. Defensive and physiological responses to threats that involve the amygdala and brainstem are conserved across species. While anxiety responses typically serve an adaptive purpose, when excessive, unregulated, and generalized, they can become maladaptive, leading to distress and avoidance of potentially threatening situations. In primates, anxiety can be regulated by the PFC, which has expanded in evolution. This prefrontal expansion is thought to underlie primates' increased capacity to engage high-level regulatory strategies aimed at coping with and modifying the experience of anxiety.

The specialized primate lateral, medial, and orbital PFC sectors are connected with association and limbic cortices, the latter of which are connected with the amygdala and brainstem autonomic structures that underlie emotional and physiological arousal. PFC pathways that interface with distinct inhibitory systems within the cortex, the amygdala, or the thalamus can regulate responses by modulating neuronal output. Within the PFC, pathways connecting cortical regions are poised to reduce noise and enhance signals for cognitive operations that regulate anxiety processing and autonomic drive. Specialized PFC pathways to the inhibitory thalamic reticular nucleus suggest a mechanism to allow passage of relevant signals from thalamus to cortex, and in the amygdala to modulate the output to autonomic structures.

Disruption of specific nodes within the PFC that interface with inhibitory systems can affect the negative bias, failure to regulate autonomic arousal, and avoidance that characterize anxiety disorders [11].

The hippocampus is essential for memory formation and learning. It allows individuals to process and retrieve health-related information accurately. Chronic stress, however, can cause hippocampal atrophy, resulting in impaired cognitive processing and the inability to form accurate health perceptions. When the hippocampus is compromised, individuals may struggle with memory and learning, leading to skewed interpretations of their health status based on incomplete or inaccurate information. This can further distort the IHP, as the ability to recall past health experiences and apply that knowledge to current situations is impaired.

The human hippocampal-dentate complex and the adjacent entorhinal cortex undergo a sequence of histological changes during aging and senescence. These alterations loosely correlate with the individual's age and more precisely fit with the degree of clinical and psychosocial deterioration demonstrated before death. Structural changes in these areas include the loss of dendrite spines, distortion and swelling of the cell-body dendrite complex, and progressive destruction of the dendrite domain. Since a significant fraction of archicortical neurons may be involved, many synaptic connections are lost, reducing the computational power of these areas. Psychophysiological studies strongly suggest a relationship between the human hippocampus-entorhinal complex and memory formation and retrieval. Animal studies indicate that the hippocampus may act as a cognitive mapping system, generating working models of the environment, which facilitate context-dependent behavior in changing settings. Thus, progressive alteration of hippocampal function with aging and senescence could significantly contribute to the increasing confusion and disorientation common in senile individuals [12].

Anxiety disorders are currently a major psychiatric and social problem, with mechanisms that are only partially understood. The hippocampus is a major target of stress mediators and is closely related to anxiety modulation. However, its complex anatomy has posed challenges for research into anxiety regulation mechanisms. Recent advances in imaging, virus tracking, and optogenetics/chemogenetics have elucidated the activity, connectivity, and function of specific cell types within the hippocampus and its connected brain regions, providing mechanistic insights into the hippocampal circuitry underlying anxiety.

Studies of hippocampal neurotransmitter systems, including glutamatergic, GABAergic, cholinergic, dopaminergic, and serotonergic systems, have contributed to understanding the neural mechanisms of anxiety. Neuropeptides and neuroinflammatory factors are also involved in anxiety modulation. This comprehensive review of hippocampal mechanisms associated with anxiety modulation provides tailored targets for future anxiety treatment [13].

The Anterior Cingulate Cortex (ACC) is involved in emotional regulation and error detection. It helps individuals manage their emotional responses and adapt to new information. Dysfunction in the ACC, often a consequence of chronic stress, can lead to heightened emotional responses and difficulties in adapting to changing circumstances. This dysfunction is significant in the context of the IHP, as it affects the ability to regulate emotions effectively and respond to health-related stressors with appropriate coping mechanisms. An impaired ACC can result in persistent emotional turmoil and a distorted view of one's health, making it challenging to maintain a balanced and accurate IHP.

Convergent studies have highlighted the amygdala-based and dorsal ACC (dACC)-based circuit or network dysfunction in post-traumatic stress disorder (PTSD). Previous research often faced complications due to the diversity of trauma types, psychiatric comorbidities, chronic illness duration, and medication effects on brain function. Notably, the functional integration between the amygdala and dACC is often disrupted in PTSD. Studies investigating the effective connectivity (EC) between these regions using resting-state functional magnetic resonance imaging (fMRI) data from drug-naive PTSD patients reveal distinct interaction patterns compared to trauma-exposed controls without PTSD. These differences, characterized by positive EC in PTSD patients and negative EC in controls, highlight the altered communication between the amygdala-dACC and other brain regions such as the PFC and inferior parietal lobule. This dysconnectivity could serve as an early diagnostic biomarker for PTSD, reflecting the pathophysiology of the disorder and its impact on emotional regulation and stress response [14]. This impaired regulation could further distort an individual's health perception and their ability to cope with stress effectively, emphasizing the need for targeted interventions to enhance ACC function [15].

These neuropsychological factors collectively influence the IHP, shaping how individuals perceive and respond to their health amid chronic stress and illness. Understanding the role of these brain regions provides insight into the complexities of the IHP and highlights the need for targeted interventions to support mental and physical well-being in individuals experiencing prolonged stress.

Metacognition and IHP

Metacognition refers to the awareness and regulation of one's cognitive processes, playing a crucial role in how individuals perceive and manage their health and well-being [16, 17]. In the context of the IHP, metacognitive processes are essential for maintaining an accurate and adaptive understanding of one's health status. These processes include self-monitoring, cognitive reappraisal, and adaptive coping strategies.

Self-monitoring is the ability to observe and evaluate one's health status. It involves being attuned to bodily sensations, symptoms, and overall health indicators. Effective self-monitoring enables individuals to detect early signs of health issues and respond appropriately. This metacognitive skill is vital for maintaining an accurate IHP, as it ensures that health perceptions are based on current and reliable information. Without effective self-monitoring, individuals may either overlook significant health problems or misinterpret normal bodily sensations as pathological, leading to unnecessary anxiety and distorted health perceptions.

Koriat [18] emphasizes the importance of metacognitive processes in decision-making and self-regulation. Effective self-monitoring involves judgments of learning (JOLs), feeling-of-knowing (FOK) judgments, and confidence judgments, which are critical in ensuring accurate self-assessments and decision-making processes related to health. These judgments help individuals evaluate their knowledge about their health and recognize when they need to seek medical advice or adjust their health behaviors. In the context of the prolonged war in Ukraine, where stress levels are high, the ability to self-monitor accurately can be compromised, leading to distorted health perceptions and inappropriate health behaviors.

In addition to self-monitoring, self-regulation encompasses a broader range of processes including motivation, behavioral strategies, and a sense of self-efficacy. Zimmerman [19] argues that self-regulation involves more than just metacognitive skills; it also includes an underlying sense of personal agency and the motivation to put self-beliefs into action. In the war-torn context, maintaining motivation and a sense of control over one's health can be particularly challenging, yet they are crucial for effective self-regulation. The social cognitive perspective highlights the interaction between metacognitive skills and motivational processes, suggesting that failures in self-regulation often stem from a lack of confidence and motivation rather than a lack of knowledge.

For Ukrainian men facing prolonged war, the stress and trauma associated with their experiences can significantly impact their metacognitive and self-regulatory processes. Chronic stress can impair cognitive functions, including memory and attention, making it difficult to accurately monitor health status and respond to health-related stressors. An integrated approach that includes both neuropsychological and cognitive models is necessary to understand and support their health perceptions and behaviors. Interventions should aim to enhance metacognitive skills, such as self-monitoring and cognitive reappraisal, while also addressing motivational and emotional factors that influence self-regulation.

Cognitive reappraisal is the process of reinterpreting negative health-related thoughts into more positive or realistic ones. This metacognitive strategy involves challenging irrational beliefs and reframing them in a way that reduces their emotional impact. For example, instead of catastrophizing a minor health symptom, cognitive reappraisal allows an individual to view it as a manageable issue. This process is crucial for maintaining a balanced IHP, as it helps individuals regulate their emotional responses to health-related stressors and fosters a more realistic and constructive

outlook on their health. Effective cognitive reappraisal can mitigate the impact of chronic stress on health perceptions, promoting psychological resilience and well-being.

Mindfulness plays a significant role in positive reappraisal. According to Garland, Gaylord, and Park [20], mindfulness meditation enables individuals to engage in positive reappraisal by fostering a metacognitive awareness that helps in decentering, or stepping back from, one's thoughts and emotions. This shift in cognitive perspective allows individuals to reinterpret stressful health-related thoughts more constructively. Mindfulness facilitates a nonjudgmental awareness of present experiences, enabling individuals to detach from their initial stress appraisals and engage in more adaptive reappraisal processes. This ability to positively reappraise stressful health situations is critical in maintaining an accurate and balanced IHP, especially under prolonged stress conditions such as those experienced by Ukrainian men amid war.

Further supporting the effectiveness of cognitive reappraisal, Troy et al. [21] found that cognitive reappraisal and acceptance are both beneficial strategies for regulating emotions. Their research indicates that while cognitive reappraisal is particularly effective in reducing negative emotions and increasing positive emotions in the short term, acceptance may be less cognitively demanding and effective in managing physiological stress responses. These findings suggest that integrating both reappraisal and acceptance strategies can enhance emotional regulation and resilience, crucial for individuals facing continuous stress and health threats.

The ability to accurately monitor and reinterpret health-related thoughts is essential for maintaining a realistic IHP. Koriat [18] emphasizes the role of metacognitive processes in self-monitoring and self-regulation, highlighting that accurate JOLs and confidence assessments are crucial in decision-making. Effective self-monitoring, as described by Koriat, ensures that health perceptions are based on reliable information, enabling individuals to respond appropriately to health concerns. In the context of prolonged war, where stress levels are heightened, the ability to engage in cognitive reappraisal and maintain effective self-monitoring becomes even more critical.

Additionally, Zimmerman [19] underscores the importance of self-efficacy and personal agency in self-regulation. Beyond metacognitive skills, the motivation and confidence to apply these skills are crucial for effective health management. In war-torn environments, fostering a sense of control and agency can significantly impact an individual's ability to cope with health-related stressors. Interventions that enhance both metacognitive strategies and self-efficacy are likely to be more effective in supporting the mental health and well-being of Ukrainian men during prolonged war.

In summary, cognitive reappraisal and mindfulness are integral to maintaining an accurate and adaptive IHP. These strategies help individuals manage their emotional responses to health-related stressors, fostering resilience and well-being. By integrating cognitive reappraisal with mindfulness practices and enhancing self-efficacy, interventions can better support individuals facing prolonged stress, such as those in war-torn regions.

Adaptive coping involves implementing strategies to manage stress and maintain well-being. Metacognitive awareness plays a key role in selecting and applying appropriate coping mechanisms in response to health-related challenges. Adaptive coping strategies may include problem-solving, seeking social support, and engaging in health-promoting behaviors. These strategies help individuals navigate the complexities of their health status, reducing the impact of stress and promoting a more positive IHP. Conversely, maladaptive coping strategies, such as avoidance or denial, can exacerbate stress and lead to distorted health perceptions. Metacognitive regulation ensures that coping strategies are effective and aligned with the individual's health goals.

Fischer, Scheunemann, and Moritz [22] highlight the context-dependent functionality of coping strategies, indicating that the effectiveness of these strategies can vary depending on the circumstances. Their study found significant associations between adaptive coping and positive outcomes, such as subjective well-being and lower levels of depression. Specifically, adaptive coping strategies, such as problem-solving and seeking social support, were linked to higher scores on the Scale of Positive and Negative Affect (SPANE) and the Temporal Satisfaction with Life Scale (TSWLS), as well as lower scores on the Patient Health Questionnaire (PHQ-9), indicating reduced depressive symptoms. On the other hand, maladaptive coping strategies, including avoidance and expressive suppression, were associated with negative outcomes, such as increased depression and lower subjective well-being. These findings underscore the importance of context in determining the functionality of coping strategies and the necessity of fostering adaptive coping mechanisms to enhance well-being [22].

In the context of prolonged war, such as the situation faced by Ukrainian men, coping resources like social support and self-efficacy become even more critical. Schwarzer [23] emphasizes the significant role of self-efficacy and social support in fostering resilience amidst trauma resulting from military war. High levels of self-efficacy enable individuals to employ adaptive coping mechanisms effectively, such as seeking social support and utilizing problem-solving skills. This can mitigate the emotional and psychological impact of trauma, promoting a more resilient response. Conversely, low self-efficacy can hinder effective coping, increasing the risk of mental health issues like PTSD.

Social support also plays a pivotal role in the psychological well-being of individuals exposed to war-related stressors. The presence of a robust social network can provide emotional comfort, practical assistance, and a sense of belonging, all of which are crucial for coping with the challenges posed by trauma. However, it is important to acknowledge that social support can have adverse effects in certain circumstances, such as the "war stress sharing deterioration effect", where sharing stress with others in similar situations can exacerbate stress levels [23].

The concept of collective efficacy within communities affected by military war is another crucial factor. Communities that share a collective belief in their ability to cope, recover, and rebuild demonstrate higher levels

of resilience and social cohesion. This collective efficacy fosters a supportive environment that enhances individual coping mechanisms, contributing to the overall well-being of the community.

In conclusion, adaptive coping strategies, supported by metacognitive awareness, play a vital role in maintaining a balanced and positive IHP. The context in which these strategies are applied significantly impacts their effectiveness. For Ukrainian men enduring prolonged war, enhancing self-efficacy, fostering social support, and promoting collective efficacy are essential components of adaptive coping. These elements not only aid in managing stress but also contribute to the resilience and psychological well-being necessary to navigate the complexities of their health status in such challenging circumstances.

In summary, metacognitive processes are integral to the IHP, influencing how individuals monitor, interpret, and respond to their health. By enhancing self-monitoring, cognitive reappraisal, and adaptive coping, individuals can develop a more accurate and resilient IHP, better equipped to handle the challenges of chronic stress and illness. Understanding and leveraging these metacognitive processes is essential for supporting mental and physical well-being, particularly in populations facing prolonged and intense stressors, such as Ukrainian men in the context of ongoing war.

A Comprehensive Framework for Analyzing the IHP amid Wartime

In examining these factors, it is crucial to understand how chronic stress and prolonged war impact neuropsychological and cognitive processes. By leveraging interdisciplinary approaches that combine advanced imaging techniques and computational tools, we can better comprehend the intricate ways in which stress affects brain function and behavior. This understanding forms the foundation for the seven key factors that shape the IHP, providing a framework to explore how irrational beliefs, attributional styles, situational assessment and response, personality functions, coping strategies, personality traits, and neurocognitive activity collectively influence health perceptions and responses in war-affected individuals.

The proposed model of the IHP for Ukrainian men amidst prolonged war integrates the aforementioned factors into a cohesive framework. This model posits that:

Irrational Beliefs create a foundational lens through which experiences are interpreted, often leading to heightened stress and maladaptive responses. These beliefs can manifest as catastrophizing, rigid expectations, low frustration tolerance, and contingent self-worth, distorting the perception of health and well-being.

Attributional Styles further color these interpretations, determining whether events are viewed with optimism or pessimism. Positive attributional styles (e.g., seeing challenges as temporary and specific) can foster resilience, while negative styles (e.g., viewing challenges as permanent and pervasive) can exacerbate feelings of helplessness and despair.

Situational Assessment and Response capabilities allow for real-time evaluations of threats and challenges, influencing immediate coping decisions. Accurate situational assessments enable effective responses, crucial for preserving mental health in a war-ridden environment.

Constructiveness, Destructiveness, and Deficit in Personality Functions shape overall self-perception and behavioral tendencies. Constructive personality functions promote positive self-perception and proactive behaviors, while destructive functions and perceived deficits can hinder effective coping and exacerbate stress responses, negatively impacting the IHP.

Coping Strategies employed in response to stressors dictate the effectiveness of managing ongoing challenges and maintaining mental equilibrium. Constructive and transformative and constructive and adaptive strategies promote resilience and positive health perceptions, whereas non-constructive strategies can lead to increased psychological distress.

Personality Traits underpin the stability and adaptability of the IHP, contributing to sustained health perceptions and responses. Traits such as resilience, social competence, and self-regulation are particularly relevant in the context of prolonged war, fostering adaptive responses and positive health perceptions.

Neurocognitive Activity involves both active and passive states of brain function critical to executive functions and overall cognitive health. This includes sustained attention, complex problem-solving, working memory, goal-directed behavior, and decision-making. Understanding neurocognitive activity helps to identify how chronic stress and war impact executive functions and mental health, influencing how individuals process information, make decisions, and regulate emotions.

This integrated model highlights the need for targeted interventions that address both neuropsychological and cognitive dimensions to support the mental and physical well-being of individuals in war-affected regions. By considering these interconnected factors, we can develop more effective strategies to enhance the IHP of Ukrainian men facing prolonged war. This comprehensive model provides a framework for future research and interventions aimed at supporting the mental and physical health of individuals in war zones.

MATERIALS AND METHODS

This cross-sectional study was conducted from December 2023 through March 2024 and included 342 Ukrainian men, aged 32 to 46 years. All participants were conscription-age Ukrainian citizens, a factor contributing to macro-level stress due to the high likelihood of being mobilized for military service. Considering that coping strategies are generally regarded as stable patterns of stress-management behavior, it was hypothesized that these strategies would reflect the intensity and impact of stress among participants – a premise consistent with the conceptual definition of coping.

The respondents were classified into three groups according to their results on the Cognitive-Behavioral Coping Strategies Detection Method (I. Syzova, S. Filippchenkova):

- first group (n = 159): men characterized by constructive transformative coping strategies;
- second group (n = 77): men characterized by constructive and adaptive coping strategies;
- third group (n = 106): men characterized by non-constructive coping strategies.

The aim was to investigate the IHP of Ukrainian men in wartime, based on neuropsychological and metacognitive points.

The research utilized the following methodologies:

- Cognitive-Behavioral Coping Strategies Detection Method (I. Syzova, S. Filippchenkova) – to identify the primary coping strategies of the participants, categorized into Constructive Transformative, Constructive Adaptive, and Non-Constructive strategies [2];
- Survey of Personal Beliefs (SPB) – to diagnose irrational beliefs based on aspects such as Awfulizing, Self-Directed Shoulds, Other-Directed Shoulds, Low Frustration Tolerance, and Self-Worth [24];
- Attributional Styles Test (L. Rudina) – to assess how individuals attribute causes to events, focusing on dimensions like Permanent Bad, Permanent Good, Pervasiveness Bad, Pervasiveness Good, Personalization of Bad, and Personalization of Good [25, 26];
- Short Form Health Survey (MOS SF-36) – to evaluate overall well-being and satisfaction with life aspects affected by health, covering Physical Functioning, Physical Role, Bodily Pain, General Health, Vitality, Social Functioning, Emotional Role, and Mental Health [27];
- Situational Difficulty and Uncertainty Scale (SDUS) (N. Vodopyanova) – to assess cognitive appraisal of stressful situations, including threat, loss, challenge, control, and understanding [25];
- I-Structural Test of Ammon – to assess personality functions, including constructive values, destructive values, and perceived deficits [28];
- California Psychological Inventory (CPI) – to empirically verify social-psychological properties such as Dominance, Sociability, Self-Acceptance, Empathy, Responsibility, Socialization, Self-Control, and others [29];
- Scale of Cognitive Assessment of Executive Network Activity (S. Sereda, V. Lunov, 2023) – to assess critical cognitive domains related to executive functions, including Sustained Attention, Complex Problem-Solving, Working Memory, Goal-Directed Behavior, and Decision-Making [30];
- Scale of Assessment of Passive Neurocognitive Activity (S. Sereda, V. Lunov, 2023) – to evaluate passive brain function across seven factors, providing insights into attention maintenance, cognitive flexibility, deep connections with self and the world, social connection circuits, temporal integration, creative abilities, and memory recall [31];
- Scale of Psychological Assessment of Ability for Objective Cognitive Evaluation (S. Sereda, V. Lunov, 2023) – to measure activities involved in detecting and integrating emotional and sensory stimuli, modulating attention shifts between internal and external cognition, facilitating communication and social behavior, and enhancing self-awareness and information integration [32].

Each methodology provided valuable insights into the cognitive, emotional, and behavioral aspects shaping the IHP of Ukrainian men under prolonged stress, contributing to a comprehensive understanding of their health perceptions and responses.

RESULTS AND DISCUSSION

Component analysis for men with constructive and transformative coping strategies

Now, we specifically present the results of the IHP analysis for men experiencing psychosomatic disorders and complaints, who are characterized by Constructive and Transformative Strategies in their coping behavior (Fig. 1). Through the application of factor analysis, we aim to uncover the core components that define the IHP of Ukrainian men amidst prolonged wartime. This analysis not only provides a deeper understanding of the factors influencing their health but also informs the development of tailored interventions to support their well-being in the face of ongoing the period of active hostilities. The results of this factor analysis are detailed in the subsequent sections, highlighting the key dimensions that emerged from our study.

Component 1: Situational Awareness and Coping Mechanisms

This component encapsulates the ability of individuals to perceive and manage stressful situations through effective situational awareness and coping strategies. High loadings on several variables suggest that individuals significantly rely on recognizing patterns, striving for independence, and utilizing intellectual capabilities to navigate stress.

Repetitiveness (SDUS), with a loading of 0.813, indicates that individuals are highly aware of the repetitive nature of stressful situations, which can influence their stress response mechanisms by providing a framework for recognizing and anticipating recurring challenges. *Achievement through Independence* (CPI Ai), with a loading of 0.777, reflects a strong tendency to achieve goals independently. This independence is crucial for effective coping in unpredictable environments, where relying on one's own capabilities becomes essential. *Intellectual Efficiency* (CPI Ie), with a loading of 0.738, denotes the ability to process information and solve problems efficiently. This intellectual capability is essential for managing stress, as it allows individuals to analyze situations, devise solutions, and implement them effectively. *Sociability* (CPI So), with a loading of 0.660, highlights the importance of maintaining social interactions. Social support is a critical buffer against stress, providing emotional and practical assistance that can mitigate the impact of stressors. *Degree of Threat* (SDUS), with a loading of –0.628, indicates that a lower perception of threat levels contributes to a more balanced stress response. Individuals who perceive less threat are likely to experience lower levels of stress and anxiety, enabling them to maintain psychological stability. *Attributional Style – Pervasiveness of Bad*, with a loading of –0.543, suggests a lesser tendency to view negative events as pervasive. This perception enhances resilience, as individuals are more likely to see challenges as isolated incidents rather than as reflective of their overall situation. *Emotional Role* (SF-36), with a loading of 0.532, implies that emotional well-being significantly impacts role functioning. High emotional well-being allows individuals to fulfill their roles and responsibilities effectively, even in stressful contexts.

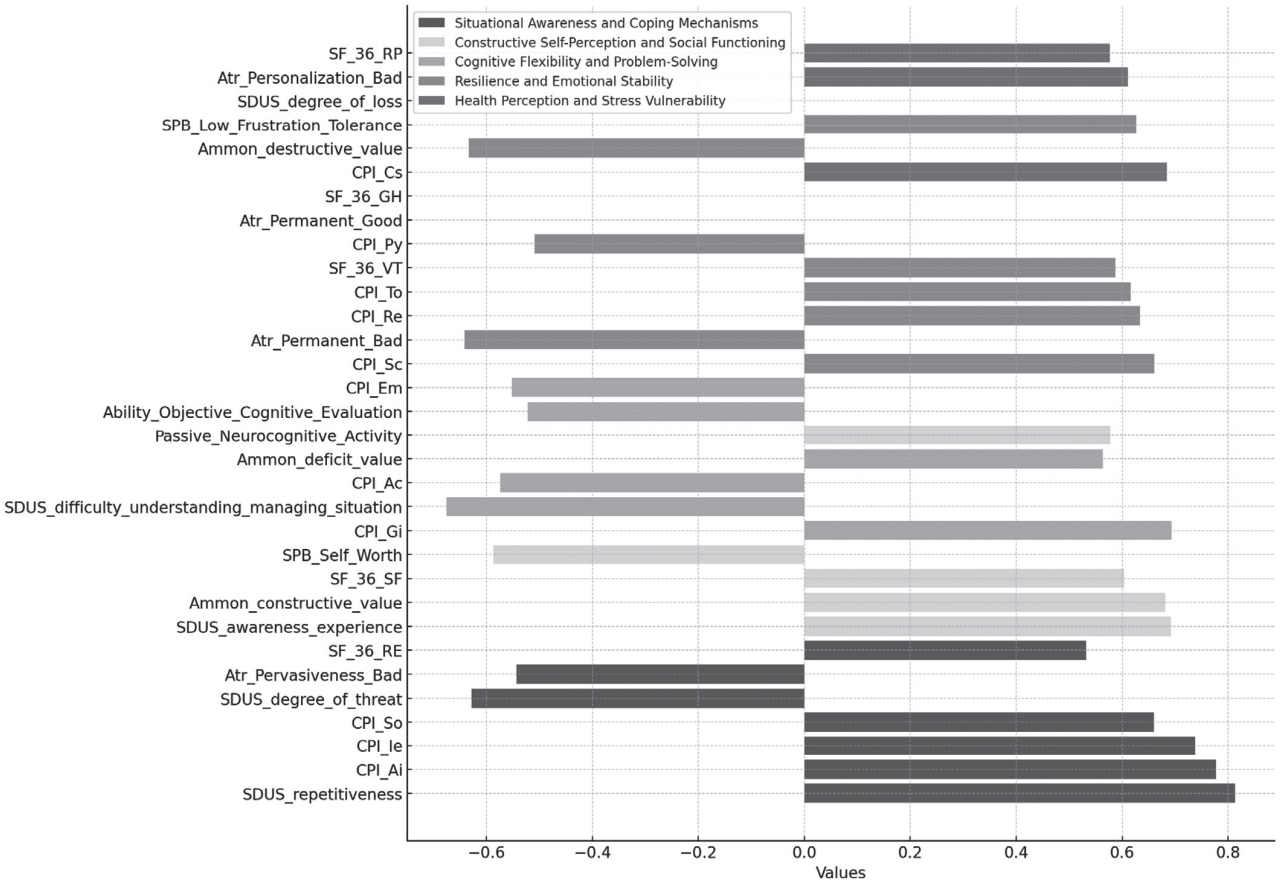

Fig. 1. IHP for men characterized by constructive transformative strategies in their coping behavior

Notes: SF_36_RP – Role limitations due to physical health; Atr_Personalization_Bad (Attributional Style – Pervasiveness of Bad) – Negative events perceived as pervasive; SDUS_degree_of_loss – Perceived degree of loss due to stress; SPB_Low_Frustration_Tolerance – Tolerance level towards frustration; Ammon_destructive_value – Destructive personality traits; CPI_Cs – Capacity for status; SF_36_GH – General health perception; Atr_Permanent_Good (Attributional Style – Permanent Good) – Positive events seen as lasting; CPI_Py – Psychological mindedness; SF_36_VT – Vitality; CPI_To – Tolerance; CPI_Re – Responsibility; Atr_Permanent_Bad (Attributional Style – Permanent Bad) – Negative events seen as lasting; CPI_Sc – Self-control; CPI_Em – Empathy; Ability_Objective_Cognitive_Evaluation – The ability to objectively evaluate cognitive functions; Passive_Neurocognitive_Activity – Engagement in passive cognitive tasks like reflection; Ammon_deficit_value – Deficits in personality functions; CPI_Ac – ; SDUS_difficulty_understanding_managing_situation – Challenges in understanding and managing stressors; CPI_Gi – Good impression; SPB_Self_Worth – Beliefs about self-worth; SF_36_SF – Social functioning; Ammon_constructive_value – Constructive personality traits; SDUS_awareness_experience – Awareness of personal experiences; SF_36_RE – Role limitations due to emotional health; Atr_Pervasiveness_Bad – Attributional style indicating a tendency to view negative events as pervasive; SDUS_degree_of_threat – Perceived threat levels in stressful situations; CPI_SO – Sociability; CPI_Ie – Intellectual efficiency; CPI_Ai – Achievement through independence; SDUS_repetitiveness – Awareness of repetitive stressors.

This component reveals a comprehensive picture of how situational awareness and coping mechanisms shape the internal health landscape for Ukrainian men under prolonged stress. The high awareness of repetitive stressors (SDUS Repetitiveness) suggests that these men can recognize and anticipate ongoing challenges, providing a foundation for adaptive coping. Their achievement through independence (CPI Ai) and intellectual efficiency (CPI Ie) indicate a robust internal resource for problem-solving and stress management, essential for navigating the complexities of war.

The importance of sociability (CPI So) underscores the role of social networks in buffering stress, while a lower perceived degree of threat (SDUS Degree of Threat) highlights a more balanced approach to stress appraisal. The reduced tendency to view negative events as pervasive (Attributional Style – Pervasiveness Bad) fosters resilience, enabling individuals to compartmentalize stressors and maintain a positive outlook.

Finally, the impact of emotional well-being on role functioning (SF-36 RE) demonstrates the critical interplay between emotional health and practical life management. Together, these factors paint a detailed picture of how cognitive, emotional, and social resources converge to support the mental health of Ukrainian men facing prolonged war, providing valuable insights for designing targeted interventions.

Component 2: Constructive Self-Perception and Social Functioning

This component emphasizes the critical role of constructive self-perception and effective social functioning in preserving mental health. The variables with high loadings in this component highlight the importance of awareness, constructive personality traits, and social interactions.

Experience of Awareness (SDUS), with a loading of 0.692, indicates a high level of awareness of personal expe-

riences. This heightened awareness enables individuals to assess situations more accurately, leading to more effective coping strategies. *Constructive Value of self-functioning* (Ammon), with a loading of 0.682, signifies a strong presence of constructive personality functions. These functions support a positive self-perception and encourage proactive behaviors, which are essential for maintaining mental health. *Social Functioning* (SF-36), with a loading of 0.604, underscores the significance of social interactions in shaping health perceptions. Positive social interactions provide emotional support and enhance overall well-being. *Self-Worth* (SPB), with a loading of –0.587, reflects fewer irrational beliefs regarding self-worth. This reduction in irrational beliefs is associated with lower stress levels and improved mental health, as individuals maintain a more balanced and realistic self-view. *Passive Neurocognitive Activity*, with a loading of 0.578, denotes engagement in passive cognitive activities. These activities, such as relaxation and reflection, play a supportive role in managing stress and promoting mental health.

This component provides a detailed understanding of how constructive self-perception and social functioning contribute to the IHP of Ukrainian men facing prolonged war. The strong awareness of personal experiences (SDUS Awareness Experience) enables these individuals to navigate stressful situations with greater precision and efficacy. The presence of constructive personality traits (Ammon Constructive Value) fosters a positive self-image and encourages behaviors that support mental health. The importance of social interactions (SF-36 SF) highlights the role of community and relationships in providing emotional support and enhancing health perceptions. Fewer irrational beliefs about self-worth (SPB Self-Worth) lead to reduced stress and a more stable mental state. Engagement in passive neurocognitive activities further supports this stability by allowing for periods of mental rest and reflection.

Collectively, these factors illustrate how a combination of self-awareness, constructive personality traits, and social support mechanisms work together to maintain mental health in the face of ongoing stress. This insight is crucial for developing interventions that strengthen these areas, ultimately aiding the well-being of individuals living in war zones.

Component 3: Cognitive Flexibility and Problem-Solving

This component underscores the importance of cognitive flexibility and effective problem-solving skills in maintaining mental health under stress. Key variables in this component highlight the capacity to manage situations effectively and make favorable impressions, which in turn bolster social support and resilience against stress.

Good Impression (CPI Gi), with a loading of 0.693, reflects an individual's tendency to create positive impressions on others. This ability is crucial for gaining social support, which serves as a buffer against stress and enhances overall resilience. *Difficulty Understanding Managing Situation* (SDUS), with a loading of –0.675, signifies a better grasp and management of challenging situations. Effective situational understanding and management reduce stress by fostering a sense of control and competency. *Achievement through Conformity* (CPI Ac), with a loading of –0.574, suggests a preference for independent problem-solving over conformist approaches. This independence in addressing issues contributes to more effective and personalized coping strategies. *Deficit Value of self-functioning* (Ammon) with a loading of 0.564, highlights areas of deficiency in personality functions. Recognizing these deficits is critical for identifying areas that require development to enhance coping mechanisms and overall mental health. *Empathy* (CPI Em), with a loading of –0.552, indicates lower empathy scores. While empathy is generally beneficial, lower scores may reduce emotional involvement, potentially allowing individuals to maintain emotional stability in high-stress environments.

This component elucidates the crucial role of cognitive flexibility and problem-solving abilities in shaping the IHP of Ukrainian men under prolonged stress. The capacity to make good impressions (CPI Gi) is linked with increased social support, which is vital for resilience. Better understanding and managing difficult situations (SDUS Difficulty Understanding Managing Situation) empower individuals to handle stress more effectively by fostering a sense of control. The inclination towards independent problem-solving (CPI Ac) underscores the importance of self-reliance in developing effective coping strategies. Identifying personality deficits (Ammon Deficit Value) is essential for targeted interventions that aim to bolster deficient areas, thereby improving overall coping capacity. Lower empathy scores (CPI Em) suggest a potential strategy for maintaining emotional distance, which can be protective in extremely stressful conditions.

Overall, this component reveals how cognitive flexibility and adept problem-solving are pivotal for managing stress and maintaining mental health. By enhancing these skills and addressing identified deficits, interventions can significantly improve the psychological resilience of individuals in war-affected regions.

Component 4: Resilience and Emotional Stability

This component embodies resilience and emotional stability, essential for sustaining mental health under prolonged stress. The significant loadings on variables such as self-control, tolerance, and vitality highlight the importance of these traits in effective stress management and psychological well-being.

Self-Control (CPI Sc), with a loading of 0.661, indicates a strong capacity to regulate emotions and behavior. This self-regulation is vital for maintaining composure and effectively managing stress. *Attributional Style – Permanent Bad*, with a loading of –0.641, suggests a lower tendency to perceive negative events as permanent. This attributional style fosters resilience by promoting a more flexible and hopeful outlook on challenging situations. *Responsibility* (CPI Re), with a loading of 0.634, reflects a pronounced sense of duty and reliability. This sense of responsibility enhances coping mechanisms by encouraging proactive problem-solving and accountability. *Tolerance* (CPI To), with a loading of 0.616, denotes an acceptance of others' behaviors and opinions. High tolerance reduces interpersonal stress and fosters a more harmonious social environment. *Vitality* (SF-36), with a loading of 0.587, suggests overall energy and liveliness. High vitality

contributes to better mental health by providing the physical and psychological energy needed to face stressors. *Psychological Mindedness* (CPI Py), with a loading of –0.509, indicates lower levels of introspective thinking. Reduced introspection might mitigate the tendency to over-analyze situations, thereby decreasing stress levels.

This component reveals the critical role of resilience and emotional stability in the IHP of Ukrainian men enduring prolonged war. Self-control (CPI Sc) is a key trait, allowing individuals to manage their emotions and behaviors effectively, which is essential for maintaining mental stability in stressful environments. The lower tendency to view negative events as permanent (Attributional Style – Permanent Bad) supports a resilient mindset, helping individuals to adapt and recover from setbacks. A strong sense of responsibility (CPI Re) underpins proactive coping strategies, as individuals feel a duty to address and manage their challenges. Tolerance (CPI To) plays a crucial role in reducing social friction and enhancing interpersonal relationships, which can be a significant source of support during difficult times. Vitality (SF-36 VT) reflects the overall energy levels that are necessary for enduring prolonged stress. High vitality ensures that individuals have the physical and mental resources to cope effectively. Finally, lower psychological mindedness (CPI Py) suggests a tendency to avoid excessive introspection, which can prevent the over-analysis that often exacerbates stress.

Together, these factors illustrate a comprehensive model of resilience and emotional stability, highlighting the traits that support mental health under sustained stress. By fostering these attributes, interventions can enhance the psychological resilience and well-being of individuals in war-affected areas.

Component 5: Health Perception and Stress Vulnerability

This component highlights the influence of health perception and susceptibility to stress on the overall IHP. The key variables here reflect elements such as social status, destructive personality traits, and frustration tolerance, which together shape how individuals perceive their health and respond to stress.

Capacity for Status (CPI Cs), with a loading of 0.684, signifies an individual's ability to navigate social hierarchies and maintain social standing. This ability is crucial as it can affect one's self-esteem and overall health perception, especially in social contexts where status is important. *Destructive Value of self-functioning* (Ammon), with a loading of –0.633, indicates the presence of destructive personality traits. These traits can negatively impact health perceptions by fostering maladaptive behaviors and thought patterns that increase stress and reduce overall well-being. *Low Frustration Tolerance* (SPB), with a loading of 0.627, points to a low tolerance for frustration. This trait can exacerbate stress and contribute to a negative perception of health, as individuals with low frustration tolerance are less able to cope with challenges effectively. *Attributional Style – Personalization of Bad*, with a loading of 0.611, reflects a tendency to personalize negative events. This tendency increases vulnerability to stress by making individuals feel personally responsible for adverse outcomes, thereby intensifying their stress responses and negatively affecting their health perception. *Physical Role* (SF-36), with a loading of 0.577, underscores the significant impact of physical health on role functioning. This suggests that physical health issues can profoundly influence how individuals perceive their ability to fulfill their roles and responsibilities, affecting their overall health perception.

This component elucidates how perceptions of health and vulnerability to stress interconnect to shape the IHP of Ukrainian men enduring prolonged war. The capacity for social status (CPI Cs) plays a significant role in self-esteem and social acceptance, which are critical for positive health perceptions. Conversely, the presence of destructive personality traits (Ammon Destructive Value) undermines these positive perceptions, promoting behaviors and thoughts that are detrimental to health. Low frustration tolerance (SPB Low Frustration Tolerance) further compounds stress, as individuals struggle to manage everyday frustrations and challenges. This exacerbates negative health perceptions and increases stress vulnerability. The personalization of negative events (Attributional Style – Personalization of Bad) adds another layer of stress by making individuals feel personally accountable for adverse circumstances, thereby intensifying their stress and negatively impacting their mental health. Finally, the impact of physical health on role functioning (SF-36 RP) highlights how physical health problems can limit individuals' ability to perform their duties, leading to a diminished sense of capability and overall well-being.

Together, these factors present a comprehensive view of how health perception and stress vulnerability interplay to influence the IHP. Understanding these dynamics is essential for developing interventions that address both the psychological and physical aspects of health, ultimately improving the resilience and well-being of individuals living in war-affected regions.

These five components offer a comprehensive neuropsychological and cognitive model of the IHP for Ukrainian men amidst prolonged war. By integrating factors such as situational awareness, self-perception, cognitive flexibility, resilience, and health perception, this model provides valuable insights for targeted interventions aimed at supporting mental and physical well-being in war-affected populations.

By integrating these components, this model offers a detailed understanding of the neuropsychological and cognitive factors influencing the IHP of Ukrainian men amidst prolonged war. This comprehensive framework informs the development of tailored interventions that address both psychological and physical aspects of health. Such interventions can enhance resilience, improve mental and physical well-being, and provide crucial support to individuals living in war-affected regions.

Component Analysis for Men with Constructive and Adaptive Coping Strategies

For the second group of men, characterized by somatic and psychosomatic complaints and employing Constructive and Adaptive Coping Strategies, we have identified three key components that define their IHP (Fig. 2). These components are derived from factor analysis and reflect various cognitive, emotional, and behavioral aspects that contribute to their health perceptions and stress responses.

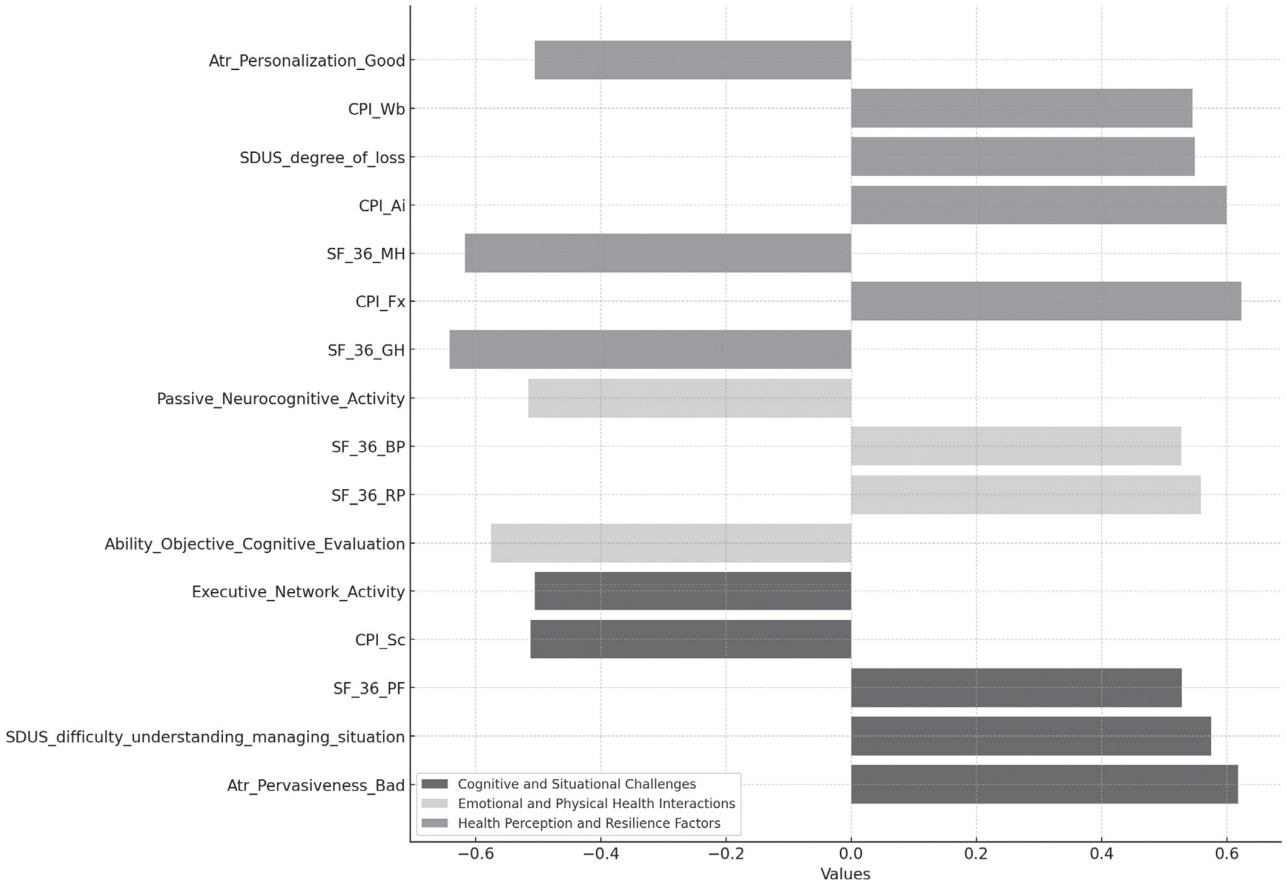

Fig. 2. IHP for men characterized by constructive and adaptive coping strategies

Notes: Atr_Personalization_Good – Attributional style indicating positive personalization of events; CPI_Wb – Well-being as measured by the California Psychological Inventory; SDUS_degree_of_loss – Perceived degree of loss due to stress; CPI_Ai – Achievement through independence; SF_36_MH – Mental health status; CPI_Fx – Flexibility, indicating cognitive and behavioral adaptability; SF_36_GH – General health perception; Passive_Neurocognitive_Activity – Engagement in passive cognitive tasks, such as reflection or rumination; SF_36_BP – Bodily pain and its impact on health perception; SF_36_RP – Role limitations due to physical health problems; Ability_Objective_Cognitive_Evaluation – Assessment of cognitive ability and accuracy in evaluating situations; Executive_Network_Activity – Activity within the brain's executive network, essential for decision-making and problem-solving; CPI_Sc – Self-control, indicating the ability to regulate emotions and behavior; SF_36_PF – Physical functioning and its impact on daily activities; SDUS_difficulty_understanding_managing_situation – Difficulty in understanding and managing stressors; Atr_Pervasiveness_Bad – Attributional style indicating a tendency to view negative events as pervasive.

Component 1: Cognitive and Situational Challenges

This component highlights the cognitive and situational challenges that influence the IHP of Ukrainian men characterized by Constructive and Adaptive Coping Strategies. The high loadings on variables such as the pervasiveness of bad events, difficulty in understanding and managing situations, and physical functioning underscore the significant impact of cognitive and situational appraisals on health perceptions.

Attributional Style – Pervasiveness of Bad, with a loading of 0.618, indicates a strong tendency among individuals to perceive negative events as pervasive and widespread. This cognitive bias can lead to a generalized sense of hopelessness, making it difficult for individuals to see beyond their current challenges. When negative events are seen as affecting many areas of life, it can significantly deteriorate one's mental health by fostering a sense of inescapability and overwhelming distress. This pervasive negativity can also lower motivation to engage in positive health behaviors, further impacting physical and mental health. *Difficulty Understanding Managing Situation* (SDUS), with a loading of 0.575, points to significant challenges in comprehending and managing stressful situations. When individuals find it difficult to understand the nature of their stressors or how to address them, it leads to increased anxiety and a feeling of being overwhelmed. This cognitive strain can manifest as difficulty concentrating, making decisions, and taking effective action, thereby exacerbating stress and potentially leading to chronic health complaints. *Physical Functioning* (SF-36), with a loading of 0.528, reflects the profound impact of physical health limitations on overall health perception. Physical functioning is a critical aspect of health, and when it is compromised, it affects an individual's ability to perform daily activities and maintain independence. Poor physical functioning can lead to frustration, a sense of helplessness, and decreased life satisfaction. This negative self-assessment of physical capability often translates into a broader negative view of one's overall health. *Self-Control* (CPI Sc), with a loading of –0.512, signifies lower self-control, which can impair effective stress management and coping abilities. Self-control is essential for regulating

emotions and behaviors, especially in stressful situations. Low self-control can result in impulsive reactions, difficulty adhering to health-promoting behaviors, and increased vulnerability to stress. Without adequate self-regulation, individuals may struggle to maintain healthy routines and manage stress effectively, leading to a deterioration in both mental and physical health. *Executive Network Activity*, with a loading of –0.505, indicates reduced executive functioning, which is crucial for effective decision-making and problem-solving. Executive functions, such as planning, attention, and working memory, are essential for managing complex and stressful situations. When these cognitive processes are impaired, individuals may find it challenging to organize their thoughts, develop strategies to deal with stressors, and follow through with plans. This cognitive impairment can lead to a cycle of ineffective coping and increased stress, further affecting their overall health.

Component 1 provides a detailed picture of the cognitive and situational challenges that shape the internal health landscape for Ukrainian men utilizing Constructive and Adaptive Coping Strategies. The tendency to view negative events as pervasive (Atr Pervasiveness Bad) contributes to a generalized sense of hopelessness, making it difficult for these individuals to maintain a positive outlook on their health and future. This cognitive distortion is compounded by significant challenges in understanding and managing stressful situations (SDUS Difficulty Understanding Managing Situation), which heightens anxiety and stress. The impact of poor physical functioning (SF-36 PF) on health perception is profound, as physical limitations not only hinder daily activities but also contribute to a negative self-assessment of overall health. Lower self-control (CPI Sc) further exacerbates these challenges by impairing emotional regulation and stress management, leading to impulsive behaviors and difficulty maintaining health-promoting routines. Reduced executive functioning (Executive Network Activity) hampers decision-making and problem-solving, essential skills for effective stress management. Overall, this component reveals a complex interplay between cognitive biases, situational appraisals, and physical health, highlighting the need for interventions that address both cognitive and physical aspects of health. Enhancing cognitive flexibility, improving situational understanding, and strengthening self-control and executive functions can help these individuals better manage stress and improve their overall health perceptions.

Component 2: Emotional and Physical Health Interactions

This component underscores the intricate interplay between emotional and physical health, demonstrating how these dimensions collectively shape health perceptions and stress responses in individuals. High loadings on variables related to role limitations due to physical problems, bodily pain, and cognitive engagement emphasize the profound impact of these factors on the IHP.

Ability Objective Cognitive Evaluation, with a loading of –0.575, indicates significant challenges in accurately assessing and executing cognitive tasks. This difficulty can impair coping strategies and stress management by limiting the individual's ability to process information effectively, make sound decisions, and apply appropriate coping mechanisms. When cognitive evaluation is compromised, individuals may struggle to understand their stressors and formulate effective responses, leading to increased anxiety and reduced confidence in handling stress.

Physical Role (SF-36), with a loading of 0.558, highlights the impact of physical health limitations on role performance. Physical health problems can restrict an individual's ability to perform daily roles and responsibilities, both at work and home. This limitation can lead to frustration, a diminished sense of purpose, and increased stress, as individuals may feel inadequate or unable to fulfill their expected roles. Consequently, these physical constraints contribute to a negative perception of overall health and well-being. *Bodily Pain* (SF-36), with a loading of 0.527, illustrates the significant impact of pain on overall health perception and well-being. Chronic pain can be debilitating, affecting not only physical functioning but also emotional health. Persistent pain can lead to emotional distress, depression, and anxiety, further complicating the individual's ability to manage stress. The presence of bodily pain often serves as a constant reminder of health issues, thereby reinforcing negative health perceptions. *Passive Neurocognitive Activity*, with a loading of –0.516, denotes engagement in passive cognitive processes. This might reflect reduced cognitive engagement, which can be indicative of higher stress levels and a tendency to withdraw from active problem-solving. Passive cognitive activities, such as rumination or daydreaming, can often exacerbate feelings of helplessness and anxiety, as individuals may become preoccupied with their stressors without actively seeking solutions. This reduced cognitive engagement can hinder effective coping and lead to a cycle of increased stress and negative health perceptions.

Component 2 provides a detailed understanding of how emotional and physical health interactions influence the IHP of Ukrainian men using Constructive and Adaptive Coping Strategies. The challenges in objective cognitive evaluation (Ability Objective Cognitive Evaluation) highlight the need for improved cognitive processing and problem-solving skills to enhance coping strategies and stress management. Effective cognitive engagement is crucial for accurately assessing stressors and implementing appropriate responses. The significant impact of physical health limitations on role performance (SF-36 RP) underscores the importance of maintaining physical health to fulfill daily responsibilities. Role limitations due to physical health problems can lead to increased stress and negative health perceptions, emphasizing the need for interventions that address physical health and its influence on emotional well-being. The profound effect of bodily pain (SF-36 BP) on overall health perception and well-being highlights the necessity of pain management strategies to improve quality of life. Chronic pain can significantly impair both physical and emotional health, reinforcing negative health perceptions and increasing stress levels. Lastly, the engagement in passive neurocognitive activities (Passive Neurocognitive Activity) indicates a tendency towards reduced cognitive engagement, which can exacerbate stress and hinder effective coping.

Encouraging active cognitive engagement and problem-solving can help break the cycle of stress and negative health perceptions, promoting a more proactive approach to managing stressors.

Overall, this component emphasizes the need for holistic interventions that address both emotional and physical health to improve the overall well-being and health perceptions of individuals. By enhancing cognitive skills, managing physical health limitations, and reducing chronic pain, individuals can better cope with stress and maintain a more positive IHP.

Component 3: Health Perception and Resilience Factors

This component focuses on health perception and resilience factors that are crucial in shaping the IHP of individuals. The key variables include general health, mental health, and personality traits associated with flexibility and achievement, which collectively influence how individuals perceive their health and manage stress.

General Health (SF-36), with a loading of –0.641, signifies a negative perception of general health. This negative self-assessment can profoundly impact overall well-being and stress levels. When individuals view their general health as poor, it can lead to feelings of vulnerability and helplessness, thereby increasing psychological distress and reducing the ability to cope effectively with stressors. *Flexibility* (CPI Fx), with a loading of 0.623, highlights the importance of cognitive and behavioral flexibility in managing stress and maintaining mental health. Flexibility allows individuals to adapt to changing circumstances and stressors, find alternative solutions to problems, and recover more quickly from setbacks. This trait is essential for resilience, as it enables a proactive and adaptive approach to managing life's challenges. *Mental Health* (SF-36 MH), with a loading of –0.617, reflects a lower mental health status. Poor mental health can exacerbate stress and negatively affect health perception, creating a feedback loop where psychological distress further impairs mental and physical health. Lower mental health status can hinder an individual's ability to engage in positive health behaviors and effectively manage stress. *Achievement through Independence* (CPI Ai), with a loading of 0.599, underscores the role of independence in achieving goals. This trait contributes to positive health perceptions and resilience by fostering a sense of self-efficacy and personal achievement. Individuals who feel capable of achieving their goals independently are likely to experience higher levels of satisfaction and lower levels of stress. *Degree of Loss* (SDUS), with a loading of 0.549, highlights the perception of loss, which can significantly impact stress levels and health perception. Perceiving a high degree of loss can lead to feelings of grief and helplessness, intensifying psychological distress and negatively affecting overall health. *Well-being* (CPI Wb), with a loading of 0.545, reflects overall well-being, which is crucial for positive health perceptions and effective stress management. A high sense of well-being is associated with lower stress levels, better health outcomes, and greater resilience in the face of adversity. *Attributional Style – Personalization of Good*, with a loading of –0.505, indicates a lower tendency to attribute positive events to personal actions. This might reduce positive reinforcement and resilience, as individuals may not fully recognize or internalize their role in achieving positive outcomes, thereby missing opportunities to build self-efficacy and confidence.

Component 3 provides insight into how health perception and resilience factors interplay to shape the IHP of Ukrainian men using Constructive and Adaptive Coping Strategies. The negative perception of general health (SF-36 GH) highlights the need for interventions that improve self-assessment of health to foster better overall well-being. Cognitive and behavioral flexibility (CPI Fx) is crucial for adapting to stressors and maintaining mental health, suggesting that enhancing flexibility could improve resilience. The lower mental health status (SF-36 MH) underscores the importance of mental health support to mitigate stress and improve health perceptions. Independence in achieving goals (CPI Ai) fosters a sense of self-efficacy and resilience, indicating that empowering individuals to achieve their goals can positively influence their health perception and stress management. The perception of loss (SDUS Degree of Loss) significantly impacts stress levels and health perception, highlighting the need for coping strategies that address feelings of loss and grief. Overall well-being (CPI Wb) is a critical factor for positive health perceptions and effective stress management, suggesting that interventions aimed at improving well-being can have broad benefits for mental and physical health. Finally, a lower tendency to attribute positive events to personal actions (Atr Personalization Good) suggests the need for strategies that help individuals recognize and internalize their achievements, thereby enhancing positive reinforcement and resilience.

By understanding these factors, targeted interventions can be developed to improve health perceptions and resilience, ultimately supporting the mental and physical well-being of individuals in war-affected regions.

For this group of men with somatic and psychosomatic complaints who utilize Constructive and Adaptive Coping Strategies, the factor analysis reveals a complex interplay of cognitive, emotional, and physical health factors.

Component 1 focuses on the cognitive and situational challenges that exacerbate stress and negatively impact health perceptions. These include a pervasive view of negative events, difficulty managing stressful situations, and physical health limitations.

Component 2 highlights the interaction between emotional and physical health, showing how physical pain and limitations can affect overall health perception and stress levels. Reduced cognitive engagement also plays a role in heightening stress.

Component 3 emphasizes the importance of health perception and resilience factors, such as flexibility, independence, and overall well-being, in shaping the IHP. Negative perceptions of general and mental health significantly contribute to stress and hinder effective coping.

By understanding these components, targeted interventions can be developed to address the specific needs of this population, enhancing their coping strategies and overall mental and physical well-being amidst prolonged stress.

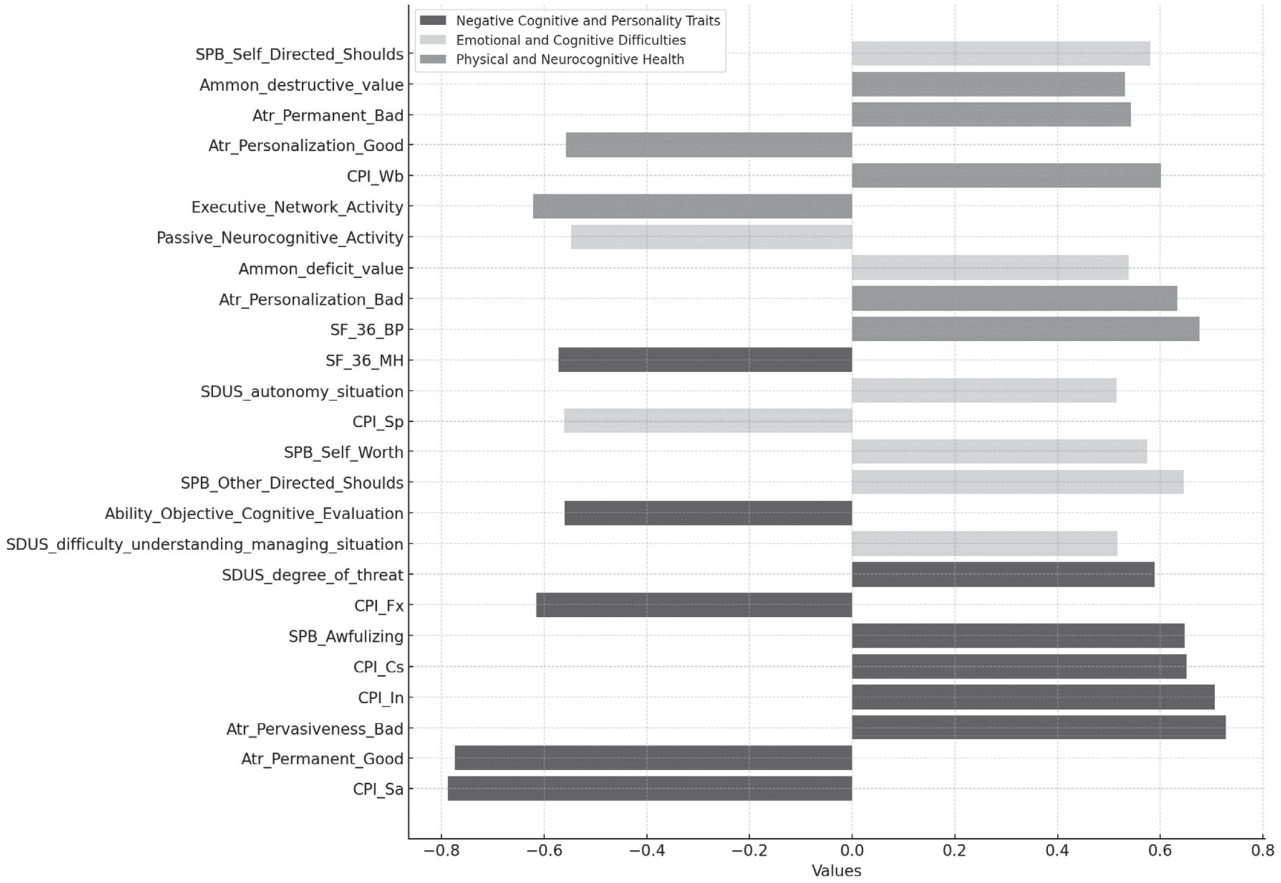

Fig. 3. IHP for men characterized by non-constructive coping strategies

Notes: SPB_Self_Directed_Shoulds – Internal pressures and unrealistic self-expectations; Ammon_destructive_value – Destructive personality traits; Atr_Permanent_Bad – Attributional style indicating negative events are seen as lasting; Atr_Personalization_Good – Attributional style indicating positive personalization of events; CPI_Wb – Overall well-being as measured by the California Psychological Inventory; Executive_Network_Activity – Activity within the brain's executive network, crucial for decision-making and problem-solving; Passive_Neurocognitive_Activity – Engagement in passive cognitive tasks, such as reflection or rumination; Ammon_deficit_value – Deficits in personality functioning; Atr_Personalization_Bad – Attributional style indicating negative personalization of events; SF_36_BP – Bodily pain and its impact on health perception; SF_36_MH – Mental health status; SDUS_autonomy_situation – Perceived autonomy in situations; CPI_Sp – Social presence, reflecting ease in social interactions; SPB_Self_Worth – Beliefs about self-worth; SPB_Other_Directed_Shoulds – External pressures and expectations; Ability_Objective_Cognitive_Evaluation – Assessment of cognitive ability and accuracy in evaluating situations; SDUS_difficulty_understanding_managing_situation – Difficulty in understanding and managing stressors; SDUS_degree_of _threat – Perceived threat levels in stressful situations; CPI_Fx – Flexibility, indicating cognitive and behavioral adaptability; SPB_Awfulizing – Tendency to catastrophize situations; CPI_Cs – Capacity for social status; CPI_In – Independence as a personal trait; Atr_Pervasiveness_Bad – Attributional style indicating a tendency to view negative events as widespread; Atr_Permanent_Good – Attributional style indicating positive events are seen as lasting; CPI_Sa – Self-acceptance, reflecting acceptance of personal traits and behaviors.

Component analysis for men with non-constructive coping strategies

For the third group of men, characterized by psychosomatic disorders and employing Non-Constructive Coping Strategies, the factor analysis identifies three key components that elucidate their IHP (Fig. 3). These components reflect various cognitive, emotional, and behavioral dimensions impacting their health perceptions and responses to stress.

Component 1: Negative Cognitive and Personality Traits

This component highlights the significant influence of negative cognitive and personality traits on health perception and stress responses among men characterized by non-constructive coping strategies. The high loadings on variables such as self-acceptance, attributional styles, and personality traits underscore their pivotal role in shaping the internal health landscape.

Self-Acceptance (CPI Sa), with a loading of –0.788, signifies low self-acceptance. Individuals with low self-acceptance often grapple with issues of self-esteem and self-worth, which can lead to heightened stress and poor health perceptions. This lack of self-acceptance fosters negative self-evaluations and a persistent sense of inadequacy, exacerbating psychological distress. Low self-acceptance can create a cycle of negative thinking that undermines efforts to maintain or improve health, leading to further emotional and physical deterioration. *Attributional Style – Permanent Good*, with a loading of –0.774, indicates a lower tendency to perceive positive events as lasting. This negative bias diminishes optimism and resilience, leading to a more pessimistic outlook on life and health. When individuals do not see positive events as enduring, they are less likely to draw strength and encouragement from them, making it harder to build resilience against stress. *Attributional Style – Pervasiveness*

of Bad, with a loading of 0.728, reflects a tendency to view negative events as widespread and pervasive. This cognitive distortion can create a sense of helplessness and chronic stress, adversely affecting mental and physical health. Viewing problems as all-encompassing and insurmountable can lead to feelings of overwhelm, reducing an individual's motivation to engage in health-promoting behaviors. *Independence* (CPI In), with a loading of 0.706, highlights a trait of independence. While independence is generally positive, in the context of non-constructive coping strategies, it may reflect a reluctance to seek support. This can exacerbate stress and health issues, as individuals may feel isolated and overwhelmed by their challenges. Independence, in this negative context, can mean that individuals are less likely to reach out for social support, which is crucial for managing stress and maintaining mental health. *Capacity for Status* (CPI Cs), with a loading of 0.651, suggests that individuals place high value on social status. This emphasis on status can lead to significant stress if individuals feel they are not meeting social expectations or achieving desired status. The pressure to attain and maintain a certain social standing can lead to chronic stress and anxiety, negatively impacting both mental and physical health. *Awfulizing* (SPB), with a loading of 0.647, indicates a tendency to catastrophize situations. Awfulizing can significantly increase stress and negatively impact health perceptions by making individuals feel overwhelmed and hopeless. This form of cognitive distortion amplifies the perceived severity of stressors, making it difficult to manage them effectively and leading to greater psychological and physiological strain. *Flexibility* (CPI Fx), with a loading of –0.615, reflects low flexibility. Lack of cognitive and behavioral flexibility can hinder effective stress management and adaptation to changing circumstances. This rigidity can lead to increased stress and poor health outcomes, as individuals may struggle to adjust their coping strategies in response to new or escalating stressors. *Degree of Threat* (SDUS), with a loading of 0.589, signifies a high perception of threat. This heightened sense of threat can lead to chronic stress and anxiety, impacting overall health. Perceiving situations as highly threatening can trigger persistent anxiety and fear responses, which over time can lead to serious mental and physical health problems.

Component 1 provides a comprehensive understanding of how negative cognitive and personality traits shape the IHP of men with non-constructive coping strategies. Low self-acceptance (CPI Sa) and the tendency to see positive events as fleeting (Attributional Style – Permanent Good) contribute to a pervasive sense of inadequacy and hopelessness, which undermine mental health. Viewing negative events as widespread (Attributional Style – Pervasiveness Bad) and catastrophic thinking (SPB Awfulizing) further exacerbate stress and hinder effective coping. Independence (CPI In) and the emphasis on social status (CPI Cs) indicate potential social isolation and pressure to meet external expectations, which can lead to chronic stress. Low cognitive flexibility (CPI Fx) and a high perception of threat (SDUS Degree of Threat) suggest difficulties in adapting to stressors and heightened anxiety, which negatively impact overall health. By addressing these cognitive distortions and personality traits through targeted interventions, it is possible to improve health perceptions and stress responses. Enhancing self-acceptance, fostering a more balanced attributional style, promoting flexibility, and reducing the emphasis on social status can help these individuals develop more constructive coping strategies and improve their overall well-being.

Component 2: Emotional and Cognitive Difficulties

This component underscores the complex interaction between emotional difficulties and cognitive challenges, highlighting their collective impact on health perception and stress management. The high loadings on variables such as difficulties in situational management, self-worth, and external expectations reflect the significant role these factors play in shaping the IHP.

Difficulty Understanding Managing Situation (SDUS), with a loading of 0.517, indicates significant challenges in comprehending and managing stressful situations. Individuals who struggle to understand and navigate complex or stressful scenarios are more likely to experience heightened stress and anxiety. This cognitive difficulty can lead to a sense of being overwhelmed and unable to cope, exacerbating health complaints and negatively impacting overall well-being. *Ability Objective Cognitive Evaluation*, with a loading of –0.560, reflects challenges in accurately evaluating cognitive tasks. Impaired cognitive evaluation can hinder effective stress management and coping strategies, as individuals may struggle to assess situations accurately and develop appropriate responses. This impairment can lead to repeated mistakes, frustration, and a sense of helplessness, further compounding stress levels. *Other-Directed Shoulds* (SPB), with a loading of 0.646, denotes the influence of external pressures and expectations. When individuals feel compelled to meet unrealistic or demanding expectations from others, it can lead to significant stress and negative health perceptions. The pressure to conform to others' standards can diminish personal autonomy and self-worth, resulting in chronic stress and health issues. *Self-Worth* (SPB), with a loading of 0.574, indicates low self-worth. Low self-worth is a critical factor contributing to negative health perceptions and increased stress. Individuals with low self-worth may feel inadequate or undeserving of good health, which can lead to self-neglect and a lack of motivation to engage in health-promoting behaviors. *Social Presence* (CPI Sp), with a loading of –0.561, reflects low social presence. This indicates difficulties in social interactions and obtaining social support, which are crucial for managing stress and maintaining mental health. Low social presence can lead to feelings of isolation and loneliness, exacerbating stress and contributing to negative health outcomes. *Autonomy Situation* (SDUS), with a loading of 0.515, highlights perceived autonomy in situations. While autonomy is generally seen as positive, in this context, it might reflect a sense of isolation or lack of support. When individuals feel they must handle challenges alone, without sufficient social or emotional support, it can increase stress and negatively impact health.

Component 2 reveals how emotional difficulties and cognitive challenges interplay to influence the IHP of men with non-constructive coping strategies. Signifi-

cant challenges in understanding and managing stressful situations (SDUS Difficulty Understanding Managing Situation) lead to increased stress and exacerbate health complaints. Impaired cognitive evaluation (Ability Objective Cognitive Evaluation) further hinders effective stress management and coping, creating a cycle of stress and poor health outcomes. The influence of external pressures (SPB Other-Directed Shoulds) and low self-worth (SPB Self-Worth) highlights the detrimental effects of unrealistic expectations and a negative self-view on health perception. These factors can lead to chronic stress, as individuals strive to meet external standards while feeling internally inadequate. Low social presence (CPI Sp) and perceived autonomy (SDUS Autonomy Situation) suggest difficulties in obtaining social support and a sense of isolation, which are crucial for effective stress management. The lack of social interactions and support can lead to increased feelings of loneliness and stress, negatively impacting overall health. Addressing these emotional and cognitive difficulties through targeted interventions can significantly improve health perceptions and stress management. Enhancing cognitive evaluation skills, fostering realistic self-worth, reducing external pressures, and improving social support can help individuals develop more effective coping strategies and improve their overall well-being.

Component 3: Physical and Neurocognitive Health

This component examines the interplay between physical health, neurocognitive functioning, and overall well-being. It highlights how these factors collectively influence health perception and stress responses, particularly in men characterized by non-constructive coping strategies. High loadings on variables related to bodily pain, neurocognitive activity, and cognitive biases underscore their significant impact on internal health perceptions.

Bodily Pain (SF-36), with a loading of 0.676, underscores the significant impact of bodily pain on health perception and overall well-being. Chronic pain can severely affect both physical and mental health by limiting mobility, disrupting sleep, and contributing to ongoing stress. The persistent discomfort associated with chronic pain can lead to frustration, irritability, and a reduced quality of life, which in turn negatively affects mental health and stress levels. *Attributional Style – Personalization of Bad*, with a loading of 0.633, reflects a tendency to personalize negative events. This cognitive bias leads individuals to attribute negative outcomes to their own actions or characteristics, resulting in increased stress and feelings of personal failure. Such personalization can diminish self-esteem and exacerbate feelings of guilt and inadequacy, further harming mental health and health perceptions. *Deficit Value of self-functioning* (Ammon), with a loading of 0.538, indicates deficits in personality functions. These deficits can impair effective coping and stress management, making individuals more vulnerable to stress and less capable of maintaining positive health behaviors. Deficits in key personality functions can lead to ineffective responses to stress, increasing the likelihood of negative health outcomes. *Passive Neurocognitive Activity*, with a loading of –0.548, suggests reduced cognitive engagement. Low levels of active cognitive processing and engagement can result in higher stress levels and impaired problem-solving abilities. When individuals are less cognitively engaged, they may be more prone to passive rumination, which can exacerbate feelings of helplessness and stress. *Executive Network Activity*, with a loading of –0.622, reflects reduced executive functioning. Impaired executive functions, such as planning, decision-making, and cognitive flexibility, hinder effective stress management and lead to poor health perceptions. Reduced executive functioning can make it difficult to navigate complex situations and stressors, leading to increased frustration and anxiety. *Well-being* (CPI Wb), with a loading of 0.601, highlights the importance of overall well-being in health perception. High levels of well-being are crucial for effective stress management and positive health outcomes. Individuals with a strong sense of well-being are better equipped to handle stress and maintain a positive outlook on their health. *Attributional Style – Personalization of Good*, with a loading of –0.558, indicates a lower tendency to attribute positive events to personal actions. This can reduce positive reinforcement and resilience, as individuals may not fully recognize or internalize their role in achieving positive outcomes. Underappreciating one's contributions to positive events can undermine self-efficacy and confidence. *Attributional Style – Permanent Bad*, with a loading of 0.543, suggests a tendency to view negative events as permanent. This cognitive bias can lead to a sense of hopelessness and chronic stress, adversely affecting health. Viewing negative events as unchangeable can discourage efforts to improve one's situation, fostering a cycle of negative health perceptions and stress. *Destructive Value of self-functioning* (Ammon), with a loading of 0.531, reflects the presence of destructive personality traits. These traits can undermine effective coping strategies and contribute to negative health perceptions. Destructive personality traits may lead to maladaptive behaviors that exacerbate stress and health problems. *Self-Directed Shoulds* (SPB), with a loading of 0.581, indicates internal pressures and unrealistic self-expectations. These self-imposed pressures can increase stress and negatively impact health perceptions by creating a constant sense of inadequacy and failure to meet one's own high standards.

Component 3 elucidates the critical role that physical health and neurocognitive functioning play in shaping the IHP of men with non-constructive coping strategies. Chronic bodily pain (SF-36 BP) significantly undermines both physical and mental health, leading to increased stress and reduced quality of life. The tendency to personalize negative events (Attributional Style – Personalization of Bad) and view negative outcomes as permanent (Attributional Style – Permanent Bad) further exacerbates stress and diminishes health perceptions. Deficits in personality functions (Ammon Deficit Value) and reduced cognitive engagement (Passive Neurocognitive Activity) hinder effective stress management and problem-solving, leading to negative health outcomes. Impaired executive functioning (Executive Network Activity) complicates decision-making and stress navigation, contributing to poor health perceptions. High well-being (CPI Wb) is essential for effective stress management and positive health

outcomes, indicating that interventions should focus on enhancing overall well-being. Conversely, a lower tendency to attribute positive events to personal actions (Attributional Style – Personalization of Good) and internal pressures from unrealistic self-expectations (SPB Self-Directed Shoulds) undermine resilience and exacerbate stress. By addressing these physical and neurocognitive challenges through targeted interventions, it is possible to improve health perceptions and stress responses. Strategies to manage chronic pain, enhance cognitive engagement, improve executive functioning, and foster realistic self-expectations can significantly enhance the well-being and health outcomes of individuals using non-constructive coping strategies.

For men with psychosomatic disorders characterized by Non-Constructive Coping Strategies, the factor analysis reveals a complex interplay of negative cognitive, emotional, and physical health factors.

Component 1 highlights the influence of negative cognitive and personality traits on health perception and stress responses. Low self-acceptance, a tendency to perceive negative events as permanent and pervasive, and high value placed on social status can contribute to chronic stress and poor health perceptions. Catastrophizing and low cognitive flexibility further exacerbate these challenges.

Component 2 underscores the interaction between emotional difficulties and cognitive challenges. Issues with understanding and managing stressful situations, low self-worth, and external pressures can heighten stress and negatively impact health perceptions. Low social presence and perceived autonomy suggest difficulties in seeking and utilizing social support, crucial for effective stress management.

Component 3 focuses on the impact of physical and neurocognitive health on overall well-being. Chronic pain, reduced neurocognitive engagement, and impaired executive functioning can lead to higher stress levels and poor health outcomes. Negative attributional styles and destructive personality traits further undermine effective coping strategies, while unrealistic self-expectations increase stress.

Overall, these components highlight the need for interventions that address negative cognitive biases, enhance emotional and social support, and improve physical and neurocognitive health to support the well-being of individuals with non-constructive coping strategies. By targeting these areas, interventions can help reduce stress, improve health perceptions, and enhance overall quality of life for this population.

The factor analysis conducted across three distinct groups of Ukrainian men with varying coping strategies – Constructive and Transformative, Constructive and Adaptive, and Non-Constructive – reveals significant insights into the interplay of cognitive, emotional, and physical health factors shaping their IHP. This discussion integrates the empirical findings with the theoretical framework outlined in this study, elucidating how these components align with or challenge existing theories and research.

Group 1: Constructive and Transformative Coping Strategies

The first component "*Situational Awareness and Coping Mechanisms*" for men utilizing Constructive and Transformative Coping Strategies emphasizes situational awareness and effective coping mechanisms. High situational awareness (SDUS Repetitiveness) and strong intellectual capabilities (CPI Ie) align with theories suggesting that cognitive engagement and problem-solving skills are crucial for managing stress [19]. The emphasis on independence (CPI Ai) and sociability (CPI So) further supports the role of personal agency and social support in fostering resilience (Schwarzer, 2024). These findings are consistent with research highlighting the importance of self-efficacy and social networks in stress management [20].

Constructive Self-Perception and Social Functioning component underscores the significance of constructive personality functions (Ammon Constructive Value) and social interactions (SF-36 SF) in maintaining mental health. High self-worth (SPB Self-Worth) and engagement in passive cognitive activities (Passive Neurocognitive Activity) align with Koriat's [18] emphasis on self-monitoring and self-regulation as critical for accurate health perceptions. The importance of social functioning resonates with theories that highlight the buffering effect of social support on stress [4].

The "*Cognitive Flexibility and Problem-Solving*" component highlights cognitive flexibility and effective problem-solving as essential for mental health. The ability to create positive impressions (CPI Gi) and manage challenging situations (SDUS Difficulty Understanding Managing Situation) supports the role of cognitive flexibility and executive functions in adaptive coping [10]. The focus on independent problem-solving (CPI Ac) aligns with the emphasis on personal agency in self-regulation [19].

The fourth component "*Resilience and Emotional Stability*" emphasizes resilience and emotional stability, with high self-control (CPI Sc) and lower perceptions of threat (Attributional Style – Permanent Bad) indicating strong emotional regulation. This aligns with research on the role of the PFC in regulating stress responses [9]. The significance of responsibility (CPI Re) and vitality (SF-36 VT) further supports theories on the interplay of cognitive and emotional resilience in health perceptions [11].

Health Perception and Stress Vulnerability component highlights the impact of social status (CPI Cs), destructive personality traits (Ammon Destructive Value), and frustration tolerance (SPB Low Frustration Tolerance) on health perceptions. The emphasis on social hierarchies and destructive traits aligns with the need to address maladaptive cognitive and personality factors in interventions [22]. This component also underscores the importance of physical health (SF-36 RP) in role functioning, consistent with theories on the holistic nature of health [5].

Group 2: Constructive and Adaptive Coping Strategies

For men with Constructive and Adaptive Coping Strategies, the first component "Cognitive and Situational Challenges" emphasizes cognitive and situational challenges. The tendency to view negative events as

pervasive (Atr Pervasiveness Bad) and difficulties in managing stressful situations (SDUS Difficulty Understanding Managing Situation) highlight the role of cognitive distortions in health perceptions [21]. Poor physical functioning (SF-36 PF) further exacerbates stress, aligning with findings on the impact of physical health on mental well-being [13].

Emotional and Physical Health Interactions component underscores the interplay between emotional and physical health, with significant impacts of pain (SF-36 BP) and cognitive engagement (Passive Neurocognitive Activity) on health perceptions. Challenges in cognitive evaluation (Ability Objective Cognitive Evaluation) align with research on the impact of chronic stress on cognitive functions [18]. The emphasis on role limitations due to physical problems (SF-36 RP) supports the holistic approach to health [5].

The third "*Health Perception and Resilience Factors*" component highlights the importance of general health perception (SF-36 GH), flexibility (CPI Fx), and independence in achievement (CPI Ai) for resilience. Negative self-assessments of health and mental health (SF-36 MH) align with findings on the detrimental effects of low self-efficacy on health perceptions [19]. The emphasis on well-being (CPI Wb) and the need to recognize positive contributions (Atr Personalization of Good) supports theories on self-regulation and resilience [23].

Group 3: Non-Constructive Coping Strategies

For men with Non-Constructive Coping Strategies, the first component "*Negative Cognitive and Personality Traits*" highlights negative cognitive and personality traits. Low self-acceptance (CPI Sa) and a tendency to perceive negative events as permanent and pervasive (Atr Permanent Good, Atr Pervasiveness Bad) are consistent with cognitive distortions linked to poor mental health [18]. The emphasis on social status (CPI Cs) and catastrophizing (SPB Awfulizing) underscores the need for interventions targeting cognitive and personality factors [10].

Emotional and Cognitive Difficulties component underscores the interaction between emotional difficulties and cognitive challenges, with significant impacts from external pressures (SPB Other-Directed Shoulds) and low self-worth (SPB Self-Worth). The challenges in managing stressful situations (SDUS Difficulty Understanding Managing Situation) align with research on the effects of chronic stress on cognitive functions [20]. The importance of social support and perceived autonomy highlights the role of social interactions in stress management [23].

The third component "*Physical and Neurocognitive Health*" focuses on physical and neurocognitive health, highlighting the impact of chronic pain (SF-36 BP) and reduced executive functioning (Executive Network Activity) on stress and health perceptions. The tendency to personalize negative events (Atr Personalization of Bad) and destructive personality traits (Ammon Destructive Value) further underscore the need for targeted cognitive and personality interventions [13]. High well-being (CPI Wb) is crucial for effective stress management, consistent with theories on resilience [23].

The factor analysis reveals distinct yet overlapping components across the three groups of Ukrainian men, highlighting the complex interplay of cognitive, emotional, and physical health factors in shaping their IHP. The findings align with existing theories on the neuropsychological and metacognitive nature of health perceptions, emphasizing the need for targeted interventions that address cognitive distortions, enhance emotional and social support, and improve physical and neurocognitive health. By integrating these insights, we can develop comprehensive strategies to support the mental and physical well-being of individuals in war-affected regions, ultimately enhancing their resilience and quality of life.

CONCLUSIONS

This study provides a comprehensive neuropsychological and cognitive model of the IHP for Ukrainian men amidst prolonged war, offering valuable insights into the factors shaping their mental and physical health perceptions. Through rigorous factor analysis, we identified key components across three distinct groups characterized by their coping strategies: Constructive and Transformative, Constructive and Adaptive, and Non-Constructive.

For men employing Constructive and Transformative Coping Strategies, the components highlighted the importance of situational awareness, constructive self-perception, cognitive flexibility, resilience, and health perception in managing stress and maintaining well-being. These findings underscore the critical role of cognitive engagement, social support, and adaptive problem-solving in fostering resilience and positive health outcomes.

In the group characterized by Constructive and Adaptive Coping Strategies, the analysis revealed the significant interplay between cognitive and situational challenges, emotional and physical health interactions, and resilience factors. Addressing cognitive distortions, enhancing mental health support, and improving physical health management emerged as crucial for improving health perceptions and stress responses in this population.

For men with Non-Constructive Coping Strategies, the components underscored the detrimental impact of negative cognitive and personality traits, emotional difficulties, and impaired neurocognitive functioning on health perception and stress management. Interventions targeting cognitive biases, enhancing emotional and social support, and addressing physical and neurocognitive health challenges are essential for improving their overall well-being.

The integration of neuropsychological and cognitive dimensions in this model provides a holistic understanding of the IHP, highlighting the need for targeted interventions that address both psychological and physical aspects of health. By focusing on enhancing cognitive skills, promoting resilience, and improving overall well-being, healthcare professionals and policymakers can develop more effective strategies to support the mental and physical health of individuals in war-affected regions.

In summary, this study advances our understanding of the complex interplay between chronic stress, neuropsychological factors, and health perceptions among Ukrainian men amidst prolonged war. The proposed

model offers a robust framework for future research and interventions, aiming to enhance resilience, improve health outcomes, and support the well-being of individuals living in war zones.

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