



Beyond Vigilance: Embodied self-regulation as a foundational competency in humanitarian contexts

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Abstract

This paper examines the role of embodied self-regulation in humanitarian preparedness, arguing that the body functions not only as a site of wellbeing but as a core mechanism underpinning situational awareness, intuitive judgement and adaptive response. Drawing on interdisciplinary literature, it outlines the conceptual limitations of current preparedness frameworks and proposes a shift towards recognising embodied regulation as a foundational operational competency.

Humanitarian professionals operate in high-risk environments that require rapid assessment and decision-making under conditions of uncertainty. While disaster risk management and mental health psychosocial support frameworks increasingly recognise workforce wellbeing, limited attention is given to the physiological processes shaping perception, comprehension, and real-time responses under stress. Situational awareness is typically conceptualised as a cognitive construct; however, interdisciplinary research in stress physiology, neurovisceral integration, and naturalistic decision-making indicates that autonomic regulation fundamentally influences perception, intuition and judgement.

This paper shifts the attention to how, in time-constrained contexts, humanitarian professionals rely on rapid pattern recognition and intuitive evaluation alongside analytical reasoning. These processes are shaped not only by prior experience, but also by the worker's physiological state, with embodied self-regulation playing a critical role in sustaining attentional stability, perceptual accuracy, and adaptive responsiveness under stress. Key directions for future empirical research and implications for training and practice accompany this discussion.

Introduction

In operational settings characterised by uncertainty and risk, humanitarian workers are required to act rapidly, manage large volumes of information and navigate potentially dangerous and evolving situations. Although existing preparedness frameworks have advanced resilience, cognition and stress mitigation, less attention has been paid to the physiological processes that shape how individuals perceive and respond to their environments in real time.

This paper develops a conceptual account of embodied self-regulation within humanitarian preparedness, focusing on how physiological processes shape situational awareness, intuitive decision-making and performance in high-risk contexts. Drawing on interdisciplinary literature, it examines the relationship between autonomic regulation and perception and proposes recognising embodied processes as an important, yet often overlooked, component of operational competence. Rather than advocating for a specific intervention or training protocol, the paper seeks to provide a conceptual framework that may inform future preparedness and training approaches.

Firstly, the paper examines situational awareness within humanitarian environments, highlighting cognitive and attentional constraints under stress and uncertainty. It then explores intuitive judgement and naturalistic decision-making, showing how experience-based pattern recognition supports rapid action. Building on these discussions, the article introduces an embodied perspective, examining how physiological regulation shapes perception and decision-making under stress. Finally, it considers implications for humanitarian training and outlines directions for future research. Together, these sections argue that embodied self-regulation is integral not only to wellbeing, but also to operational functioning in humanitarian contexts.

Situational awareness and cognitive constraints

Humanitarian workers operate in unpredictable and high-pressure environments requiring rapid action, the management of extensive information, and decision making under conditions of uncertainty. In these contexts, workers must anticipate changes, interpret evolving information, and identify salient environmental cues while maintaining operational effectiveness. Preparedness frameworks, including Mental Health and Psychosocial Support (MHPSS) and Disaster Risk Management, have progressively acknowledged the significance of worker resilience, wellbeing and psychological support (IASC, 2007; WHO, 2013). Similarly, humanitarian staff care, security risk management and preparedness literature place considerable emphasis on external risk management, psychosocial support, communication protocols and security training including hostile environment and scenario-based-preparation (Antares Foundation 2012; Guidero, 2022)

At the same time, humanitarian workers are frequently exposed to chronic stress, trauma and fatigue, with implications for both individual wellbeing and organisational effectiveness (Cameron et al., 2024; Foo et al., 2023; Macpherson and Burkle, 2021). Beyond their impact on wellbeing, these conditions may also influence the physiological and attentional processes through which practitioners perceive, interpret, and respond to complex operational environments. While occupational stress has been widely documented within the humanitarian literature, comparatively less attention has been given to how physiological regulation may shape situational awareness, perception and judgement in the field. This suggests the need to further examine how stress physiology and autonomic activation may influence operational functioning, situational awareness and adaptive responding within rapidly evolving humanitarian environments.

A growing body of research in cognitive science and neuroscience indicates that stress physiology and autonomic regulation actively affect perception, attentional flexibility and decision-making processes, particularly under uncertainty (Thayer and Lane, 2000; Sarmiento et al., 2024). In humanitarian settings, where professionals routinely operate under sustained cognitive demand, these processes may shape how environmental information is perceived and interpreted (Cameron et al., 2024).

Situational awareness (Endsley, 1995) is traditionally defined as the ability to perceive, comprehend and retain information about one's surroundings in order to support effective decision making. Although this framework has been widely applied across operational settings, it has been predominantly conceptualised as a cognitive process. Attention functions as a selective mechanism that filters conflicting inputs and allocates cognitive resources to particular stimuli (Kahneman, 1973; Wickens, 2002). In humanitarian environments, however, attentional processes may become compromised by cognitive overload, fatigue, stress, exposure and ongoing uncertainty, reducing the capacity to accurately detect and interpret relevant environmental cues. Furthermore, working memory constrains the quantity of information that can be concurrently retained (Baddeley, 1992), further limiting perception and decision making under pressure. From this perspective, situational awareness is shaped not only by external information, but also by the physiological and attentional state of the individual who is processing that information.

Intuition and naturalistic decision-making

Building on the case for situational awareness presented in the previous section, perception in humanitarian environments cannot be understood solely as the passive reception of external information. Human information-processing models suggest that perception emerges through the interaction between top-down expectations shaped by prior experiences and bottom-up sensory data (Neisser, 1976). In operational

environments such as humanitarian settings, professionals frequently rely on previously developed mental models to interpret environmental cues and guide action. While these models may facilitate rapid orientation and response, they may also increase susceptibility to perceptual bias under conditions of stress and ambiguity.

Humanitarian workers, for example, may unintentionally interpret situations through prior assumptions, expectations, or threat-based interpretation rather than through the immediate realities of the environment, particularly when operating under prolonged stress exposure and rapidly evolving crisis conditions (Cameron et al., 2024; Foo et al., 2023). Research on naturalistic decision-making explains how professionals act under pressure. Experienced practitioners frequently rely on pattern recognition processes that match environmental cues with prior operational experience rather than analytically comparing multiple alternatives. This allows for rapid decision-making in uncertain and dynamic environments (Klein, 1998, Kahneman, 2011).

Recent neurobiological models of decision-making further suggest that judgment under stress is not exclusively cognitive, but emerges through ongoing interactions between physiological activation, attentional processes, emotional salience and prior experience (Pessoa, 2022; Sarmiento et al., 2024). From this perspective, the capacity to recognise and regulate internal physiological states may influence how humanitarian practitioners perceive environmental cues, prioritise information and respond under pressure. Intuitive judgment can therefore be understood not as irrational or as a purely instinctive process, but as a form of rapid cognition shaped through prior operational experience and the embodied conditions in which perception and decision-making occur.

Phillips, Klein and Sieck (2004) further argue that intuitive judgement may be strengthened through structured forms of operational preparation, including exposure to key events, scenario-based simulations, cognitive task analysis and structured feedback. While these approaches were not developed originally for humanitarian settings, they suggest that repeated engagement with operationally relevant scenarios may support the refinement of pattern recognition and adaptive responding under pressure. These observations point towards the potential relevance of embodied processes in shaping perception and judgement under pressure, an issue explored in the following section.

Embodied regulation and performance under stress

Contemporary theories of intuitive expertise (see, for example, the work of Pessoa, 2022, and Sarmiento et al., 2024) offer important insights into the development of cognitive and perceptual abilities; nonetheless, they frequently overlook the physiological circumstances in which these processes transpire. Autonomic

modulation, impacting attentional stability, cue detection, and interpretative flexibility with experience and knowledge, affects the dependability of intuitive judgment. Dysregulation can skew perception and incline interpretation towards threat in high-stress situations, undermining situational awareness and decision-making.

Within humanitarian environments, these processes may substantially shape how practitioners perceive environmental cues, prioritise information, and respond in the field. For humanitarian workers, this often translates into heightened vigilance in unstable security contexts, selective attention to potential threats over less salient but operationally relevant cues, and rapid interpretative judgements in situations characterised by ambiguity and time pressure. For example, prolonged exposure to volatile environments may contribute to threat-oriented interpretations of ambiguous environmental and social cues, potentially influencing both operational decisions and interpersonal dynamics in the field (Cameron et al., 2024).

This indicates that existing training methodologies remain insufficiently integrated, notwithstanding their efficacy in facilitating external observation and pattern recognition. Incorporating embodied self-regulation into training regimens may be a crucial advancement in enhancing intuitive performance. This ensures that practitioners maintain the physiological conditions necessary for precise perception and adaptive reaction, while also enabling them to recognise and comprehend environmental stimuli. These mechanisms are explicitly trained within operational contexts, particularly in military situational awareness programmes that emphasise baseline detection, anomaly recognition and cue integration (U.S. Army, 2014; U.S. Marine Corps, 2007).

In extreme stress situations, brain circuits reallocate resources from higher-order cognitive functions to bottom-up processes, prioritising swift danger identification and behavioural reaction. Here, bottom-up processes refer to responses driven primarily by incoming sensory information and immediate environmental demands, whereas top-down processes involve conscious attention, reflection, and goal-directed regulation. Although such shifts may facilitate immediate survival-oriented reactions, prolonged activation can contribute to cognitive rigidity and reduced adaptability over time. Emerging evidence suggests that somatic techniques may help restore balance within these processes by enhancing the collaboration between top-down and bottom-up control mechanisms. Interoception, defined as the awareness of internal bodily states, may play an important role in supporting this integration (Craig, 2002; Mehling et al., 2011; Van der Kolk, 2014).

Chronic stress exposure in high-risk occupations such as humanitarian work has been consistently associated with burnout, compassion fatigue, diminished empathy and emotional tiredness (Figley, 1995; Connorton et al., 2012). Research on emergency

responders and high-risk occupations similarly demonstrates that extended stress exposure may negatively affect cognitive function, emotional control and decision-making abilities (LeBlanc, 2009). From a systems perspective, this suggests a potential imbalance within humanitarian preparedness models, which often prioritise responses to external demands while insufficiently addressing the internal conditions required for optimal operation.

A method to circumvent this limitation is to reconceptualise operational competence. An embodied approach acknowledges that physiological processes affect perception, decision-making and interpersonal relationships. It places emphasis on self-awareness as the ability to identify internal signals linked to autonomic activation, and on regulation as the capacity to alter these states in reaction to external stimuli.

Enhancing operational effectiveness may therefore require greater attention to interoceptive awareness and autonomic regulation within humanitarian preparedness. This implies equipping practitioners not only with technical and procedural knowledge, but also with the capacity to recognise and regulate physiological activation during field operations. Such capacities may contribute to the conditions that support clearer perception, adaptive decision-making, and more grounded engagement within complex operational environments, although these outcomes are likely to be influenced by multiple interacting individual, interpersonal and contextual factors.

Emerging evidence from humanitarian and operational contexts further supports the relevance of embodied approaches. Programmes implemented among refugees and humanitarian practitioners have reported improvements in emotional regulation, attentional stability and stress awareness following structured contemplative and mindfulness-based interventions (Chung and Hunt, 2016; Pigni, 2014). These findings align with broader research suggesting that mindfulness-based approaches may support attentional regulation, interoceptive awareness, emotional flexibility and adaptive stress responding (Kabat-Zinn, 2003; Tang et al., 2015; Mehling et al., 2011). Within humanitarian contexts, such capacities may hold relevance not only for wellbeing, but also for operational functioning, particularly in relation to perception, situational awareness, interpersonal attunement and decision-making under stress.

Within the context of this paper, mindfulness-based approaches are not presented as synonymous with embodied self-regulation, nor as a prescriptive solution for humanitarian preparedness. Rather, they represent one potential pathway through which capacities such as interoceptive awareness, attentional stability and awareness of physiological activation may be cultivated. The broader argument advanced here is that embodied self-regulation may constitute an important dimension of operational functioning, regardless of the specific practices through which it is developed.

At the same time, these emerging applications should be interpreted cautiously. Broader evidence on mindfulness-based interventions suggests that findings remain mixed and are frequently characterised by methodological limitations, variability in outcomes, and limited long-term evidence (Van Dam et al., 2018). These limitations do not undermine the relevance of embodied approaches but rather highlight the need for more rigorous and context-specific research within humanitarian operational settings.

Taken together, these findings suggest that embodied processes may influence not only resilience and wellbeing, but also the perceptual and regulatory conditions through which situational awareness and adaptive decision-making emerge under stress. While this article does not offer comprehensive empirical confirmation, it introduces a conceptual framework that may help guide future interdisciplinary and field-based research into the role of embodied processes in humanitarian preparedness and operational competence.

Implications for training and preparedness

Humanitarian organisations have made significant progress in recognising the importance of staff wellbeing and psychological support. However, if the physiological conditions shaping perception, attention and adaptive responding are not explicitly considered within preparedness frameworks, important dimensions of operational functioning may remain overlooked.

The argument advanced in this paper is that embodied self-regulation may represent a relevant, yet under-recognised, component of operational competence. If the physiological states influence how practitioners perceive, interpret and respond to complex environments, then preparedness frameworks may benefit from greater attention to the cultivation of embodied awareness alongside cognitive, procedural and technical skills.

From this perspective, future training approaches could explore ways of supporting practitioners' capacity to recognise and regulate physiological activation under stress. Such efforts would not seek to reduce embodied processes to prescriptive techniques, but rather to create conditions that foster greater awareness of the interaction between physiological states, situational awareness and decision-making.

Mindfulness-based approaches represent one potential avenue through which capacities such as attentional stability, interoceptive awareness and physiological self-regulation may be cultivated. While further empirical research is needed, the conceptual framework presented here suggests that these capacities may warrant greater consideration within future humanitarian preparedness and training initiatives.

Conclusions

This paper has argued that situational awareness in humanitarian contexts cannot be fully understood as a purely cognitive process. Rather, perception, attention and decision-making emerge from the interaction between external demands and internal physiological states.

Although current preparedness frameworks have made important advances in recognising resilience, wellbeing and cognitive performance, they have not yet fully integrated embodied self-regulation as a potentially relevant dimension of operational competence. Addressing this gap may contribute to a more comprehensive understanding of how humanitarian practitioners perceive, interpret and respond to complex and rapidly evolving environments.

The argument advanced here is not that embodied self-regulation can be reduced to a specific intervention or training technique. Rather, it suggests that physiological self-awareness may represent an important condition supporting adaptive performance under stress. At the same time, these processes are inherently dynamic, context-dependent and relational, making them difficult to translate into training approaches without risking oversimplification.

Future research should therefore examine the relationships between autonomic regulation, situational awareness and decision-making in humanitarian settings, while also exploring how embodied processes may be meaningfully incorporated into preparedness and training frameworks in ways that preserve their complexity and contextual nature. Such work may help inform the development of future approaches, including mindfulness-based and other embodied training models, aimed at strengthening operational effectiveness in humanitarian environments.

Ultimately, the contribution of this paper lies not in proposing a specific intervention, but in advancing a conceptual framework through which embodied processes may be more explicitly considered within future understandings of humanitarian preparedness, operational competence and adaptive performance under stress.

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