Article

Not peer-reviewed version

Performer Readiness: A Multidimensional Framework for Understanding Human Performance Degradation in High-Stakes Occupational Contexts

Jonathan H. Westover *

Posted Date: 30 March 2026

doi: 10.20944/preprints202603.2288.v1

Keywords: human performance; occupational stress; cognitive readiness; fatigue; emotional regulation; human factors; high-reliability organizations; performer states

Article

Performer Readiness: A Multidimensional Framework for Understanding Human Performance Degradation in High-Stakes Occupational Contexts

Jonathan H. Westover

Nexus Institute for Work and AI, USA; jon.westover@gmail.com

Abstract

Human performance failures in high-stakes occupational settings—healthcare, aviation, emergency response, and industrial operations—frequently prompt interventions targeting individual behavior, training, or motivation. This article proposes an alternative analytical framework centered on performer readiness: the constellation of cognitive, physiological, emotional, and motivational states that determine whether individuals can effectively deploy their existing competencies in demanding moments. Synthesizing research from occupational health psychology, human factors engineering, cognitive science, stress physiology, and organizational behavior, I develop a multidimensional model distinguishing four core readiness dimensions and examine their interactions, temporal dynamics, and assessment challenges. The framework provides conceptual tools for diagnosing performance problems more accurately, designing interventions that address root causes rather than surface manifestations, and reconceptualizing organizational responsibility for human performance outcomes. I present concrete case illustrations demonstrating multilevel analysis, articulate boundary conditions for framework application, and discuss ethical considerations in implementation. This integrative synthesis extends existing theoretical models by focusing on momentary state accessibility rather than stable capacities, systematically analyzing dimension interactions, and providing diagnostic guidance that generates distinctive predictions for practice.

Keywords: human performance; occupational stress; cognitive readiness; fatigue; emotional regulation; human factors; high-reliability organizations; performer states

---

Introduction

When a nurse administers medication to the wrong patient, conventional organizational responses follow predictable patterns: incident investigation, identification of the individual responsible, remedial training, perhaps disciplinary action, and documentation emphasizing procedural compliance. When an air traffic controller clears two aircraft to conflicting altitudes, similar logic applies—the controller made an error, therefore the controller requires correction. When a nuclear plant operator misses warning indicators preceding a system failure, investigation focuses on what the operator should have done differently.

This individualistic attribution pattern persists despite decades of human factors research demonstrating that performance emerges from complex interactions between human capabilities and environmental conditions (Reason, 1990; Dekker, 2014). Organizations continue defaulting to person-focused explanations and interventions even when evidence suggests that situational factors substantially constrain performance possibilities. The gap between research knowledge and organizational practice reflects not merely implementation failures but conceptual limitations in how we understand human performance variation.

This article develops a framework for analyzing human performance in high-stakes contexts through the lens of *performer readiness*—the dynamic constellation of states determining whether individuals can effectively deploy their competencies when performance demands arise. Rather than

 doi:10.20944/preprints202603.2288.v1

assuming performance failures reflect capability or motivation deficits, the framework begins from recognition that competent, well-intentioned individuals routinely underperform when conditions compromise their readiness for effective action.

Scope and Definitions

The framework addresses *high-stakes occupational contexts* characterized by significant consequences for errors, time pressure during critical operations, complexity requiring sustained cognitive engagement, and interdependence among actors. Primary domains include healthcare delivery, aviation operations, emergency response, nuclear and industrial process control, and military operations—settings where human performance directly affects safety, mission success, and consequential outcomes for others.

Performer readiness refers to the integrated state of an individual's cognitive, physiological, emotional, and motivational resources at a specific moment, determining capacity to meet performance demands. Readiness is conceptually distinct from competence (stable capability acquired through training and experience), from motivation (direction and intensity of effort), and from personality (enduring dispositional characteristics). Readiness concerns whether existing competencies can be accessed and deployed effectively under current conditions.

The framework specifically addresses what might be termed *Type II performance problems*: situations where individuals possess adequate knowledge and skill but fail to perform effectively due to state-based limitations. This contrasts with *Type I problems* involving genuine capability gaps addressable through training, and *Type III problems* involving volitional non-compliance or accountability failures. Distinguishing among these problem types has significant implications for intervention design, as I develop below.

Theoretical Foundations and Distinctive Contributions

The performer readiness framework builds upon several established theoretical traditions while extending them in specific directions.

The *Job Demands-Resources (JD-R) model* (Bakker & Demerouti, 2017) provides foundational understanding of how job demands and resources interact to influence wellbeing and performance. The JD-R model demonstrates that demands consume resources while resources buffer demand effects—a dynamic central to readiness. The performer readiness framework extends JD-R by focusing specifically on momentary performance capacity rather than longer-term outcomes, and by developing systematic treatment of how resource dimensions interact with each other during performance episodes.

Conservation of Resources (COR) theory (Hobfoll, 1989, 2001) articulates how individuals protect resources, experience stress when resources are threatened, and invest resources to acquire additional resources. COR's emphasis on resource dynamics—particularly the primacy of resource loss—informs the framework's treatment of depletion and recovery. The present framework extends COR by specifying distinct resource dimensions with different depletion and recovery characteristics, and by focusing on diagnostic application in occupational performance contexts.

Resilience engineering (Hollnagel et al., 2006) reconceptualizes safety as a dynamic property emerging from system adaptability rather than merely the absence of failures. This perspective informs the framework's systems orientation and its emphasis on adaptive capacity. The framework extends resilience engineering by providing more granular analysis of the individual-level conditions enabling adaptive responses.

Allostatic load theory (McEwen, 1998) explains how chronic stress exposure accumulates physiological costs that eventually compromise adaptive capacity. This perspective informs the framework's treatment of accumulation dynamics and its attention to recovery processes. The framework extends allostatic load concepts from primarily health-focused applications to real-time performance contexts.

doi:10.20944/preprints202603.2288.v1

Cognitive load theory (Sweller, 2011) distinguishes intrinsic, extraneous, and germane cognitive demands, providing tools for analyzing mental resource consumption. This tradition informs the framework's treatment of cognitive readiness while extending beyond cognitive factors to encompass physiological, emotional, and motivational dimensions.

The performer readiness framework does not claim to supersede existing models but to extend and apply them in ways that enhance practical utility while maintaining theoretical grounding. Three distinctive contributions differentiate this synthesis:

1. First, the framework focuses on *momentary state accessibility* rather than stable capacities. While existing models generally address how conditions influence wellbeing or performance over extended periods, readiness concerns whether specific capabilities can be deployed at particular moments—whether a nurse can concentrate effectively during this medication administration, whether a controller can detect conflicts during this traffic configuration. This temporal specificity has direct diagnostic and intervention implications.
2. Second, the framework develops *systematic analysis of dimension interactions*—how deficits in one readiness component trigger or amplify deficits in others, creating cascade dynamics that explain rapid performance degradation. Existing models acknowledge interactions but generally treat them as moderation effects rather than as dynamic processes requiring dedicated analysis.
3. Third, the framework integrates *diagnostic and assessment guidance* enabling practitioners to distinguish readiness problems from other performance problem types, assess which dimensions are implicated in specific situations, and select appropriately targeted interventions. This practical orientation extends theoretical models toward implementation.

Distinctive Predictions: Framework Versus Existing Models

The practical value of any framework depends partly on whether it generates predictions or recommendations that differ from those derived from existing approaches. The performer readiness framework makes several distinctive predictions that can be contrasted with standard human factors or training-focused approaches:

Prediction 1: Competence verification is insufficient for performance assurance. Standard approaches often assume that if training is adequate and competence verified, performance problems indicate either motivation deficits or procedural violations. The readiness framework predicts that individuals with verified competence will nonetheless underperform when readiness states are compromised—and that such underperformance will show systematic patterns corresponding to specific dimension deficits. For example, a cognitively fatigued surgeon with verified skills should show degradation specifically in executive function-dependent tasks (planning, error monitoring, adaptation) while potentially maintaining procedural memory-dependent skills—a pattern distinct from undertrained performance, which would show broader skill deficits.

Prediction 2: Single-dimension interventions will show limited effectiveness when multiple dimensions are compromised. Standard fatigue management programs assume that addressing sleep/rest will restore performance capacity. The readiness framework predicts that if emotional distress or motivational depletion co-occurs with physical fatigue, rest interventions alone will show attenuated effects. This prediction can be tested by examining whether fatigue intervention effectiveness varies as a function of other dimension states.

Prediction 3: Performance degradation patterns will differ based on which readiness dimension is primarily compromised. Standard error analysis often categorizes errors by type (slips, lapses, mistakes, violations) without systematic connection to performer states. The readiness framework predicts that cognitive readiness deficits will manifest primarily as working memory failures, attention lapses, and executive function errors; physiological deficits will manifest as slowed processing and reduced sustained attention; emotional deficits will manifest as threat-biased attention and impaired interpersonal coordination; and motivational deficits will manifest as reduced initiative and persistence. These distinctive patterns enable targeted diagnosis.

Prediction 4: Threshold effects will produce nonlinear relationships between readiness levels and performance outcomes. Standard workload analysis often assumes approximately linear relationships between demands and performance degradation. The readiness framework predicts that performance will remain relatively stable until readiness dimensions fall below critical thresholds, whereupon degradation will accelerate—and that threshold locations will differ across dimensions and individuals. This prediction has implications for workload management, suggesting that maintaining buffer above threshold is more critical than minimizing average load.

These predictions are empirically testable and generate intervention guidance that differs from standard approaches. The following sections develop the theoretical foundations supporting these predictions.

The Multidimensional Structure of Performer Readiness

Performer readiness encompasses at least four distinguishable though interacting dimensions, each representing a domain of resources required for effective high-stakes performance.

Cognitive Readiness

Cognitive readiness encompasses the mental resources necessary for effective information processing, decision-making, and behavioral regulation. Drawing on cognitive psychology and neuroscience, this dimension includes working memory capacity, attentional control, executive function, and mental energy available for effortful processing.

Working memory provides the mental workspace for holding and manipulating information during complex tasks—maintaining patient medication lists while calculating dosages, tracking multiple aircraft while anticipating trajectory conflicts, integrating multiple sensor readings while diagnosing system states (Baddeley, 2012). Working memory capacity, while showing stable individual differences, also varies within individuals as a function of fatigue, stress, and cognitive load history. When working memory becomes compromised, individuals lose information, make calculation errors, and fail to integrate relevant factors into decisions.

Attentional control determines ability to direct cognitive resources appropriately—maintaining focus on relevant information, filtering distractions, and shifting attention flexibly as situations evolve. Hockey's (2011) research on compensatory control demonstrates that maintaining attention under demanding conditions requires active effort that depletes over time. Particularly significant for high-stakes performance is *vigilance*—sustained attention to low-frequency signals that has well-documented degradation patterns over time (Warm et al., 2008), with detection probability declining substantially within 20-30 minutes of continuous monitoring.

Executive function encompasses higher-order regulatory processes including planning, cognitive flexibility, inhibitory control, and metacognitive monitoring (Diamond, 2013). These capacities enable adaptive responses to novel situations, suppression of prepotent but inappropriate responses, and awareness of one's own cognitive state. Executive function shows particular vulnerability to sleep deprivation, with studies demonstrating degradation after as few as 17-19 hours without sleep—impairment comparable to blood alcohol concentrations exceeding legal driving limits (Williamson & Feyer, 2000). However, importantly, this impairment affects executive function-dependent tasks more than well-practiced procedural tasks, a dissociation with diagnostic implications.

Cognitive readiness becomes compromised through multiple mechanisms: *fatigue* (both time-on-task and sleep-related), *interference* from competing cognitive demands, *depletion* following extended effortful processing, and *overload* when information processing demands exceed available capacity.

doi:10.20944/preprints202603.2288.v1

Physiological Readiness

Physiological readiness concerns the bodily states affecting capacity for physical and cognitive performance. This dimension includes energy availability, arousal regulation, and the cumulative effects of physical stress on system functioning.

Fatigue represents the most extensively studied physiological readiness factor in occupational contexts. Shen et al. (2006) distinguish physical fatigue (muscular exhaustion and reduced physical capacity), mental fatigue (cognitive depletion addressed above), and sleepiness (homeostatic and circadian sleep pressure). These fatigue types, while correlated, have distinct causes and remediation requirements. Circadian factors further modulate physiological readiness, with performance capabilities varying systematically across the 24-hour cycle—typically reaching nadirs during early morning hours (Folkard & Tucker, 2003).

Arousal regulation affects performance through the well-established inverted-U relationship between arousal and performance (Yerkes & Dodson, 1908, as interpreted through subsequent research; Hancock & Warm, 1989). Both under arousal and overarousal degrade performance, though the optimal level varies with task characteristics—higher arousal benefits simple, well-practiced tasks while impairing complex tasks requiring flexible cognition. Individuals vary in arousal regulatory capacity, with some maintaining appropriate activation levels across conditions while others show dysregulated responses to stressors.

Allostatic load (McEwen, 1998) describes the cumulative physiological cost of chronic stress exposure. Repeated activation of stress response systems without adequate recovery produces wear on cardiovascular, metabolic, and immune systems that eventually compromises adaptive capacity. While allostatic load accumulates over extended periods rather than shifting momentarily, it establishes baseline physiological readiness that conditions responses to acute stressors. Individuals with high accumulated allostatic load may enter performance situations with reduced physiological reserve.

Nutrition and hydration status also affect cognitive and physical performance, with even mild dehydration (1-2% body mass loss) producing measurable cognitive impairment (Masento et al., 2014). Blood glucose fluctuations influence cognitive capacity, with both hypoglycemia and postprandial glucose spikes potentially degrading performance. These factors receive less attention in traditional human factors analysis than fatigue but may contribute meaningfully to readiness variation.

Emotional Readiness

Emotional readiness concerns the affective states and regulatory capacities influencing performance effectiveness. This dimension includes current emotional states, capacity for emotion regulation, and residual effects of emotional experiences.

Acute emotional states directly influence cognitive processing, attention, and interpersonal functioning. Anxiety narrows attention toward threat-related stimuli (Eysenck et al., 2007), potentially useful when threats require immediate response but problematic when important information lies outside the attentional spotlight. Anger impairs deliberative reasoning while potentially enhancing approach-motivated behavior. Sadness reduces initiative and engagement. These effects occur largely automatically, meaning that individuals cannot simply decide to prevent emotional states from influencing their performance.

Emotion regulation describes the processes through which individuals influence which emotions they experience, when they experience them, and how they express and manage them (Gross, 2015). Emotion regulation requires cognitive resources—suppressing emotional expression, reappraising situations, or deliberately shifting attention all consume capacity otherwise available for primary task performance. Individuals with depleted regulatory resources show reduced ability to modulate emotional responses, creating vulnerability to emotional disruption.

Emotional labor (Hochschild, 1983) describes the effort required to display organizationally appropriate emotions regardless of felt experience. Many high-stakes occupations require emotional

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

labor—nurses managing their own distress while comforting patients, emergency responders maintaining calm demeanors during chaotic situations, controllers projecting confidence to pilots. Emotional labor consumes regulatory resources and produces fatigue effects that accumulate across interactions (Grandey & Melloy, 2017). A nurse who has managed difficult family interactions throughout a shift may enter the evening with significantly depleted emotional readiness, regardless of break periods that addressed physical fatigue.

Emotional residue from prior experiences can persist beyond the situations that generated them, influencing subsequent performance. A physician who has just informed a family of a patient's death may carry emotional activation into the next clinical encounter, potentially affecting attention, interpersonal sensitivity, and cognitive function. Traumatic exposure can produce more extended emotional residue—first responders exposed to severe incidents may experience intrusive thoughts, hyperarousal, and emotional numbing that compromise readiness for subsequent responses (Kleim & Westphal, 2011).

Motivational Readiness

Motivational readiness concerns the energetic and directional aspects of goal pursuit—the capacity and inclination to invest effort in performance. This dimension includes goal activation, self-efficacy, and the psychological resources enabling sustained engagement. Motivation occupies a somewhat distinctive position in the readiness framework, as it connects more directly to stable individual differences (intrinsic motivation, career commitment, values alignment) than other dimensions while still exhibiting state-level variation.

Goal activation describes whether relevant performance goals are cognitively active and driving behavior. Professionals may possess appropriate goals that become temporarily deactivated under depleting conditions. Ego depletion research (Baumeister et al., 1998), though subject to recent replication debates (Friese et al., 2019), suggests that sustained self-regulation efforts can reduce capacity for subsequent goal-directed behavior. Even when replication failures temper strong conclusions, meta-analytic evidence suggests a small but reliable effect (Dang, 2018), and the broader pattern—that sustained self-regulation is effortful and can produce subsequent decrements—remains consistent with cognitive resource models.

Self-efficacy (Bandura, 1997) influences whether individuals initiate and persist in challenging tasks. While self-efficacy shows trait-like stability, it also varies with recent performance experiences, physiological states, and social feedback. A clinician whose last several diagnostic attempts proved incorrect may experience reduced self-efficacy that diminishes initiative and thoroughness in subsequent cases.

Psychological safety and belonging influence willingness to engage fully in collaborative performance. Edmondson's (1999) research demonstrates that psychological safety—belief that interpersonal risk-taking is safe within a team—affects willingness to speak up about errors, ask questions, or offer observations that might prove incorrect. Individuals experiencing exclusion, evaluation apprehension, or interpersonal threat may withdraw engagement in ways that compromise collective performance.

Value alignment and meaning contribute to motivational readiness by connecting specific tasks to larger purposes. When workers perceive their tasks as meaningful and aligned with personal values, they show greater engagement and persistence (Rosso et al., 2010). Conversely, experiencing work as meaningless or conflicting with values produces motivational deficits that may manifest as reduced initiative, perfunctory performance, or emotional withdrawal.

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

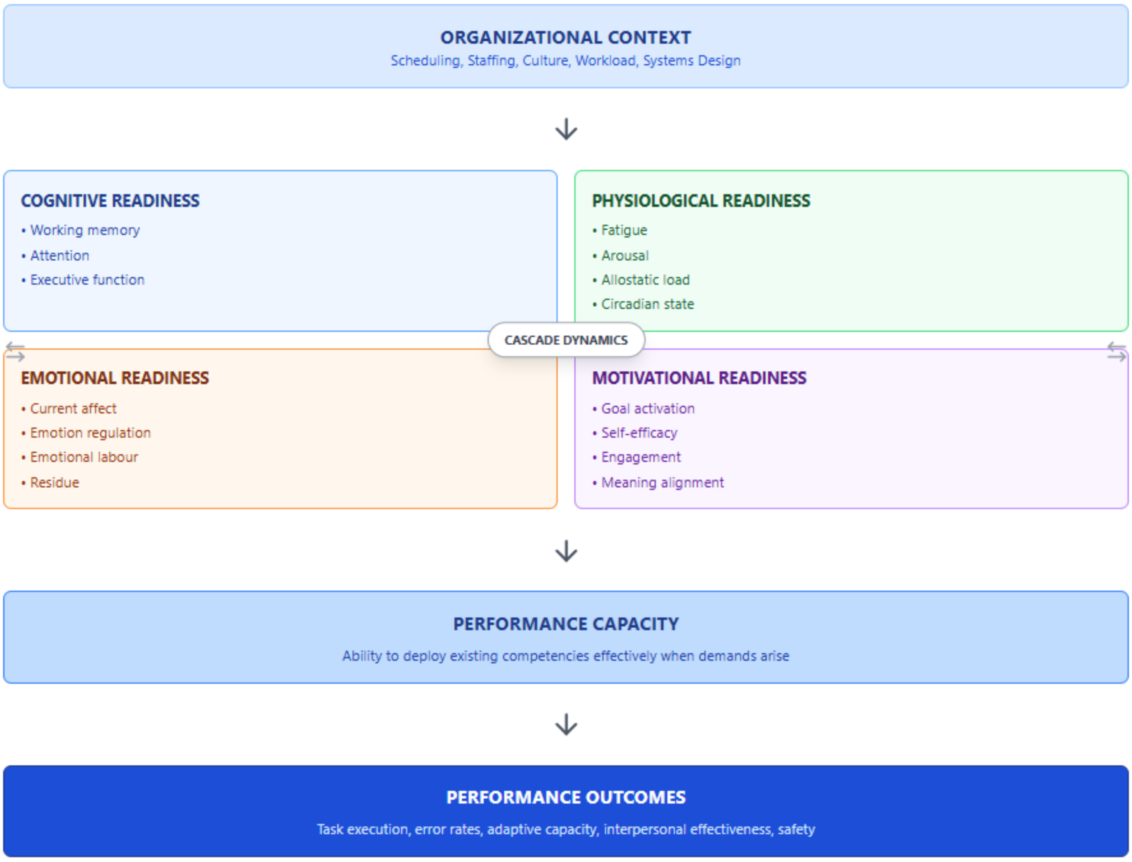

Figure 1. The Performer Readiness Framework.

Interactions and Cascades Among Dimensions

While analytically distinguishable, the four readiness dimensions interact dynamically such that deficits in one dimension frequently trigger or amplify deficits in others. Understanding these interactions is essential for accurate diagnosis and effective intervention.

Physiological-cognitive cascades are perhaps best documented. Sleep deprivation degrades cognitive function through multiple mechanisms—reduced glucose metabolism in prefrontal cortex (Thomas et al., 2000), impaired hippocampal memory consolidation, and compromised attention network functioning. Physical fatigue also impairs cognitive performance, as maintaining cognitive function becomes itself effortful and depleting (Hockey, 2013). Conversely, intense cognitive demands produce physiological stress responses, with mental effort increasing cortisol, elevating heart rate, and potentially accelerating physical fatigue.

Emotional-cognitive cascades reflect the bidirectional relationship between affect and cognition. Anxiety consumes working memory resources through worry and threat monitoring (Eysenck et al., 2007), leaving reduced capacity for primary task performance. Cognitive depletion, conversely, impairs emotion regulation, leaving individuals more reactive to emotional provocations (Tice et al., 2001). The regulatory effort required to manage emotions further depletes cognitive resources, potentially creating self-reinforcing cycles where emotional and cognitive deficits amplify each other.

Motivational-emotional cascades connect achievement-related affect with goal pursuit. Failure experiences generate negative affect that can undermine subsequent motivation; sustained effort without reward produces frustration that may transition to disengagement; interpersonal exclusion produces emotional pain that reduces goal-directed behavior. Motivational depletion—reduced capacity for effortful goal pursuit—may also impair emotion regulation, which is itself an effortful process requiring motivated engagement.

These cascade dynamics mean that readiness problems rarely remain confined to single dimensions. A nurse beginning a shift with mild sleep debt (physiological) may experience this as

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

increased emotional reactivity (emotional), leading to a difficult interaction with a patient family member that requires emotional labour to manage. This depletes regulatory resources, impairing concentration during subsequent medication administration (cognitive), leading to a near-miss that damages confidence (motivational). What might have been manageable single-dimension deficit escalates into multidimensional impairment through cascade dynamics.

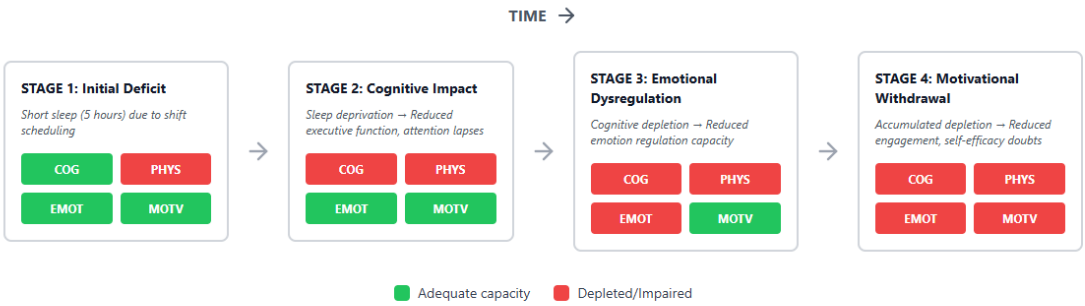

Figure 2. Cascade Dynamics Illustration. **Note:** Cascade dynamics explain why single-dimension interventions often show limited effectiveness—by the time performance problems manifest, multiple dimensions may be compromised.

Threshold effects complicate these dynamics further. Individuals may maintain adequate performance while readiness deficits remain above critical thresholds, drawing on compensatory effort to offset limitations (Hockey, 1997). Below threshold levels, however, compensation becomes insufficient and performance degrades—often rapidly. Because thresholds may differ across dimensions and individuals, predicting when accumulated deficits will produce performance failures is challenging. Someone functioning adequately at 90% cognitive capacity may show dramatically degraded performance at 80%, with the 10% reduction producing disproportionate effects once threshold is crossed.

Compensation dynamics between dimensions can temporarily mask deficits. High motivation may compensate for moderate physiological fatigue through increased effort. Strong cognitive skills may enable adequate performance despite emotional distress. This compensation has costs, however—additional effort itself depletes resources, meaning compensation produces faster overall resource consumption. Sustained compensation may therefore accelerate cascade dynamics, maintaining adequate surface performance while systematically depleting the reserves that would enable continued adaptation.

Temporal Dynamics of Readiness

Performer readiness varies across multiple timescales, from moment-to-moment fluctuations to career-spanning accumulation of allostatic load. Understanding these temporal patterns is essential for assessment and intervention.

Within-Episode Fluctuation

Within individual performance episodes, readiness can shift rapidly in response to events and demands. A critical incident may trigger sudden arousal that, depending on context and individual response patterns, either enhances or impairs performance. Feedback about errors may produce emotional reactions that temporarily compromise cognitive function. Success experiences may bolster confidence and enhance subsequent engagement.

Depletion trajectories describe how readiness dimensions decline during sustained performance. Vigilance decrements follow predictable patterns, with detection probability declining substantially within the first 20-30 minutes of monitoring tasks (Warm et al., 2008). Physical endurance follows characteristic curves as energy reserves are consumed. Emotional labor accumulates across

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

interactions, with later encounters drawing on diminished regulatory reserves. Understanding these trajectories enables scheduling that avoids tasking critical activities during predictable low-readiness periods.

Recovery micro-cycles can restore readiness within episodes. Brief breaks in task demands may enable partial recovery of cognitive resources—studies of brief rest pauses suggest that even 10-minute breaks can restore some vigilance capacity (Tucker, 2003). Physical position changes, brief social interactions, or transitions between task types may provide recovery opportunities. However, recovery rates vary by dimension—cognitive resources may recover faster than emotional equilibrium, and physiological fatigue may require extended rest.

Between-Episode Patterns

Between performance episodes, recovery processes restore depleted resources while exposure to stressors and demands continues shaping readiness trajectories.

Sleep serves as the primary recovery mechanism for multiple readiness dimensions. Sleep deprivation impairs cognitive function through well-documented mechanisms, with performance deficits accumulating roughly linearly with hours of wakefulness beyond normal sleep periods and showing additional impairment during circadian troughs (Van Dongen et al., 2003). Importantly, individuals often poorly estimate their own impairment during sleep deprivation, with subjective sleepiness stabilizing while objective performance continues declining. Sleep also enables emotional recovery, with sleep deprivation increasing emotional reactivity and impairing regulation (Palmer & Alfano, 2017).

Recovery activities beyond sleep contribute to restoration. Detachment from work during off-hours predicts next-day recovery (Sonnentag & Fritz, 2015), suggesting that sustained mental engagement with work problems impairs resource restoration. Physical exercise shows complex relationships with recovery—moderate activity may enhance restoration while excessive training without adequate recovery produces fatigue. Social connection can provide emotional recovery through support and belonging, though demanding social interactions may themselves deplete resources.

Shift scheduling structures recovery opportunities between work episodes. Research consistently demonstrates that extended shifts (beyond 8-12 hours), short intervals between shifts (less than 11 hours), and night work produce cumulative impairment (Caruso, 2014). However, scheduling effects interact with other factors—long shifts may be manageable if demands are intermittent and recovery opportunities exist within shifts, while short shifts may produce excessive depletion if intensely demanding.

Accumulation and Long-Term Patterns

Over extended periods, inadequate recovery produces accumulating readiness deficits that may not fully reverse with standard recovery activities.

Chronic fatigue develops when sleep debt accumulates without adequate recovery. Unlike acute sleep deprivation, chronic insufficient sleep may produce more subtle but persistent impairment that individuals normalize and fail to recognize (Basner et al., 2013). Chronic fatigue may manifest as reduced initiative, impaired emotional regulation, and decreased cognitive flexibility without dramatic acute performance failures.

Burnout represents sustained depletion of emotional and motivational resources, characterized by emotional exhaustion, depersonalization (or cynicism), and reduced personal accomplishment (Maslach & Leiter, 2016). Burnout develops over months or years of imbalance between demands and resources, producing relatively stable impairment that resists brief recovery interventions. Recovery from established burnout may require extended periods of reduced demands or significant organizational change.

Cumulative trauma exposure can produce enduring effects on emotional readiness. First responders, emergency clinicians, and others with repeated exposure to traumatic events may

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

develop secondary traumatic stress or compassion fatigue that compromises subsequent emotional availability and resilience (Figley, 2002). These conditions manifest as emotional numbing, intrusive memories, and hypervigilance that interfere with effective interpersonal engagement and emotional regulation.

Figure 3. Temporal Dynamics of Readiness. **Note:** Inadequate recovery at shorter timescales produces accumulating deficits at longer timescales. Sustainable performance requires recovery processes matched to each timescale.

Assessment Challenges and Approaches

Assessing performer readiness confronts significant challenges: readiness varies dynamically, self-report shows systematic biases, and observer assessment captures only limited information. Despite these challenges, multiple approaches offer partial information that, combined appropriately, can inform intervention decisions.

Self-Report Methods

Self-report instruments assess how individuals perceive their own readiness states. Validated instruments exist for fatigue (e.g., Chalder Fatigue Scale, Fatigue Severity Scale, with Chalder et al., 1993, originally developed for chronic fatigue syndrome populations), burnout (Maslach Burnout Inventory, with extensive validation across professional populations as summarized in Schaufeli et al., 2009), emotional states (PANAS, measuring positive and negative affect with good psychometric properties as documented in Watson et al., 1988), and related constructs.

Self-report faces limitations for readiness assessment. Individuals poorly perceive their own impairment during sleep deprivation, with subjective sleepiness stabilizing while objective performance continues declining (Van Dongen et al., 2003). Adaptation to chronic stress may produce normalization that prevents recognition of accumulated impairment—a clinician functioning at 70% of their well-rested capacity may perceive their performance as normal if that state has persisted for weeks. Demand characteristics and impression management motives may bias reporting, particularly when respondents fear consequences for admitting impairment. Most importantly, self-report captures how individuals perceive their states rather than how those states actually affect performance.

Despite limitations, self-report provides information unavailable through other methods—access to internal experiences of fatigue, emotion, and motivation that behavioral observation cannot directly capture. Self-report is most valid when individuals have adequate insight into their states (easier for discrete emotions than for cumulative cognitive impairment), when reporting occurs close in time to the experience being assessed, and when psychological safety enables honest disclosure.

Behavioral and Performance Indicators

Observable behavior and performance metrics provide information about readiness without requiring self-report, though interpretation presents challenges.

Performance decrements—slower response times, increased error rates, reduced accuracy—may reflect readiness impairment but may also result from task difficulty, equipment problems, or environmental factors. Distinguishing readiness-related performance variation from other causes requires controlling for these factors or establishing individual baselines against which variation can be interpreted.

Behavioral indicators may signal readiness problems before performance failures occur. Changes in communication patterns (shortened utterances, reduced prosocial behavior, increased conflict), reduced initiative or engagement, physical manifestations of fatigue or emotional distress, and subtle changes in work patterns may all indicate readiness concerns. However, interpretation requires familiarity with individual baseline behavior—behavior that indicates unusual fatigue for one individual may represent normal functioning for another.

Some organizations have implemented monitoring systems that track Behavioral indicators associated with fatigue or impairment. Gander et al. (2011) describe fatigue risk management systems in aviation that combine scheduling tools, incident monitoring, and fatigue reporting. Such systems can detect patterns invisible in individual incidents while raising privacy concerns addressed in ethical considerations below.

Physiological and Objective Measures

Physiological measures offer objective assessment of some readiness dimensions but face implementation challenges in operational settings.

Actigraphy enables inference about sleep patterns and circadian phase through movement monitoring, providing objective sleep data without requiring sleep laboratory assessment. Actigraphy shows good correspondence with polysomnography for detecting sleep periods (Van De Water et al., 2011, based on a systematic review comparing validation studies) while remaining practical for field use. However, actigraphy captures only part of the relevant information—sleep duration and timing, but not sleep quality or individual sleep need.

Psychomotor vigilance testing (PVT) assesses reaction time to random stimuli, providing sensitive detection of fatigue-related impairment (Basner & Dinges, 2011). Brief PVT versions (3-5 minutes) show acceptable sensitivity while maintaining field practicality. However, PVT primarily assesses vigilance rather than higher cognitive functions that may be differentially affected by various readiness factors.

Physiological monitoring (heart rate variability, electrodermal activity, cortisol sampling) can detect stress responses and autonomic state, but interpretation in field settings is complicated by movement, environmental factors, and individual variation. These methods remain primarily research tools with limited operational deployment.

Integrated Assessment Approaches

No single assessment method adequately captures readiness across dimensions; integrated approaches combining multiple methods provide stronger assessment foundations. Table 1 provides diagnostic guidance for distinguishing readiness problems from other performance concerns.

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

Table 1. Distinguishing Readiness Problems from Other Performance Concerns.

Indicator	Readiness Problem	Training/Competence Gap	Accountability/Motivation Problem
Performance history	Previously demonstrated competence; recent decline	Consistent skill gaps; never demonstrated competence	Variable performance, often situation-dependent
Error patterns	Random timing; executive function errors; may improve with rest	Consistent across conditions; specific skill deficits	Clustered in low-monitoring conditions; judgment intact
Situational factors	Occurs after high demands, inadequate recovery	Occurs across conditions; matches training gaps	Occurs when perceived consequences are low
Individual awareness	Often limited insight into own impairment	May or may not recognize gap	May deny or minimize; aware of expectations
Response to rest/recovery	Performance improves	Minimal change	Minimal change
Response to increased monitoring	Minimal change (can't perform better)	Minimal change	Performance improves
Error type	Slips, lapses, memory failures	Mistakes due to knowledge/skill gaps	May appear deliberate; corner-cutting

Implementing integrated assessment requires balancing validity against feasibility and burden. Comprehensive assessment protocols may themselves compromise readiness—extensive pre-shift testing consumes time and cognitive resources, potentially leaving less capacity for actual work. Assessment approaches should scale to risk level, with more intensive assessment justified for higher-stakes performance periods.

Organizational and Systems Perspectives

The performer readiness framework carries significant implications for organizational design, policy, and culture. Performance emerges not from individuals alone but from individuals operating within organizational systems that shape readiness in powerful ways.

Table 2 summarizes assessment approaches by dimension, with practical implementation considerations.

Table 2. Readiness Assessment Approaches by Dimension.

Dimension	Self-Report Options	Behavioral Indicators	Objective Measures	Practical Considerations
Cognitive	Subjective alertness ratings; perceived workload	Slowed responses; memory failures; reduced speech complexity	PVT; actigraphy; cognitive testing	PVT sensitive but brief versions needed for field use; actigraphy feasible for shift workers
Physiological	Fatigue ratings; sleep diaries	Observable fatigue signs; posture changes; yawning	Actigraphy; heart rate variability; biomechanical measures	Actigraphy validated but captures quantity not quality; HRV interpretation challenging in field
Emotional	Mood ratings; PANAS; anxiety measures	Communication tone; facial expression; interpersonal friction	Limited; some experimental affect detection	Self-report may be most valid source; social desirability concerns
Motivational	Engagement scales; burnout inventories	Reduced initiative; minimal discretionary effort; withdrawal	Limited direct measures	Measurement may conflate state and trait; career stage confounds

Organizational Determinants of Readiness

Organizational policies and practices substantially determine the conditions individuals experience, thereby shaping readiness independently of individual factors.

Workload management practices distribute demands across individuals and time. Organizations that permit or encourage sustained high workload without recovery periods systematically deplete readiness. Research on physician work hours demonstrates that reduced weekly hours and shorter continuous shifts are associated with reduced fatigue-related errors (Landrigan et al., 2004, reporting findings from a specific intervention study in intensive care units), informing hours restrictions in

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

graduate medical education. However, workload effects depend not only on hours but on demand intensity, recovery opportunities within work periods, and schedule predictability.

Staffing models determine whether adequate personnel are available to meet demands. Understaffing forces remaining workers to absorb additional demands, potentially without compensating recovery time. Nurse staffing research demonstrates associations between patient-to-nurse ratios and adverse outcomes (Aiken et al., 2014, Synthesizing evidence across multiple studies with consistent patterns though effect sizes vary by context), with proposed mechanisms including reduced attention per patient, fewer opportunities for recovery between care activities, and increased time pressure.

Schedule design structures the temporal distribution of work and recovery. Compressed schedules, night work, and rotating shifts present different challenges for readiness maintenance. Shift work disorder (Drake et al., 2004, based on a population-based study defining prevalence criteria)—insomnia and excessive sleepiness related to shift work—affects a substantial proportion of shift workers and may represent a marker for broader readiness compromise.

Culture and climate shape how readiness concerns are perceived and whether individuals feel safe acknowledging impairment. Organizations with "hero cultures" that valorize working through exhaustion implicitly discourage readiness maintenance behaviors and admissions of impairment (Bergman et al., 2016). Cultures emphasizing blame and individual accountability rather than systems improvement may drive reporting underground, preventing organizational learning about readiness challenges.

Systemic Interactions and Latent Conditions

Following Reason's (1990, 2000) analysis, the readiness framework recognizes that adverse events typically result from interactions among latent conditions (organizational factors creating hazards) and active failures (proximate actions triggering incidents). From this perspective, individual readiness impairment often represents the final pathway through which organizational conditions produce adverse events.

Consider a medication error occurring when a fatigued nurse misreads a drug label. The active failure is the nurse's misreading, but latent conditions may include: scheduling policies that permitted the nurse to work consecutive shifts with inadequate recovery; staffing decisions that created patient loads requiring hurried medication administration; purchasing decisions that selected similar-appearing drug packaging; design decisions that placed frequently confused medications in adjacent locations; and training policies that did not address fatigue recognition or management.

This analysis does not excuse individual failures but contextualizes them. Addressing only the active failure (retraining the nurse, documenting the error in the individual's file) leaves latent conditions intact, awaiting another fatigued worker to complete the error pathway. Effective intervention requires addressing both immediate circumstances and the organizational conditions enabling readiness compromise.

Level-of-Analysis Considerations

The performer readiness framework spans multiple levels of analysis, from individual physiology to organizational policy to regulatory environment. Understanding level-of-analysis issues is essential for both theoretical coherence and practical intervention.

At the *individual level*, readiness describes states of specific persons—a nurse's cognitive alertness, a controller's emotional equilibrium, a pilot's physiological fatigue. Individual-level analysis examines how personal factors (sleep quality, coping strategies, trait resilience) interact with demands and conditions to determine individual readiness.

At the *team/unit level*, readiness concepts extend to collective capabilities. A team's readiness involves not only the aggregate of individual member readiness but emergent properties—communication effectiveness, shared mental models, role flexibility—that enable collective performance (Salas et al., 2015). Team readiness can be compromised by individual member

 doi:10.20944/preprints202603.2288.v1

impairment, but also by interpersonal dynamics, coordination failures, or inadequate shared understanding that persist even when individuals are individually prepared.

At the *organizational level*, readiness concerns systemic capacity to support human performance across operations. Organizational readiness encompasses policies, resources, culture, and practices that either maintain or compromise individual and team readiness. An organization may be "ready" to support human performance when staffing is adequate, schedules permit recovery, culture supports speaking up about impairment, and systems exist to detect and respond to readiness concerns.

At the *regulatory/industry level*, standards and expectations shape what organizations can and must do regarding readiness. Hours of service regulations, rest requirements, and safety mandates establish minimum standards that influence organizational practice.

Importantly, levels interact bidirectionally. Organizational policies shape individual readiness (scheduling determines sleep opportunity), but individual readiness problems can signal organizational deficiencies (patterns of fatigue-related errors may indicate scheduling problems). Effective intervention requires matching intervention level to problem source—individual-focused interventions cannot remedy organizational conditions, while organizational changes may be unnecessary when problems are truly individual.

The *aggregation problem* refers to challenges in moving from individual-level readiness states to characterizing collective readiness. Simple averaging of individual readiness scores may obscure critical information—a team with moderate average readiness but one severely impaired member faces different risks than a team with all members moderately impaired. Task interdependence affects which aggregation approach is appropriate: for independent tasks, average team readiness may predict outcomes; for tightly coupled tasks, minimum member readiness may be limiting.

Multilevel causation recognizes that performance outcomes typically result from factors at multiple levels simultaneously. A surgical error might involve an individual surgeon's fatigue (individual level), inadequate communication among OR team members (team level), scheduling practices that permitted the surgeon's sleep deprivation (organizational level), and absence of required fatigue mitigation (regulatory level). Attributing causation exclusively to any single level provides incomplete understanding.

Case Illustration: Multilevel Analysis in Practice

To illustrate how multilevel analysis proceeds, consider a hypothetical medication error in which a nurse administers an incorrect dose of anticoagulant medication, resulting in patient harm. A readiness-informed multilevel analysis might proceed as follows:

Individual level assessment: The nurse had completed a 12-hour shift following a shift the previous day with only 9 hours between shifts. Sleep diary data (if available) or interview reveals approximately 5 hours of sleep. The nurse had managed two difficult family conferences earlier in the shift, describing emotional exhaustion. PVT testing (if conducted) would likely show slowed reaction times consistent with fatigue. Diagnosis: cognitive and emotional readiness compromise, with cascade dynamics evident (sleep deprivation → reduced emotional regulation → demanding interactions further depleting resources → reduced cognitive capacity for medication verification).

Team level assessment: The unit was operating with one nurse below planned staffing due to a sick call. The charge nurse had redistributed patients, increasing the involved nurse's load. Colleagues reported high activity throughout the shift with limited informal support. The unit's typical "double-check" practice for high-risk medications was not followed due to time pressure. Diagnosis: team-level resource depletion, with staffing shortage eliminating buffer capacity and time pressure compromising normal safety practices.

Organizational level assessment: Scheduling policy permits minimum 9-hour breaks between shifts (below the 11-hour minimum recommended by fatigue research). No formal fatigue risk management system exists. Staffing models do not include buffer positions for sick calls. Culture emphasizes individual responsibility for managing fatigue ("we're all professionals; we manage ourselves"). No system exists for monitoring shift-to-shift patterns or identifying high-risk schedules. Diagnosis: organizational policies and culture that fail to protect individual readiness and create latent conditions for error.

Figure 4. Multilevel Analysis Framework.

Intervention implications by level:

- *Individual:* Education about fatigue recognition (limited value alone, as the nurse may have recognized fatigue but felt unable to act on it)
- *Team:* Reinforcement of double-check requirements; protocols for redistributing patients when staffing is reduced
- *Organizational:* Scheduling policy revision to ensure minimum 11-hour breaks; buffer staffing positions; fatigue risk management system; culture change initiatives addressing "toughness" norms
- *Regulatory:* Hours restrictions (if not already in place); staffing requirements (within regulatory scope)

Distinctive prediction: A traditional analysis might recommend individual retraining and policy reinforcement. The readiness framework predicts that without addressing organizational conditions (particularly scheduling policy and staffing), similar errors will recur—if not with this

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

nurse, then with others exposed to the same readiness-compromising conditions. An appropriate test of this prediction would examine whether individual-level intervention reduces subsequent errors at rates predicted by the individual-responsibility model, or whether recurrence patterns indicate unaddressed systemic factors.

This case illustrates several key features of readiness-informed multilevel analysis:

1. Individual readiness problems are contextualized rather than treated as isolated
2. Cascade dynamics between dimensions are identified
3. Latent conditions enabling readiness compromise are surfaced
4. Intervention recommendations span levels, with higher-level interventions addressing root causes
5. Distinctive predictions are generated that can distinguish framework utility from alternatives

Interventions and Applications

The performer readiness framework suggests intervention strategies at multiple levels, targeting different readiness dimensions and different causal mechanisms. Interventions should be matched to accurate diagnosis—addressing cognitive readiness when physiological factors are primary, or targeting individual behavior when organizational conditions are causal, produces waste and frustration.

Dimension-Specific Interventions

Interventions targeting specific readiness dimensions address the particular mechanisms underlying each component. Evidence strength varies considerably across interventions, and practitioners should calibrate confidence accordingly.

For *cognitive readiness*, interventions may include:

- **Strong evidence** supports protected time blocks that reduce interruption frequency during critical tasks. Field studies in clinical settings demonstrate that interruption reduction protocols can decrease error rates (Westbrook et al., 2017, though specific effect sizes vary across implementations and settings), with mechanisms linked to reduced working memory disruption.
- **Strong evidence** supports adequate sleep as foundational for cognitive function, with research consistently demonstrating performance deficits accumulating with sleep restriction (Belenky et al., 2003, in a controlled sleep restriction study; Van Dongen et al., 2003, demonstrating cumulative impairment).
- **Moderate evidence** supports external memory aids (checklists, cognitive prompts, information displays) that reduce reliance on working memory. The surgical safety checklist demonstrates how external tools can support performance under high-demand conditions (Haynes et al., 2009, in a multicenter study that showed significant mortality reductions, though implementation quality significantly affects outcomes and subsequent replications have shown variable results depending on implementation fidelity).
- **Moderate evidence** supports scheduling that aligns high-demand tasks with periods of better cognitive readiness—typically morning hours for day workers, avoiding circadian troughs for shift workers.
- **Practice-based evidence** supports environmental modifications that reduce extraneous cognitive load, though controlled evaluations are limited.

For *physiological readiness*, interventions may include:

- **Strong evidence** supports reduced extended work hours, with studies demonstrating that shifts exceeding 12-16 hours produce performance decrements (Rogers et al., 2004, in a survey of nurse errors and hours worked; Barger et al., 2006, on physician extended shifts). Implementation reduces acute fatigue-related impairment though effects on chronic fatigue require longer-term intervention.

 doi:10.20944/preprints202603.2288.v1

- **Strong evidence** supports strategic napping during extended operations, with controlled studies demonstrating alertness benefits from brief sleep periods (Caldwell et al., 2009, in a review of aviation fatigue countermeasures; Signal et al., 2009, examining specific nap protocols). However, sleep inertia following awakening requires post-nap recovery periods before safety-critical duties.
- **Moderate evidence** supports adequate inter-shift recovery periods, with 11+ hours between shifts enabling better recovery than shorter intervals. However, individual variation in sleep efficiency and recovery needs complicates universal recommendations.
- **Moderate evidence** supports optimizing break timing and duration to enable recovery within shifts (Tucker, 2003, reviewing rest pause research).
- **Emerging evidence** examines caffeine and other pharmacological interventions, with systematic effects on alertness but varying individual responses and potential for masking underlying fatigue.

For *emotional readiness*, interventions may include:

- **Strong evidence** supports transition time following emotionally demanding events, consistent with recovery research demonstrating that immediate task resumption after stressors impairs performance (though specific protocols lack controlled evaluation in most operational settings). Removing individuals from immediate performance demands following critical incidents aligns with basic stress response research.
- **Moderate evidence** supports peer support systems that provide emotional processing opportunities, with studies of critical incident stress management showing variable effectiveness depending on implementation (though debriefing efficacy debates continue, peer support for ongoing rather than acute stress shows more consistent benefits).
- **Moderate evidence** supports clinical supervision providing regular emotional processing opportunities for those in emotionally demanding roles. Professional supervision practices are standard in some fields (psychotherapy, social work) but less common in others (nursing, emergency medicine) despite comparable emotional demands.
- **Practice-based evidence** supports environmental design enabling brief retreat from performance demands, though controlled evaluations are limited.

For *motivational readiness*, interventions may include:

- **Moderate evidence** supports autonomy support—enabling appropriate control over work methods and timing—with self-determination theory research consistently linking autonomy to sustained engagement (Deci & Ryan, 2000). However, high-stakes contexts may limit feasible autonomy, requiring attention to which decisions can be devolved without compromising safety.
- **Moderate evidence** supports fairness and procedural justice, with research demonstrating that perceived unfairness undermines engagement and organizational commitment (Colquitt, 2001).
- **Practice-based evidence** supports recognition and feedback connecting effort to outcomes and acknowledging contributions, though motivational effects may be short-lived without systemic support.
- **Practice-based evidence** supports meaning-making processes that connect specific tasks to valued outcomes, though individual variation in meaning sources complicates standardized approaches.

Table 3 summarizes intervention options by dimension and evidence level.

 doi:10.20944/preprints202603.2288.v1

Table 3. Intervention Options by Readiness Dimension and Evidence Strength.

Dimension	Strong Evidence	Moderate Evidence	Practice-Based Evidence
Cognitive	Sleep protection; interruption reduction; structured sleep opportunity	External memory aids; circadian-aligned scheduling; cognitive load management	Environmental modifications
Physiological	Hours restrictions; strategic napping; recovery time between shifts	Shift length limits; break optimisation; fatigue detection systems	Nutrition/hydration attention
Emotional	Protected time following critical incidents	Peer support systems; clinical supervision	Retreat spaces; team climate interventions
Motivational	(Limited strong evidence)	Autonomy support; fairness/justice attention; workload balance	Recognition practices; meaning-making

Cultural change addressing norms that undermine readiness—hero cultures, stigma around fatigue acknowledgment, blame-focused incident response—requires sustained leadership commitment and Behavioral modelling. Such change is difficult and slow but may be essential for sustainable readiness protection. Edmondson's (2019) work on psychological safety provides frameworks for building cultures where readiness concerns can be safely raised.

Technology and automation can reduce demands on human operators, though implementation requires careful attention to automation's own complexities. Automation may reduce routine workload while increasing demands during unusual situations, potentially catching operators at low readiness for the rare high-demand events (Parasuraman & Riley, 1997). Thoughtful automation design supports human performance rather than simply replacing it.

When Behavior-Focused Intervention Remains Appropriate

The performer readiness framework does not argue that readiness problems explain all performance failures. Behavior-focused intervention remains appropriate when:

1. *Genuine capability gaps exist*: When individuals lack knowledge or skill required for performance, training addresses the actual deficit. Accurate diagnosis distinguishes capability gaps (consistent errors matching training gaps, unimproved with rest or support) from readiness problems (variable performance in previously competent individuals).
2. *Accountability failures are primary*: When individuals with adequate capability and readiness choose not to perform appropriately—conscious violations, deliberate corner-cutting, willful neglect—accountability mechanisms address volitional non-compliance. Diagnosis requires ruling out readiness explanations and identifying patterns suggesting intentionality (e.g., performance that varies with perceived monitoring rather than with conditions affecting readiness).
3. *Behavioral patterns are independent of readiness conditions*: Some performance problems persist regardless of readiness state, suggesting learned maladaptive patterns, habit-based errors, or other factors requiring Behavioral rather than readiness intervention.
4. *Individual factors genuinely drive variation*: In some cases, individual differences in capability, personality, or disposition—rather than organizational conditions or situational states—explain performance variation. Such situations may warrant individually-targeted intervention, though care is needed to avoid misattributing systemic problems to individual factors.

Distinguishing among these situations requires careful diagnosis attending to patterns, contexts, and individual histories as outlined in Table 1.

Boundary Conditions and Limitations

The performer readiness framework applies most directly to specific contexts and should not be overgeneralized. Understanding boundary conditions enables appropriate application.

 doi:10.20944/preprints202603.2288.v1

Organizational Context Boundaries

The framework is developed primarily for *high-stakes, operationally-oriented contexts* where performance failures carry significant consequences, time pressure characterizes critical operations, and task demands are substantial. The framework's assumptions may not hold equally in contexts with different characteristics:

- *Creative and knowledge work* may involve different readiness dynamics. While cognitive readiness matters for creative performance, research suggests that mild fatigue or reduced executive control may sometimes enhance creative insight by reducing inhibition of unusual associations (Wieth & Zacks, 2011). Framework applications in creative contexts require adaptation rather than direct transfer.
- *Strategic and long-cycle tasks* differ from acute performance demands. Decisions unfolding over weeks or months involve different temporal dynamics than those made in moments during critical operations. The framework's emphasis on momentary state accessibility may be less central for extended deliberative processes.
- *Lower-stakes contexts* may not warrant the intensive attention to readiness that high-stakes environments justify. Administrative tasks, routine operations without significant consequences, and self-paced work may tolerate readiness variation without problematic outcomes.
- *Self-managed work* presents different dynamics than work directed by organizational schedules and demands. When individuals control their own work timing and intensity, they may naturally regulate effort to match readiness. Organizational intervention may be less appropriate when workers can self-manage appropriately.

Individual Difference Considerations

Individual differences moderate framework dynamics in ways that complicate universal prescription:

- *Baseline readiness resources* vary among individuals. Some people require more sleep, have more limited emotional regulatory capacity, or maintain lower physiological reserves. Interventions appropriate for typical individuals may be insufficient for those with lower baselines or excessive for those with greater reserves.
- *Recovery efficiency* differs across individuals. Some recover quickly from depletion while others require extended recovery. Standardized recovery periods may be adequate for some and insufficient for others.
- *Threshold levels* vary individually. The point at which readiness degradation produces performance failure differs among individuals and may not be predictable from general principles. Some individuals maintain function at readiness levels where others would fail.
- *Coping and compensation strategies* differ in effectiveness and efficiency. Some individuals have developed highly effective strategies for managing readiness challenges; standardized approaches may be less effective than supporting individual strategy use.

These considerations argue against one-size-fits-all intervention and for approaches that permit individual adaptation within appropriate frameworks.

Evidence Limitations

The evidence base underlying the framework varies in strength across components:

- *Strongest evidence* supports the impact of sleep deprivation on cognitive function, with extensive experimental and field research establishing clear relationships (Lim & Dinges, 2010, in a meta-analysis of sleep deprivation effects on cognitive functions). Evidence on extended work hours effects, while less experimentally controlled, shows consistent patterns across multiple study types and settings.

Preprints.org (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 March 2026 doi:10.20944/preprints202603.2288.v1

- *Moderate evidence* supports relationships between emotional labor and depletion (Grandey & Melloy, 2017, reviewing mechanisms and outcomes), between organizational climate and safety outcomes (Christian et al., 2009, providing meta-analytic synthesis), and between workload and performance (though these relationships are moderated by numerous factors).
- *Weaker evidence* characterizes some motivational dynamics, cascade interactions, and intervention effectiveness claims. While theoretical arguments are sound, empirical support for specific claims is often limited to correlational studies, single-site implementations, or extrapolation from laboratory findings to operational contexts.
- *Limited evidence* exists for the integrated framework as a whole. While individual components draw on established research, the synthesis is conceptual rather than empirically validated as a unified model. Predictions derived from the integrated framework await systematic testing.

Framework Limitations Requiring Further Development

The performer readiness framework as presented leaves several issues underdeveloped:

- *Quantification approaches*: The framework provides conceptual structure but not quantitative prediction. Specifying how much cognitive depletion combines with how much emotional distress to produce what probability of what type of error requires empirical work not yet available.
- *Individual readiness profiles*: Systematic approaches to characterizing individual patterns of readiness vulnerability, recovery characteristics, and compensation strategies require development. Current understanding supports individual variation but not reliable profiling.
- *Team and collective readiness*: Extension to team-level analysis requires more systematic development than the present treatment provides. How individual readiness states combine to determine team capability, and how team processes influence individual readiness, need further elaboration.
- *Dynamic modelling*: Temporal dynamics including cascades, thresholds, and accumulation patterns are described conceptually but not modelled quantitatively. Predictive models that could inform scheduling or workload management require parameter estimation not yet available.

Implementation Barriers and Organizational Change

Moving from conceptual framework to organizational practice confronts substantial barriers that must be anticipated and addressed.

Cultural and Cognitive Barriers

Attribution habits persist despite education. Managers, colleagues, and workers themselves routinely attribute performance problems to individual factors even when situational factors are implicated (Ross, 1977). Shifting attributional patterns requires sustained intervention beyond information provision—repeated practice identifying situational contributors, explicit structures for situational analysis, and accountability for considering context before concluding individual fault.

Hero cultures that valorize working through exhaustion resist readiness-protective practices. In many high-stakes occupations, demonstrating toughness by working beyond comfortable limits signals commitment and competence. Those who acknowledge readiness concerns may be perceived as weak or uncommitted. Changing such cultures requires leadership modelling of readiness-protective behavior, explicit rejection of hero narratives, and recognition systems that value sustainable performance over dramatic sacrifice.

Short-term orientation favors immediate productivity over long-term sustainability. Scheduling changes, staffing increases, and recovery time all have immediate costs while benefits accrue through prevented problems and sustained performance—benefits that are difficult to observe because they consist of events that did not occur. Building business cases for readiness investment requires

 doi:10.20944/preprints202603.2288.v1

sophisticated outcome tracking and willingness to invest based on risk reduction rather than visible returns.

Structural Barriers

Resource constraints limit organizations' ability to implement ideal practices. Staffing at levels fully protective of readiness may be economically unviable, particularly in organizations with thin margins or unpredictable demand. Schedule designs optimizing recovery may conflict with operational requirements or worker preferences. Implementation must work within real constraints rather than assuming unlimited resources.

Operational variability complicates standardized approaches. Demand fluctuations mean that staffing adequate for typical periods may be insufficient during surges, while staffing for surges is economically unviable during typical periods. Flexible approaches—surge capacity, cross-training, demand management—may address variability but introduce their own costs and complexities.

Fragmented accountability across organizational units impedes coordinated intervention. Scheduling may be controlled by operations, staffing by human resources, training by education departments, and incident investigation by quality or safety offices. Readiness-protective intervention may require coordination across units that lack mechanisms for joint action.

Measurement Barriers

Lagging indicators dominate performance measurement. Organizations typically track incidents, errors, and adverse outcomes—all of which represent readiness failures that have already occurred. Leading indicators that could enable proactive intervention—readiness levels, near-miss patterns suggesting readiness problems, early warning signs—are rarely captured.

Readiness invisibility makes it difficult to demonstrate the value of readiness investment. Adequate readiness produces an absence of problems rather than a visible positive—outcomes that are difficult to attribute and easy to take for granted. Making readiness visible through systematic monitoring enables evidence-based resource allocation but requires investment in measurement systems.

Change Enablers

Despite barriers, organizations do sometimes successfully implement readiness-protective practices. Enablers include:

- *Sentinel events* that make the costs of readiness failures visible and attributable. Following high-profile incidents, organizations may have political will and resource availability for changes that would otherwise face resistance.
- *Leadership commitment* that models readiness-protective behavior and holds others accountable for readiness consideration. Without leadership driving change, initiatives tend to fade when competing pressures arise.
- *Regulatory pressure* that mandates certain practices, overriding economic calculations that might otherwise prevent investment. Hours restrictions, staffing requirements, and mandated training create floors below which organizations cannot fall.
- *Pilot implementation* that demonstrates feasibility and value before requiring organization-wide commitment. Successful pilots can build confidence and political support for broader implementation.

Ethical Considerations

Implementation of performer readiness concepts raises ethical considerations requiring explicit attention.

 doi:10.20944/preprints202603.2288.v1

Privacy Concerns

Assessment of readiness may involve collecting sensitive information about individuals' physiological states, emotional conditions, and personal lives (sleep patterns, off-work stressors). Such information collection raises privacy concerns:

- *Scope limitation*: Information collected should be limited to what is necessary for legitimate readiness-protective purposes. Collecting detailed personal information beyond operational need represents unjustified intrusion.
- *Use restrictions*: Information collected for readiness protection should not be repurposed for disciplinary action, performance evaluation, or employment decisions beyond immediate safety concerns. Using fatigue data to discipline workers, for example, would deter honest reporting and undermine the system's protective function.
- *Data security*: Sensitive readiness information requires protection against unauthorized access. Physiological data, emotional state information, and related data are potentially sensitive and require appropriate security.
- *Voluntary participation*: Where possible, monitoring systems should rely on voluntary participation rather than mandatory surveillance. When monitoring is required for safety reasons, transparency about what is monitored and how data are used is essential.

Autonomy Considerations

Readiness-protective interventions may limit individual autonomy in ways requiring justification:

- *Mandatory rest*: Requiring workers to stop working when readiness indicators suggest impairment may conflict with worker preferences, particularly when economic incentives favor continued work. Such requirements can be justified by safety considerations but represent paternalistic intervention.
- *Schedule constraints*: Shift length limitations and required recovery periods may conflict with individual preferences for compressed schedules, overtime opportunities, or self-determined work patterns.
- *Task restrictions*: Removing impaired individuals from high-stakes tasks protects safety but may be experienced as insulting or stigmatizing, particularly in cultures valuing professional autonomy.
- Balancing safety protection against autonomy respect requires transparent processes, proportionate intervention, and worker involvement in policy design.

The framework is most appropriately applied to *addressing systemic conditions that compromise readiness* rather than to *managing individuals' readiness states*. Organizational responsibility lies primarily in creating conditions that protect readiness—adequate staffing, reasonable schedules, appropriate demands—rather than in intensive monitoring and management of individual states. Shifting from system-level intervention to individual-level surveillance risks converting readiness protection into another form of worker control.

Fairness and Equity

Readiness vulnerabilities are not equally distributed. Individuals with caregiving responsibilities, chronic health conditions, longer commutes, socioeconomic constraints affecting sleep quality, and other factors may face greater readiness challenges than others. Readiness-focused systems must attend to equity implications:

- *Differential burden*: If readiness standards effectively exclude those with greater vulnerability, discriminatory effects result. Standards should be set with awareness of differential impact.

 doi:10.20944/preprints202603.2288.v1

- *Accommodation obligations*: When individual factors affect readiness, reasonable accommodation may be appropriate rather than exclusion. Scheduling flexibility, role modification, and other accommodations may enable participation while protecting safety.
- *Systemic inequity*: Readiness vulnerabilities often reflect broader social inequities (e.g., housing quality affecting sleep, economic constraints preventing adequate recovery). While organizations cannot resolve societal inequities, awareness of how they manifest in readiness should inform policy.

Responsibility Attribution

The performer readiness framework has implications for how responsibility for adverse events is attributed. If readiness failures reflect organizational conditions rather than individual choices, individual accountability may be inappropriate. However, complete absolution of individuals may be equally inappropriate:

- *Shared responsibility*: Most adverse events involve both individual factors and system conditions. Attribution frameworks should acknowledge multiple contributors rather than seeking single responsible parties.
- *Prospective versus retrospective*: Individuals may bear responsibility for prospective readiness protection (managing sleep, reporting impairment) even when retrospective blame for impaired performance is inappropriate.
- *Just culture principles*: Fair accountability distinguishes among human error (not blameworthy), at-risk behavior (coaching appropriate), and reckless behavior (accountability appropriate) (Reason, 1997). Readiness-compromised performance typically reflects error or at-risk behavior rather than recklessness, arguing against punitive responses.

Future Research Directions

The performer readiness framework identifies several directions for empirical research and theoretical development:

- *Dimension interaction dynamics*: How exactly do deficits in one dimension trigger or amplify deficits in others? What are the temporal dynamics of cascade effects? Can intervention in one dimension interrupt cascades affecting others? Research combining real-time assessment across multiple dimensions with performance measurement could address these questions.
- *Threshold identification*: Can thresholds below which performance degrades be identified for specific dimensions, tasks, and individuals? Can individual threshold profiles be characterized and used for personalized intervention? Such research requires longitudinal assessment approaches tracking individuals across varying readiness conditions.
- *Intervention effectiveness*: Which interventions most effectively protect or restore readiness, for which dimensions, under what conditions? Controlled trials of specific interventions with readiness-relevant outcome measures would strengthen the evidence base considerably.
- *Assessment validity*: How well do various assessment approaches capture readiness dimensions that actually predict performance? Validation research linking assessment measures to performance outcomes in operational contexts is needed.
- *Multilevel dynamics*: How do individual readiness states aggregate to team-level capability? How do team and organizational factors influence individual readiness beyond direct individual-level mechanisms? Multilevel research designs could address these questions.
- *Long-term trajectories*: How do readiness patterns evolve across careers? What distinguishes individuals who maintain readiness from those who develop chronic impairment? Longitudinal cohort studies could inform sustainable career design.
- *Framework validation*: Do the framework's distinctive predictions (differential degradation patterns, threshold effects, limited single-dimension intervention effectiveness, multilevel causation) receive empirical support when systematically tested? Comparative studies

examining framework predictions against alternative approaches would establish practical utility.

Conclusions

Human performance in high-stakes contexts depends not only on what individuals know and can do, but on whether they are ready to deploy those capabilities when demands arise. The performer readiness framework provides conceptual tools for understanding readiness as a multidimensional, dynamic, contextually-determined phenomenon with direct implications for organizational responsibility.

When competent, well-intentioned individuals fail, the most likely explanation is not deficient character or inadequate motivation but compromised readiness—cognitive resources depleted by interrupted sleep, physiological systems stressed by relentless demands, emotional reserves exhausted by accumulated exposure to distressing situations, motivational engagement undermined by conditions that frustrate rather than support effective action.

The framework generates predictions distinguishing it from standard approaches: that competence verification is insufficient for performance assurance, that single-dimension interventions will show limited effectiveness when multiple dimensions are compromised, that performance degradation patterns will differ based on which dimension is primarily affected, and that threshold effects will produce nonlinear relationships between readiness and performance. These predictions have practical implications for diagnosis, intervention targeting, and system design.

Organizations bear significant responsibility for the conditions that determine readiness. Scheduling practices, staffing decisions, workload expectations, cultural norms, and system designs establish parameters within which individuals must function. Intervention that focuses only on individual behavior, training, or attitude while ignoring these organizational determinants addresses symptoms while leaving causes intact.

The transition from person-focused to system-focused understanding of performance failures is not complete by acknowledging that "systems matter." It requires developing the conceptual vocabulary, assessment approaches, and intervention frameworks that make systems-informed practice possible. The performer readiness framework contributes to this development by specifying what readiness comprises, how it is compromised, how it can be assessed, and how it might be protected—providing practitioners and researchers with tools for understanding and addressing one of the fundamental determinants of human performance in consequential contexts.

The framework does not claim that readiness explains all performance variation or that individual factors are irrelevant. Genuine capability gaps require training, accountability failures require consequences, and individual differences matter. But across a wide range of performance problems in high-stakes settings, the readiness lens illuminates dynamics that person-focused explanations obscure—and in doing so, opens possibilities for intervention that are both more effective and more just than approaches that locate failure in the individual who happened to stand at the end of a long causal chain of organizational conditions.

References

Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., Diomidous, M., Kinnunen, J., Kózka, M., Lesaffre, E., McHugh, M. D., Moreno-Casbas, M. T., Rafferty, A. M., Schwendimann, R., Scott, P. A., Tishelman, C., van Achterberg, T., & Sermeus, W. (2014). Nurse staffing and education and hospital mortality in nine European countries: A retrospective observational study. *The Lancet, 383*(9931), 1824-1830.

Baddeley, A. D. (2012). Working memory: Theories, models, and controversies. *Annual Review of Psychology, 63*, 1-29.

Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology, 22*(3), 273-285.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.

Barger, L. K., Ayas, N. T., Cade, B. E., Cronin, J. W., Rosner, B., Speizer, F. E., & Czeisler, C. A. (2006). Impact of extended-duration shifts on medical errors, adverse events, and attentional failures. *PLoS Medicine, 3*(12), e487.

Basner, M., & Dinges, D. F. (2011). Maximizing sensitivity of the psychomotor vigilance test (PVT) to sleep loss. *Sleep, 34*(5), 581-591.

Basner, M., Rao, H., Goel, N., & Dinges, D. F. (2013). Sleep deprivation and neurobehavioral dynamics. *Current Opinion in Neurobiology, 23*(5), 854-863.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*(5), 1252-1265.

Belenky, G., Wesensten, N. J., Thorne, D. R., Thomas, M. L., Sing, H. C., Redmond, D. P., Russo, M. B., & Balkin, T. J. (2003). Patterns of performance degradation and restoration during sleep restriction and subsequent recovery: A sleep dose-response study. *Journal of Sleep Research, 12*(1), 1-12.

Bergman, B., Ahmad, F., & Stewart, D. E. (2016). Physician health, stress and gender at a university hospital. *Journal of Psychosomatic Research, 64*(1), 59-67.

Caldwell, J. A., Mallis, M. M., Caldwell, J. L., Paul, M. A., Miller, J. C., & Neri, D. F. (2009). Fatigue countermeasures in aviation. *Aviation, Space, and Environmental Medicine, 80*(1), 29-59.

Caruso, C. C. (2014). Negative impacts of shiftwork and long work hours. *Rehabilitation Nursing, 39*(1), 16-25.

Chalder, T., Berelowitz, G., Pawlikowska, T., Watts, L., Wessely, S., Wright, D., & Wallace, E. P. (1993). Development of a fatigue scale. *Journal of Psychosomatic Research, 37*(2), 147-153.

Christian, M. S., Bradley, J. C., Wallace, J. C., & Burke, M. J. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology, 94*(5), 1103-1127.

Colquitt, J. A. (2001). On the dimensionality of organizational justice: A construct validation of a measure. *Journal of Applied Psychology, 86*(3), 386-400.

Dang, J. (2018). An updated meta-analysis of the ego depletion effect. *Psychological Research, 82*(4), 645-651.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.

Dekker, S. W. A. (2014). *The field guide to understanding 'human error'* (3rd ed.). Ashgate.

Diamond, A. (2013). Executive functions. *Annual Review of Psychology, 64*, 135-168.

Drake, C. L., Roehrs, T., Richardson, G., Walsh, J. K., & Roth, T. (2004). Shift work sleep disorder: Prevalence and consequences beyond that of symptomatic day workers. *Sleep, 27*(8), 1453-1462.

Edmondson, A. C. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350-383.

Edmondson, A. C. (2019). *The fearless organization: Creating psychological safety in the workplace for learning, innovation, and growth*. Wiley.

Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion, 7*(2), 336-353.

Figley, C. R. (Ed.). (2002). *Treating compassion fatigue*. Brunner-Routledge.

Folkard, S., & Tucker, P. (2003). Shift work, safety and productivity. *Occupational Medicine, 53*(2), 95-101.

Friese, M., Loschelder, D. D., Gieseler, K., Frankenbach, J., & Inzlicht, M. (2019). Is ego depletion real? An analysis of arguments. *Personality and Social Psychology Review, 23*(2), 107-131.

Gander, P. H., Mangie, J., Phillips, A. J., Santos-Fernandez, E., & Wu, L. J. (2011). Flight crew fatigue IV: Overnight cargo operations. *Aviation, Space, and Environmental Medicine, 82*(9), 867-875.

Grandey, A. A., & Melloy, R. C. (2017). The state of the heart: Emotional labor as emotion regulation reviewed and revised. *Journal of Occupational Health Psychology, 22*(3), 407-422.

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry, 26*(1), 1-26.

Hancock, P. A., & Warm, J. S. (1989). A dynamic model of stress and sustained attention. *Human Factors, 31*(5), 519-537.

Haynes, A. B., Weiser, T. G., Berry, W. R., Lipsitz, S. R., Breizat, A. H. S., Dellinger, E. P., Herbosa, T., Joseph, S., Kibatala, P. L., Lapitan, M. C. M., Merry, A. F., Moorthy, K., Reznick, R. K., Taylor, B., & Gawande, A. A.

(2009). A surgical safety checklist to reduce morbidity and mortality in a global population. *New England Journal of Medicine, 360*(5), 491-499.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513-524.

Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied Psychology, 50*(3), 337-421.

Hochschild, A. R. (1983). *The managed heart: Commercialization of human feeling*. University of California Press.

Hockey, G. R. J. (1997). Compensatory control in the regulation of human performance under stress and high workload: A cognitive-energetical framework. *Biological Psychology, 45*(1-3), 73-93.

Hockey, G. R. J. (2011). A motivational control theory of cognitive fatigue. In P. L. Ackerman (Ed.), *Cognitive fatigue: Multidisciplinary perspectives on current research and future applications* (pp. 167-187). American Psychological Association.

Hockey, G. R. J. (2013). *The psychology of fatigue: Work, effort and control*. Cambridge University Press.

Hollnagel, E., Woods, D. D., & Leveson, N. (Eds.). (2006). *Resilience engineering: Concepts and precepts*. Ashgate.

International Civil Aviation Organization. (2016). *Manual for the oversight of fatigue management approaches* (Doc 9966, 2nd ed.). ICAO.

Kleim, B., & Westphal, M. (2011). Mental health in first responders: A review and recommendation for prevention and intervention strategies. *Traumatology, 17*(4), 17-24.

Landrigan, C. P., Rothschild, J. M., Cronin, J. W., Kaushal, R., Burdick, E., Katz, J. T., Lilly, C. M., Stone, P. H., Lockley, S. W., Bates, D. W., & Czeisler, C. A. (2004). Effect of reducing interns' work hours on serious medical errors in intensive care units. *New England Journal of Medicine, 351*(18), 1838-1848.

Lim, J., & Dinges, D. F. (2010). A meta-analysis of the impact of short-term sleep deprivation on cognitive variables. *Psychological Bulletin, 136*(3), 375-389.

Maslach, C., & Leiter, M. P. (2016). Understanding the burnout experience: Recent research and its implications for psychiatry. *World Psychiatry, 15*(2), 103-111.

Masento, N. A., Golightly, M., Field, D. T., Butler, L. T., & van Reekum, C. M. (2014). Effects of hydration status on cognitive performance and mood. *British Journal of Nutrition, 111*(10), 1841-1852.

McEwen, B. S. (1998). Stress, adaptation, and disease: Allostasis and allostatic load. *Annals of the New York Academy of Sciences, 840*(1), 33-44.

Palmer, C. A., & Alfano, C. A. (2017). Sleep and emotion regulation: An organizing, integrative review. *Sleep Medicine Reviews, 31*, 6-16.

Parasuraman, R., & Riley, V. (1997). Humans and automation: Use, misuse, disuse, abuse. *Human Factors, 39*(2), 230-253.

Reason, J. (1990). *Human error*. Cambridge University Press.

Reason, J. (1997). *Managing the risks of organizational accidents*. Ashgate.

Reason, J. (2000). Human error: Models and management. *BMJ, 320*(7237), 768-770.

Rogers, A. E., Hwang, W. T., Scott, L. D., Aiken, L. H., & Dinges, D. F. (2004). The working hours of hospital staff nurses and patient safety. *Health Affairs, 23*(4), 202-212.

Ross, L. (1977). The intuitive psychologist and his shortcomings: Distortions in the attribution process. *Advances in Experimental Social Psychology, 10*, 173-220.

Rosso, B. D., Dekas, K. H., & Wrzesniewski, A. (2010). On the meaning of work: A theoretical integration and review. *Research in Organizational Behavior, 30*, 91-127.

Salas, E., Shuffler, M. L., Thayer, A. L., Bedwell, W. L., & Lazzara, E. H. (2015). Understanding and improving teamwork in organizations: A scientifically based practical guide. *Human Resource Management, 54*(4), 599-622.

Schaufeli, W. B., Leiter, M. P., & Maslach, C. (2009). Burnout: 35 years of research and practice. *Career Development International, 14*(3), 204-220.

Shen, J., Barbera, J., & Shapiro, C. M. (2006). Distinguishing sleepiness and fatigue: Focus on definition and measurement. *Sleep Medicine Reviews, 10*(1), 63-76.

Signal, T. L., Gander, P. H., Anderson, H., & Brash, S. (2009). Scheduled napping as a countermeasure to sleepiness in air traffic controllers. *Journal of Sleep Research, 18*(1), 11-19.

 doi:10.20944/preprints202603.2288.v1

Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior, 36*(S1), S72-S103.

Sweller, J. (2011). Cognitive load theory. In J. P. Mestre & B. H. Ross (Eds.), *The psychology of learning and motivation* (Vol. 55, pp. 37-76). Academic Press.

Thomas, M., Sing, H., Belenky, G., Holcomb, H., Mayberg, H., Dannals, R., Wagner, H., Thorne, D., Popp, K., Rowland, L., Welsh, A., Balwinski, S., & Redmond, D. (2000). Neural basis of alertness and cognitive performance impairments during sleepiness: I. Effects of 24 h of sleep deprivation on waking human regional brain activity. *Journal of Sleep Research, 9*(4), 335-352.

Tice, D. M., Bratslavsky, E., & Baumeister, R. F. (2001). Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology, 80*(1), 53-67.

Tucker, P. (2003). The impact of rest breaks upon accident risk, fatigue and performance: A review. *Work & Stress, 17*(2), 123-137.

Van De Water, A. T. M., Holmes, A., & Hurley, D. A. (2011). Objective measurements of sleep for non-laboratory settings as alternatives to polysomnography: A systematic review. *Journal of Sleep Research, 20*(1pt2), 183-200.

Van Dongen, H. P., Maislin, G., Mullington, J. M., & Dinges, D. F. (2003). The cumulative cost of additional wakefulness: Dose-response effects on neurobehavioral functions and sleep physiology from chronic sleep restriction and total sleep deprivation. *Sleep, 26*(2), 117-126.

Warm, J. S., Parasuraman, R., & Matthews, G. (2008). Vigilance requires hard mental work and is stressful. *Human Factors, 50*(3), 433-441.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.

Westbrook, J. I., Raban, M. Z., Walter, S. R., & Douglas, H. (2017). Task errors by emergency physicians are associated with interruptions, multitasking, fatigue and working memory capacity: A prospective, direct observation study. *BMJ Quality & Safety, 27*(8), 655-663.

Wieth, M. B., & Zacks, R. T. (2011). Time of day effects on problem solving: When the non-optimal is optimal. *Thinking & Reasoning, 17*(4), 387-401.

Williamson, A. M., & Feyer, A. M. (2000). Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occupational and Environmental Medicine, 57*(10), 649-655.

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology, 18*(5), 459-482.