THE INVISIBLE ARCHITECTURE OF WELL-BEING

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John Thomas Paruch, MD
Internal Medicine • Psychiatry • Lifestyle Medicine

A multiscale systems framework for health, resilience, recovery, and human performance. Working scientific framework; not a validated diagnostic or treatment instrument.

Integrated theoretical update through November 10, 2026. This working synthesis preserves the eight-domain systems model while explicitly distinguishing system conditions, adaptive capacities, and flourishing outcomes. Not a validated clinical algorithm.

Executive summary

The Invisible Architecture of Well-Being (IAWB) is a proposed integrative, transdiagnostic systems framework explaining how health, illness, resilience, recovery, performance, and experienced well-being emerge from interactions among biological, developmental, relational, behavioral, cognitive, environmental, existential, and societal conditions.

The theory centers on effective load, available and accessible reserve, adaptive capacity, compensation, feedback loops, bottlenecks, time-dependent change, and network leverage. It complements rather than replaces diagnosis, evidence-based treatment, specialty care, and public-health interventions.

Core proposition: The clinically useful question is not only what diagnosis explains the symptom, but what architecture is generating, maintaining, buffering, or amplifying the present state—and which safe, feasible, evidence-supported intervention is most likely to improve the trajectory.

I. Foundational theory

Well-being is an emergent property of a dynamic, interconnected human system, not merely the absence of illness or a sum of independently optimized biomarkers.

The architecture is 'invisible' because the network of determinants and relationships is seldom apparent from a symptom inventory, laboratory panel, or diagnosis alone. Many elements can nevertheless be measured.

Health, well-being, performance, resilience, and longevity are distinct outcomes. Exceptional performance can coexist with vulnerability; chronic illness can coexist with meaning and quality of life.

IAWB seeks to explain heterogeneity of response to similar stressors, hidden fragility beneath preserved function, cross-domain benefits of interventions, apparent treatment resistance, incomplete recovery after removal of a stressor, and strategic intervention prioritization.

II. Eight interacting domains

1. Biological / Body — genetics, physiology, sleep, circadian regulation, cardiometabolic health, immune/endocrine function, pain, medications, fitness, illness, and aging.

2. Developmental / Shaping — early adversity, attachment, learning history, accumulated exposures, developmental opportunities, and life-course transitions.

3. Relational / People — family, peers, social support, loneliness, caregiving, conflict, attachment, trust, and belonging.

4. Behavioral / Daily Acts — sleep scheduling, movement, nutrition, meal timing, substance use, routines, avoidance, adherence, and practice.

5. Cognitive / Mind — attention, executive function, appraisal, emotional regulation, cognitive flexibility, self-efficacy, beliefs, and perceived control.

6. Physical Environment — housing, light, noise, air quality, temperature, safety, nature, walkability, and built environments.

7. Existential / Meaning — purpose, values, identity, hope, coherence, personal significance, and spirituality when relevant.

8. Societal / Systems — income, employment, education, discrimination, healthcare access, transportation, policy, and community resources.

These domains are organizational lenses, not silos. Sleep, for example, is simultaneously biological, behavioral, environmental, cognitive, and occupational. Important clinical information frequently lies in relationships between domains.

III. Load, reserve, and accessibility

Objective load is the measurable demand or exposure. Perceived load is the individual's appraisal of that demand. Effective load is the consequential regulatory and functional burden after appraisal, context, behavior, and physiological response. These are not interchangeable.

Load can be acute or chronic, predictable or unpredictable, controllable or uncontrollable. Challenge is not intrinsically harmful: the response depends on dose, timing, context, baseline state, and recovery.

Available reserve is capacity or resources that exist. Accessible reserve is what can be recruited under current conditions. Functional reserve is capacity actually mobilized into adaptive function. Observed resilience is maintenance or recovery of function after perturbation.

The accessibility gate can be influenced by sleep, pain, metabolic state, autonomic arousal, fear, cognition, self-efficacy, agency, motivation, safety, social support, and structural opportunity.

A person can possess resources without being able to use them. Intervention may need to improve accessibility rather than build more underlying capacity.

Adaptive margin is a conceptual relationship: $M(t) \approx$ accessible reserve(t) – effective load(t). This is not a validated numerical equation; the quantities are multidimensional and lack a common measurement scale.

IV. Challenge, compensation, and system states

The proposed challenge continuum is underload → adaptive challenge → strain → overload. Optimal challenge is individualized and recovery-dependent. More exercise, fasting, stress exposure, or cognitive effort is not universally better.

Compensation preserves apparent function at additional physiological, psychological, behavioral, or social cost. Redundancy is the presence of alternate pathways to maintain function. Performance may remain normal while redundancy declines.

The six proposed system states are robust, adaptive, compensated, fragile, decompensated, and reconstructing. They are dynamic, potentially domain-specific, and not validated clinical staging categories.

Thresholds, nonlinear responses, time delays, path dependence, sensitization, habituation, and hysteresis explain why removal of a stressor may not promptly restore the prior state.

Recovery can involve stabilization, restoration of access, reconditioning, rebuilding, reintegration, and continuing adaptation; these phases may overlap and need not occur in a fixed order.

V. Coupling, feedback, and leverage

Coupling means that a change in one process alters others. Reinforcing loops may perpetuate deterioration or amplify improvement; stabilizing loops may buffer disturbances.

Examples include poor sleep → fatigue → inactivity → reduced capacity → poorer sleep; pain → avoidance → deconditioning → disability → pain; and activity → mastery → self-efficacy → sustained activity.

A hub is a highly connected variable; a bottleneck is a rate-limiting constraint; a feedback loop is a reciprocal sequence; a leverage point is a feasible intervention target with potential downstream impact. These terms are not synonyms.

Network centrality alone does not justify intervention. Leverage depends on causal evidence, effect magnitude, modifiability, safety, feasibility, timing, patient preference, and whether the pathway is active in that individual.

The Interconnection and Leverage Principle: because domains are coupled, interventions may propagate across multiple systems, but the magnitude and direction depend on the individual's network and context.

VI. Multiscale biological embedding

IAWB links context and exposures to appraisal and behavior; CNS, autonomic, and HPA-axis signaling; metabolic, endocrine, immune, vascular, and circadian regulation; cellular/tissue adaptation; organ function; reserve accessibility; and symptoms, behavior, and performance.

Relevant mechanisms may include neurotransmission and network regulation, glucocorticoid/adrenergic signaling, inflammatory signaling, insulin and lipid regulation, endothelial function, mitochondrial energetics, redox biology, proteostasis, autophagy, and gene regulation when evidence supports them.

Relationships are bidirectional: immune and metabolic states affect brain function and behavior just as experience and behavior influence physiology.

Mechanistic detail is included only when it improves explanation or measurement and is supported at the stated evidence level. Plausible molecular mechanisms are not substitutes for demonstrated human clinical outcomes.

VII. Stress–immune pathway

Acute, brief stress can mobilize or redistribute leukocytes and transiently enhance selected immune defenses; chronic, severe, unpredictable, or unresolved stress more often contributes to maladaptive immune dysregulation.

A proposed pathway is stressor → appraisal/control → CNS/ANS/HPA signaling → immune-cell trafficking and hematopoiesis → receptor sensitivity and gene regulation → inflammatory/antiviral balance → tissue effects → symptoms/function/reserve, with immune-to-brain feedback.

Do not characterize stress as uniformly immunosuppressive, infer a universal Th1/Th2/Th17 switch, or claim that inflammation mediates every mental–physical relationship.

VIII. Sleep, movement, and recovery

Sleep is a cross-domain hub and possible bottleneck connecting cognition, emotion, cardiometabolic regulation, immune function, pain, physical recovery, and behavior. Insomnia, circadian irregularity, environmental light, and obstructive sleep apnea warrant condition-specific assessment.

Exercise is a model of adaptive challenge. Training benefits depend on appropriate dose, recovery, energy availability, baseline fitness, and injury status. Distinguish capacity from readiness to express capacity.

Preserved athletic performance can coexist with sleep debt, energy deficiency, excessive training burden, pain, or psychological distress. Durability and recovery capacity are essential outcomes.

IX. Nutrition, fiber, microbiome, and fasting

Overall dietary pattern, rather than isolated superfoods, is the primary clinically actionable nutritional construct. Plant-forward minimally processed patterns have established benefits for selected cardiometabolic and general-health outcomes.

Dietary interventions have some randomized-trial support as adjunctive depression treatment, but should not be presented as replacements for indicated psychiatric care.

Fiber → microbial fermentation → short-chain fatty acids (acetate, propionate, butyrate) → receptor/metabolic/immune/barrier signaling is an important mechanistic pathway. Not all fiber benefits are mediated by SCFAs.

Human evidence for fiber-related cardiometabolic benefits is stronger than evidence for specific SCFA- or psychobiotic-based mental-health interventions.

Fasting and time-restricted eating are conditional nutritional timing/energy exposures, not universal pillars. Potential benefit or harm depends on energy balance, nutritional adequacy, medications, metabolic state, and training demands. Human longevity claims based on presumed autophagy require caution.

X. Mental–physical coupling and developmental influences

Depression, anxiety, serious mental illness, cardiovascular disease, diabetes, chronic pain, inflammatory conditions, cancer, and kidney disease show multiple bidirectional associations through behavior, treatment engagement, neuroendocrine/immune regulation, and disease burden.

Adverse childhood experiences and developmental conditions can shape vulnerability, behavior, relationships, and physiology over the life course, but do not determine individual destiny.

Allostatic load is a physiological burden construct related to, but distinct from, the broader IAWB construct of effective load.

XI. Allostatic-load measurement

Tier A: a parsimonious candidate composite informed by McCrory et al. (2023), including CRP, resting heart rate, HDL cholesterol, waist-to-height ratio, and HbA1c; pulmonary function was also considered in the underlying work.

Tier B: a broader multisystem composite spanning cardiovascular, metabolic, inflammatory, and optionally neuroendocrine measures.

Tier C: an outcome-specific continuous predictive model; it must be labeled separately and not presented as a measurement of construct-level allostatic load.

Traditional Seeman-style high-risk biomarker sums are interpretable but lose continuous information. No universal cutoff or reference population is appropriate for every research question; age/sex normalization can obscure absolute disparities.

XII. Relationships, environment, meaning, and agency

Social isolation and loneliness are distinct. Relationships can buffer load, influence appraisal and behavior, or themselves be sources of strain. Quality, safety, and personal preferences matter.

Air quality, light, noise, heat, housing, nature exposure, and neighborhood infrastructure shape exposure and behavioral opportunity. Environmental modification may lower load without demanding continual individual effort.

Autonomy, competence, relatedness, self-efficacy, mastery, and perceived control may support behavior initiation and persistence. Their role as reserve-access mechanisms is a promising but incompletely tested IAWB hypothesis.

Meaning and identity can influence goal value, engagement, and recovery orientation without implying that purpose alone overcomes illness or structural constraints.

Personality traits such as conscientiousness and neuroticism may modify appraisal and behavior probabilistically, not deterministically.

XIII. Clinical formulation workflow

1. Define symptoms, diagnoses, function, goals, and immediate safety needs.

2. Map relevant loads and resources across the eight domains.

3. Separate objective, perceived, and candidate effective load.

4. Distinguish available, accessible, and functional reserve.

5. Identify upstream drivers, downstream consequences, and active feedback loops.

6. Locate candidate bottlenecks and compensatory costs.

7. Rank leverage points by evidence, expected benefit, modifiability, feasibility, safety, and patient values.

8. Choose the smallest coherent intervention portfolio consistent with indicated standard care.

9. Measure proximal changes and meaningful patient-centered outcomes.

10. Reassess the network and revise hypotheses when observed response differs from prediction.

Medication, psychotherapy, rehabilitation, procedures, and public-health action can all be leverage interventions. Clinical urgency and safety supersede theoretical network centrality.

XIV. Clinical and performance examples

Depression with fatigue and insomnia: evaluate depressive symptoms and appropriate treatment while also assessing sleep disorders, activity, occupational strain, metabolic health, social support, and access barriers. A sleep bottleneck is a hypothesis to test, not an assumed universal cause.

Chronic pain: nociception, fear, avoidance, poor sleep, deconditioning, mood, and disability can form reinforcing loops. Interventions may target pain mechanisms, function, sleep, graded exposure, and environmental constraints.

Athlete: training output may remain high while sleep debt, inadequate energy availability, identity pressure, injury, and insufficient recovery accumulate. Optimize durable capacity and well-being, not merely today's output.

Post-setback recovery: initially reduce harmful load and restore access to reserve; subsequently introduce appropriately dosed challenge, rebuild capacity, and address confidence, relationships, and meaning.

XV. The mixing-board analogy

An audio mixing console offers an accessible educational model: input channels represent the eight domains; signal and gain represent exposures and amplification; faders represent modifiable targets; routing represents coupling; effects processors represent regulatory mechanisms; headroom approximates spare capacity; distortion illustrates strain; feedback illustrates reinforcing loops; and master output represents function and experienced well-being.

Changing one channel can improve the overall mix or create interference elsewhere. Increasing every control is not optimization; settings depend on the composition, the equipment, and the current objective.

The analogy has limits: human systems self-regulate and change over time, many determinants are not under personal control, and there is no omnipotent external sound engineer. Use it as a teaching interface, not a literal causal model.

Public-facing formulation: Well-being is like a complex musical composition. Biology, behavior, relationships, environment, and meaning all contribute to the sound. The task is to understand how the channels interact and identify realistic adjustments most likely to improve the whole composition.

XVI. Measurement, evidence graph, and validation

An eight-domain assessment can depict perceived strain and support using a radar chart, but the display is descriptive until reliability, validity, and measurement invariance are demonstrated. Avoid assuming one universal composite score is psychometrically justified.

Longitudinal assessment may combine patient-reported outcomes, function, validated symptoms scales, activity/sleep measurements, ecological momentary assessment, and clinically indicated biomarkers.

Represent clinically meaningful concepts as nodes and directional relationships as edges. For each edge record source, design, population, effect size, moderators, temporal scale, causal confidence, and last-review date.

Proposed evidence grades: A strong human experimental/convergent evidence; B substantial human evidence with residual uncertainty; C biologically/clinically plausible with limited direct human causal evidence; D exploratory/theoretical/preclinical.

Feedback-loop confidence cannot exceed the weakest materially necessary edge. Network metrics generate hypotheses, not clinical mandates.

Proposed research tests: reserve accessibility predicts function beyond baseline capacity; compensation cost predicts future decline; individualized bottleneck intervention improves cross-domain outcomes; temporal load–reserve models outperform static measures; IAWB formulation adds value beyond diagnosis and standard biopsychosocial screening.

A candidate state-space model is $dx(t)/dt = f(x(t), u(t), e(t), \theta) + \varepsilon(t)$, with observations $y(t) = g(x(t)) + \eta(t)$. This is a mathematical research scaffold, not a fitted or validated equation.

XVII. Scientific guardrails and limitations

IAWB is a working scientific formulation framework, not a validated diagnosis, treatment algorithm, universal causal model, or replacement for established standards of care.

Association is not causation; mechanistic plausibility does not demonstrate treatment benefit; population-level pathways may not be dominant in a particular individual.

Structural barriers must not be mislabeled as lack of motivation. Patient safety, clinical urgency, preference, and feasibility can override network-derived rankings.

Construct overlap with biopsychosocial medicine, allostasis, ecological systems, resilience science, and complex adaptive systems must be addressed explicitly. Scientific novelty requires distinctive predictions or improved decisions, not merely integration.

Downgrade, merge, or remove nodes and edges that fail replication, lack reliable measurement, duplicate other constructs, or do not improve explanation, prediction, or intervention selection.

XVIII. Twelve governing propositions

1. Well-being emerges from interacting systems.

2. Network configuration matters beyond isolated factors.

3. Load is contextual and time-dependent.

4. Reserve exists in available, accessible, and functional forms.

5. Adaptation is nonlinear and recovery-dependent.

6. Preserved performance may conceal costly compensation.

7. Feedback loops shape trajectories.

8. Bottlenecks constrain otherwise reasonable interventions.

9. Interventions may propagate across domains.

10. History and accumulated exposure influence current response.

11. Environment, opportunity, and agency interact.

12. Architecture is modifiable but not infinitely controllable.

XIX. Formal unified theory statement

The Invisible Architecture of Well-Being proposes that human health, illness, resilience, recovery, performance, and experienced well-being emerge from dynamic interactions among biological, developmental, relational, behavioral, cognitive, environmental, existential, and societal systems.

These systems influence demands, available resources, resource accessibility, and adaptive responses across time. The consequences of exposure depend on appraisal, physiological regulation, context, history, available reserve, and capacity to mobilize that reserve.

Coupling, feedback, thresholds, redundancy, compensation, and path-dependent processes generate heterogeneous trajectories. The same intervention may have different effects across individuals and at different times.

The clinical objective is to identify active constraints and feasible, safe, evidence-supported interventions likely to improve meaningful outcomes. The scientific objective is to operationalize these constructs and test whether network-informed formulations improve explanation, prediction, and treatment prioritization beyond existing approaches.

XX. Selected foundational references

Felitti VJ et al. Relationship of childhood abuse and household dysfunction to many leading causes of death in adults. Am J Prev Med. 1998. doi:10.1016/S0749-3797(98)00017-8.

Hughes K et al. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. Lancet Public Health. 2017. doi:10.1016/S2468-2667(17)30118-4.

McCrory C et al. Psychoneuroendocrinology. 2023. doi:10.1016/j.psyneuen.2023.106117. [Allostatic-load measurement reference; bibliographic details to verify before publication.]

Reynolds A et al. Carbohydrate quality and human health: a series of systematic reviews and meta-analyses. Lancet. 2019. doi:10.1016/S0140-6736(18)31809-9.

Additional research programs incorporated into the IAWB evidence compilation: Seeman allostatic load; Cohen stress/glucocorticoid resistance; Kiecolt-Glaser psychoneuroimmunology; Mezuk depression/diabetes; AHA mind–heart–body statements; SMILES dietary intervention; IMPACT/Unützer and Katon collaborative care; Cherkin MBSR/CBT for back pain; physical resilience/frailty and cognitive reserve literatures.

References are selected anchors from the ongoing compilation, not an exhaustive verified bibliography. Complete source-level verification and edge grading are necessary before journal submission.

Publication note. Prepared for public education and professional discussion. Selected citations are included; a complete reference audit is required before peer-reviewed submission.

XXI. Refinement: Six states as condition, process, and trajectory

The six named states are best interpreted as a two-layer conceptual framework rather than six mutually exclusive or obligatorily sequential stages. Current condition: robust (function sustained with sufficient margin), compensated (function preserved at meaningful cost), fragile (small perturbations may disrupt function), or decompensated (function substantially impaired and support or stabilization required). Active processes: adapting (capacity is being strengthened or reconfigured under manageable challenge) and reconstructing (restoring function, access, and capacity after disruption).

An individual may be fragile and reconstructing, or compensated and adapting. A third descriptor tracks trajectory—improving, stable, worsening, or fluctuating—and confidence in the classification. Condition, process, and trajectory can differ across domains.

Clinical assessment should use repeated measures of baseline and stressed function, degree of compensation, recovery time, functional reserve, redundancy, and response to perturbation. No IAWB-specific thresholds or biomarker cutoffs have been validated. State ratings are provisional hypotheses, not diagnoses.

XXII. Sleep as a cross-domain hub and reserve-access gate

Sleep may act simultaneously as exposure, symptom, outcome, load amplifier, reserve-support process, and bottleneck. Evaluate duration, continuity, timing, regularity, sleep-disordered breathing, insomnia, and daytime impairment separately. Duration alone does not capture sleep health.

Illustrative pathway: irregular or insufficient sleep → impaired alertness, emotion regulation, glucose control, pain tolerance, or activity → increased effective load or reduced reserve accessibility → further disruption of sleep. The evidence strength of each edge differs, and the complete feedback loop is not validated as an IAWB causal model.

Prioritize established clinical management: evaluate suspected obstructive sleep apnea, consider CBT-I for chronic insomnia, address shift-work or circadian disruption, and assess medication/substance contributors. Improvements in sleep may enable behavioral change elsewhere, but this is patient-specific.

XXIII. Circadian architecture, light, and darkness

Circadian organization is distinct from sleep quantity. Relevant constructs include circadian phase, amplitude, stability/regularity, and coordination of central and peripheral rhythms. Light exposure, nighttime darkness, meal timing, activity, and social schedules act as temporal cues.

Human experimental evidence supports effects of circadian misalignment on selected metabolic and neurobehavioral measures. Translation to long-term disease prevention, aging trajectories, and longevity remains uncertain. Animal studies and molecular-clock mechanisms are not direct evidence of human lifespan benefit.

Light effects depend on timing, duration, intensity, spectrum, and individual sensitivity. Melanopsin-containing retinal pathways are sensitive to short-wavelength light, but biological effects cannot be reduced to a single wavelength. Nocturnal light can alter circadian phase and melatonin in relevant conditions; observational associations with chronic disease do not prove intervention effects.

Practical environmental options include bright daytime light when appropriate, consistent timing, reduction of unnecessary bright light near bedtime, and control of bedroom light intrusion without compromising safety. Environmental design can reduce recurring load with less reliance on sustained willpower.

XXIV. Adaptive agency, acceptance, and accessibility

Adaptive agency is proposed as the ability to select and enact value-consistent action within the constraints of current physiology, accessible resources, social support, safety, and structural opportunity. Agency is neither a synonym for motivation nor a justification for individualizing responsibility for structural disadvantage.

Acceptance and action can coexist: recognizing uncontrollable demands may reduce futile regulatory expenditure while preserving purposeful action where influence exists. This is a proposed formulation pathway, not a proven IAWB-specific mechanism.

A researchable contrast is whether reducing friction or improving reserve access (e.g., treating pain, restoring sleep, arranging transport, reducing environmental load) produces greater short-term functional gains than adding further demands to build capacity.

XXV. Athlete-specific recovery and pre-sleep nutrition

High output can coexist with increasing compensatory costs. Athlete formulation should examine energy availability, training dose, sleep regularity, injury/pain, stress, identity pressure, relationships, and recovery readiness rather than equating performance with health.

Acute experiments suggest pre-sleep protein may increase overnight muscle protein synthesis in some settings. Whether pre-sleep timing independently improves long-term hypertrophy, strength, sport performance, or sleep after matching total daily protein and energy remains less secure. Total nutrition, adequate energy, training, and recovery remain primary clinical priorities.

Future studies should compare matched total protein and energy, assess longitudinal outcomes, and test diverse athlete populations. Do not treat acute anabolic signaling as proof of sustained performance benefit.

XXVI. Research agenda and falsification criteria

H1: accessible reserve adds incremental prediction of function beyond baseline capacity and conventional risk measures. H2: compensation costs predict future deterioration despite preserved performance. H3: effective load and accessible reserve interact nonlinearly in predicting functional response. H4: a prospectively specified bottleneck-guided intervention algorithm improves meaningful outcomes versus standard care. H5: condition/process/trajectory ratings demonstrate acceptable reliability and predictive validity. H6: circadian measures add prognostic information beyond sleep duration. H7: passive environmental modifications improve reserve accessibility and behavior under defined conditions.

The research program should preregister definitions and analyses, distinguish within-person from between-person inference, validate across populations, assess harms and equity, and test incremental clinical utility. Candidate constructs or edges should be downgraded or removed when they lack reliability, replication, predictive value, or intervention relevance.

Novelty requires falsifiable incremental value beyond established biopsychosocial, allostatic, resilience, and ecological systems frameworks. The evidence base supports many component pathways; it does not yet validate IAWB as an integrated causal or clinical decision model.

XXVII. Source and publication status

This update draws on the existing IAWB evidence compilation and recent theoretical synthesis. New October 2026 refinements are identified as conceptual extensions unless independently established. A fully audited, edge-specific bibliography and systematic evidence appraisal are needed before describing this as a peer-reviewed or validated scientific theory.

For website distribution, label this paper a working white paper and include version/date, author, citation information, and a note that medical decisions require individualized professional evaluation.

XXI. Foundational three-layer architecture (November 2026)

The current organizing architecture comprises three analytically distinct, reciprocally interacting layers: (1) system conditions, (2) adaptive capacity, and (3) flourishing outcomes. This is a refinement of the eight-domain model, not its replacement. The eight domains describe the breadth of conditions; the three layers describe functional roles within the explanatory model.

Layer 1 — System conditions: biological state, sleep and circadian alignment, nutrition, movement, exposures and stressors, relationships, physical environment, institutions, material opportunity, and developmental history. Conditions can create demand, provide resources, or modify accessibility. They are neither universally beneficial nor universally harmful.

Layer 2 — Adaptive capacity: available, accessible, and functional reserve; agency; adaptability; recovery; resilience; redundancy; and compensatory capacity/cost. These are not one latent trait. Reserve is potential capacity, agency is action-selection and enactment under constraints, recovery is return or reorganization following challenge, and resilience is observed functioning through disturbance.

Layer 3 — Flourishing outcomes: multidimensional experienced and enacted well-being, including physical/mental health, meaning/purpose, relationships, character/contribution, and community/institutional conditions, while recognizing that individuals may flourish in important respects despite adversity or illness.

Cross-layer feedback is essential. Flourishing outcomes may reinforce or deplete future conditions and capacities (for example, social engagement may expand relationships and accessible support). The same construct may occupy different roles depending on time, level of analysis, and causal question. Avoid treating a role-dependent variable as an

invariant exposure or outcome.

The three layers are a conceptual causal map, not an empirically estimated mediation model. Do not infer that all effects flow linearly from conditions through capacity to flourishing.

XXII. Flourishing as a multidimensional outcome

IAWB now explicitly distinguishes flourishing from the absence of symptoms, from performance output, and from survival. Flourishing incorporates subjective and objective dimensions of a life going well: health, happiness/life satisfaction, meaning/purpose, character/virtue or contribution, close relationships, and supportive community or institutional contexts.

Flourishing is compatible with adversity: a person with chronic disease or functional limitations may still report strong meaning, relationships, and contribution. Conversely, apparently high productivity or favorable biomarkers do not establish flourishing.

For research, a multidimensional flourishing measure (including a 12-item flourishing instrument when appropriate) can complement symptom, functional, and physiological outcomes. Instrument selection, construct validity, population appropriateness, and longitudinal sensitivity must be established before clinical interpretation.

The relationship between adaptive capacity and flourishing is a proposed explanatory link, not a demonstrated universal causal pathway.

XXIII. Coordinated functional reserve and cognitive–motor integration

Coordinated Functional Reserve Principle (proposed): the capacity to maintain safe, effective performance when cognitive and motor demands compete may reveal functional reserve not captured by isolated strength, balance, cognition, or gait tests.

Dual-task interference can be measured as the change in motor and/or cognitive performance when tasks are combined versus performed separately. It is task-specific and influenced by strategy, instruction, speed–accuracy trade-offs, sensory limitations, familiarity, and motivation. It is not a validated direct measure of total IAWB reserve.

An illustrative integrated cognitive–motor training prescription is 30–60 minutes, two to three times weekly, for eight to twelve weeks, individualized to ability, safety, and rehabilitation goals. This is a practical candidate program, not an evidence-established optimal dose.

Prospective research should test whether change in dual-task performance predicts falls, independence, sport-specific function, or recovery beyond established assessments and whether training improves durable real-world outcomes.

XXIV. Performance optimization: capacity, readiness, durability

Performance capacity is the attainable ability under favorable conditions; readiness is the capacity expressible now; durability is the ability to maintain or repeatedly express performance over time without disproportionate cost. These distinctions prevent the mistaken inference that high output implies healthy reserve.

Stress appraisal and growth-oriented challenge may influence engagement and responses to manageable demand, but effects are context- and population-dependent. Positive framing cannot overcome unsafe exposure, energy deficiency, injury, or structural constraint.

Resistance training near muscular failure can stimulate adaptation, but maximizing failure is not a universal requirement for strength or hypertrophy. Recovery burden, injury risk, exercise selection, training status, and total volume matter. The appropriate dose balances gains against costs.

IAWB treats training as an intervention on the system, not merely on muscle: outcomes may include strength, mobility, confidence, social participation, and functional independence. Multiple simultaneous improvements do not, by themselves, demonstrate causal network propagation.

XXV. Adaptive challenge, trampoline training, and evidence limits

Structured challenge can build capacity when stimulus is appropriately dosed and recovery and safety are adequate. This is a cross-domain organizing principle rather than a claim that every challenge is beneficial.

A supervised 12-week mini-trampoline intervention in older adults has been discussed as a candidate example of gains in balance, mobility, strength endurance, gait-related function, and fear-of-falling scores. Such findings support the feasibility of multi-outcome intervention research, but do not validate IAWB-specific state transitions, reserve accessibility, feedback mechanisms, fracture prevention, or long-term durability.

When extrapolating from intervention trials, distinguish observed endpoints from hypothesized mediators and avoid treating short-term functional improvements as evidence for broader longevity effects.

XXVI. Updated clinical and research implications

Clinical formulation now follows three linked questions: Which system conditions are supporting or constraining this person? Which adaptive capacities are available, accessible, and functioning? Which flourishing outcomes matter to this person, and what trade-offs are acceptable?

Assess conditions and capacity separately from outcomes. A patient can improve an outcome while reserve deteriorates, or build reserve before a meaningful outcome changes. Record compensatory costs, functional trajectories, and context-dependent variation.

New testable hypotheses: (1) three-layer formulations predict longitudinal flourishing better than symptom-only or static eight-domain assessments; (2) accessible reserve and adaptive agency mediate or moderate selected condition–outcome associations; (3) dual-task interference provides incremental prognostic information for functional decline; (4) performance durability predicts outcomes independently of peak capacity; (5) intervention-induced gains in multiple outcomes are explained by identifiable causal pathways rather than nonspecific correlation.

Pre-register construct definitions, comparator models, measurement intervals, adverse effects, and null-result criteria. These are research proposals, not established results.

XXVII. Selected evidence and citation status

Foundational source anchors retained from the earlier manuscript include Felitti et al. (1998), Hughes et al. (2017), McCrory et al. (2023), and Reynolds et al. (2019). Their DOIs are listed in the existing references section.

Additional literature to verify and cite in a publication-grade evidence table includes VanderWeele and colleagues on multidimensional flourishing; Yeager and colleagues on stress/growth mindsets; Refalo and colleagues on resistance training proximity to failure; cognitive–motor dual-task intervention studies; and the mini-trampoline training study by Posch and colleagues.

No claim is made here that these added sources have undergone a complete bibliographic or systematic evidence audit. Source-supported findings, conceptual synthesis, and novel IAWB hypotheses must remain explicitly differentiated.