

From Zoo Smart to Jungle Smart

Training Mental Fitness for Adapting to Real-World Complexity

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ABSTRACT: Zoo training doesn't prepare you for the jungle. TQ (Thinking Quotient) measures the trainable capacity to *organize* information using universal structure (O)—and to detect and correct predictable structural errors in that organization—making it a direct instrument for “jungle-smart” adaptivity rather than “zoo-smart” (g/IQ) test performance. *Jungle-smart* refers to real-world adaptivity under changing, embodied constraints. IQ is commonly treated as a synonym for the g -factor. While g is a powerful statistical summary of performance across narrow analytic ability tests, it is routinely overstated as “general intelligence”—as if being general across tests implied being general across real life. Intelligence in the wild is adaptivity: the capacity to remain aligned with situational reality as reality changes. This paper reframes real-world intelligence as movement toward model–world alignment over time (the Love–Reality Loop limit, $\lim_{t \rightarrow \infty} \mathbb{M}/\mathbb{R} = 1$) and shifts the primary measurement handle from Zoo IQ to Jungle IQ: from IQ to TQ, a psychometric instrument of organizing capability (O) and metacognitive control of organization (the ability to detect and correct predictable structural error, including Pareto allocation bias). This is a theory-and-instrument paper: it specifies a mechanistic model, defines measurable targets, and outlines an extensible measurement interface. It does not claim to settle the full empirical program in a single manuscript or to replace all existing psychometrics; it claims that intelligence in the wild requires measurement of organization plus constraint and debt dynamics, and that TQ provides an existing, testable handle on the organization term. Grounded in O-theory, we formalize mental models and reality as $\mathbb{M} = I_{\mathbb{M}} \cdot O_{\mathbb{M}}$ and $\mathbb{R} = I_{\mathbb{R}} \cdot O_{\mathbb{R}}$, implying that performance depends multiplicatively on information (I) and organization (O). This makes trainability explicit: while baseline traits may vary, organization is trainable; therefore real-world adaptivity is substantially trainable. We define Mental Fitness as the coupled capacity to (1) increase and regulate organizational control via TQ-indexed metacognition (de-biasing structural error) and (2) manage and/or regulate Emotional, Motivational, and Physical constraints (EMP) so that organizational capacity O_{cap} is expressed as effective organization $O_{\text{eff}}(t)$ in the moment. We retain a conservative weakest-link logic for realized adaptivity (limiter behavior) while distinguishing organizational capacity from its state-constrained expression. To capture delayed consequences of lopsided optimization, we define Cross-Domain Debt as accumulating unmodeled costs (otherizing) and introduce a bounded leading indicator (Sustainability) that combines current state and trajectory to surface collapse risk before it appears in outcomes (“we looked fine until we didn’t”). Operationally, debt is detected when costs are repeatedly pushed into “other” categories of the model—left untracked, deferred, or externalized—until they return as binding constraints (e.g., skipped recovery becoming injury; suppressed conflict becoming rupture; chronic

override becoming burnout). In measurement terms, debt is any persistent, time-accumulating deficit signal in a domain that is being systematically under-modeled relative to what reality enforces. Finally, we specify a measurement interface that treats TQ as the primary instrument for O -capability and metacognitive error-correction, complemented by admissible mixed panels indexing EMP (emotional, motivational, physical) constraints and debt dynamics, positioning operationalization as an ongoing empirical program. We conclude that g remains useful for predicting Zoo-smart analytic performance, but Jungle-smart adaptive intelligence is more parsimoniously modeled—and more directly measurable and trainable—via TQ-indexed organization plus constraint and debt dynamics that govern adaptivity in the wild. This paper’s claim is deliberately bounded: it does not reject g within its testing scope; it argues that intelligence in the wild requires additional measurable structure—organization plus state and debt dynamics—that standardized test batteries are not designed to capture.

KEYWORDS: intelligence in the wild | real-world adaptivity | model–world alignment | Love–Reality Loop | O-theory | $\mathbb{M} = I \cdot O$ | $\mathbb{R} = I \cdot O$ | IQ | g factor | TQ | organization capability | metacognition | Pareto bias | structural error correction | DSRP | Six Move Power Law

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1.0 Introduction

“Intelligence” (often operationalized as IQ and modeled psychometrically as g) is commonly treated as a mainly cognitive capacity. In practice it is measured with decontextualized analytic tasks (e.g., word problems, puzzles, test questions) and summarized by a general factor (g) extracted from test batteries—what this paper will call *zoo* conditions: standardized, bounded, and decontextualized. This approach traces to Spearman’s factor-analytic program and a robust empirical pattern called the positive manifold. The positive manifold simply means that scores on different cognitive tests tend to be positively correlated: people who do well on one kind of mental task (e.g., vocabulary) tend, on average, to also do well on others (e.g., spatial or math), even when the tasks look different. It also matters in the real world: g predicts training and job performance on average across large meta-analytic literatures [1,2].

At the same time, real-world adaptation—the *jungle* problem—is not a purely cognitive event. People function as coupled systems, so performance is often constrained by factors routinely treated as “outside of” intelligence—emotion regulation, motivation/volition, and physiology, among others. Psychology has long distinguished cognition, emotion (affect), and conation (motivation or striving) as a three-legged stool. Cognitive science has also emphasized that cognition is not cleanly separable from bodily state and organism–environment interaction; grounded/embodied perspectives argue that cognitive processes are rooted in the body’s engagements with the world.

The claim in this paper is not that g is useless, just limited by scope. The claim is that g is often treated as if “general across cognitive tests” meant “general across human situations” or “general across human adaptivity.” Spearman’s “general intelligence” was defined and measured through mental test

performance, and the modern g construct remains anchored in that same measurement class. As a result, g may be general within a narrow family of information-heavy analytic tasks while still being narrow relative to whole-person adaptivity in real situations where emotional, motivational, and physical constraints can dominate outcomes.

Throughout, “zoo-smart” refers to performance optimized for standardized, decontextualized analytic testing (IQ/ g conditions). “Jungle-smart” refers to real-world adaptivity *in vivo*—maintaining alignment under changing emotional, motivational, and physical constraints (the TQ+EMP conditions).

In the wilds of the jungle, intelligence is adaptivity: the capacity to stay aligned with situational reality as reality changes. In O-theory terms [3], adaptation depends on the quality of a model and its alignment with what is real. Models are not a function of information alone, but of how information is organized. We formalize a model as:

$$\mathbb{M} = I_{\mathbb{M}} \cdot O_{\mathbb{M}}$$

and reality as:

$$\mathbb{R} = I_{\mathbb{R}} \cdot O_{\mathbb{R}}$$

Here, $\mathbb{M}$ denotes a model (the working representation that guides perception, decision, and action), I denotes information (facts, cues, data, experience), and O denotes organization (structure, framing, constraints, and tradeoffs). The equation states that model quality depends multiplicatively on both information and organization: if either is poor, the model is poor. This matters because adding information (I) does not guarantee better adaptation when organization (O) is misaligned. When structure is wrong, additional information is often absorbed into the wrong structure—sometimes increasing confidence while decreasing alignment. Consequently, a useful theory of adaptive intelligence must be O-sensitive and must treat human performance as constrained by interacting subsystems rather than reducible to a single domain. Practically, this shifts the center of gravity from “more information” to “better organization,” and especially to the ability to improve organization as conditions change (ΔO).

This paper therefore makes two coupled moves. First, it reframes “real-world intelligence” as movement toward model–world alignment over time (the Love–Reality Loop limit). Second, it shifts the primary measurement handle from IQ to TQ. IQ/ g summarize performance in a restricted measurement class (narrow analytic test performance). TQ (Thinking Quotient) is designed to measure organizational capability ($T : I \rightarrow O$)—how well a person can apply and regulate organization (O) in thinking—and, crucially, metacognitive control of organization: the ability to detect and correct predictable structural error, including known allocation skews (Pareto bias). On this view, intelligence in the wild is best approached by measuring organization capability directly (TQ), then accounting for the internal constraints that determine whether that capability can be expressed in the moment. Throughout, ‘in the wild’ refers to *in vivo* intelligence—adaptive functioning under naturalistic, embodied constraints in real situations, not performance in narrow analytic test conditions.

Empirical status of TQ and the Six Pareto Moves. TQ is not introduced here as a speculative proposal; it is an existing psychometric instrument with an empirical validation program, including evidence that it

functions as a measurable skill metric of organization and metacognitive regulation of organization [4,5]. Likewise, the Six Pareto Moves are not presented as an untested add-on, but as empirically derived, operationalizable micro-interventions aimed at reducing predictable structural error and improving organization in practice [6,7]. The present paper does not reprint full psychometric reliability/validity tables or training study results; instead, it leverages those prior results as the measurement-and-training layer that makes the broader Mental Fitness construct instrumentable and extensible within the scope of this manuscript.

1.1 From Jungle-Smart Theory to Jungle-Smart Instrument

TQ + EMP is fully actionable as an instrument and also in practice. Thus the paper not only explicates the underlying theory of intelligence and measurement, but a usable instrument for diagnosing and improving real-world adaptivity.

An instrumental construct must do four things: (1) distinguish causes of failure, (2) prescribe different actions depending on diagnosis, (3) be measurable repeatedly in vivo, and (4) change what the user does next. The combined TQ + EMP configuration satisfies all four.

First, it disambiguates failure modes that are routinely collapsed under “low intelligence.” Poor performance can be traced to distinct sources: insufficient organizational capability (low O_{cap}), distorted organization due to predictable structural error (metacognitive bias), or adequate organization that is temporarily gated by emotional, motivational, or physical constraints (EMP). This matters because each failure mode requires a different intervention.

Second, the model prescribes action. Low TQ calls for deliberate structural practice (DSRP / Six Pareto Moves) to raise O_{cap} . High TQ with poor expression calls for EMP regulation so capability can be expressed. Calibration errors call for metacognitive correction. Diagnosis determines what to do next. Consider a worked micro-case of how the math changes the intervention: Two people with the same observed performance failure (missed deadline, bad decision, conflict blowup). Person A has high TQ (high O_{cap}) but is in a low-EMP state (sleep-deprived, anxious, low glucose), so $g_{EMP}(t)$ is low; even with strong organizational skill, $O_{eff}(t) = O_{cap} \cdot g_{EMP}(t)$ is low in the moment. The correct intervention is not “more thinking,” but restoring the gate (EMP regulation) so existing capability can express. Person B has stable EMP (high $g_{EMP}(t)$) but low TQ (low O_{cap}), so $O_{eff}(t)$ is low for a different reason. Here the correct intervention is structural practice (Six Pareto Moves $\rightarrow$ DSRP-483) to raise O_{cap} over time. Same outward failure, different binding cause, different next action. This is the sense in which the math does real work: it prevents the common error of treating every failure as “low intelligence” and it routes intervention to the binding term.

Third, the system is time-indexed and repeatable. TQ measures relatively stable organizational capacity, while EMP indices measure momentary state. Effective organization in the moment is modeled as: $O_{eff}(t) = O_{cap} \cdot g_{EMP}(t)$. This enables repeated in-the-wild measurement rather than one-off assessment. EMP is not treated as a single “magic number,” but as an admissible measurement panel

(sleep, glucose/energy, arousal/stress, affect regulation, pain/fatigue, volitional control, etc.) summarized as a gating function $g_{EMP}(t)$ for purposes of the model.

Finally, the math does real work. The equations do not merely illustrate a metaphor; they explain why performance failed, what is binding, and what will not help next. EMP is modeled as a gate on expression—sometimes informational, sometimes constraining—not as a parallel “intelligence.” Crucially, this shift does not add complexity; it removes ambiguity. Intelligence in the wild becomes measurable organizational capability plus state-dependent expression, with debt dynamics surfacing delayed costs before collapse. That is what makes the framework fully instrumental.

Operational status of the equations. The equations in this paper are intended to be measurable, not merely illustrative. Organization (O) is operationalized as DSRP structure, and DSRP is enumerable: a model’s organization can be audited by explicit counting and coding across the elemental slots of Distinctions (identity/other), Systems (part/whole), Relationships (action–reaction), and Perspectives (point/view). This does not assume information is fixed. In real settings, information is time-varying—often rapidly—so we treat information as $I(t)$: at any moment the available information is finite, but it can expand (even exponentially) as new data arrives, conditions change, or new distinctions become salient. In practice, “measuring” organization is therefore a structured audit relative to the current information set: analysts or practitioners inspect an explicit model and count where the eight elements are present, absent, otherized, or misallocated, and where relationships and perspectives are missing or distorted, given $I(t)$. Alignment is empirically assessable as change in mismatch over repeated iterations: as $O_M(t)$ becomes more fully and correctly explicated across the DSRP elements while $I(t)$ updates, constraint surprises and prediction errors decrease, and fit improves. On this view, $\lim_{t \rightarrow \infty} M/\mathbb{R} = 1$ names the convergence target of iterative structural correction under evolving information, and DSRP-based counting provides a concrete procedure for tracking movement toward that target over time.

1.2 Mental Fitness and Intelligence

1.2 Mental Fitness and Intelligence

Intelligence is widely treated as a capacity to solve problems, learn, and make good judgments—leaving much detail underspecified. In the modern literature it is often operationalized in a very narrow way, as performance on specific types of cognitive tests, summarized as (g). That operationalization is empirically useful within its measurement class, but it is not equivalent to real-world adaptivity. g —and the IQ tests predicated on it—does not capture what most people mean by intelligence or informally “smart.” We routinely observe people who test modestly yet navigate life with exceptional practical judgment, adaptability, and performance in situ. Under the narrow “IQ = intelligence” framing, improvement is implicitly constrained: if intelligence is what IQ tests measure, then the simplest way to “increase intelligence” is, effectively, to have been born differently.

Currently, mental fitness is poorly specified and inconsistently operationalized. When definitions are proposed, they are often non-operational, weakly evidenced, or internally inconsistent—more a collection of adjacent constructs than a coherent, measurable capacity. In practice, “mental fitness” is frequently

reduced to partial framings (e.g., cognitive training/brain games, mindfulness/affect regulation, grit/perseverance, stress resilience), each capturing a slice of performance while omitting the coupled constraints that determine whether capability can be expressed *in vivo*. The result is a construct-validity problem: we lack a stable definition that distinguishes capacity from expression, supports repeated measurement, and prescribes training. A core aim of this paper is therefore to define mental fitness and intelligence in a way that is unified, diagnostic, and instrumentable.

Herein, *Intelligence* is defined as *expressed adaptivity*—what a person can actually do in a real-world situation. *Mental fitness* is defined as the *capacity for adaptivity*—the underlying, cross-domain readiness that makes intelligent performance more likely and more robust across contexts and time. Thus, the two are deeply related but not identical: mental fitness is the upstream condition that drives the reliable expression of intelligence. This has a direct implication: if mental fitness can be developed through the right kinds of practice, then intelligent performance is *trainable* in the only sense that matters—improving what people can do in the wild. The science of intelligence is therefore not only about what intelligence *is*, but about the “right reps” required to build it.

A useful analogy is physical fitness. We call someone physically fit when they have broad, general capacity—endurance, strength, mobility, coordination, and recovery—such that they can adapt to varied physical demands. But we would not call them a great basketball player (or climber, or lifter) on that basis alone. Those are expressions of fitness in specific contexts, requiring specialized skills, technique, and domain knowledge [8,9]. Likewise, mental fitness is a general capacity for adaptive alignment across situations; “being intelligent” in any particular real-world context is what that fitness looks like when expressed through the information, constraints, and practices of that domain (e.g., leading a tense negotiation, diagnosing a mechanical fault, parenting under stress, or making decisions under uncertainty).

Importantly, just as a person can develop fitness tailored to a specialized performance domain like mountain climbing—grip and pulling strength, posterior-chain endurance, balance and proprioception, aerobic capacity at altitude, and recovery under fatigue—one can develop mental fitness tailored to specialized domains like business, science, medicine, or military operations. Yet, as with physical fitness, the base elements remain the same: general-purpose capacities that can be trained, then expressed through domain-specific practice and information [8,9]. Mental fitness is not reserved for rare geniuses, and it is not reducible to cognitive capacity alone: it is the coupled functioning of cognition, emotion, motivation, and body as they jointly shape what a person can do next.

The connection is structural. Real-world intelligent performance depends on organization (O): how well a person structures information into workable models, anticipates constraints, and selects actions. TQ instruments this organizational capability as a relatively stable capacity term, O_{cap} . But the expression of that capacity is state-gated. Emotional, motivational, and physical conditions can reduce (or sometimes amplify) how much of O_{cap} is usable at a given time. This is captured by the EMP gate:

$$O_{\text{eff}}(t) = O_{\text{cap}} \cdot g_{\text{EMP}}(t)$$

So TQ estimates what you can organize; EMP estimates what you can express now.

Mental fitness extends the intelligence question in a second way: sustainability. A person can appear “smart” in the short run by overriding constraints—especially motivationally—while quietly accumulating debt that later becomes binding. This paper therefore treats debt and sustainability as integral to real-world adaptivity: alignment indicates current fit; debt indicates the trajectory of future constraint. On this view, mental fitness is not a rebranding of intelligence. It is the broader construct that contains intelligence-in-the-wild: organizational capability measured by TQ, state-dependent expression measured by EMP, and the debt dynamics that determine whether today’s performance is stable or borrowed.

1.2 Domain specialties in cross-domain adaptivity

Human adaptation is carried by coupled subsystems. The domains are equally necessary for adaptive functioning, but not structurally identical. Cognition is structurally central because it is the primary locus of explicit organizational control (O) and metacognitive correction of organization. Emotional, motivational, and physical processes provide indispensable signals and constraints; they shape what information is salient, what objectives are weighted, and what costs are binding. The practical implication is a division of labor: Emotional and Physical systems often detect and escalate constraint signals; Motivation selects what is optimized (and therefore what costs are accepted); Cognition diagnoses, models, and reorganizes—auditing tradeoffs, searching for otherized costs, and correcting structural error.

Motivational constraints (Mo). Motivation sets the objective function: it selects, prioritizes, and weights outcomes across domains and time. In neuroeconomic terms, the brain computes subjective value by integrating multiple determinants (benefits, costs, delay, uncertainty, social consequences), and choice follows from comparing those values [10]. Practically: motivation determines what you are optimizing for—and therefore what you are willing to pay (including what you are willing to neglect). When Mo overweights near-term wins or single-domain rewards, it can systematically otherize downstream costs, feeding debt dynamics.

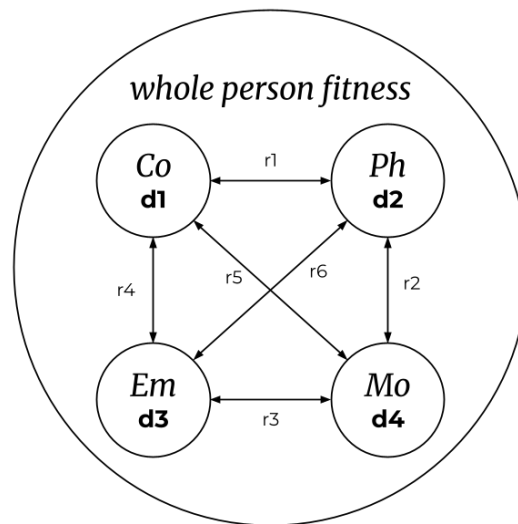
Cognitive organization (Co). Cognition builds and audits models that track cross-domain tradeoffs, delayed liabilities, and hidden constraints. A core piece is metacognition: how well confidence tracks correctness, and how effectively you detect and correct your own recurring structural error patterns [11,12]. Metacognition is simple but profound—it is the equivalent of being Jane Goodall to your inner chimp. Practically: cognitive capability here is less “test cleverness” and more “model hygiene”—the capacity to surface neglected variables, update beliefs under feedback, correct bias, and keep the map aligned as conditions change. TQ is the proposed primary instrument for this organizational capability (O) and its metacognitive regulation, including the reduction of Pareto allocation bias.

Emotional constraints (Em). Emotion provides rapid, low-latency appraisal signals that often function like a canary in the coal mine: “something is off.” But emotional signals are not inherently diagnostic about what is off or why. Classical evidence shows that felt emotion depends on both physiological arousal and how the situation is interpreted/labeled; the same arousal can be assigned different meanings depending on context [13]. Practically: Em is a fast alarm and prioritization system. It is valuable for early detection and urgency, but it can misclassify without good cognitive modeling and context.

Physical constraints (Ph). The body supplies interoceptive and physiological constraint signals—energy, fatigue, pain, stress arousal, recovery capacity—that heavily shape attention, valuation, and behavior [14]. Contemporary work on interoception emphasizes that internal bodily signals are integrated and interpreted, influencing emotion and decision processes while remaining partly ambiguous and inference-dependent. Over time, repeatedly “winning” in one domain by chronically taxing another shows up as physiological wear-and-tear: the stress mediators that are protective short-run can become damaging when overactivated or poorly regulated (allostatic load) [15,16].

Figure 1. Whole-person fitness as four coupled domains with six bidirectional relationships

Whole-person fitness (Figure 2) means modeling the person as one embodied, interacting system rather than four separate buckets. The four domains are shown as nodes (d1–d4): cognitive (Co, d1), physical (Ph, d2), emotional (Em, d3), and motivational (Mo, d4). The six relationships (r1–r6) represent bidirectional coupling among every domain pair: r1 (Co↔Ph), r2 (Ph↔Mo), r3 (Em↔Mo), r4 (Co↔Em), r5 (Co↔Mo), and r6 (Em↔Ph). The diagram's claim is structural: “seeing the whole person” requires attending to all four domains and the full web of cross-domain interactions, because change or constraint in any one domain can propagate to the others through these links.



Cross-domain coupling and the constraint regime. Because emotional and physical signals are fast but not always specific, they often indicate misalignment before you can name it—and sometimes they point at the wrong culprit. Misattribution effects illustrate how high arousal can be re-labeled as something else when context is misleading [17]. The practical implication is not that Em/Ph are “irrational,” but that they are fast constraint-and-salience systems that require cognitive organization to interpret and respond effectively. In this paper’s configuration, Emotional, Motivational, and Physical processes (EMP) are treated as constraint variables that gate whether organizational capacity can be expressed in the moment. In short: TQ estimates organizational capacity (O_{cap}), while EMP constraints determine effective organization ($O_{eff}(t)$).

Concrete cascade example. Suppose a physical constraint emerges first (Ph): two nights of poor sleep reduce energy and recovery. That Ph constraint propagates to Em as heightened irritability/anxiety and lower tolerance for ambiguity, which then propagates to Co as degraded working-memory, poorer

inhibition, and a narrower search over options (the model simplifies exactly when the situation requires richer organization). Under that load, Mo often shifts toward either avoidance (“I can’t deal with this”) or override (“push through no matter what”), both of which bias what gets optimized and what costs get otherized. The result can look like a “cognitive failure,” but the binding limiter was Ph, amplified by Em, expressed through Co, and action-selected by Mo—exactly the kind of coupled, cross-domain propagation Figure 2 is meant to make visible.

1.3 Fitness: why sometimes when you win you lose

Mental Fitness is a capacity, but we can still measure its current state. We begin with a simple operational stance: adaptation at time t depends on (1) organizational capacity and (2) the degree to which that capacity is expressible under current EMP constraints. We denote organizational capacity as O_{cap} (instrumented primarily by TQ) and effective organization as:

$$O_{\text{eff}}(t) = O_{\text{cap}} \cdot g_{\text{EMP}}(t)$$

where $g(\cdot) \in [0, 1]$ captures the degree to which Emotional, Motivational, and Physical state constrains expression of organization at time t . This is not a claim that EMP “replaces” organization; it is a claim that organization is state-constrained in vivo.

To keep the framework measurable without pretending premature precision, we report a small set of state indices together. First, we retain the idea of domain-level fit-to-reality indices, but we change their interpretation. The cognitive term is anchored by TQ as the primary estimate of organizational capability and metacognitive regulation (including de-biasing structural error). The Emotional, Motivational, and Physical terms are treated as constraint indices that quantify how binding those constraints are (how much they are gating effective organization and action) rather than as separate “intelligences.” Let:

$$A_{Co}(t), A_{Em}(t), A_{Mo}(t), A_{Ph}(t) \in [0, 1]$$

where $A_{Co}(t)$ is a normalized index of organizational capability in the moment (anchored by TQ and its metacognitive calibration) and $A_{Em}(t), A_{Mo}(t), A_{Ph}(t)$ are normalized indices of constraint-management state (higher means less binding constraint / better regulation). This paper treats the specific measurement batteries used to estimate these indices as an evolving empirical program; the theoretical contribution is the measurement interface—criteria for admissible indicators (observable, reliable, valid, sensitive to change, time-resolved) and the requirement that each non-cognitive domain state index be assessed via an admissible mixed panel (self-report + behavioral/performance + at least one objective proxy where feasible).

Mental Fitness vs. Current Fitness vs. Sustainability. *Mental Fitness* is your trainable capacity for real-world adaptivity—how well you can build and update workable models and regulate yourself across thinking, emotion, motivation, and body. *Current Fitness*, $F(t)$, is how that capacity is showing up right now under today’s constraints (a conservative weakest-link snapshot). *Sustainability*, $S(t)$, is an

early-warning signal about where things are heading: it combines your current state with whether you are accumulating debt, so it can flag rising collapse risk before it shows up as a visible failure.

At the whole-person level, we define Current Fitness, denoted $F(t)$, as a conservative weakest-link summary of realized adaptivity [18]:

$$F(t) = \min A_{Co}(t), A_{Em}(t), A_{Mo}(t), A_{Ph}(t)$$

Here, $F(t)$ is a state metric (“where you are”), not the definition of Mental Fitness as a capacity. The $\min$ operator means “take the lowest of the four indices.” In plain terms: whole-person functioning is often limited by the most binding constraint. Many systems are governed by constraints rather than averages. A familiar example is a production line—overall throughput is limited by the slowest step. For persons, the analogous claim is that real tasks frequently require coordinated functioning (organization under stress; effort under fatigue; affect under threat); when any subsystem becomes sufficiently constrained, it becomes binding. This does not deny compensations. It says compensations are eventually limited—and often come with costs.

Those costs often come in the form of delayed failure. People can appear “fine” in the near term while accumulating liabilities that surface later as sudden collapse (burnout, injury, relational failure, cognitive degradation under stress, psychological dysregulation). In physiology, a close analogue is allostatic load, defined as cumulative “wear and tear” from chronic stress-response demands over time [16]. In plain terms, allostatic load is the cost the body pays for repeatedly “running the stress system.” The broader structural point is that short-term success can be financed by hidden costs.

Accordingly, we define domain otherizing as a modeling failure (in DSRP, other (o) is a structural invariant that has been shown to be widely ignored): unmodeled costs (externalities) that exist in reality but are absent from the model guiding action. In plain terms, domain otherizing is when a real cost is treated as “not part of the situation,” so it never shows up in the decision frame. This is an analytic—not moral—definition. Any objective function is permitted, including extreme tradeoffs, provided the costs are explicitly represented rather than denied.

We define Mental Fitness Debt as accumulating unmodeled costs and their measurable signature in state and trajectory. The core correction is that debt can accrue under both *decline* and *chronic deficit*. Let $\tau \in (0, 1)$ be a functional threshold (the “safe operating” level) and let $\dot{A}_d(t)$ be the time derivative of the relevant index. Fitness debt accrual (rate) is:

$$\dot{D}_d(t) = \alpha \max(0, \tau - A_d(t)) + \beta \max(0, -\dot{A}_d(t))$$

where $\alpha, \beta > 0$ are scaling constants. In plain terms: debt increases when a domain is persistently below threshold (chronic constraint) and increases faster when alignment/constraint state is deteriorating (negative drift). This yields a trajectory view—“what you’re becoming”—that can worsen even when current-state outcomes still look good.

1.4 Where you are currently and where you are in the process of becoming

To keep the framework usable without pretending premature precision, we report two quantities together: a state metric and a trajectory metric. Current Fitness, $F(t)$, is the limiter index (“where you are”). Sustainability (S) is a bounded $[0, 1]$ leading indicator (“where you’re heading”), defined from the fitness debt accrual (rate) relative to the current state:

$$S_{\text{raw}}(t) = \frac{\varepsilon + F(t)}{\varepsilon + \sum_d \dot{D}_d(t)}$$

$$S(t) = \frac{S_{\text{raw}}(t)}{1 + S_{\text{raw}}(t)}$$

Here, ε is a small constant included to prevent division by zero. In plain terms, $S(t)$ is high when the current limiter state is high and the fitness-debt accrual rate is low; $S(t)$ is low when the limiter state is low and/or debt is accumulating quickly. For practical use, $S(t)$ can be zoned (e.g., green/yellow/red) as an awareness trigger: increasing risk implies an increasing need for cross-domain auditing—specifically, searching for otherized costs and emerging constraints before they bind. Put simply: alignment tells you where you are; debt tells you what you’re becoming. Table 1 provides a translational finance analogy for interpreting $F(t)$, fitness-debt accrual, and sustainability $S(t)$.

Table 1. Finance analogy for interpreting $F(t)$, fitness-debt accrual, and sustainability $S(t)$.

Translational mapping (everyday finance → formal constructs): the state metric is current “fitness cash on hand,” the trajectory term is the rate of fitness-debt accrual, and sustainability is high when living within means and low when living on credit. A sudden “crash” corresponds to the limiter binding.

Everyday concept	Formal construct
Current income / cash flow	$F(t)$
Debt accrual rate	$\sum_d \dot{D}_d(t)$
Living within means	High $S(t)$
Living on credit	Low $S(t)$
Sudden crash	Limiter binding (low $F(t)$)

1.5 From Zoo IQ (g) to Jungle Intelligence (F)

Finally, this paper clarifies a narrow but important point: g is only general across cognitive tests. It is not “general intelligence” in the ordinary sense across the full space of human adaptive performance. g is “general” within the narrow world of standardized cognitive testing—“general” inside a deliberately constrained box nested within a larger cognition box—but it does not automatically follow that it is “general” across person-to-situation adaptation, i.e., what most people mean when they say “intelligence.” Cognition is a broad set of processes (e.g., perception, attention, memory, learning, language, reasoning, executive control, social cognition) operating in context. Psychometric testing samples only a limited region of this space. Accordingly, g is “general” only within a particular measurement slice of cognition—performance covariation across a family of standardized cognitive tests. It therefore does not represent cognition as a whole, and its breadth within that measurement slice does not automatically generalize to adaptivity in vivo. Spearman’s program and subsequent evidence show that g is valuable within its scope. The critique here is a scope correction: g is better interpreted as a narrow index of analytic test performance (an information-heavy measure under constrained conditions), not as a definition of intelligence in the wild. In shorthand: IQ/ g measures “zoo-smart” analytic test performance; the aim here is to measure and train “jungle-smart” adaptivity in the wild.

This criticism of g and IQ is not new. A long line of work—especially Sternberg’s—has argued that the ordinary meaning of intelligence is fundamentally adaptive: it concerns how well people navigate, select, and shape real-world environments under uncertainty, and cannot be reduced to “generality” within a constrained genre of decontextualized analytic tests. In this view, what psychometrics labels “general” is best understood as generality within a test-defined slice of cognition, while adaptive intelligence is a broader person–task–situation phenomenon that demands different constructs and different measurement targets (e.g., successful/triarchic intelligence and, more recently, adaptive intelligence as a response to real-world problems) [19–22].

Sternberg’s direction is therefore the right one: toward adaptivity as the criterion. What has been missing is a mechanistic, epi-ontic account of how adaptivity is generated—one that links cognition and reality through a common invariant rather than treating “adaptation” as a label. Here, that mechanism is O-Theory [3,23]: models are a multiplicative function of information and organization ($\mathbb{M} = I \cdot O$), reality is likewise structured ($\mathbb{R} = I_{\mathbb{R}} \cdot O_{\mathbb{R}}$), and the invariant required for adaptive intelligence in the wild is organization (O).

To parallel g in psychometrics, we use $F(t)$ as a single-number summary of realized adaptivity. The difference is definitional: g is estimated from the shared variance (correlations) among scores on a battery of tests within the same genre—standardized, decontextualized analytic tasks—whereas $F(t)$ is computed from a person’s capacity to organize information into meaning using universal structure (O), as expressed under real-world binding constraints.

If models are $\mathbb{M} = I \cdot O$ [23], and if real-world adaptation is cross-domain and debt-constrained, then an account of adaptive intelligence requires explicit representation of organization (O), the systematic biases that distort organization (including familiar information-selection and belief-evaluation biases such as confirmation and motivated reasoning, and the deeper structural allocation bias often captured by the

Pareto Cognitive Bias: $D \gg S \gg R \gg P$ AND $Di \gg Do, Sp \gg Sw, Rgen \gg Ra/Rr, Pv \gg Pp$) [6], and the constraint dynamics that determine whether O_{cap} expresses as $O_{eff}(t)$ in situ.

In summary, this paper contributes (1) a definition of intelligence in the wild as adaptivity (movement toward model–world alignment over time), (2) a measurement shift from IQ/g to TQ as an instrument of organization capability and metacognitive error-correction, (3) an operational state metric $F(t)$ for limiter constraint behavior, (4) a formal mechanism for delayed collapse (debt from chronic deficit and negative drift), (5) an early-warning trajectory metric (Sustainability), and (6) a measurement interface designed for empirical extensibility rather than fixed batteries.

2.0 Foundations

2.1 Jungle Intelligence is a model–reality fitness problem

Adaptivity—the core of intelligence in the wild—is a $\mathbb{M}$ – $\mathbb{R}$ fitness problem: you cannot adapt well to a situation you are mis-modeling. Three related terms matter:

1. **Fit** is the condition in which a mental model $\mathbb{M}$ matches the relevant structure of reality $\mathbb{R}$ well enough to support effective prediction, decision, and action (i.e., $\mathbb{M}$ fits $\mathbb{R}$).
2. **Fittedness** is the degree of that match—how close $\mathbb{M}$ is to the relevant organization of $\mathbb{R}$, given situational demands.
3. **Fitness** is the capacity to produce and maintain fit: the ability to build, test, and update $\mathbb{M}$ so it stays aligned with $\mathbb{R}$ as conditions change.

Fitness is trainable because it is largely a skill: fittedness improves through repeated cycles of action $\rightarrow$ feedback $\rightarrow$ correction (“right reps”). Baseline traits can affect starting conditions and learning rate, but they do not set a fixed ceiling on the capacity to improve alignment.

A second point follows immediately: models are not determined by information alone ($\mathbb{M}[\neq I?]$). Two people can face the same facts (I) and still make different predictions, choices, and mistakes, because what matters is not just what is in the model, but how it is organized (O , organization). When organization (O) is misaligned, even good information produces poor fit; when organization (O) is aligned, even limited information (I) can produce workable fit.

2.2 The cognitive law: models are multiplicative, not additive

Models depend multiplicatively on information and organization, or in $\mathbb{M}$ -law terms:

$$\mathbb{M} = I \cdot O$$

Here, $\mathbb{M}$ is the working representation guiding perception, decision, and action; I is the available information (inputs, cues, data, experience); O is the organization applied to that information (structure, framing, what counts as relevant, what is treated as irrelevant, which constraints exist, which tradeoffs exist, what consequences are anticipated). In this paper, O is specified by DSRP—the four universal

patterns of organization: Distinctions (identity/other), Systems (part/whole), Relationships (action–reaction), and Perspectives (point/view). The key implication is blunt: if either I or O is poor, $\mathbb{M}$ is poor; and in complex, real-world settings, failure is often dominated by the neglected multiplier— O . This is the practical reason “smart people” can remain systematically maladaptive in vivo: they may be information-rich but structurally misaligned.

Concrete operational example (what “measuring O ” looks like). In practice, measuring O means auditing the model’s DSRP structure for what is explicitly present vs. missing. For example, in a burnout scenario, a zoo-smart model might include identities (“work tasks”) and goals but omit (i) the relevant others (“recovery,” “sleep,” “relationships”), (ii) part–whole nesting (which tasks are parts of which goals; which constraints are parts of capacity), (iii) key relationships (sleep $\rightarrow$ emotion regulation $\rightarrow$ decision quality; workload $\rightarrow$ recovery debt), and/or (iv) perspectives (manager vs self vs family). A DSRP audit codes those eight elemental slots (identity/other; part/whole; action–reaction; point/view) and surfaces structural omissions that predict failure even when I is “known.”

2.3 The Zoo Assumption: $\mathbb{M} \approx I$ is structurally incomplete

A common assumption—explicit in some theories and implicit across schooling, industry, scientific practice, and public life—is that increasing information reliably improves functioning, as if:

$$\mathbb{M} \approx I$$

This is the zoo assumption: that adding information reliably improves functioning; in the jungle, the dominant failure mode is often mis-organization (O), not missing inputs (I). Sometimes this can feel locally true: missing facts can cause failure. But in complex, cross-domain settings, it is systematically incomplete because information can be absorbed into the wrong structure. When the organizing model is mis-specified, more information does not repair the mis-specification; it often strengthens it (including by increasing confidence while decreasing alignment). This is why many dominant real-world failure modes are not “you didn’t know enough,” but “you organized what you knew in a way that hid the constraint”: burnout, injury, relational collapse, panic under pressure, goal collapse, and debt dynamics.

Thus, adaptive intelligence *is* fundamentally O -sensitive. In practice, improvement is less about piling on inputs (although new I is an input) and more about improving the organization that keeps the model aligned under changing conditions—especially the capacity to change organization when reality changes (i.e., ΔO). In other words, we often have the right or enough I but to make an effective decision, we need to organize it differently.

2.4 Reality is structured too: $\mathbb{R} = I \cdot O$ and alignment is definable

If models are structured, reality is structured too [6,23–25]. Reality is the organized state of the world—identity-other distinctions, part-whole systems structure, dynamic relationships and perspectival reference frames—whether we notice them or not. We write that symmetry as:

$$\mathbb{R} = I_{\mathbb{R}} \cdot O_{\mathbb{R}} \quad \mathbb{M} = I_{\mathbb{M}} \cdot O_{\mathbb{M}}$$

Alignment is the degree to which the organization in the model O_M matches the organization in reality O_R . In this framework, “oneness” is not metaphysical poetry but a limit condition of

alignment—formalized as $\lim_{t \rightarrow \infty} \frac{M}{R} = 1$, i.e., the convergence of M toward R over time through iterative updating.

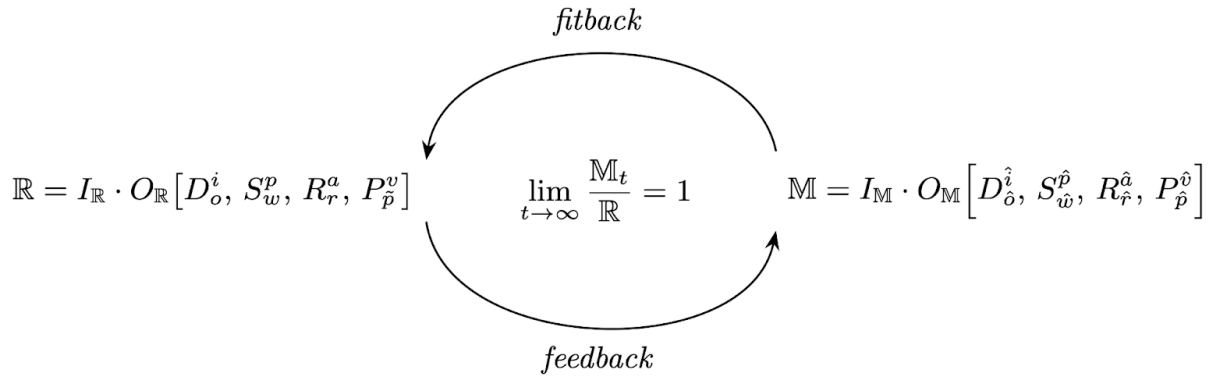
Operational note on O_R and alignment. O_R is not treated as a subjective “interpretation of reality,” but as the situation’s binding structure: the constraints, couplings, tradeoffs, delays, and dependencies that govern success or failure whether or not an agent represents them. In practice, O_R is accessed through observable signatures of structure—recurring constraint violations, consistent surprise outcomes, coupling cascades, and stable regularities that remain even as $I(t)$ grows. Accordingly, alignment does not require measuring “all of reality” as a single scalar; it is assessed by whether revisions to O_M (made explicit and countable via DSRP coding) reduce mismatch with those constraint signatures over repeated iterations (e.g., fewer surprises, fewer violations, improved prediction and control, improved calibration).

By O_R we mean reality’s DSRP organization: the distinctions that matter, the part–whole nesting, the relationships/interaction dynamics, and the relevant perspectives/reference frames—whether or not an agent represents them. Operationally, mismatch is detected through repeated surprises (prediction error), recurring constraint violations, and cascade patterns that indicate O_M is not yet aligned with O_R .

2.5 The Love–Reality Loop: the mechanism of alignment

The Love–Reality Loop (LRL) names the basic mechanism of learning and adaptation: an agent acts on M ; reality returns outcomes; mismatch generates error; error drives updating; and over time the loop yields convergence (increasing fittedness) or divergence (persistent misalignment). In LRL terms, “Love” is not sentiment; it is an operational stance: a disciplined preference for reality over model-protection—treating disconfirming feedback as data and allowing it to revise what you believe [3,23,26–28]. When that stance is absent, error signals are filtered, explained away, or never cleanly sampled, and the loop fails to converge.

Figure 2: Love–Reality Loop (LRL) diagram. LRL shows feedback from reality to model (prediction error) and fitback: how current model quality shapes what the agent can notice, test, and learn.



This formalizes a core claim for intelligence in the wild: real-world adaptivity is a longitudinal alignment process, not a static trait label.

2.6 The “right reps” for Mental Fitness are known practices that produce large, replicable gains

Importantly, the “right reps” for improving O are not vague. A convergent research arc identifies specific, teachable micro-practices that (a) target the structural biases people reliably exhibit and (b) produce large measurable gains with brief interventions.

Empirically, human thinking exhibits a Pareto-structured imbalance (e.g., $D \gg S \gg R \gg P$), implying that a small set of underused structural operations functions as a high-leverage training target. From that diagnosis, the Six Pareto Mental Moves were derived as the most efficient “fundamental drills,” and short practice interventions report large improvements on complex cognition and emotional intelligence outcomes. Empirically, human thinking is trainable and can show large, replicable gains with brief interventions—including reported gains up to roughly the 247%–551% range depending on outcome and study design [6,7,29].

Replicable performance gains are the result of structured practice (not concept exposure). This practice produces “fast and right” cognition or Systems 3 Thinking [6,30,31].

In parallel, measurement of O -skill is not speculative: the Thinking Quotient (TQ) is positioned as a skill-metric for structural thinking, with evidence of strong internal reliability and a dominant general factor alongside pattern-specific subskills—supporting the claim that O is measurable and trainable (and that metacognitive awareness can be tracked via the competence–confidence architecture).

Table 1. “Right reps” for Mental Fitness as O -training (practice-first sequence). Repeatable organizational practices (“right reps”) that directly train O and metacognitive error-correction, with observable and measurable outputs.

Practice element	What it trains	Observable output / metric
TQ baseline + retest	O -competence and metacognitive calibration	Competence + confidence tracking; reliability and factor-structure evidence supports O as a measurable skill
Six Pareto Moves drills → DSRP-483	A small set of empirically derived, high-leverage micro-operations for correcting predictable structural error (Pareto bias) in DSRP organization	Short interventions with large measured gains; targets underused structure → DSRP patterns, elements, dynamics
Mapping (drawing O)	Externalization and visibility of organization	Quality of structural maps; ability to “do the structure” rather than talk about it
LRL practice cycles	Error-correction discipline; alignment seeking	Demonstrated model updating under feedback; improved $\mathbb{M}/\mathbb{R}$ alignment over time

This is the egalitarian consequence: in vivo intelligence is not reserved for the lucky. It is accessible through measurable, repeatable, structural practice. Baseline traits matter—but they do not eliminate the requirement for right reps, and they do not substitute for them. The practical claim is: if “life” demands roughly N units of effective organization to succeed across most domains, most people already have sufficient raw substrate; what differentiates outcomes is whether they build and apply O skill—especially metacognitive error-correction—under real constraints.

2.7 From “whole person” to “one control variable”: O as the cognitive spine, constraints as expression limits

Mental Fitness is embodied and constrained, but its dominant practical control variable is improving O and the metacognitive capacity to detect/correct structural error (i.e., de-biasing predictable Pareto allocation). TQ operationalizes this as a measurable skill construct (competence) plus metacognitive calibration (confidence) within an O -theory frame.

On this framing, non-cognitive domains (emotion, motivation, physiology) remain essential, but they function primarily as constraints on expression: they modulate whether O_{cap} can be expressed as O_{eff} in the moment. That is, the training target bifurcates cleanly:

- (1) Increase O_{cap} via structural practice (right reps) and metacognitive calibration (TQ).
- (2) Improve EMP constraint regulation so that momentary conditions do not suppress O_{eff} below what the person can otherwise do.

This yields a single, clean foundations claim for the rest of the paper: intelligence in the wild is real-world adaptivity, and real-world adaptivity is increasing $\mathbb{M}/\mathbb{R}$ alignment over time—driven primarily by trainable organization, and bounded moment-to-moment by constraint regulation.

3.0 The Mental Fitness Model

3.1 Domain alignment as a fit-to-reality index

Mental Fitness treats adaptivity as an alignment problem: how well the person-system is fitting the situation as it exists, not as wished. Because the person is embodied, we model adaptivity across four coupled domains, $d \in Co, Em, Mo, Ph$. For each domain we define a domain state index,

$$A_d(t) \in [0, 1],$$

where higher values mean better fit-to-reality in that domain at time t .

In this revised configuration, the key change is interpretive rather than cosmetic: the four indices are not four equal “intelligences.” Cognition is structurally central because it is the primary locus of explicit organization O and metacognitive control over organization. The cognitive term is therefore anchored to organizational capability, measured primarily by TQ. The other three indices $A_{Em}(t)$, $A_{Mo}(t)$, and $A_{Ph}(t)$ are treated as EMP constraint regulation indices that determine whether organizational capability can be expressed effectively in the moment. In other words, $A_{Co}(t)$ primarily tracks organizational capability and metacognitive regulation, while $A_{Em}(t)$, $A_{Mo}(t)$, and $A_{Ph}(t)$ track whether emotional, motivational, and physical constraints are binding or regulated such that cognition can do its work.

This yields a clean and testable separation between capability and expression:

$$O_{cap} \neq O_{eff}(t)$$

TQ primarily instruments O_{cap} . EMP constraint regulation determines whether O_{cap} can be expressed as $O_{eff}(t)$ under real conditions.

The intent of $A_d(t)$ remains deliberately general. This is not a claim that there is one final marker panel. It is a measurement interface: each $A_d(t)$ is constructed from a mixed panel of admissible indicators (self-report + behavioral/performance + at least one objective proxy where feasible), with marker selection treated as versioned and evolving.

The theoretical point is that the kinds of failures this paper targets are not usually solved by simply adding more information. In the wild, misalignment often comes from predictable structural error—constraints unrepresented, tradeoffs collapsed, frames unexamined, delays ignored, and costs otherized. In those cases, improvements in alignment are produced primarily by changes in organization. In shorthand:

$$\Delta A_d \text{ is primarily a function of } \Delta O$$

This is not because information never matters. It is because organizational failure modes often dominate cross-domain adaptivity, and more information can be absorbed into the wrong structure—sometimes increasing confidence while decreasing alignment.

3.2 Whole-person state: Current Fitness as the limiter

Mental Fitness is a capacity, but we need an operational state metric—something we can compute and track over time. We define Current Fitness, denoted $F(t)$, as a conservative limiter summary of embodied state:

$$F(t) = \min_{d \in Co, Em, Mo, Ph} A_d(t)$$

In plain terms: $F(t)$ is your weakest-domain fit-to-reality at time t . It is not “who you are.” It is “where you are.”

This is the model’s core: whole-person functioning is constrained by the minimum domain state rather than by the average. A person can be highly aligned in three domains and still fail because one domain is misaligned enough to bind system performance. Importantly, in this configuration, the minimum frequently represents a binding EMP constraint that collapses the expression of organizational capability. This is why high TQ (high O_{cap}) can fail to show up as real-world adaptivity when EMP constraints are unregulated: realized organization becomes state-limited (low $O_{eff}(t)$).

3.3 Why limiter (min) is the right systems operator

The motivation for the minimum operator is not rhetorical. Many systems are governed by constraints: throughput, stability, and performance are limited by a limiter rather than by mean capacity. Improvements upstream of the limiter do not improve system performance until the limiter itself is addressed. For persons, the analogous claim is that real tasks frequently require coordinated functioning across domains. When one domain becomes misaligned enough, it constrains what the whole system can reliably do.

This does not deny temporary compensations. People can compensate for misalignment in one domain by drawing on slack in another—for example:

1. Co $\rightarrow$ Em (cognition overriding emotion): “white-knuckling” through anxiety, suppressing fear/anger to stay on-task, pushing executive control to keep affect from driving behavior.
2. Co $\rightarrow$ Ph (cognition overriding body): using planning/technique to conserve energy—pacing, breathing control, task chunking, or ergonomic strategy to keep performance up despite low physical capacity.
3. Em $\rightarrow$ Co (emotion overriding cognition): panic, rage, or euphoria hijacking working memory and judgment; affect-driven impulsivity or tunnel vision overriding deliberation.
4. Em $\rightarrow$ Mo (emotion overriding motivation): mood-dependent goal drift—discouragement collapsing effort allocation, or anger/spite temporarily amplifying drive and persistence independent of prior priorities.
5. Mo $\rightarrow$ Ph (motivation overriding body): brute-forcing fatigue/illness—pushing through sleep loss, pain, or exhaustion to hit a deadline or finish an event.

6. Ph → Co (body overriding cognition): raw capacity brute-forcing poor strategy—high energy/arousal carrying performance despite weak planning, or physical depletion (sleep loss, hypoglycemia) collapsing cognition regardless of intent [32,33].

The claim is not “compensation is impossible.” The claim is that compensation is finite, and it often accumulates debt. So constraints eventually bind.

Thus, whole-person fitness at time t can be modeled as a limiter effect governed by cross-domain fit-to-reality:

$$F(t) = \min_{d \in Co, Em, Mo, Ph} A_d(t)$$

Under this operator, $F(t)$ is the system’s current limiting state: improving a non-limiting domain may be locally helpful, but it does not raise $F(t)$ until it raises the minimum.

The practical way out of the limiter is therefore:

$$\Delta F(t) > 0 \quad \Rightarrow \quad \Delta! \left(\min_d A_d(t) \right) > 0$$

In practice, lifting the minimum is frequently less about acquiring more facts (+ I) and more about reorganizing what is already known so the model represents the real constraints, tradeoffs, delays, and cross-domain costs (ΔO). When the organization is wrong, additional information often gets misfiled, otherized, or used to defend the current model rather than update it. So the limiter is rarely solved by more input; it is usually solved by better structure.

This has a blunt implication in real life: lopsided development eventually collides with the hard minimum. If you do not develop across all four domains of your embodied identity, your weakest domain—and usually the one you have most ignored or otherized—becomes a wall. In real life, that wall looks like physical degradation limiting cognitive work; emotional dysregulation limiting relationships, leadership, and judgment; motivational drift or compulsive optimizing undermining long-horizon goals; or any combination where one domain’s constraint cancels out strength elsewhere. The minimum governs because coordinated tasks require the whole person, not just its best part. This is why brilliant people can still do stupid things, why exorbitantly wealthy people can be so unhappy, and why talented people can crash and burn when the limiter finally binds. Intelligence is systemic fitness.

In contrast, mainstream psychometrics has been highly successful at measuring narrow analytic performance (g), but much less successful at capturing real-world adaptivity—especially the constraint dynamics that govern functioning outside the lab. The result is predictable: people labeled “highly intelligent” can still make systematically maladaptive choices when non-cognitive limiters bind. Psychometrics measured what was easy, not what mattered. They got real good at weighing the cow, but not at keeping it alive.

3.4 Correcting IO imbalance

Because $\mathbb{M} = I \cdot O$, information and organization are not competitors and not sequential steps. They are multiplicative. You never have “just information” in a usable sense, and you never have “pure organization” without something being organized.

The practical problem is not theoretical. It is cultural and operational: we routinely overemphasize I and underemphasize O . In intelligence talk, performance improvement talk, education talk, even “self-help,” the default move is to add more inputs—more material, more facts, more data, more content, more advice—as if more I automatically produces better models. But when O is misaligned, additional I is often assimilated into the wrong structure. That can increase confidence without increasing alignment.

Put plainly: if your current information is organized incorrectly—and you have little awareness of how you are organizing it—adding more information can make you more wrong, not less. The real-world signatures are familiar: misinformation, disinformation, confirmation bias, echo chambers, systematic thinking errors, and rigid false beliefs [34,35]. These often do not weaken with more information; they strengthen, because the underlying organization stays intact. If every new piece of information is forced to fit the pattern you want to see (or need to see), and there is no disciplined preference for reality (LRL), the model doesn’t update—it doubles down. That’s why the focus is organizational: change the structure and the same information produces a different model.

The corrective action is not to put O “before” I . The corrective action is to restore $I \cdot O$ balance by explicitly training and measuring organization—especially the ability to represent constraints, tradeoffs, delays, and domain otherized costs, and to detect and correct predictable structural error. *Importantly, the empirical program does not merely assert trainability; it specifies the practice units—the “right reps”—for improving organization and metacognitive error-correction, and these improvements are measurable via TQ.*

3.5 Model commitments

From here on, the paper commits to three modeling choices:

Whole-person adaptivity is modeled as state across four coupled embodied domains (Co, Em, Mo, Ph), each with a time-varying index $A_d(t)$. The cognitive term is anchored to organizational capability (measured primarily by TQ), while the Em/Mo/Ph terms are interpreted as EMP constraint regulation indices that gate real-world expression of organizational capability (i.e., the O_{cap} to $O_{\text{eff}}(t)$ gap).

Current fitness is the limiting state, $F(t) = \min_d A_d(t)$. This is the conservative “where you are” metric: the limiter governs.

Fitness improvements are driven primarily by organizational change (ΔO) and metacognitive error-correction (including predictable structural allocation bias), because cross-domain failure commonly comes from mis-organization rather than from a simple lack of information.

4.0 *O* failure mode in the wild

4.1 Domain otherizing defined

The central dynamic that differentiates Mental Fitness from single-domain performance constructs is simple: real-world adaptation routinely involves tradeoffs across domains and across time. When those tradeoffs are explicitly represented, they remain available for deliberate choice. When they are not represented, they become a failure mode.

We define domain otherizing as a precise modeling failure: unmodeled costs—costs that exist in reality but are absent from the model guiding action. In plain terms, domain otherizing occurs whenever consequences are treated as irrelevant, external, “not part of the objective,” or “not now,” despite being causally coupled to present action.

This definition is intentionally analytic rather than moral. The framework permits any objective function, including extreme tradeoffs. The requirement is transparency: if costs are chosen, they must be modeled. Surprises are diagnostic. When a consequence arrives “unexpectedly,” it often indicates that a relevant “other” was missing in the governing model. In other words, it is possible to ignore your emotional self in order to accomplish a physical, cognitive, or motivational goal, but the effects of this domain otherizing do not disappear. This holds for any domain tradeoff (sacrifice of any domain for the perceived short-term benefit of another). What fails is not the tradeoff; what fails is the model. The core principle is: reality keeps score.

4.2 Core law: unmodeled costs do not disappear

A foundational claim of this paper can be stated plainly:

Unmodeled costs do not vanish. When costs are *otherized* not *vaporized*—they are displaced across domains and time and return as constraints.

This is the mechanism behind brittle success. A person can optimize visible outcomes on one domain or one metric while silently accumulating constraints elsewhere. The system may look stable until a threshold is crossed, at which point the limiter domain collapses and whole-system performance degrades rapidly.

This displacement principle is not unique to persons. It parallels externality logic in social and economic systems: when a cost is not internalized within the decision frame, it does not cease to exist; it is borne elsewhere in the system or later in time. Here the person is treated as a coupled system in which costs can be displaced across domains *Co*, *Em*, *Mo*, *Ph* and across temporal horizons.

4.3 Cross-Domain Debt: definition and measurable signature

We define cross-domain debt in two linked ways:

1. Debt as displaced cost: the set of costs that were not represented in the model guiding action.
2. Debt as measurable signature: the observable pattern of negative drift in domain state over time as those displaced costs return as constraints.

Formally, let $A_d(t)$ be the domain state index and $\dot{A}_d(t)$ its time derivative (how fast the state is changing). Fitness debt accrual (rate) is defined as:

$$\dot{D}_d(t) = \max(0, -\dot{A}_d(t))$$

In plain terms: debt increases when domain state is trending downward. If a domain is stable or improving, its fitness debt accrual (rate) is zero. This makes debt behave like an accounting variable: it accumulates when the system is “borrowing” against a domain—whether or not the focal outcome still looks good.

Domain debt can be tracked as $D_d(t)$, with system-level debt summarized additively (e.g., $\sum_d D_d(t)$), while recognizing that system impact is often dominated by the binding constraint (the minimum state).

Note on chronic low state: a stable-but-low $A_d(t)$ (i.e., $\dot{A}_d(t) = 0$ at a low value) does not increase *new* debt under this definition, but it still represents an existing constraint state. In practice, this is handled by pairing fitness debt accrual (rate) with the state metric $F(t)$: chronic low state shows up as low $F(t)$ even when $\sum_d \dot{D}_d(t) \approx 0$.

4.4 State + trajectory: Current Fitness and the Sustainability

Because cross-domain imbalance can stay hidden for long periods, current-state alone is not enough for practical diagnosis. The framework therefore pairs a state metric with a trajectory metric.

Current Fitness (state):

$$F(t) = \min_d A_d(t)$$

the present limiter state (“where you are”).

Sustainability (trajectory): a bounded $[0, 1]$ leading indicator (“where you’re heading”) based on fitness debt accrual (rate) relative to current state. First define:

$$S_{\text{raw}}(t) = \frac{\varepsilon + F(t)}{\varepsilon + \sum_d \dot{D}_d(t)}$$

Then bound it to $[0, 1]$:

$$S(t) = \frac{S_{\text{raw}}(t)}{1 + S_{\text{raw}}(t)}$$

S is designed to be interpreted as “higher is better.” Higher values indicate that the system is maintaining limiter state while accumulating relatively little new debt per unit time. For communication and practice, S can be zoned (green/yellow/red) as an awareness trigger: increased risk implies increased need for cross-domain auditing—specifically, searching for otherized costs and emerging constraints before they bind. $S(t)$ is designed as an early-warning dashboard signal. When $S(t)$ drops (yellow/red), the correct next step is not “try harder,” but a cross-domain audit: identify which domain is limiting $F(t)$, what costs are being otherized, and what structural omissions in O_M are allowing debt to accumulate unchecked. Put simply: alignment tells you where you are; debt tells you what you’re becoming.

4.5 Example: motivational override and brittle success

A common pattern of domain otherizing is motivational override: a narrow objective function drives sustained effort while costs in other domains are systematically backgrounded. For example, an individual may pursue a performance goal while otherizing sleep, recovery, relational stability, affect regulation, or long-term health. For a time, outcomes can look positive on the focal metric, even as debt accumulates elsewhere. Eventually, displaced costs return as constraints (injury, burnout, emotional destabilization, cognitive degradation under stress). At that point the weakest-link domain becomes binding and whole-system performance degrades quickly.

The purpose of this illustration is not to moralize tradeoffs. It is to make the mechanism visible: brittle success is often debt-financed success, and debt is often created by an organizational failure—specifically, otherizing costs that are causally coupled to present action.

4.6 Summary

This section established the primary failure dynamics of Mental Fitness:

- (1) Domain otherizing is defined as unmodeled cost (a missing “other” in the governing model).
- (2) Unmodeled costs do not disappear; they displace across domains and time and return as constraints.
- (3) Cross-domain debt is defined both as displaced cost and as negative drift, with fitness debt accrual (rate). A useful special case is: $\dot{D}_d(t) = \max(0, -\dot{A}_d(t))$ (i.e., debt as negative drift).
- (4) Practical diagnosis requires state + trajectory: Current Fitness $F(t)$ plus Sustainability $S(t)$.

5.0 Mo sets objective, Co audits the model, but ΔO drives change

Whole-person mental fitness is governed by (1) what the system is optimizing (Mo), (2) whether the governing model is being audited (Co), and (3) whether organization is being improved in the only way it can be improved—through repeated practice with feedback (ΔO). Motivation can drive extraordinary short-run performance, cognition can notice and correct error, but sustained improvement in model–world

alignment comes from reorganizing the model so it represents the real constraints, tradeoffs, delays, and displaced costs that reality will enforce anyway ($\mathbb{M} = I \cdot O$; $\mathbb{R} = I \cdot O$) [3,6,23].

In practical terms: *Mo* decides what counts as “success.” *Co* decides whether your story about reality is structurally adequate. ΔO is the mechanism that raises the limiter state $F(t)$ by reducing domain otherizing and debt accumulation.

In this revised configuration, the control spine is explicit: TQ is the primary instrument for the *Co* side because it measures organizational capability and metacognitive error-correction (i.e., the ability to detect and correct structural error), while EMP constraint regulation determines whether that capability shows up as effective organization in vivo (the O_{cap} to $O_{\text{eff}}(t)$ gap) [4,23,36].

5.1 Motivational fitness sets the objective function

Motivational fitness (*Mo*) sets the objective function—the aim the system is optimizing toward. In practice, that means selecting and weighting outcomes across domains and across time. Put plainly: *Mo* determines what counts as success, what constraints get treated as relevant, and what gets backgrounded or deferred.

This is normatively neutral. Any objective function is permissible, including deliberate tradeoffs (mission-first, peak-performance, sacrifice for a cause, singular objective). The analytic requirement is not “balance” as a moral stance; it is explicit modeling of tradeoffs. *Mo* matters because it shapes what is likely to be otherized. When the objective function is narrow or unexamined, cross-domain costs are more likely to be displaced and converted into debt.

As an intentionally extreme example to make the structure visible: imagine a person whose objective function is dominated by net worth. They optimize for money across time and treat other domains as secondary—vacation becomes “waste,” sleep becomes “optional,” physical training is postponed, relationships are instrumentalized, and control is chosen over connection. No judgment: this is a viable life path. But the tradeoffs are not absent. They are displaced. Over time, what was otherized in the model (*Ph* recovery, *Em* regulation, *Co* introspection, *Mo* relational depth) can accumulate as domain debt and return as binding constraints—burnout, health deterioration, relational collapse, or loss of meaning—regardless of how successful the net-worth objective appears on paper.

5.2 Motivational override as a common cross-domain failure pattern

A common whole-person pattern is motivational override: high drive sustains behavior toward a focal goal while costs in other domains are treated as irrelevant or “not now.” This can produce real short-term gains and the appearance of high functioning. But because domains are coupled, sustained override increases the probability of domain otherizing and therefore increases cross-domain debt.

Override is not inherently “bad.” It can be adaptive in short horizons and essential in high-stakes contexts. The failure mode is override paired with organizational blindness—when costs are not represented as real constraints and therefore accumulate beyond recoverable thresholds. In this paper’s language: override without audit produces debt-financed success.

Practically, override becomes dangerous when the model contains a hidden rule like: “the cost doesn’t count until it stops me.” That rule guarantees the cost will arrive late, as a constraint, and it will arrive when you have the least slack to pay it.

5.3 Cognitive fitness as metacognitive audit capacity (instrumented by TQ)

Cognitive fitness (Co) is defined here primarily as metacognitive capacity to build and audit cross-domain models. Co is not equivalent to test performance or analytic speed. It is the structural competence required to keep models reality-aligned under pressure, including the ability to revise organization when reality changes (LRL) [3,6,23,37,38].

Operationally within the domains, Co functions as audit capacity. It asks and answers questions like:

- What is the limiter right now, and why?
- What costs am I treating as “not part of the situation”?
- What tradeoffs am I collapsing or refusing to represent?
- What delays am I ignoring that will convert today’s win into tomorrow’s constraint?
- What would I have to include in the model for this outcome to stop being “surprising”?

Many delayed failures that feel “unexpected” are predictable outcomes of missing organization: a relevant other was absent, a constraint was unmodeled, a time horizon was truncated, or cross-domain coupling was ignored until it became binding.

In this configuration, TQ is the primary measurement handle on this capacity because it is designed to measure organizational capability (the O side of $\mathbb{M} = I \cdot O$) and metacognitive calibration/error-correction—i.e., the ability to detect and correct predictable structural error, not merely to generate answers [23].

5.4 ΔO is the practical driver of improvement

The central practice implication of O-theory is that improvement is not primarily achieved by adding more information. It is achieved by changing organization. In shorthand: ΔF is driven by ΔO when the dominant failure mode is organizational [6,23].

This is not a claim that information never matters. It is a claim about what is usually missing in the wild: most people already possess large quantities of relevant information about risks, constraints, and long-term costs. The more common failure is that this information is not organized into a model that keeps constraints visible under motivational pressure and affective load. When organization is misaligned, additional information is often misfiled, otherized, or used to defend the current model rather than update it (LRL).

So the practical emphasis is ΔO : improving the capacity to reorganize information into reality-aligned models that (i) surface constraints early, (ii) make tradeoffs explicit, (iii) represent delays and

accumulation, (iv) reduce domain otherizing, and (v) raise the limiter state that determines Current Fitness $F(t)$. Organization is the neglected multiplier in $\mathbb{M} = I \cdot O$.

5.5 EMP constraint regulation as the expression gate for ΔO

Even with high organizational capability, real-world adaptivity depends on whether organization can be expressed in the moment. This is where EMP constraint regulation functions as a gate: emotional, motivational, and physiological state can suppress effective organization even when capability exists. In the paper's notation: high O_{cap} can fail to yield high $O_{\text{eff}}(t)$ when $A_{Em}(t)$, $A_{Mo}(t)$, or $A_{Ph}(t)$ is binding.

This clarifies why “more insight” often fails under load: the limiter is not knowledge and not even capability; it is expression. EMP constraint regulation is therefore not a side issue—it is the practical condition for deploying ΔO where it matters most (in vivo).

5.6 The Six Pareto Moves as a pedagogical proxy for ΔO

This paper does not attempt to formalize the full organizational calculus underlying O-theory. Instead, it takes a pragmatic stance: the Six Pareto Moves can function as a compact, trainable proxy for ΔO across contexts [3,6,23].

The claim is not that the Moves provide new content. The claim is that they provide repeatable operations that make organization visible and adjustable. Applied within and across contexts, they help people:

- surface hidden constraints and missing others,
- widen or correct time horizons,
- model cross-domain tradeoffs explicitly,
- reduce brittle success by keeping debt from remaining invisible.

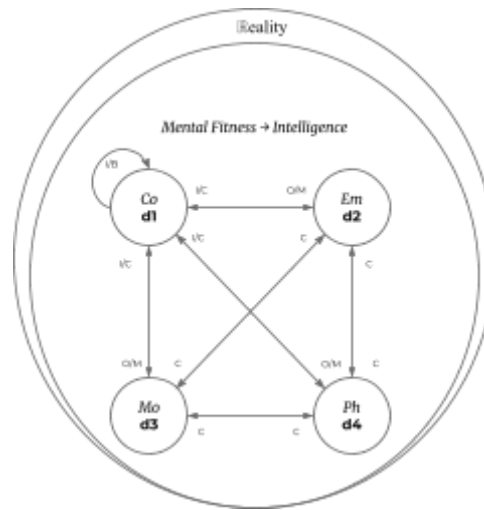
This creates a coherent practice pathway consistent with the model: increasing adaptive intelligence is fundamentally an organizational training problem, and the Moves provide a method for training organization without requiring mastery of the full formal theory.

5.7 Example: Fitting it all together

Real intelligence is in vivo intelligence—not whether you can pick which shape is rotated correctly on a test. Mental Fitness is the capacity to think things through in real life, under real constraints, as reality changes. Imagine packing for a weekend trip. Reality ($\mathbb{R}$) includes the outside world and you: TSA rules, weather, time, and what you own, plus your physical state (Ph), emotions (Em), and motivation (Mo). I is the stream of inputs from all of it: the forecast, itinerary, bag size, what's on your list, fatigue signals (Ph), fears and anxiety spikes (Em), and “I don't want to forget anything or take too much” motives (Mo). C are the binding constraints those inputs imply: carry-on limits and time pressure (external), low energy (Ph), and fear-driven urgency (Em). O is DSRP—how you organize the whole situation: what you distinguish as essential vs otherized, how you build part-whole kits, how you map relationships (liquids $\rightarrow$ screening time; cold $\rightarrow$ bulk $\rightarrow$ weight; Em anxiety $\rightarrow$ extra outfits; Ph fatigue $\rightarrow$ slower

decisions), and which perspectives you adopt (security, “move fast and light,” your future tired self, your present self-image). $\mathbb{M}$ is all of that subsumed under the working plan that results: “one carry-on works.” Then $\mathbb{R}$ gives feedback: TSA just changed a rule, and your plan fails at the checkpoint. Intelligence is the adaptive update—reorganizing O and modeling/regulating EMP constraints (Em, Mo, Ph)—so O_{cap} expresses as $O_{eff}(t)$ under real conditions, not just on paper.

Figure X. Intelligence in the wild as adaptive DSRP organization of reality—including your own EMP state.



5.8 Summary

This section established the role-claims used throughout the remainder of the paper:

1. Mo sets the objective function and therefore strongly influences what is foregrounded versus otherized.
2. Co functions as metacognitive audit capacity, enabling explicit modeling of constraints, tradeoffs, and delayed effects, and is instrumented primarily via TQ.
3. Improvements in in vivo adaptivity are driven primarily by ΔO (trainable organization), while EMP constraint regulation governs whether organizational capability is expressed effectively in the moment (the O_{cap} to $O_{eff}(t)$ gate).
4. The Six Pareto Moves provide a practical proxy for training ΔO , enabling measurable gains in model–world alignment while reducing domain otherizing and fitness debt accrual (rate).

6.0 Conclusion: Stop Training for the Zoo

In zoo terms, “general” means general across a test battery—across the zoo; in jungle terms, “general” must mean general across situations—adaptivity under changing constraints.

6.1 Zoo “General” vs Jungle “General”: g isn’t intelligence in the wild

The claim that g is “general” is grounded in the positive manifold: scores on many different cognitive tests tend to be positively correlated, and Spearman’s program defined “general intelligence” through that test-performance pattern [39]. That is real and worth keeping. A second claim is also real: cognitive ability measures often predict outcomes inside educational and occupational pipelines—training performance, some job performance metrics, and related criteria [1,2,39]. This is why g remains influential.

The critique here is not “ g is meaningless.” The critique is a scope error. g is “general” primarily within the measurement class that produces it: decontextualized analytic/cognitive tasks. It is frequently treated as general intelligence in the real world—as if it were general adaptivity across human situations—even though real-world adaptation is routinely constrained by broader cognitive plus motivational, emotional, and physical dynamics that are not directly represented in the cognitive-test manifold.

There is also a practical confound that matters for interpretation: g is correlated with socioeconomic status (SES) in many datasets, and SES is itself entangled with access, selection effects, stability, nutrition, safety, schooling quality, stress exposure, and opportunity. That means some of what looks like “ g predicts outcomes” can reflect “SES predicts outcomes,” plus selection into environments where cognitive-test skill is rewarded and reinforced [2,40]. You don’t need to resolve the entire causality debate to make the paper’s point. You just need to be clear: g is a useful predictor in some contexts, but it is not a sufficient definition of general intelligence or adaptive intelligence across real situations.

In the terms of this paper, g is best interpreted as narrow analytic intelligence: a useful, information-heavy index of cognitive test performance that does not attempt to measure (1) cross-domain limiters, (2) cross-domain debt, or (3) the organizational audit capacity needed to surface domain-otherized costs under changing constraints.

6.2 What “general” should mean: fitness in any situation

What is “general” about adaptive intelligence is not a single-domain score. It is a system property: remaining aligned to situational reality across coupled domains as reality changes.

That is the definition of Mental Fitness used here: the capacity to stay aligned with reality as reality changes. It is embodied: cognition (Co), emotion (Em), motivation (Mo), and physical regulation/action (Ph). It is also organizational: models are $\mathbb{M} = I \cdot O$, reality is $\mathbb{R} = I_{\mathbb{R}} \cdot O_{\mathbb{R}}$, and the Love–Reality Loop names the ongoing update process that pulls models toward reality when they are allowed to update [3,4,6,23–25,41].

Operationally, the framework pairs two complementary constructs:

State (where you are):

$$F(t) = \min_d A_d(t)$$

a conservative limiter summary of current embodied state across Co, Em, Mo, Ph .

Trajectory (what you're becoming):

$$\dot{D}_d(t) = \max(0, -\dot{A}_d(t))$$

fitness debt accrual (rate) flags accumulating liabilities even when near-term outcomes still look good, because domain-otherized costs return later as constraints.

This is the proposed sense in which Mental Fitness is “general”: not “one ability applies everywhere,” but “adaptation across situations is constrained by changing limiters and delayed costs in a coupled person-system.”

6.3 From Zoo Tests to Jungle Interfaces

This paper does not claim a finalized marker set for each domain. That would be premature and would falsely imply that the empirical program is already settled. Instead, the paper specifies a measurement interface: what a domain panel must look like to be admissible. Fixed batteries are well-suited to zoo measurement; a criteria-based interface is required for jungle measurement, because real-world constraints and debt dynamics vary by context and time.

Minimum requirements:

1. Domain state indices $A_d(t) \in [0, 1]$ for each $d \in Co, Em, Mo, Ph$, derived from mixed panels in each domain: at least one self-report (when appropriate), at least one behavioral/performance indicator, and at least one objective proxy where feasible. Marker sets are versioned.
2. Whole-person reporting that always includes state + trajectory: $F(t)$ (Current Fitness) plus a debt-sensitive leading indicator (e.g., $S(t)$) derived from $\dot{D}_d(t)$. This prevents “we looked fine until we didn’t.”
3. Auditability: the operationalization must support identifying what was otherized. If the measures only output a score after collapse, they cannot guide ΔO . A usable system must help locate missing constraints, collapsed tradeoffs, truncated time horizons, and displaced costs—so organization can be revised, not merely judged.
4. Operationally, the measurement interface can be implemented as a minimal field workflow that pairs TQ (capacity and calibration) with a lightweight EMP panel (state gate). See Appendix A for a minimal EMP item set and Appendix B for an expanded version.

Minimal operational protocol (TQ + EMP loop)

1. Step 1 (Capacity): Administer TQ on a periodic cadence to estimate organizational capability O_{cap} and metacognitive calibration (competence–confidence).
2. Step 2 (State gate): Sample EMP in vivo (brief mixed panel per domain) to estimate state indices $A_{Em}(t), A_{Mo}(t), A_{Ph}(t)$ and the aggregate gate $g_{EMP}(t) \in [0, 1]$.
3. Step 3 (Expression): Compute momentary effective organization $O_{eff}(t) = O_{cap} \cdot g_{EMP}(t)$ to distinguish low-capacity from gated-expression failures.

4. Step 4 (Limiter): Report current fitness as the conservative weakest-link summary

$$F(t) = \min_d A_d(t) \text{ across } d \in \{Co, Em, Mo, Ph\}.$$
5. Step 5 (Trajectory/debt): Track debt accrual (e.g., $\dot{D}_d(t)$) and Sustainability $S(t)$ to surface deferred costs and rising collapse risk before outcomes degrade.

Instrument outputs (what the instrument returns each time)

1. O_{cap} (from TQ): organizational capability and metacognitive control of organization.
2. $g_{EMP}(t)$ and $A_{Em}(t), A_{Mo}(t), A_{Ph}(t)$: whether capability is usable right now, and which noncognitive constraints are binding.
3. $O_{eff}(t)$: effective organization expressed under current conditions.
4. $F(t)$: a conservative “where you are” index (current limiter).
5. $S(t)$ (and related debt terms): a bounded “where you’re heading” indicator that flags brittle success and otherized costs.

Diagnosis → next action (decision rules)

- Low TQ / low O_{cap} : prioritize structural practice (DSRP / Six Pareto Moves) to raise organizational capability; do not confuse information loading with organization training.
- High TQ but low $g_{EMP}(t)$: treat this as a gated-expression problem; regulate the binding EMP constraint(s) first, then re-engage the task once $g_{EMP}(t)$ recovers.
- Calibration error (confidence mis-tracks correctness): prioritize metacognitive correction and feedback hygiene; more effort or more information can amplify error when calibration is poor.
- Stable $F(t)$ but declining $S(t)$: treat this as debt accumulation; perform cross-domain auditing to surface otherized costs, widen time horizons, and revise the objective/constraints before the limiter binds.

6.4 Limitations and research agenda

Limitations. This paper is a theoretical consolidation. It argues that (i) whole-person adaptivity is meaningfully modeled as four coupled domains, and (ii) a dominant real-world failure mode is organizational: otherizing produces debt that later returns as constraints. It does not yet provide (a) validated domain panels yielding stable $A_d(t)$ estimates across contexts, (b) population norms for $A_d(t)$, $F(t)$, $\dot{D}_d(t)$, or $S(t)$, or (c) a formal cross-domain coupling model (directionality and lags). It also treats the limiter operator as a conservative baseline; future work may need threshold/soft-limiter variants to capture compensations that hold until a breaking point.

Research agenda. The minimal empirical program implied by this paper is:

- (1) construct validation of candidate mixed panels for each $A_d(t)$;
- (2) predictive validity testing of $F(t)$ for near-term failures and $\dot{D}_d(t)/S(t)$ for delayed failures;
- (3) longitudinal modeling of how otherized costs accumulate and when they return as constraints (domain-specific delays and nonlinearities);

- (4) organization training vs information loading—test whether deliberate ΔO practice yields measurable gains in $A_d(t)$, raises $F(t)$, and reduces $\sum_d \dot{D}_d(t)$;
- (5) coupling estimation once panels stabilize; and
- (6) g vs fitness comparisons under SES-related confounds using stronger designs where possible.

In sum, the claim is intentionally bounded: g remains useful within its measurement scope, but “general intelligence” as whole-person adaptivity is more parsimoniously modeled as cross-domain fitness governed by limiters and debt—an $I \cdot O$ construct where the neglected multiplier in practice is organization. Put simply: g remains useful for zoo-smart prediction, but the central target of intelligence in the wild is jungle-smart adaptive alignment over time—measurable and trainable via O plus constraint and debt dynamics.

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Appendix A: Minimal EMP Instrument for In-Vivo Constraint Gating

This appendix provides the minimal EMP panel referenced in Section 6.3 for in-vivo constraint gating.

This appendix specifies a minimal, attachable EMP instrument designed to complement TQ by indexing expression constraints, not additional intelligence constructs. The purpose is not exhaustive measurement, but fast diagnosis of whether organizational capability (O_{cap}) is currently expressible as effective organization (O_{eff}).

A.1 Conceptual role EMP variables do not measure intelligence. They measure whether intelligence can be used right now. Formally, EMP acts as a state-dependent gate:

$$O_{\text{eff}}(t) = O_{\text{cap}} \cdot g_{\text{EMP}}(t)$$

Where

$$g_{\text{EMP}}(t) \in [0, 1].$$

EMP variables may be informational (providing signal) or constraining (binding performance). The instrument estimates the latter.

A.2 Structure Each domain is indexed by a single bounded state variable:

$$A_{Em}(t), A_{Mo}(t), A_{Ph}(t) \in [0, 1]$$

Higher values indicate less binding constraint.

A.3 Minimal item set (per domain) Each index is derived from three items, sampled at time t:

Emotional (Em)

1. Current affective intensity (self-report, single item)
2. Affect volatility in last interval (self-report or EMA delta)
3. Behavioral interference marker (e.g., attentional disruption)

Motivational (Mo)

1. Goal clarity (single item)
2. Effort–avoidance conflict (single item)
3. Task persistence proxy (behavioral trace where available)

Physical (Ph)

1. Energy/fatigue state (single item)
2. Physiological load proxy (sleep debt, HRV, or equivalent)

3. Somatic interference marker (pain, illness, depletion)

Items are normalized and aggregated conservatively (e.g., minimum or weighted minimum) to preserve constraint sensitivity.

A.4 Output The EMP instrument outputs:

- Domain states $A_{Em}(t), A_{Mo}(t), A_{Ph}(t)$
- Aggregate gating function $g_{EMP}(t) = \min(A_{Em}, A_{Mo}, A_{Ph})$

This value directly modulates expression of TQ-measured organizational capability.

A.5 Design commitments

- State, not trait: EMP indices are expected to fluctuate rapidly.
- **Low burden: ≤ 9 total items; suitable for repeated in-situ use.**
- Actionable: Identifies why TQ is not expressing, not how smart the person is.
- Extensible: Proxies may be swapped as empirical validation evolves.

In sum, the EMP instrument completes the measurement system by distinguishing can think from can use thinking now, making the overall framework operational rather than merely descriptive.

Appendix B: EMP Constraint Regulation Instrument

This appendix provides an expanded EMP panel option referenced in Section 6.3 for richer state estimation when feasible.

Purpose. This instrument measures whether Emotional, Motivational, and Physical states are currently constraining the use of your thinking skill. It does not measure intelligence, ability, or personality. It measures expression conditions at the moment of use.

Instructions to respondent. Answer based on how you feel right now (or within the last 15 minutes). There are no right or wrong answers. Use the following scale for all items:

- 0 = Not at all
- 1 = Slightly
- 2 = Moderately
- 3 = Strongly
- 4 = Extremely

Emotional Constraint (Em)

- E1. My emotions are interfering with my ability to think clearly.
- E2. My emotional state feels unstable or reactive right now.
- E3. I feel emotionally regulated enough to stay focused on the task. (reverse scored)

Motivational Constraint (Mo)

- M1. I feel clear about what I am trying to do right now. (reverse scored)
- M2. Part of me is resisting or avoiding the task at hand.
- M3. My effort feels fragmented or conflicted right now.

Physical Constraint (Ph)

- P1. My energy level is limiting my mental performance.
- P2. Physical discomfort, fatigue, pain, or illness is distracting me.
- P3. My body feels capable of supporting focused effort right now. (reverse scored)

Scoring (for researchers / practitioners)

1. Reverse-score items E3, M1, P3.
2. Normalize each item to $[0,1]$.
3. Compute domain indices conservatively (constraint-sensitive; higher values = less binding constraint.):

$$A_{Em}(t) = 1 - \max(E1, E2, E3)$$

$$A_{Mo}(t) = 1 - \max(M1, M2, M3)$$

$$A_{Ph}(t) = 1 - \max(P1, P2, P3)$$
4. Compute EMP gating factor:

$$g_{EMP}(t) = \min(A_{Em}(t), A_{Mo}(t), A_{Ph}(t))$$

This value modulates expression of TQ-measured organizational capability:

$$O_{\text{eff}}(t) = O_{\text{cap}} \cdot g_{\text{EMP}}(t)$$

Intended Use Notes

- Designed for repeated, in-situ administration (pre-task, mid-task, post-task).
- Suitable for dashboards, coaching, training, or research contexts.
- Flags why thinking skill is not expressing—without redefining intelligence.

In short: TQ tells you how well you can organize. EMP tells you whether you can use it right now.

EMP Metacognitive Pass (same items, different purpose)

1. **Step 1: Identify the limiter (30 seconds).** Circle the single highest-rated item (0–4). That is your current limiter.
2. **Step 2: Name the mechanism (1 sentence).** Finish: “My thinking is being constrained most right now by ____ because ____.”
3. **Step 3: Choose one regulation move (pick one).**
 - a. Downshift (reduce arousal / reactivity)
 - b. Clarify (reduce motivational conflict / goal ambiguity)
 - c. Restore (reduce physical constraint: fuel, sleep, pain, recovery)
4. **Step 4: Re-test (2 minutes later).** Re-rate only the three items in that domain (Em or Mo or Ph) and note the change. This preserves the quantitative scoring, but also turns the same questions into a tight metacognitive loop: detect → label → regulate → re-measure.