

WHITE PAPER

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# The Three Biggest Blind Spots in Human Performance

*Why the brain is the most undertrained organ in every high-performance organization, and what the neuroscience says about closing the gap.*

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# The Organ Nobody Trains

Every serious organization invests in building the capabilities of its people. Athletes train their bodies. Musicians refine their technique. Executives sharpen their strategic thinking. Billions of dollars flow into coaching, training programs, and performance technology every year.

Almost none of it addresses the organ that determines whether any of those investments pay off when it matters.

The brain is the single most important organ in human performance. It controls movement, attention, decision-making, emotional regulation, learning, and memory. It determines how skills are built, whether they can be accessed under pressure, and whether they endure over time. And yet no discipline, no medical specialty, and no branch of performance science has taken ownership of optimizing it. The result is three blind spots that affect virtually every performer, team, and organization. Each one has a specific neuroscience explanation. Each one is addressable. And each one is currently being missed because the knowledge sits in academic journals that practitioners never read, scattered across disciplines that don't talk to each other.

This paper describes those three blind spots, the neuroscience behind them, and what they mean for anyone responsible for human performance.

## Blind Spot 1: Training That Feels Productive But Teaches Nothing

### The Problem

Most training programs are designed around what feels like progress rather than what the brain actually needs to encode durable skills. The result is a pattern familiar to every coach and training director: people look good during the session and forget everything within weeks.

This is not a motivation problem. It is not a talent problem. It is a design problem rooted in a misunderstanding of how the brain learns.

### What the Neuroscience Says

Research from cognitive psychologist Robert Bjork and others has revealed something deeply counterintuitive: *conditions that make practice feel harder and less successful often produce better long-term learning, while conditions that make practice feel smooth and successful often produce worse long-term learning.*

This is the learning-performance paradox. Performance during training and actual learning are often inversely correlated in the short term. The training session where everyone nails it on the first try may produce less durable encoding than the session where people struggle and make errors. The workshop where participants report high satisfaction may produce less behavioral change than the one where they felt challenged and uncertain.

The mechanisms behind this are well established. When practice is easy and repetitive, the brain encodes a shallow, context-dependent representation. It works in the training room under training conditions but breaks down the moment anything changes. When practice involves what Bjork calls "desirable difficulties" (spacing sessions apart, varying the context, interleaving different skills, introducing unpredictability) the brain is forced to build a deeper, more flexible representation that transfers to real-world conditions.

Sleep-dependent consolidation adds another layer. New skills and knowledge require offline processing (particularly during slow-wave sleep) to stabilize and integrate into long-term memory. Intensive single-day workshops, the standard format across corporate training, sports coaching, and continuing education, often fail to account for this. A full day of information delivered without spacing or sleep between sessions is neurologically designed to be forgotten.

### **Why It Persists**

Because the feedback signals are misleading. Smooth practice performance feels like evidence that people are learning. Positive evaluations at the end of a workshop feel like evidence that the workshop worked. Both of these signals correlate poorly with actual retention and transfer. The organizations that measure training effectiveness by participant satisfaction or same-day performance assessments are systematically deceived by the very metrics they rely on.

This research has been established in the scientific literature for over three decades. It has barely penetrated mainstream training practice in any domain.

### **The Implication**

Any training program that prioritizes smooth execution during the session, packs content into single intensive blocks, and measures success by immediate performance or participant satisfaction is working against the brain's learning architecture. The fix is not more training. It is differently structured training designed around how encoding, consolidation, and transfer actually work.

## **Blind Spot 2: The Wrong Brain System Takes Over When It Matters Most**

## The Problem

Every coach, manager, and training director has seen it. The person who performs brilliantly in practice, in rehearsal, in preparation, and then underperforms in the moments that actually count. The athlete who dominates in scrimmages and disappears in competition. The executive who knows the material cold and stumbles through the board presentation. The musician who plays flawlessly at home and falls apart on stage.

The conventional explanations for this (lack of confidence, insufficient preparation, personality weakness, need for more mental toughness) are not just unhelpful. They are neurologically wrong. And because the explanation is wrong, the interventions that follow from it are mismatched to the actual problem.

## What the Neuroscience Says

When someone performs a well-trained skill under comfortable conditions, the execution is handled by fast, automatic processing systems, primarily the cerebellum and basal ganglia. These systems operate below conscious awareness. They are fast, precise, and capable of the fluid, coordinated execution that characterizes expert performance. This is the system that produces your best work.

When the stakes rise, something changes. The brain's threat detection circuitry appraises the situation as high-risk. This appraisal triggers a shift in which system controls execution. The prefrontal cortex, the seat of conscious deliberation, attempts to take over. It begins monitoring and micromanaging movements and decisions that were previously running on autopilot.

This is what researchers call conscious reinvestment, and it is one of the two primary routes through which performance breaks down under pressure. The conscious system is too slow for the task. It processes information sequentially rather than in parallel. It turns fluid, automatic execution into something stiff, deliberate, and error-prone. The person has not lost their skills. The wrong system is now attempting to deploy them.

The second route is physiological. Threat appraisal triggers an autonomic nervous system surge: racing heart, shaking hands, muscle tension, narrowed attention. When this response exceeds a certain threshold, it physically prevents the fine motor control and cognitive flexibility that skilled performance requires.

These two routes can operate independently or together, and they often feed each other. Someone notices their hands shaking, which triggers more conscious self-monitoring, which increases anxiety, which increases shaking. The cascade is rapid and self-reinforcing.

The critical insight is that these are *different problems requiring different interventions*. A person whose primary failure route is autonomic overload needs physiological regulation tools:

breathing protocols, heart rate variability training, arousal management. A person whose primary failure route is conscious reinvestment needs attentional redirection: training to keep the prefrontal cortex occupied with the right things (the music, the audience, the strategic goal) so it cannot hijack automatic execution. A person experiencing both needs both, in the right sequence. Giving everyone the same generic advice ("just relax," "be more confident," "trust your preparation") ignores the mechanism entirely.

### **Why It Persists**

Because from the outside, all forms of underperformance under pressure look roughly similar. The coach sees someone who "choked." Without a diagnostic framework that distinguishes the underlying mechanisms, the coach applies whatever tool they know best, typically a motivational intervention or a generic relaxation technique. Sometimes it helps. Often it makes things worse. Telling someone experiencing conscious reinvestment to "focus" activates the very system that is causing the problem. Telling someone experiencing useful arousal to "calm down" strips away the physiological energy their body mobilized for the task.

The neuroscience of choking under pressure has been studied extensively for over twenty-five years. The two-route model is well validated. But the knowledge lives in journals of experimental psychology and motor control, not in coaching manuals or leadership development programs. The people who understand the science are rarely the people working with performers, and the people working with performers rarely have access to the science.

### **The Implication**

The practice-to-performance gap is not mysterious. It has specific neurological explanations that point to specific, targeted interventions. But those interventions only work when they match the mechanism. Treating all pressure-related underperformance the same way is like prescribing the same medication for every headache regardless of whether the cause is tension, migraine, dehydration, or a brain tumor. Diagnosis has to come before treatment.

## **Blind Spot 3: The Brain Actively Dismantles What You Stop Using**

### **The Problem**

Most organizations and individuals think about performance as a present-tense concern. How do we perform today? How do we prepare for the next competition, the next quarter, the next presentation? Almost no one is thinking about trajectory. The brain that performs today is the

same brain that will need to perform in five years, ten years, and beyond. And that brain is changing, for better or worse, based on the demands placed on it.

The conventional view of cognitive decline is that it is an inevitable, passive process. You get older, your brain gets worse, and all you can do is try to slow it down. Build up "cognitive reserves" when you are young and hope they last. This view is not just incomplete. It is fundamentally wrong about the direction of causation.

### **What the Neuroscience Says**

The brain does not passively decline. It actively maintains and repairs itself in response to demand. Neural circuits that receive ongoing stimulation maintain their structural integrity because the demand signals the biological machinery (neurotrophic factors, activity-dependent plasticity, neurogenesis) to keep investing in maintenance. When demand drops, those maintenance signals weaken, and the circuits degrade. *Degeneration is not something that happens to the brain despite its best efforts. It is what happens when the brain stops receiving the signal to keep working.*

This is demand coupling: the principle that neural circuit health is coupled to the demand placed on those circuits. It reframes decline from an inevitable process to an active consequence of reduced demand. The retired surgeon whose fine motor skills deteriorate, the former executive whose strategic thinking slows, the musician who stops performing and loses fluency: these are not simply aging. They are the brain responding to reduced demand by withdrawing maintenance resources from the relevant circuits.

The practical implications extend beyond retirement. Any sustained reduction in cognitive demand, whether from a role change, a shift to more routine work, reduced social engagement, or decreased physical activity, can initiate this process. And it is domain-specific. The circuits that lose demand are the circuits that decline. A person who remains intellectually active but becomes socially isolated will lose social cognitive capacity while maintaining analytical capacity. The decline tracks the demand reduction.

### **Why It Persists**

Because the timeline is long enough to be invisible. A reduction in demand today does not produce noticeable decline tomorrow. The erosion is gradual, and by the time it is noticed, the conventional assumption ("this is just aging") provides a ready explanation that asks nothing of anyone. The connection between what someone stopped doing five years ago and what they can no longer do today is almost never drawn.

Additionally, the performance world and the brain health world do not speak to each other. Performance optimization is treated as a young person's concern. Brain health is treated as an

old person's medical concern. The idea that these are the same project, that performance optimization today is brain health investment for tomorrow, has no institutional home. No discipline currently bridges this gap.

## The Implication

Cognitive decline is far more addressable than most people believe. Maintaining demand on the circuits you want to keep is the single most important lever. This is not about crossword puzzles or brain training apps (which produce narrow, non-transferable improvements). It is about maintaining the specific kinds of complex, challenging, cognitively demanding activity that keep the relevant neural circuits healthy. For organizations, this means understanding that role transitions, retirement programs, and reduced-demand assignments carry a neurological cost that is rarely accounted for.

## Why These Blind Spots Exist

These are not failures of science. The research behind each blind spot is well established, in some cases decades old. The failure is one of integration and application. The knowledge exists but it is scattered across disciplines that do not communicate with each other.

Motor learning researchers study how skills are encoded. Sleep scientists study consolidation. Sports psychologists study performance under pressure. Exercise physiologists study physical training. Neurologists study disease. Each discipline produces valuable work within its domain. But the questions that matter most to performers and organizations, questions like "why does my training produce poor retention?" or "why does this person choke while that person thrives?" or "why are my best people declining earlier than expected?", fall between disciplines. They require integrating knowledge from multiple fields, and nobody currently does that integration.

This is the gap that Performance Neurology addresses. Performance Neurology is the integration of neuroscience toward the understanding and optimization of human performance across the lifespan. It provides a systematic diagnostic framework that identifies *which* mechanism is causing a given performance problem and matches the intervention to the diagnosis. It covers the full lifecycle of human capability: how skills are built (Acquisition), how they are deployed under pressure (Access), and how they are maintained over time (Sustainment). And it recognizes that these three pillars interact. Better learning builds more raw material for performance. Better performance under pressure prevents the avoidance behaviors that lead to skill decay. And sustained brain health preserves the biological foundation on which everything else depends.

# What This Means for Organizations

Each blind spot carries a practical cost. Training programs that produce poor retention waste time and money. Performers who underperform under pressure represent unrealized potential in the moments that matter most. And the slow erosion of capability in experienced personnel represents the loss of institutional expertise that took years to build.

These costs are addressable, but only when the underlying mechanisms are understood. Generic interventions applied without diagnosis will continue to produce inconsistent results. The same mental skills training that helps one athlete may actively harm another if it targets the wrong failure route. The same training schedule that works for one team may produce plateaus and burnout in another if it ignores consolidation requirements. The same retirement timeline that seems reasonable on paper may accelerate cognitive decline if it withdraws demand too rapidly.

The neuroscience is clear. The application of that neuroscience to real-world performance problems is where the opportunity lies.

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## About the Institute for Performance Neurology

The Institute for Performance Neurology advances the science and practice of neurological optimization for human performance. Founded by Dr. Josh Turknett, a board-certified neurologist, the Institute applies the diagnostic methodology of clinical neurology to performance problems across domains including athletics, music, medicine, business, and public life.

The Institute offers speaking engagements, workshops, and applied programs for organizations and individuals. All work is grounded in the three-pillar framework of Performance Neurology: Acquisition (how capabilities are built), Access (how they are deployed under pressure), and Sustainment (how they are maintained across the lifespan).

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