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The sedentary - cognitive paradox at work: movement as a strategic business imperative for brain fitness

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ABSTRACT

Human movement directly supports physical, emotional, and mental health and well-being—how people think, feel, and function. The neurons that spark creative ideas, the circuits that support memory and focus, and the neurotransmitters that regulate mood all improve function when the body moves and rests when needed. Unfortunately, the modern work setting—including in-person, remote, or hybrid options—has quietly engineered human movement out of the day. As cognitive demands on knowledge workers rise, their opportunities for movement decline. And as their movement declines, their cognitive abilities are under increased stress. This phenomenon may be referred to as the sedentary – cognitive paradox.

Companies can leverage the work environment, corporate polices, and culture to position movement as cognitive infrastructure. In the context of a work environment where attention, creativity, and adaptability may be challenged resources, movement is a strategic imperative that can effectively address the sedentary – cognitive paradox.

1. Introduction

It's noon on Tuesday. In one corner of the office, a small group of employees return from a brisk 20-minute walk around the campus. Their conversation is animated, their posture upright, their laughter easy. Across the hall, another team emerges from a three-hour stretch of back-to-back virtual meetings. Shoulders slouched, eyes glazed, one employee rubs his temples while another reaches reflexively for her third cup of coffee.

Both groups are working hard. Both are equally committed to their projects. But only one is harnessing a resource that science now calls one of the most powerful drivers of human performance: physical movement.

We've long known that exercise is good for health and function [1]. Exercise (*i.e.,* intentional movement) and physical activity (*i.e.,* any bodily movement produced by skeletal muscles that result in energy expenditure), help lower blood pressure, reduce diabetes risk, build strength, and provide a host of other health benefits. Perhaps less widely appreciated, but arguably far more relevant to today's knowledge economy, is how exercise, physical activity, and rest (when needed) combine into human movement and directly supports physical, emotional, and mental health and well-being—how people think, feel, and function [2]. The neurons that spark creative ideas, the circuits that support memory and focus, and the neurotransmitters that regulate mood all show improved function when the body moves and rests when needed [3]. (See Fig. 1).

Movement-at-work is a business strategy [4]. Innovation, adaptability, and creativity depend upon brain-based skills, and they are sharpened, sustained, and protected by human movement.

2. The sedentary - cognitive paradox

The contemporary workplace—those occupational settings where sitting and mostly sedentary work has become ubiquitous—has quietly engineered human movement out of the day. Elevators instead of stairs. Seated meetings. Knowledge workers spent ten or eleven hours sitting, eyes fixed on a screen. This occurs regardless of whether employees show up in-person at the office, work fully from home, or opt for a hybrid approach the combines remote work-from-home with in-person at-the-office. Companies prize qualities like focus, creativity, and emotional intelligence. Yet the very structure of work—long meetings, sedentary roles, and constant connectivity—erodes the physical

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movement habits that make those qualities flourish. As cognitive demands on workers rise, their opportunities for movement decline [5]. And as their movement declines, their cognitive abilities are under increased stress. I refer to this as the sedentary – cognitive paradox.

Consequences include burnout, stress, and anxiety that drive employee absenteeism and presenteeism. The human body was not designed for prolonged sitting, standing, or heavy physical exertion [6–8]. Whereas office workers may get too little movement throughout the day, over-exertion can occur for workers in construction or manufacturing jobs [6,7]. Neither too little, nor too much activity at work is a good thing. On balance, movement is not just a way to prevent disease in the future; it is a fuel source for cognitive performance in the present.

3. The science of brain fitness

The benefits of human movement extend far beyond physical health—they are profoundly neurological and cognitive. Based on exercise-neurobiological mechanisms, the brain can rewire and regenerate, *i.e.,* aerobic exercise stimulates neuroplasticity [3]. Next, there are cognitive gains that stem from movement. A single bout of exercise has immediate cognitive impacts—short-term and longer-term improvements occur in working memory, attention, information processing speed, executive function, and task-switching ability [9]. Also, exercise elevates creativity and mood. Light aerobic activity can significantly boost creative thinking and problem-solving [10] while mood and clarity is improved by modulating stress hormones and releasing neurotransmitters like dopamine, serotonin, and endorphins, which in turn support focus and emotional regulation [11]. Practically speaking, walking meetings appear to enhance productivity, social connection, and stress recovery [12].

Science unambiguously positions movement-while-at-work as vital brain infrastructure. Movement enhances executive control, emotional resilience, memory, and creative thinking across both short and long timescales—critical skills for high-performing workers and teams.

4. Rethinking value: ROI, VOI, and NPV

The case for promoting health at the worksite often hinges on whether or not the benefits are worth the investment. Financial metrics are central to make this case, yet all of them are notoriously difficult to measure. The worksite health promotion field has leaned heavily on the return on investment (ROI) argument: if employees get healthier, healthcare claims should drop and companies save money [13]. Yet, many benefits of promoting health do not necessarily directly relate to the medical care received by the workers, *e.g.,* improvements in mood states. Additionally, the contemporary workplace generates challenges to employees' health and performance that don't show up neatly on a claims report, e.g., burnout, cognitive fatigue, disengagement, and lack of innovation.

Value on investment (VOI) may be a better perspective to consider [14]. VOI is distinct from ROI, which focuses solely on quantifiable monetary gains (*e.g.,* cost savings, revenue increase). Instead, VOI incorporates a broader perspective, often described as telling the "human story" behind an investment. ROI asks, "Did we save money on healthcare costs?" whereas VOI asks, "What value did this program create for the business?" VOI considers intangible assets such as knowledge, processes, and ability to collaborate. It also considers more subjective approaches to measurement when compared to the more standard formulas for a financial ROI, such as surveys, qualitative assessments, and worker feedback.

Most compelling may be the net present value (NPV) metric [15]. NPV is used to evaluate the profitability of an investment by comparing the present value of all future cash flows to the initial investment cost. NPV considers the time value of money. Basically, a dollar today is worth more than a dollar in the future. If NPV is positive, it is likely that financial value is created; if negative, initial costs are higher than projected net cash flows and thus, no financial value. When NPV is zero, other non-financial factors may become the reason for continued investment.

This shift reframes workplace-based movement from a cost-benefit center to a human capital strategy. ROI tells us if the program saves money. VOI tells us if it creates value. NPV informs us how value unfolds over time. For movement-while-at-work, the greatest returns may be in creativity, energy, and resilience—traits that define organizational competitiveness—with value generated over time and across stakeholders.

5. The worksite as a brain fitness lab

The worksite is one of the most powerful laboratories for shaping health behavior. Most adults spend nearly one-third of their waking lives

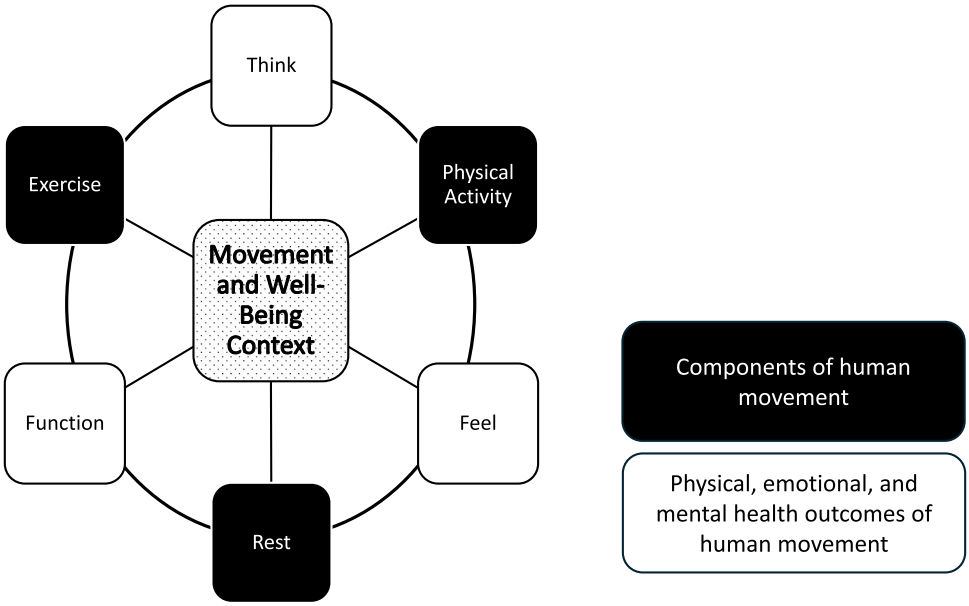

Fig. 1. The Context of Human Movement and Well-Being.

at work, making it a uniquely influential setting to either reinforce sedentary habits or normalize movement as part of daily life. Workplaces control three levers that, when pulled, strongly influence employee behavior: 1) environment, 2) policy, and 3) culture. Table 1 presents examples of how managers may promote movement throughout the day by pulling these levers at the right time.

Intentional optimization of cognitive performance through movement may be accomplished by:

- Designing office layouts (physical environment) for movement (*e.g.,* visible stairwells),
- Leveraging technology (physical and social environment) to enhance movement (*e.g.,* AI-driven nudges can prompt employees to stand, stretch, or move after prolonged sedentary bouts).
- Using policy as an enabler for movement (*e.g.,* paid time for physical activity),
- Leveraging corporate culture and leadership to model healthy behaviors (*e.g.,* encouraging breaks, sharing their own activity goals),

When organizations combine environment, policy, and culture, the result is a powerful ecosystem where movement is not an optional perk, but an embedded expectation of the workday.

6. Barriers and equity: who gets to move?

While the evidence for human movement's cognitive and organizational benefits may be convincing, not every worker experiences those benefits equally [16]. Whereas a salaried knowledge worker may enjoy flexible scheduling, standing desks, or an on-site gym, a shift-based warehouse employee may be constrained by rigid shift times, production quotas, and a lack of safe spaces to move. This disparity can inadvertently widen health inequities. For example, scheduling flexibility or time-trading with co-workers may support those who are otherwise constrained by rigid shift times. Thus, equity-focused approaches are essential. Without an equity lens, even well-intentioned programs risk reinforcing the very disparities they aim to reduce.

7. Glimpsing the future: movement as cognitive infrastructure

Human movement, instead of being framed as a corporate wellness perk, will be considered part of a company's cognitive infrastructure, as essential to innovation and resilience as broadband internet or cybersecurity. Emerging technologies will accelerate this shift. Wearables and AI-driven platforms can detect fatigue, stress, sedentary time, and deliver personalized nudges to prompt movement breaks. Office architecture is being redesigned to embed "active pathways," flexible meeting rooms, and stair-first layouts into everyday workflow. Corporate sustainability and Environmental, Social, and Governance (ESG) reporting includes workforce health and well-being metrics, positioning employee movement as a measurable dimension of corporate responsibility. Policy innovations can support daily movement through tax credits like how they subsidize energy efficiency or workforce training [17].

Financially, how will programs be paid for and by whom? Physical inactivity costs health-care systems billions of dollars, of which a large share is paid for by the public sector, the private sector, and households [18]. Hence, the financial stakes involved in sedentary behaviors and inactivity are everyone's business. Movement has been labelled a "best buy" for public health, and there is evidence that the value of movement is reflected in the willingness-to-pay for it across community settings [19,20]. Investments made at the workplace are likely supported by the communities in which the workplace is located. Such insights provide strong rationale for convening community stakeholders to position movement as cognitive infrastructure.

But the real frontier is cultural. The most forward-thinking companies will normalize movement by embedding it in schedules, workflows, and "the-way-we-do-things-around-here." In these organizations,

Table 1
Levers Corporate Managers can Pull to Enhance Movement at Work.

Lever	Description	Manager and Supervisor Role
Physical environment	The physical working conditions of the workplace include elements such as architecture, temperature, air quality, arrangement of equipment and technology, furniture, and presence of a break room or fitness center.	Managers can promote short, regular breaks, offer on-site fitness opportunities like walking paths or gyms, use lighting and noise control to reduce distractions and support concentration, and provide areas for social interaction to promote breaks and collaboration.
Social environment	The social working environment includes factors such as corporate culture, including norms and leadership styles, interpersonal dynamics among coworkers, social capital factors such as empathy, trust, inclusion, cohesion, and a sense of belonging.	Supervisors can foster an environment where employees feel comfortable discussing the emotional aspects of work, reduce stigma around mental health, and openly acknowledge the importance of cognitive health that are all supported by physical activity. They may also encourage self-care, monitor for stress, offer opportunities for feedback, and support professional development to build overall well-being.
Economic environment	The economic milieu includes factors such as company performance, job security, and financial well-being. At a more macro-level, it also includes economic factors such as product demand, competition, inflation, wages, and profitability while at the employee-level aspects of compensation, job security, and personal growth opportunities also apply.	Managerial staff can support the economic milieu by offering flexible work arrangements, encouraging taking time off to help employees manage stress, and maintaining a healthy work-life balance that also provides options for regular physical activity. Support may also include encouraging employer-sponsored retirement savings and use of employer-sponsored education benefits.
Policy	Policies establish overarching principles and rules to guide decision-making and behavior. As such, common workplace policies include code of conduct, recruitment policy, internet and email policy, non-smoking policy, drug and alcohol policy, health and safety policy, anti-discrimination and harassment policy, grievance handling policy, discipline and termination policy.	Managers and supervisors can advocate for flexible work policies that provide options for physical activity participation designed to improve work-life balance, support mental health and resources like Employee Assistance Programs (EAPs), encourage physical fitness through workplace programs, and foster a positive, communication-rich environment where employees feel safe to discuss their needs, including daily physical activity.
Corporate culture and climate	Workplace culture may be referred to as its deep-rooted values, beliefs, and behaviors that shape its identity and long-term goals. Workplace climate refers to the more day-to-day, perceptions of the work environment, such as leadership, communication, and reward systems. Culture is regarded to be more stable whereas climate is more fluid and current.	Supervisors can leverage culture for physical activity and movement throughout the day by creating a positive psychological climate with social connections, task autonomy, and fairness. They can foster a culture of learning and psychological safety. They should encourage breaks when needed and act with empathy. Flexible work options and task sharing can build both teamwork and trust.

movement will not compete with work; it will become part of work [21].

8. Call to action

Movement sharpens focus, fuels creativity, regulates mood, and builds resilience. Avoiding prolonged periods of sitting or standing by encouraging movement interspersed with periods of rest when needed, strengthens brain performance on which contemporary work depends. As companies prize focus, creativity, and emotional intelligence, it is imperative to address the sedentary – cognitive paradox and create an environment supportive of movement. The future of work will demand design that incorporates movement into the fabric of the company culture. In an economy where human attention, creativity, and adaptability are the ultimate scarce resources, physical activity is not a perk—it's a strategic imperative.

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