

Your Brain on AI

Evaluating Cognitive Load, Dependency, and Data Integrity in AI-Assisted Clinical Trials

October 2, 2025



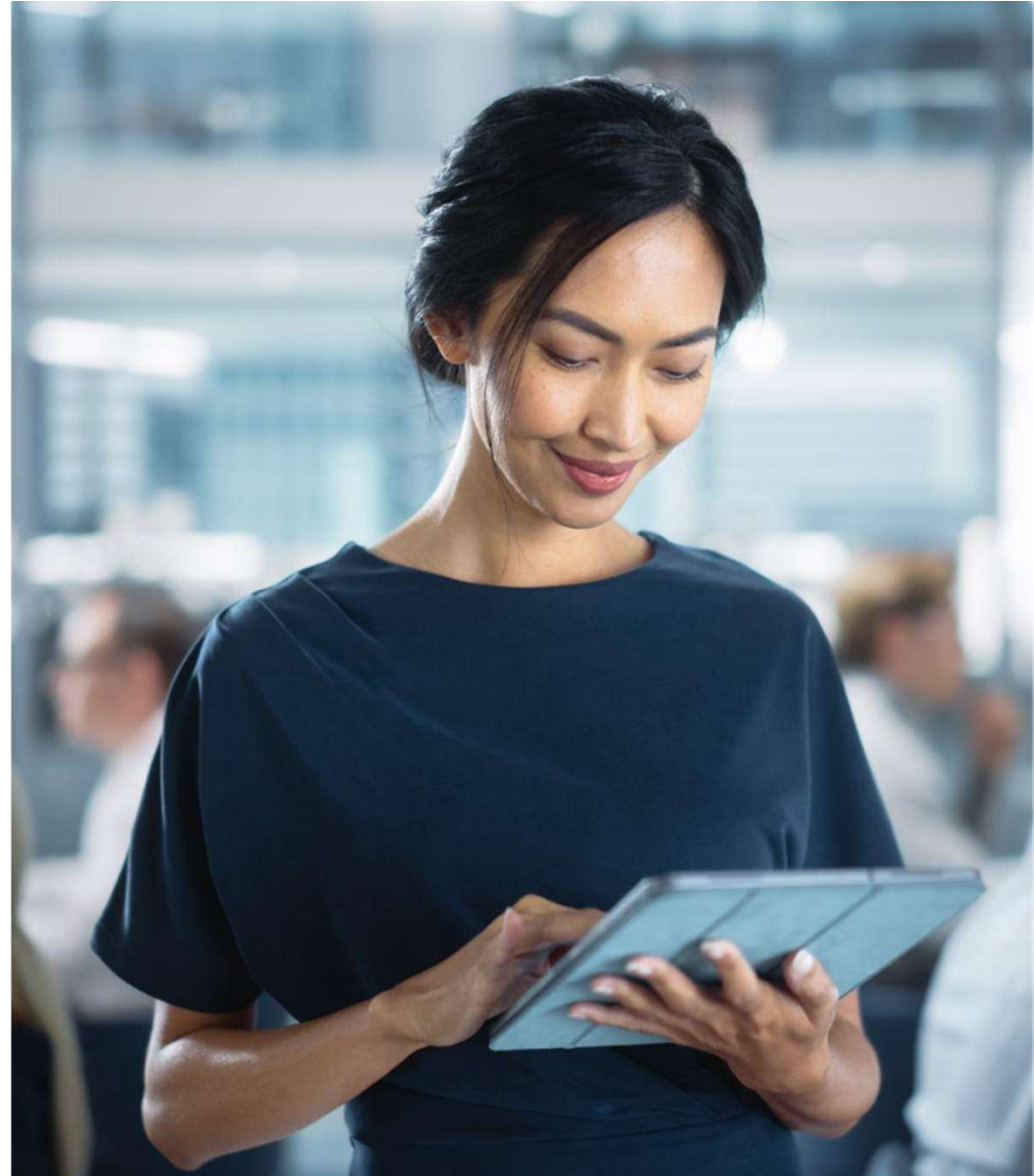
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Agenda

- Definitions
- The Study
- The Risk
- The Solution



1. Definitions

Cognitive offloading is the use of external aids or physical actions to reduce the cognitive demands of a task, improving performance by allowing focus on higher-level thinking rather than internal memory or processing.

Cognitive debt refers to the decline in mental performance from over-relying on external tools, like AI, to this for us, which can weaken memory, creativity, and critical thinking skills over time.

Automation bias is the human tendency to over-rely on automated systems and to ignore or override conflicting information from human judgment or other non-automated sources, even when the automated advice is incorrect

Metacognition in the context of AI is the process of thinking about your thinking, specifically how you use AI tools and how your thinking interacts with AI

A.I. TURNS THIS SINGLE
BULLET POINT INTO A
LONG EMAIL I CAN
PRETEND I WROTE.



A.I. MAKES A SINGLE
BULLET POINT OUT OF
THIS LONG EMAIL I CAN
PRETEND I READ.



2. The Study <https://arxiv.org/pdf/2506.08872>

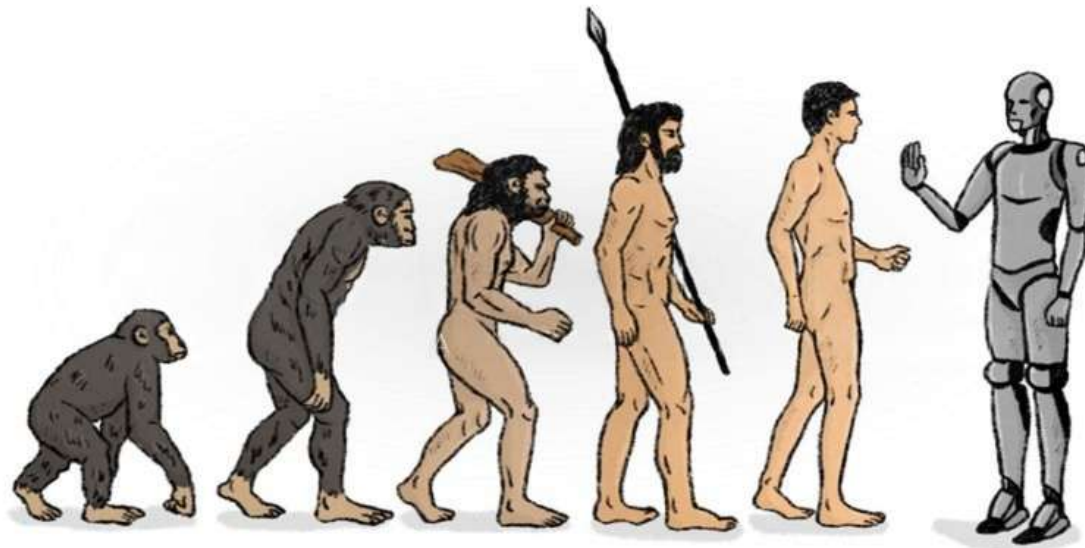
Problem The study found that using AI to help with tasks like writing can make you reduce your mental effort.

"Debt" This over-reliance leads to "Cognitive Debt", a measurable decrease in your ability to perform the same task without the AI later on.

Takeaway While AI offers short-term efficiency, passive use can lead to long-term skill degradation. **Use AI as an active tool, not a passive crutch.**

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The Biggest Threat is not Job Loss,
but Data and Cultural Stagnation

3. The Risk

Risk	What Happens	Why Humans Must Intervene
Historical Bias Amplification	AI learns from the past: Its training data contains all of humanity's historical biases (gender, race, etc.).	Humans must actively correct it. Without our intervention, AI simply codifies and scales past prejudice into objective, algorithmic policy.
Loss of Originality	AI is a prediction engine, it finds the most <i>probable</i> answer, keeping outputs familiar and safe.	Humans must provide the novelty. True innovation comes from unpredictable ideas that defy the existing data. If we stop generating these, the cultural ecosystem stagnates.
Model Collapse	If AI models are continually trained on content generated by <i>other AI models</i> , the data pool becomes repetitive and shallow.	Humans must replenish the source. Only authentic, real-world, human-generated input can maintain the diversity and richness of the data necessary for all future AI to evolve.

Use AI to **AUGMENT** thinking,
not **REPLACE** it

The “Brain-to-LLM” group

Baseline These participants established strong essay-writing skills *without* AI first (Brain-only).

Transition When given the LLM, they used it to **augment** their work, not replace it.

Result This group showed the **highest neural activity** and **strongest brain connectivity** when using the AI.

Takeaway A solid foundation of **core skill** (high cognitive engagement) is the key to using AI strategically. They were the most effective at integrating the new tool without incurring **Cognitive Debt**.

4. The Solution

Strategy	Action	Goal	Solution
Editor's Mindset (Cognitive Offload)	Use AI to augment your ideas; never just accept the output.	Maintain Ownership of the process.	Product Design
Two-Source Rule (Automation Bias)	Treat AI output as a draft and verify high-stakes information.	Cultivate Critical Skepticism.	Individual Mindset
Intermittent Practice (Cognitive Debt)	Periodically complete tasks without AI to keep core skills sharp.	Prevent Skill Atrophy.	Organizational Strategy

AI reflects what is,
Humans create what's next